CONTRACT DOCUMENTS

AND

TECHNICAL SPECIFICATIONS

FOR

SANITARY GRAVITY SEWER LINE IMPROVEMENTS
LIFT STATION NO. 1 TO F. G. CLARK ACTIVITY CENTER

FOR

SOUTHERN UNIVERSITY
AND AGRICULTURAL & MECHANICAL COLLEGE
BATON ROUGE, LOUISIANA

STATE OF LOUISIANA
Jeff Landry, Governor

DIVISION OF ADMINISTRATION
Taylor F. Barras, Commissioner of Administration

OFFICE OF FACILITY, PLANNING AND CONTROL
Roger E. Husser, Jr., Director

SOUTHERN UNIVERSITY AND A & M COLLEGE
Kenneth Dawson, Director of Facilities Planning
Jimmie Wade, Office of Facility Services/Physical Plant

STATE FP&C PROJECT NO. 01-107-24-05, F.01004726
STATE ID NO. 217038 SITE CODE: N/A

BID DATE: December 16, 2026, 10:30 AM

PREPARED BY

GEC
Gulf Engineers & Consultants
G.E.C., INC.
8282 GOODWOOD BLVD.
BATON ROUGE, LA 70806

STATE OF LOUISIANA
CARY A. BOURGEOIS
License No. 23414
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
06/27/2026

AUGUST 27, 2026

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ADVERTISEMENT
REQUEST FOR BID
BID #50016-10375
SANITARY GRAVITY SEWER LINE IMPROVEMENTS
LIFT STATION 1 TO F.G. CLARK ACTIVITY CENTER
SOUTHERN UNUVERSITY AND A&M COLLEGE
BATON ROUGE CAMPUS
FP&C Project # 01-107-24-05, F 01004726
State ID No. 217038
DECEMBER 16, 2026 @ 10:30 AM

Sealed bids will be received by Southern University, Baton Rouge, Louisiana, in the Purchasing Department, 8100 James L. Prestage Drive, PO Box 9543, J. S. Clark Administration Building Annex, South Entrance, First Floor East, Baton Rouge, LA 70813. Bids will be opened and read aloud in a public meeting in the Southern University Purchasing Department.

As an alternative
Use link to submit bid/upload online: *http://www.sus.edu/bidcertification*

MAIL, HAND-DELIVER OR UPLOAD BID TO PURCHASING DEPARTMENT NO LATER THAN 10:30 AM-on DECEMBER 16, 2026

Bidders are solely responsible for ensuring timely delivery of their bids. The Southern University Purchasing Department is not responsible for any delays caused by bidders' chosen means of delivery. Failure to meet the bid deadline submittal date and time shall result in rejection of bid.

Engineer Firm: G.E.C., Inc.
8282 Goodwood Blvd., Baton Rouge, LA 70806
Cary A. Bourgeois, PE, Sr. Vice President
Ph. (225) 612-4121, Email: cbourgeois@gecinc.com

ALL BID SPECIFICATIONS AND ADDENDA CAN BE OBTAINED BY ACCESSING THE LA STATE PROCUREMENT WEBSITE
https://wwwcfprd.doa.louisiana.gov/osp/lapac/pubMain.cfm.
(Search by bid # 50016-10375)
We highly recommend registering your company with Louisiana State Procurement/LAPAC.

Mandatory Pre-Bid Conference & Site Visit DECEMBER 3, 2026 @ 10:30 AM
Conference & Site Visit Location: Physical Plant Department
(Southern University Campus)
Benjamin H. Kraft Building, 515 James L. Hunt Street
Baton Rouge, La 70813
Site Visit Location Telephone Number: 225-771-4741 or 225-771-6241

Participants shall be in attendance by 10:30 a.m. and sign sheet provided by the Purchasing Department.

Bidders shall visit the site and be familiarized with the local conditions under which the work is to be performed. No additional compensation will be granted because of unusual difficulties, which may be encountered in the execution of any portion of the work.

Inquiries will be accepted until December 7, 2026 by 5:00 p.m. Inquiries shall be submitted to Linda Antoine at linda_antoine@subr.edu

Responses to inquiries will be posted on LAPAC-LA State Procurement website by December 10, 2026 by 5:00 PM

Any person requiring special accommodation should notify the Purchasing Office of the type(s) of accommodation required not less than seven (7) days before the bid opening date. Additional contact is Henry Thurman, Southern University Safety Department henry_thurman@subr.edu or 225-771-4741.

5% Security

All bids must be accompanied by bid security equal to **five (5%) percent of the sum of the base bid and all alternates, if applicable** and must be in the form of a certified/official check, cashier's check or bid bond, made payable to Southern University and A & M College. Surety represents that it is listed on the current U.S. Department of the Treasury Financial Management Service list of approved bonding companies and that is listed thereon as approved for amount equal to or greater than the amount for which it obligates itself in this instrument. No bid bond indicating an obligation of less than five percent (5%) by any method is acceptable.

Performance & Payment Bond

Successful Proposer shall be required to furnish a performance (surety) bond. The amount will be determined during contract negotiations for the period the contract is in effect. The Bond should be made payable to Southern University. Any performance bond furnished shall be written by a surety or insurance company currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the *Federal Register*, or by a Louisiana domiciled insurance company with at least an A-:VI rating or higher in the latest printing of the A.M. Best's Key Rating Guide or by an insurance company that is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.

No surety or insurance company shall write a performance bond which is in excess of the amount indicated as approved by the U.S. Department of the Treasury Financial Management Service list or by a Louisiana domiciled insurance company with an A-:VI rating by A.M. Best up to a limit of 10 percent of policyholders' surplus as shown by A.M. Best; companies authorized by this Paragraph who are not on the treasury list shall not write a performance bond when the penalty exceeds 15 percent of its capital and surplus, such capital and surplus being the amount by which the company's assets exceed its liabilities as reflected by the most recent financial statements filed by the company with the Department of Insurance.

In addition, any performance bond furnished shall be written by a surety or insurance company that is currently licensed or authorized to do business in the State of Louisiana. The bond must be received within twelve (12) working days from the date of notification.

Bidders shall include the following on envelopes of choice: company's name, address, Louisiana contractor's license number, bid number, name of bid, bid opening date and time.

Bids may be withdrawn by written, telegraphic fax notice or email and received at the

opening, as recorded by date stamp at the Purchasing Office. Bids received after closing time will be returned unopened. Evidence of authority to submit the bid shall be required in accordance with R.S. 38:2212(a)(1)(c) and/or R.S. 39:1594(c)(2)(d).

The Southern University System is a participant in the Louisiana for the Small Entrepreneurships Program (the Hudson Initiative) and the Louisiana Initiative for Veterans and Service-Connected Disabled Veterans-Owned Business Small Entrepreneurships. Bidders are encouraged to consider participation. A list of certified vendors and additional information can be obtained from website http://www.ledsmallbiz.com. Potential participants may also register at this website.

Any questions concerning bid documents, please contact Mary Jane Spruel, Assistant Director of Purchasing at (225) 771-2800 or email to maryjane_spruel@subr.edu

No bid may be withdrawn for a period of forty-five (45) days after receipt of bids, except under the provisions of LA. R.S. 38:2214. Bidder is required to comply with provisions and requirements of LA R.S. 38:2212(B)(5).

The University reserves the right to reject all bids and to waive any informalities incidental thereto.

Bids shall be accepted from Contractors who are licensed under LA. R.S. 37:2150-2192 for the classification of 72000000 Building and Construction Maintenance Services; 72100000 General Building Construction; 72102300 Plumbing and Heating and Air Conditioning 83000000 Public Utilities and Public Sector Related Services 83100000 Utilities 83101500 Water and Sewer Utilities

SOUTHERN UNIVERSITY & A&M COLLEGE
AN EQUAL OPPORTUNITY EMPLOYER
Linda A. Antoine, Director of Purchasing

DATES ADVERTISED
NOVEMBER 18, 25, 2026 & DECEMBER 2, 2026

SOUTHERN UNIVERSITY AND A&M COLLEGE
BATON ROUGE CAMPUS

REQUEST FOR BID-BID # 10375

SANITARY GRAVITY SEWER LINE IMPROVEMENTS
LIFT STATION 1 TO F.G. CLARK ACTIVITY CENTER
STATE FP&C PROJECT NO. 01-107-24-05, F01004726
STATE ID NO. 217038, SITE CODE: N/A
DECEMBER 16, 2026 @ 10:30 AM

Engineer Firm: G.E.C., Inc.
8282 Goodwood Blvd., Baton Rouge, LA 70806
Cary A. Bourgeois, P.E., Sr. Vice President
Ph. (225) 612-4121, Email: cbourgeois@gecinc.com

DATE ADVERTISED (LAPAC)	**NOVEMBER 18, 2026**
THE ADVOCATE	**NOVEMBER 18, 25, 2026 & DECEMBER 2, 2026**

MANDATORY PRE—BID CONFERENCE AND SITE VISIT:	**DECEMBER 3, 2026 @ 10:30 AM**
LOCATION:	Physical Plant Department Benjamin H. Kraft Building 515 James L. Hunt Street Southern University Baton Rouge Campus 70813 Site Telephone No. 225-771-4741 or 225-771-6241
DEADLINE TO SUBMIT INQUIRIES:	**DECEMBER 7, 2026 by 5:00 PM**
SUBMIT INQUIRIES TO:	**Linda Antoine** Email: linda_antoine@subr.edu

DEADLINE TO RESPOND TO INQUIRIES **DECEMBER 10, 2026 by 5:00 PM**

Note: Responses to inquiries/addenda are pasted on LAPAC (La State Procurement website) LAPAC website:
https://wwwcfprd.doa.louisiana.gov/OSP/LaPAC/Agency/outMain.cfm
It is the responsibility of the vendor to check LAPAC for addenda.

DEADLINE TO SUBMIT BID:	**DECEMBER 16, 2026 @ 10:30 AM**
SUBMIT BID TO:	Linda Antoine, Director Southern University Purchasing Department-P. O. Box 9534 or James L. Prestage Drive J. S. Clark Adm. Bldg. Annex, 1st Floor Baton Rouge, LA 70813 Telephone 225-771-2804 or 771-4587
As an alternative ***Use link to submit bid online:*** *http://www.sus.edu/bidcertification*	

Note: Bid shall be delivered or uploaded to link no later than 10:30 AM on DECEMBER 16, 2026

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO:	Southern University and A & M College	**BID FOR**:	Southern University and A & M College
	8100 James L. Prestage Drive / P. O. Box 9543		Baton Rouge Campus
	J. S. Clark Administration Build Annex		Sanitary Gravity Sewer Line Improvements
	South Entrance, First Floor East		FP&C Project No.: 01-107-24-05, F.01004226
	Baton Rouge, LA 70813		State ID No.: 217038, Site Code: N/A

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: G.E.C., Inc. and dated: August 27, 2026.

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following ADDENDA: (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging): _____

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid"* but not alternates) the sum of:

_____Dollars ($_____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1: ***Manhole Rehabilitation*** for the sum of:

_____Dollars ($_____)

Alternate No. 2: ***Describe*** for the sum of

_____Dollars ($_____)

Alternate No. 3: ***Describe*** for the sum of

_____Dollars ($_____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER ** **:** _____

DATE: _____

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

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

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

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

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: Southern University and A & M College
8100 James L. Prestage Drive / P. O. Box 9543
J. S. Clark Administration Build Annex
South Entrance, First Floor East
Baton Rouge, LA 70813

BID FOR: Southern University and A & M College
Baton Rouge Campus
Sanitary Gravity Sewer Line Improvements
FP&C Project No.: 01-107-24-05, F.01004226
State ID No.: 217038, Site Code: N/A

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

DESCRIPTION:	X Base Bid or □ Alt.# ___ Removal of Asphalt Surfacing and Base			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
2020500	34	SQUARE YD		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Removal of Concrete Walks and Drives			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
2020600	30	SQUARE YD		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Restore Asphalt Concrete Pavement and Base			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
5010606	40	SQUARE YD		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Sewer Point Repair, Excavation, Backfill and Compaction (0.0' – 6.0' Depth)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
801100	10	LINEAR FT		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Sewer Point Repair, Excavation, Backfill and Compaction (6.1' – 8.0' Depth)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8011001	10	LINEAR FT		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Sewer Point Repair, Excavation, Backfill and Compaction (8.1' – 10.0' Depth)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8011002	10	LINEAR FT		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Sewer Point Repair, Excavation, Backfill and Compaction (10.1' – 12.0' Depth)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8011003	10	LINEAR FT		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Sewer Point Repair, Excavation, Backfill and Compaction (12.1' – 16.0' Depth)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8011004	20	LINEAR FT		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Sewer Point Repair, Excavation, Backfill and Compaction (16.1' – 20.0' Depth)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8011005	20	LINEAR FT		

All quantities are estimated. The Contractor will be paid based upon actual quantities as verified by the Owner.

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: Southern University and A & M College
8100 James L. Prestage Drive / P. O. Box 9543
J. S. Clark Administration Build Annex
South Entrance, First Floor East
Baton Rouge, LA 70813

BID FOR: Southern University and A & M College
Baton Rouge Campus
Sanitary Gravity Sewer Line Improvements
FP&C Project No.: 01-107-24-05, F.01004226
State ID No.: 217038, Site Code: N/A

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

DESCRIPTION:	X Base Bid or □ Alt.# ___ PVC Rehab Sewer Pipe (8")			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
802200C	80	LINEAR FT		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Non-Shear Couplings (8")			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
802500C	16	EACH		

DESCRIPTION:	X Base Bid or □ Alt.# ___ 48" Sanitary Sewer Manhole (12.1 to 16 feet)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8031484	1	EACH		

DESCRIPTION:	X Base Bid or □ Alt.# ___ 8" Diameter Sewer CIPP Lining			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
808100C	2,977	LINEAR FT		

DESCRIPTION:	X Base Bid or □ Alt.# ___ 4" Concrete Walks			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
9070304	30	SQUARE YD		

DESCRIPTION:	X Base Bid or □ Alt.# ___ 6" Concrete Drives			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
9070406	30	SQUARE YD		

DESCRIPTION:	X Base Bid or □ Alt.# ___ Mobilization			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
9090100	1	LUMP		

DESCRIPTION:	□ Base Bid or _X_ Alt.# _1_ Manhole Repair (Patching)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8065000	14	CUBIC FT		

DESCRIPTION:	□ Base Bid or _X_ Alt.# _1_ Manhole Rehabilitation (Epoxy Lining)			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8066200	140	VERTICAL FT		

All quantities are estimated. The Contractor will be paid based upon actual quantities as verified by the Owner.

BID BOND

FOR

SOUTHERN UNIVERSITY AND A&M COLLEGE

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____of_____, as

Principal, and_____, as Surety, are held and firmly bound unto the State of Louisiana, Southern University and A&M College (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

_____

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

_____	_____
PRINCIPAL (BIDDER)	SURETY
BY: _____	BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER	AGENT OR ATTORNEY-IN-FACT(SEAL)

STATE OF LOUISIANA
PARISH OF **«PARISH_OF_PROJECT»**

CONTRACT BETWEEN OWNER AND CONTRACTOR
AND PERFORMANCE AND PAYMENT BOND

This agreement entered into this _____ day of _____, 2026, by **«Contractor»** hereinafter called the "Contractor", whose business address is **«Contractor_Address», «Contractor_City», «Contractor_State» «Contractor_Zip»**, and the State of Louisiana Division of Administration, herein represented by the contracting officer executing this contract, hereinafter called the "Owner".

Witnesseth that the Contractor and the Owner, in consideration of premises and the mutual covenants; consideration and agreement herein contained, agree as follows:

Statement of Work: The contractor shall furnish all labor and materials and perform all of the work required to build, construct and complete in a thorough and workmanlike manner for the:

SANITARY GRAVITY SEWER LINE IMPROVEMENTS
Project No.: 01-107-24-05, F.01004726
State ID No.: 217038 Site Code: N/A

in strict accordance with Contract Documents prepared by:
G.E.C., Inc.
8282 Goodwood Boulevard
Baton Rouge, LA 70806

It is recognized by the parties herein that said Contract Documents including by way of example and not of limitation, the Drawings and Specifications dated **August 27, 2026**, Addenda number(s) **XX XX** the Instruction to Bidders, Bid Form, General Conditions, Supplementary Conditions, any Addenda thereto, impose duties and obligations upon the parties herein, and said parties thereby agree that they shall be bound by said duties and obligations. For these purposes, all of the provisions contained in the aforementioned Construction Documents are incorporated herein by reference with the same force and effect as though said Construction Documents were herein set out in full.

Time for Completion: The work shall be commenced on a date to be specified in a written order of the Owner and shall be completed within 180 consecutive calendar days from and after the said date.

Liquidated Damages: Contractor shall be assessed Liquidated Damages in the amount of **$500.00** per day for each consecutive calendar day which work is not complete beginning with the first day beyond the completion time.

Compensation to be paid to the Contractor: The Owner will pay and the Contractor will accept in full consideration for the performance of the contract the sum of **«Contract_Amount_Words» and No/100 Dollars («Contract_Amount_Numeral»)** which sum represents the **«Base_Bid_Only_or_Plus_Alternates»**

Taxes: Contractor hereby agrees that the responsibility for payment of taxes from the funds thus received under this Contract and/or legislative appropriation shall be contractor's obligation and identified under Federal tax identification number _____.

Performance and Payment Bond:
To these presents personally came and intervened _____, herein acting for _____ _____, a corporation organized and existing under the laws of the State of _____ _____, and duly authorized to transact business in the State of Louisiana, as surety, who declared that having taken cognizance of this contract and of the Construction Documents mentioned herein, he hereby in his capacity as its Attorney in Fact obligates his said company, as Surety for the said Contractor, unto the said Owner, up to the sum of **«Contract_Amount_Words» and No/100 Dollars («Contract_Amount_Numeral»)**. By issuance of this bond, the surety acknowledges they are in compliance with R.S. 38:2219.

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

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

Contractor acknowledges and agrees to comply with the provisions of La. R.S. 38:2212.10 and federal law pertaining to E-Verify in the performance of services under this Contract.

It is hereby agreed that the Legislative Auditor of the State of Louisiana and/or the Office of the Governor, Division of Administration auditors shall have the option of auditing all accounts of contractor which relate to this contract.

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

The contractor agrees to abide by the requirements of the following as applicable: Title VI of the Civil Rights Act of 1964 and Title VII of the Civil Rights Act of 1964, as amended by the Equal Employment Opportunity Act of 1972, Federal Executive Order 11246 as amended, the Rehabilitation Act of 1973, as amended, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, the Fair Housing Act of 1968 as amended, and contractor agrees to abide by the requirements of the Americans with Disabilities Act of 1990.

Contractor agrees not to discriminate in its employment practices, and will render services under this contract without regard to race, color, religion, sex, sexual orientation, national origin, veteran status, political affiliation, disability, or age in any matter relating to employment. Any act of discrimination committed by Contractor, or failure to comply with these statutory obligations when applicable shall be grounds for termination of this contract.

In accordance with R.S. 39:1602.1, effective May 22, 2018, for any contract for $100,000 or more and for any contractor with five or more employees, Contractor, or any Subcontractor, shall certify it is not engaging in a boycott of Israel, and shall, for the duration of this contract, refrain from a boycott of Israel. The State reserves the right to terminate this contract if the Contractor, or any Subcontractor, engages in a boycott of Israel during the term of the contract.

Contractor has a continuing obligation to disclose any suspensions or debarment by any government entity, including but not limited to General Services Administration (GSA). Failure to disclosed may constitute grounds for suspension and/or termination of the Contract and debarment from future Contracts.

Contractor, and each tier of Subcontractors, shall certify that it is not on the List of Parties Excluded from Federal Procurement or Nonprocurement Programs promulgated in accordance with E.O.s 12549 and 12689, "Debarment and Suspension," as set forth at 24 CFR part 24.

In Witness whereof, the parties hereto on the day and year first above written have executed this agreement in six (6) counterparts, each of which shall, without proof or accountancy for the other counterparts, be deemed an original thereof.

THUS DONE AND SIGNED at Baton Rouge, Louisiana, on the day, month, and year first written above.

CONTRACTOR:

_____
Witness #1 Sign Here

_____
Witness #2 Sign Here

_____
Contractor Witness #1 Sign Here

_____
Contractor Witness #2 Sign Here

_____
Surety Witness #1 Sign Here

_____
Surety Witness #2 Sign Here

SOUTHERN UNIVERSITY AND A&M COLLEGE

BY: _____
JOHN K. PIERRE., CHANCELLOR
Southern University and A&M College

BY: _____
«CONTRACTOR»

SURETY:

BY: _____
ATTORNEY IN FACT

_____

_____
ADDRESS

_____
TELEPHONE NUMBER

STATE OF LOUISIANA
PARISH OF **«PARISH_OF_CONTRACTOR»**

PROJECT NO.: 01-107-24-05; F.01004726

NAME: Sanitary Gravity Sewer Line Improvements

LOCATION:
Southern University and A&M College

NON-COLLUSION AFFIDAVIT

Before me, the undersigned authority, duly commissioned and qualified within and for the State and Parish aforesaid, personally came and appeared _____ representing **«Contractor»** who, being by me first duly sworn deposed and said that he has read this affidavit and does hereby agree under oath to comply with all provisions herein as follows:

PART I.

Section 2224 of Part II of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant; and

(2) That no part of the Contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the Contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

PART II.

Section 2190 of Part I of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

That affiant, if an architect or engineer, or representative thereof, does not own a substantial financial interest, either directly or indirectly, in any corporation, firm, partnership, or other organization which supplies materials for the construction of a public work when the architect or engineer has performed architectural or engineering services, either directly or indirectly, in connection with the public work for which the materials are being supplied.

For the purposes of this Section, a "substantial financial interest" shall exclude any interest in stock being traded on the American Stock Exchange or the New York Stock Exchange.

That affiant, if subject to the provisions of this section, does hereby agree to be subject to the penalties involved for the violation of this section.

_____

AFFIANT

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 2026.

_____

NOTARY

INSURANCE REQUIREMENTS
Southern University and A&M College
Sanitary Gravity Sewer Line Improvements-Lift Station 1 to F.G. Clark Activity Center
Bid 10375

The Contractor shall purchase and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, its agents, representatives, employees or subcontractors.

A. MINIMUM SCOPE AND LIMITS OF INSURANCE

1. **Workers Compensation**
   Workers Compensation insurance shall be in compliance with the Workers Compensation law of the State of the Contractor's headquarters. Employers Liability is included with a minimum limit of $500,000 per accident/per disease/per employee. If work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act, or other maritime law coverage shall be included and the Employers Liability limit increased to a minimum of **$1,000,000. A.M. Best's insurance company rating requirement may be waived for workers compensation coverage only.**

2. **Commercial General Liability**
   Commercial General Liability insurance, including Personal and Advertising Injury Liability, shall have a minimum limit per occurrence of $**1,000,000 and a minimum general aggregate of $2,000,000.** The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. Claims-made form is unacceptable.

3. **Automobile Liability**
   Automobile Liability Insurance shall have a minimum combined single limit per occurrence of $1,000,000. ISO form number CA 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles.

B. DEDUCTIBLES AND SELF-INSURED RETENTIONS

Any deductibles or self-insured retentions must be declared to and accepted by the Agency. The Contractor shall be responsible for all deductibles and self-insured retentions.

C. OTHER INSURANCE PROVISIONS

The policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverage

   a. The Agency, its officers, agents, employees and volunteers shall be named as an additional insured as regards negligence by the contractor. ISO Form CG 20 10 (current form approved for use in Louisiana), or equivalent, is to be used when applicable. The coverage shall contain no special limitations on the scope of protection afforded to the Agency.

   b. The Contractor's insurance shall be primary as respects the Agency, its officers, agents, employees and volunteers. Any insurance or self-insurance maintained by the Agency shall be excess and non-contributory of the Contractor's insurance.

   c. Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, agents, employees and volunteers.

   d. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the policy limits.

2. Workers Compensation and Employers Liability Coverage
   The insurer shall agree to waive all rights of subrogation against the Agency, its officers, agents, employees and volunteers for losses arising from work performed by the Contractor for the Agency.

3. All Coverage

   a. Coverage shall not be canceled, suspended, or voided by either party (the Contractor or the insurer) or reduced in coverage or in limits except after 30 days written notice has been given to the Agency. Ten-day written notice of cancellation is acceptable for non-payment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor's policy.

   b. Neither the acceptance of the completed work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.

c. The insurance companies issuing the policies shall have no recourse against the Agency for payment of premiums or for assessments under any form of the policies.

d. Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, agents, employees and volunteers.

D. ACCEPTABILITY OF INSURERS

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with a A.M. Best's rating of **A-:VI or higher**. This rating requirement may be waived for workers compensation coverage only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another Certificate of Insurance as required in the contract.

E. VERIFICATION OF COVERAGE

Contractor shall furnish the Agency with Certificates of insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the Agency before work commences and upon any contract renewal thereafter.

In addition to the Certificates, Contractor shall submit the declarations page and the cancellation provision endorsement for each insurance policy. The Agency reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the Agency, may be suspended, discontinued or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the contract.

F. SUBCONTRACTORS

Contractor shall include all subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the Certificates provided by each subcontractor. Subcontractors shall be subject to all of the requirements stated herein. The Agency reserves the right to request copies of subcontractor's Certificates at any time.

G. WORKERS COMPENSATION INDEMNITY

In the event Contractor is not required to provide or elects not to provide workers compensation coverage, the parties hereby agree that Contractor, its owners, agents and employees will have no cause of action against, and will not assert a claim against, the State of Louisiana, its departments, agencies, agents and employees as an employer, whether pursuant to the Louisiana Workers Compensation Act or otherwise, under any circumstance. The parties also hereby agree that the State of Louisiana, its departments, agencies, agents and employees shall in no circumstance be, or considered as, the employer or statutory employer of Contractor, its owners, agents and employees. The parties further agree that Contractor is a wholly independent contractor and is exclusively responsible for its employees, owners, and agents. Contractor hereby agrees to protect, defend, indemnify and hold the State of Louisiana, its departments, agencies, agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

Maritime (Jones Act and LHWCA) needed when work is performed over navigable bodies of water

H. INDEMNIFICATION/HOLD HARMLESS AGREEMENT

Contractor agrees to protect, defend, indemnify, save, and hold harmless, the State of Louisiana, all State Departments, Agencies, Boards and Commissions, its officers, agents, servants, employees, and volunteers, from and against any and all claims, damages, expenses, and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of Contractor, its agents, servants, and employees, or any and all costs, expenses and/or attorney fees incurred by Contractor as a result of any claims, demands, suits or causes of action, except those claims, demands, suits, or causes of action arising out of the negligence of the State of Louisiana, all State Departments, Agencies, Boards, Commissions, its officers, agents, servants, employees and volunteers.

Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits, or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent.

Note: Successful bidder will be required to submit a certificate of insurance to Southern University as the certificate holder.
PO Box 9534
Baton Rouge, LA 70813

GENERAL CONDITIONS

SANITARY GRAVITY SEWER LINE IMPROVEMENTS
LIFT STATION NO. 1 TO F. G. CLARK ACTIVITY CENTER

FOR

SOUTHERN UNIVERSITY AND A & M COLLEGE
BATON ROUGE, LOUISIANA

SOUTHERN UNIVERSITY AND A&M COLLEGE
BATON ROUGE CAMPUS
REQUEST FOR BID

GENERAL CONDITIONS

PROJECT: ***SANITARY GRAVITY SEWER LINE IMPROVEMENTS***
LOCATION: ***LIFT STATION 1 TO F.G. CLARK ACTIVITY CENTER***
Project # 01-107-24-05, F01004726

BID DUE DATE AND TIME: DECEMBER 16, 2026 @ 10:30 AM
BID # 50016-10375

Bids submitted are subject to provisions of but not limited to La.R.S.38:2212 Purchasing Rules and Regulations; Executive Orders; and the General Terms and Conditions, listed in this Invitation for Bid. Southern University reserves the right to award items separately, grouped or on an all or none basis and to reject any or all bids and waive any informalities.

BIDS MAY BE SENT BY MAIL, HAND-DELIVERED or UPLOADED TO:

Bids should be mailed to:
Southern University
Purchasing Department
Post Office Box 9534
Baton Rouge, LA 70813

As an alternative, bids may be hand delivered to:
Southern University
Purchasing Department
1st Floor East-James L. Prestage Drive
J. S. Clark Administration Building
Baton Rouge, LA 70813

As an alternative:
Use link to submit bid online:
http://www.sus.edu/bidcertification

The Southern University Purchasing Department is not responsible for any delays caused by bidders' chosen means of delivery. Failure to meet the bid deadline submittal date and time shall result in rejection of bid.

Engineer Firm: G.E.C., Inc.
8282 Goodwood Blvd., Baton Rouge, LA 70806
Cary A. Bourgeois, P.E., Sr. Vice President
Ph. (225) 612-4121, Email: cbourgeois@gecinc.com

MANDATORY PRE-BID CONFERENCE & SITE VISIT: DECEMBER 3, 2026 @ 10:30 AM
LOCATION: Physical Plant Department
Benjamin H. Kraft Building
515 James L. Hunt Street
Southern University SUBR Campus
Site Telephone No. 225-771-4741

Deadline to submit inquiries: December 7, 2026 by 5:00 PM
Deadline to respond to inquiries: December 10, 2026 by 5:00 PM

INQUIRIES:
No negotiations, decisions, or actions will be executed by any bidder as a result or any oral discussion with any University employee or State Consultant. Only those transactions which are in writing, sent to **Linda A. Antoine, Director of Purchasing, will be considered as valid.**
Send inquiries to linda_antoine@subr.edu

INSTRUCTIONS TO BIDDERS

1. **Bid Forms**
   All written bids, unless otherwise provided for, must be submitted on, and in accordance with forms provided and properly signed in ink. Bids submitted in the following manner will not be accepted:
   Bid containing no signature indicating intent to be bound
   (1) Bid filled out in pencil
   (2) Bid not submitted on university standard forms
   Bids must be received at the address specified in the Invitation for Bid or uploaded prior to bid opening time to be considered.

2. **Envelope (if mailed)**
   Bidders are requested to submit bid package in a sealed envelope of your choice that is clearly marked identifying the ***company's name, complete address, bid number, time and date of bid opening, and license number, if applicable.***
   Bidder is responsible for means of delivery of bid.
   Louisiana Contractors License Number shall be placed on the outside of the envelope.

3. **Standards of Quality**
   Any product or service bid shall conform to all applicable federal, state and local laws, regulations and the specifications contained in the IFB. Unless otherwise specified in the IFB, any manufacturer's name, trade name, brand name, or catalog numbers used in the specifications is for the purpose of describing the quality level, performance and characteristics required. Bidder must specify the brand and model number of the product offered in his/her bid. Bids not specifying brand and model numbers will be considered as offering the exact product(s) specified in the IFB.

4. **Descriptive Information**
   Bidders proposing an equivalent brand or model should submit information with bid (such as illustrations, descriptive literature, technical data) sufficient for the University to evaluate quality, suitability and compliance with the specifications in the IFB. Failure to submit descriptive information may cause bid to be rejected. Any change made to a manufacturer's published specification submitted for a product should be verifiable by the manufacturer. If item(s) bid do not fully comply with specifications (including brand and/or product number), bidder must state in what respect the item(s) deviate. Failure to note exceptions on the bid form will not relieve the successful bidder(s) from supplying the actual products requested.

5. **Insurance**
   A current insurance certificate with Southern University as the certificate holder shall be sent to the Purchasing Department before starting project. Contractor shall maintain insurance coverage until project is completed.

6. **Prices**
   Unless otherwise specified by the Purchasing Department, bid prices must be complete, including transportation, prepaid by bidder to destination. In the event of extension errors, the unit price shall prevail.

7. **Payment Terms**
   Payment is to be made within thirty (30) days after receipt of properly executed invoice, or delivery and acceptance, whichever is later. Delinquent payment penalties are governed by **L.R.S. 39:1695**.

8. **Deliveries**
   Bids may be rejected if the delivery or completion time indicated is longer than that specified in the bid.

9. **Vendor Invoices**
   Invoices or AIA payment form shall reference the Southern University purchase/release order number, vendor's packing list/delivery ticket, ticket number, shipping/delivery date, etc. Invoices are to be itemized and billed in accordance with the order and should show the amount of any prompt payment discount and submitted on the vendor's own invoice form. Invoices submitted by the vendor's supplier will not be accepted. Terms are net 30.

10. **Tax Information/State of Louisiana**
    Vendor is responsible for including all applicable taxes in the bid prices. Southern University is exempt from all Louisiana state and local sales and use taxes. By accepting an award, resident and non-resident firms acknowledge their responsibility for the payment of all taxes duly accessed by the State of Louisiana and its political subdivisions for which they are liable, including but not limited to: franchise taxes, privilege taxes, sales taxes, use taxes, ad valorem taxes, etc. In accordance with Act Number 1029 of the 1991 Regular Session, effective September 1, 1991 state agencies will no longer be required to pay state sales tax.

11. **New Products**
    Unless specifically called for, all products for purchases must be new (never previously used) and the current model and/or packaging. The manufacturer's standard warranty will apply unless otherwise specified in the IFB.

12. **Contract Cancellation**
    Southern University has the right to cancel any contract, in accordance with Purchasing Rules and Regulations, for cause, including but not limited to, the following:

(1) failure to deliver within time specified in the contract; (2) failure of the product or service to meet specifications, conform to sample quality or to be delivered in good condition; (3) misrepresentations by the contractor;(4) fraud, collusion, conspiracy or other unlawful means of obtaining any contract with the state; (5) conflict of contract provisions with constitutional or statutory provision of state or federal law; (6) any other breach of contract.

13. **Award And Execution of Contract**
The owner shall incur no obligation to the contractor until the contract between the owner and contractor is duly executed. If the contractor is notified of the acceptance of the bid within thirty (30) days of the opening bid date, contractor agrees to execute and deliver to owner, Performance and Payment Bond and Certificate of Insurance, a copy of which is attached to the Contract Documents, within ten (10) working days after notice from the Owner that the instrument is ready for signature.

14. **Fiscal Funding Clause (Renewal Contracts Only)**
In accordance with LA R.S.39:1615 (c) and (e), any contract entered into by the State of Louisiana and Southern University shall include the following Fiscal Funding Clause:
C. Termination due to unavailability of funds in succeeding years. When funds are not appropriated to support continuation of performance in a subsequent year of a multiyear contract, the contract for such subsequent year shall be terminated. When a contract is terminated under these conditions, no additional funds shall be paid to the contractor as a result of such action. **E.** With respect to all multiyear contracts, there shall be no provisions for a penalty to the state for the cancellation or early payment of the contract. The continuation of this contract is contingent upon the appropriation of funds to fulfill the requirements of the contract by the legislature. All proposers should be aware that our legislative process is such that it is often impossible to give prior notice of the non-appropriation of funds.

15. **Default of Contactor**
Failure to deliver within the time specified in the bid will constitute a default and may cause cancellation of the contract. Where the state had determined the contractor to be in default, the state reserves the right to purchase any or all products or services covered by the contract on the open market and to charge the contractor with cost in excess of the contract price. Until such assessed charges have been paid, no subsequent bid from the defaulting contractor will be considered.

16. **Order of Priority**
In the event there is a conflict between the Instructions to Bidders the General Terms and Conditions will govern.

17. **Applicable Law**
All contracts will be construed in accordance with and governed by the laws of State of Louisiana. Vendors shall be in compliance with applicable laws of the State of Louisiana and Federal Laws where applicable, to include licenses, fees and permits. Vendors are responsible for the cost of licenses, fees and permits.

18. **Certification of No Suspension or Debarment ($25,000 or more)**
By signing and submitting this bid, bidder certifies that its company, any subcontractors, or principals thereof, are not suspended or debarred under federal or state laws or regulations. A list of parties who have been suspended or debarred by federal agencies is maintained by the General Services Administration and can be viewed on the internet at www.sam.gov.
____ Federal Funded **_XX_ Non-Federal Funded**

19. **E-Verify** (verification of employees)
Contractor acknowledges and agrees to comply with the provisions of La R.S. 38:2212.10 and federal law pertaining to E-Verify in the performance of services under this contract.

20. **Prohibited Contractual Arrangements**
Per Louisiana R.S. 42:1113.a, no public servant, or member of such public servant's immediate family, or legal entity in which he is a controlling interest shall bid on or enter into any contract, subcontract, or other transaction that is under the supervision or jurisdiction of the agency of such public servant. See statute for complete law, exclusions and provisions.

21. **Discriminatory Boycotts of Israel**
This section applies to procurements with a value of $100,000 or more and for vendors with five (5) or more employees
Prohibition of Discriminatory Boycotts of Israel
In accordance with R.S. 39:1602.1, for any contract for $100,000 or more and for any contractor with five or more employees, the Contractor certifies that neither it nor its subcontractors are engaged in a boycott of Israel, and that the Contractor and any subcontractors shall, for the duration of this contract, refrain from a boycott of Israel. The State reserves the right to terminate this contract if the Contractor, or any Subcontractor, engages in a boycott of Israel during the term of this contract.

22. **Prohibition of Companies That Discriminate Against Firearm and Ammunition Industries**
In accordance with La. R.S. 39:1602.2, the following applies to any competitive sealed bids, competitive sealed proposals, or contract(s) with a value of $100,000 or more involving a for-profit company with at least fifty full-time employees:
Unless otherwise exempted by law, by submitting a response to this solicitation or entering into this contract, the Bidder, Proposer or Contractor certifies the following:
- The company does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association based solely on the entity's or association's status as a firearm entity or firearm trade association;
- The company will not discriminate against a firearm entity or firearm trade association during the term of the contract based solely on the entity's or association's status as a firearm entity or firearm trade association.

23. **Mutual Indemnification**
Each party hereto agrees to indemnify, defend and hold the other, its officers, directors, agents and employees harmless from and against any and all losses, liabilities and claims, including reasonable attorney's fees arising out of or resulting from the willful act, fault, omission, or negligence of the indemnifying party or of its employees, contractors, or agents in performing its obligations under this agreement, provided however, that neither party hereto shall be liable to the other for any consequential damages arising out of its willful act, fault, omission, or negligence.

24. **Fair Labor Standards Act**
Contractor shall be in compliance with the **Fair Labor Standards Act 29 USC 201-6;** Establishes minimum wage, overtime pay, equal pay, recordkeeping, and child labor standards for employees or in the production of goods for interstate commerce. **By signing and submitting this bid, bidder certifies that its company, any subcontractors, or principals thereof** is in accordance with said compliance. **United States Department of Labor website: www.dol.gov/esa**

25. **Davis-Bacon Act ($2,000 or more)**
Contractor shall be in compliance with the **Davis-Bacon Act, 40 USC 276A-7;** ensures that laborers and mechanics employed pursuant to federally funded construction contracts, subcontracts and construction under Federal grants, will be paid wages as determined by the U.S. Secretary of Labor. **By signing and submitting this bid, bidder certifies that its company, any subcontractors, or principals thereof** is in accordance with said compliance. **United States Department of Labor website: www.dol.gov/esa**
____Federal Funded ___XX__Non-Federal Funded

26. **Small Business Entrepreneurship Programs**
The Southern University System is a participant in the Louisiana for the Small Entrepreneurships Program (the Hudson Initiative) and the Louisiana Initiative for Veterans and Service-Connected Disabled Veterans-Owned Business Small Entrepreneurships. Bidders are encouraged to consider participation. A list of certified vendors and additional information can be obtained from website http://www.ledsmallbiz.com. Potential participants may also register at this website. Businesses include minority and women.

27. **Public Works Projects (R.S. 38:2227)**
In accordance with the provisions of R.S. 38:2227; in awarding public works projects, any public entity is authorized to reject a proposal or bid, or not award the contract, to a business in which any individual with an ownership interest of ten percent (10%) or more, has been convicted, or has entered a plea of guilty or nolo contenere to any state felony or equivalent federal felony crime.

28. **Tobacco-Free Policy**
The use of tobacco products on any Southern University campus is prohibited by students, staff, faculty or visitors in all campus buildings, facilities, or property owned or leased by Southern University System and outside areas of the campus where non-smokers cannot avoid exposure to smoke; on campus grounds, facilities, or vehicles that are the property of the University; and at lectures, conferences, meetings, and social and cultural events held on school property or school grounds. The sale or free distribution of tobacco products, including merchandise on campus or at school events is prohibited.

29. **Equal Opportunity Employer**
Southern University and A&M College Systems of the State of Louisiana is an equal opportunity employer and looks to its contractors, sub-contractors, vendors, and suppliers to take affirmative action to effect this commitment in its operations. By submitting and signing this bid, the bidder certifies that he agrees to adhere to the mandates dictated by Title VI and VII of the Civil Rights Act of 1964, as amended; the Vietnam Era Veterans' Readjustment Assistance Act of 1974; Section 303 of the Rehabilitation Act of 1973; Section 202 of Executive Orderll24b,as amended; and the Americans with Disabilities Act of 1990. Bidder agrees that he will not discriminate in the rendering of services to and/or employment of individuals because of race, color, religion, sex, age, national origin, handicap, disability, veteran status, or any other non-merit factor. Bidder further agrees to keep informed of and comply with all Federal, State, and local laws, ordinances, and regulations which affect his employees or prospective employees. Any person who is a "Qualified Individual with a Disability" as defined by 42 USC 12131 of the American with Disabilities Act who has submitted a bid on this procurement and who desires to attend the bid opening, must notify this office in writing no later than seven (7) working days prior to the bid opening date of their need for special accommodations. If the requested accommodations cannot be reasonably provided, the individual will be so informed prior to the bid opening.

30. **Code of Ethics**
The contractor acknowledges that Chapter 15 of Title 42 of the Louisiana Revised Statutes (R.S. 42:1101 et. seq., Code of Governmental Ethics) applies to the Contracting Party in the performance of services called for in this contract. The contractor agrees to immediately notify the state if potential violations of the Code of Governmental Ethics arise at any time during the term of this contract.

31. **Vendor Forms/SU Signature Authority**
The terms and conditions of the SU solicitation and purchase order/contract shall solely govern the purchase agreement, and shall not be amended by any vendor contract, form, etc. The University's chief procurement officer, or designee, is delegated sole authority to execute any vendor contracts, forms, etc. Departments are prohibited from signing any vendor forms.

32. **Prosecution of Work**
The work is to be done when Southern University is in operation. The contractor shall, therefore, plan the repairs and installation in specifications so as not to interfere with normal operations of the facility and shall exert effort to expedite completion of the work once it has started. It is intended that the work shall be done during normal working hours, however, should work require overtime (Saturday, Sunday and/or night working hours), the cost must be borne by the contractor at no extra compensation from the Owner (Southern University).

33. **On-Campus Attendance Requirements (COVID-19)**
The Center for Disease and Control (CDC) recommends social distancing and wearing of masks to prevent the spread of the Coronavirus (COVID19). Persons visiting Southern University are required to wear a mask/face covering and stay at least 6 feet between yourself and others, even when you wear a face covering.

34. **Termination of the Contract for Convenience**
The State/University may terminate the contract at any time by giving thirty (30) days written notice to the Contractor of such termination or negotiating an effective date with the Contractor. The Contractor shall be entitled to payment for deliverables in progress, to the extent work has been performed satisfactorily.

35. **Termination for Cause**
The State may terminate this Contract for cause based upon the failure of the Contractor to comply with the terms and/or conditions of the Contract; provided that the State shall give the Contractor written notice specifying the Contractor's failure. If within thirty (30) days after receipt of such notice, the Contractor shall not have either corrected such failure or thereafter proceeded diligently to complete such correction, then the State may, at its option, place the Contractor in default and the Contract shall terminate on the date specified in such notice. The Contractor may exercise any rights available to it under Louisiana law to terminate for cause upon the failure of the Owner to comply with the terms and conditions of this contract; provided that the Contractor shall give the State, written notice specifying the State's failure and a reasonable opportunity for the Owner to cure the defect.

36. **Auditors**
It is hereby agreed that the Legislative Auditor of the State of Louisiana and/or the Office of the Governor, Division of Administration auditors shall have the option of auditing all accounts of contractor which relate to this contract.

37. **Awarded Products/Unauthorized Substitutions**
Only those awarded brands and numbers stated in the SU contract are approved for delivery, acceptance, and payment purposes. Any substitution requires prior approval of the Purchasing Office. Unauthorized product substitutions are subject to rejection at time of delivery, post-return at vendor's expense, and non-payment.

38. **Acceptance**
Upon written notice by the Owner, a Notice by Owner of Acceptance of Work will be executed and forwarded to the Contractor for recording with the Clerk of Court in the parish in which the work has been performed and shall furnish a clear Lien Certificate from the Clerk of Court (to the owner along with final invoice) forty-five (45) days after recordation of acceptance. Final payment of ten percent (10%) will be made at this time.

39. **Guarantee**
It is the intention of the specifications to secure a first-class permanent material and construction and to this end, Contractor will be held responsible for and must correct defects discovered in the work within one (1) year from acceptance. Should any materials or methods be called for, of such nature to render this guarantee impossible, written notice to this effect should be given Owner (Southern University) before signing contract and/or beginning of work; failure to do this will be construed as agreement to the strictest terms of the guarantee.

40. **Clean-Up**
The Contractor will be directed during the progress of work to remove and properly dispose of the resultant and debris. Upon completion, Contractor shall remove all equipment, unused materials and debris and will leave the premises in a clean and first-class condition.

41. **Examination of Site**
Each bidder will visit the site of the proposed project and will fully acquaint himself with conditions relating to construction and labor so that he may fully understand the facilities, difficulties and restrictions attending the execution of work under this contract. No consideration or allowance will be granted the Contractor for failure to visit the site or for any alleged misunderstanding of the materials to be furnished or the work to be done.

42. **Anti-Kickback Clause**
The Contractor hereby agrees to adhere to the mandate dictated by The Copeland "Anti-Kickback" ACT which provides that each Contractor or Subgrantee shall be prohibited from inducing, by any means, any person employed in the completion of work, to give up any part of the compensation to which he is otherwise entitled.

43. Clean Air Act

The Contractor hereby agrees to adhere to the provisions which require compliance with all applicable standards, orders or requirements issued under Section 306 of the CLEAN AIR ACT which prohibits the use under non-exempt contracts, grants or loans of facilities included on the EPA list of Violating Facilities.

44. Clean Water Act

The Contractor hereby agrees to adhere to the provisions which require compliance with all applicable standards, orders or requirements issued under Section 508 of the Clean Water Act which prohibits the use under non-exempt federal contracts, grants or loans of facilities included on the EPA list of Violating Facilities.

45. Energy Policy and Conservation Act

The Contractor hereby recognizes the mandatory standards and policies relating to energy efficiency which are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (P.L. 94-163).

46. Anti-Lobbying and Debarment Act

The Contractor will be expected to comply with federal statutes in the Anti-Lobbying Act and The Debarment Act.

47. Signature Authority

A CORPORATE RESOLUTION OR WRITTEN EVIDENCE OF THE AUTHORITY OF THE PERSON SIGNING THE BID FOR THE PUBLIC WORK AS PRESCRIBED BY LOUISIANA REVISED STATUTE 38:2212 (B)(5)
A copy of the applicable signature authority document/Board Resolution or LA Secretary of State Registration must be submitted with bid.

48. Additional Requirements

a. All work shall be in accordance with the plans; the project specifications, and hall comply with applicable local and state building codes as well as any and all regulatory agency requirements and laws, including but not limited to OSHA, etc. General notes shall apply to all drawings.
b. Contractor shall notify the engineer/architect, if applicable, of all conflicts or discrepancies presented in these plans prior to the start of work.
c. All work, whether shown or implied, unless specifically questioned shall be considered understood in all respects by the general contractor and who will be responsible for any misinterpretations and consequences thereof.
d. Any utilities damaged during construction shall be repaired at the contractors expense.
e. Engineer/architect shall be notified immediately of all identified existing utilities not identified in the plans.
f. Owner shall provide water for cleaning operations from any fire hydrant at no cost to the consultant.

49. PUBLIC AWARENESS – 192.616

Southern University Baton Rouge owns and operates a master meter natural gas distribution system on the school campus. The gas system consists of an underground network of pipelines. The purpose of the gas system is to provide a reliable and safe economical source of energy for heating purposes. The pipeline system has the capacity to reliably deliver natural gas.

The hazards of natural gas are odorless, colorless, tasteless, lighter than air and can ignite and/or explode with tremendous force when mixed with the right amount of air.

Measures taken include:

- Adding odorant to the gas to give it that distinctive smell, like rotten eggs, to warn us of its presence.
- Testing the odorant level each calendar quarter,
- Performing annual gas leakage surveys, and
- Conducting periodic pipeline patrols.

The following are signs that may indicate a gas leak:

- A hissing or roaring sound (caused by escaping gas)
- A patch of dead or discolored vegetation in an otherwise green setting along a pipeline route
- Blowing dirt, grass or leaves near a pipeline,
- Continuous bubbling in wet, flooded areas,
- A “gas small” like rotten eggs.

Anyone who may smell this odor or notice any unusual conditions on or near gas mains, vents, service lines, meter sets, or especially inside of a building should call the maintenance office immediately. If you smell a strong gas odor inside a building, notify everyone in the building to leave. Do not operate any switches or use the phone. Go a safe distance away upwind of the smell of the gas and call the maintenance office. With any gas leak protect life first, then property, then notify the maintenance office.

State and federal laws require excavators to notify LA One-Call 2 days before digging. If any excavation is planned, you must notify LA One-Call which will notify the Southern University to locate the gas lines.

To obtain additional information or report a gas related issue call Southern University Baton Rouge Maintenance Office. The Southern University Maintenance Office phone number is 225-771-4741. The LA One-Call Center phone number is 811.

SPECIAL PROVISIONS

SANITARY GRAVITY SEWER LINE IMPROVEMENTS
LIFT STATION NO. 1 TO F. G. CLARK ACTIVITY CENTER

FOR

SOUTHERN UNIVERSITY AND A & M COLLEGE
BATON ROUGE, LOUISIANA

SPECIAL PROVISIONS

Since local area Contractors are familiar with the below referenced construction specifications, units of measurements and payments, etc., these specifications have been properly examined and determined to be in compliance with all applicable Louisiana codes and have been properly site adapted to use for this Project.

The Standard Specifications referred to herein are the 1997 City of Baton Rouge, Parish of East Baton Rouge, Standard Specifications for Public Works Construction. The Standard Specifications are hereby amended to include the following Wastewater Sections for this Project. When any part of the Standard Specifications is unaltered by the following Special Provisions, the unaltered provisions of the Standard Specifications shall remain in effect.

Copies of the Standard Specifications may be obtained from the Department of Transportation and Drainage, Engineering Division, Room 128, Public Works and Planning Center, 1100 Laurel Street or Post Office Box 1471, Baton Rouge, Louisiana 70821 (Telephone No. [225] 389-3186).

EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF WORK

Before preparing your bid, each bidder is expected to make a field examination of the proposed work and to fully acquaint himself with conditions relating to construction and labor so that he may fully understand the facilities, difficulties and restrictions attending the execution of the work under this contract. Bidders shall also thoroughly examine and be familiar with the Plans, Specifications and Contract Documents prior to site visit.

Submission of a bid shall be considered prima facie evidence that the bidder has made such an examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the plans, project specifications and documents.

PART I GENERAL PROVISIONS

SECTION 1 ABBREVAITIONS AND DEFINITIONS: Section 1 of the Standard Specifications is hereby amended as follows:

1-1 ABBREVIATIONS: This subsection of the Standard Specifications is hereby amended to include the following:

DPW: This abbreviation shall now mean G.E.C., Inc.

1-2 DEFINITIONS: This subsection of the Standard Specifications is hereby amended as follows:

1-2.A Assembly Period: Time the contractor is given to acquire approvals of required drawings, brochures, and other submittals, begin the purchase and assembly of materials, and to perform specified preconstruction activities. Contract time will not be charged during the assembly period.

1-2.B Conditional Notice to Proceed: Written notice to the contractor to proceed with ordering of materials, and when specified, performing other activities which would hinder progress in the beginning stages of construction.

1-2.3 Bidder: Wherever the term Bidder is used in the Standard Specifications and these Special Provisions under this Contract it shall also mean Contractor.

1-2.8 Contractor: The Individual, Firm, Partnership, Manufacture, Corporation or Joint Venture entering into this Contract with the contracting agency to provide specified services.

1-2.11 Department of Public Works: Wherever the term Department of Public Works (DPW) is used it shall mean G.E.C., Inc.

1-2.13 Director: Shall mean Southern University and A & M College Director of Facility Planning or his authorized representative.

1-2.15 Engineer: The term Engineer shall mean the Chief Engineer for G.E.C., Inc. or authorized Representative.

1.2.50 Supplemental Specifications: Additional specification sections that cover unique conditions or work elements associated with this Project.

TECHNICAL SPECIFICATIONS

SECTION 801

EXCAVATION, BACKFILLING, AND COMPACTION FOR SANITARY SEWERS AND RELATED STRUCTURES

SECTION 801
EXCAVATION, BACKFILLING, AND COMPACTION
FOR SANITARY SEWERS AND RELATED STRUCTURES

801-1 DESCRIPTION: This Work shall include, but not necessarily be limited to, excavation and trenching operations to install pipe, manholes, pump stations, and other structures and all related work such as shoring, bracing, water handling, and miscellaneous clearing and grubbing; filling and grading under and around sanitary sewer structures; and all backfilling, compaction, grading, import of backfill material, disposal of surplus and unsuitable materials.

801-2 GENERAL:

a. All work shall be performed in compliance with L.R.S. 40:1749.11-22, "Louisiana Underground Utilities and Facilities Damage Prevention Law", OSHA regulations and applicable codes, ordinances, and standards of governing authorities having jurisdiction.

b. Open excavations, including incomplete manholes and pump stations, shall be barricaded and posted with operating warning lights in accordance with Federal, State and local requirements.

c. Public and private structures, utilities, driveways, sidewalks, pavements, and other facilities shall be protected from damage caused by settlement, lateral movement, undermining washout, construction activities, and other hazards created by these operations. All settlement or other damage caused by the Contractor's operations shall be repaired within 7 days, or the facilities shall be replaced, at the Contractor's sole expense and at the discretion and direction of the Engineer. This includes the warranty period as well.

801-3 MATERIALS:

a. **Definitions:**

1. **Sanitary Sewer Bedding/Backfill Materials:** Bedding and initial backfill material shall be a sand-aggregate mixture. The aggregate shall be free of angular stones that could score, crack, or puncture the pipe. The sand-aggregate mixture shall meet the following gradation:

Sieve Size	Percent Passing
1-1/2 inch	95-100
No. 4	30-50
No. 10	20-45
No. 200	0-10

2. **Usable Excavated Soils:** Usable excavated soils shall have a maximum PI of 25 and a maximum organic content of 5 percent. Soils with a silt content of 50 percent or greater and also a PI of 10 or less will not be allowed. Soil shall be tested at Owner's option by the Owner's testing lab. Usable excavated material may be neatly stockpiled at the site where designated by the Engineer provided there is an area available that will not interfere with the Owner's access nor inconvenience traffic or adjoining property owners.

3. **#610 Stone Backfill:** The 610 Stone shall be one hundred percent quarried material. The stone shall pass the ASTM soundness test and abrasion test. Soundness loss shall not exceed fifteen percent when subjected to five cycles of

the magnesium sulfate soundness test in accordance with AASHTO 104. The stone shall show an abrasion loss of not more than forty percent when tested in accordance with AASHTO 96. The 610 Stone backfill shall meet the following gradation:

Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	90-100
3/4 inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

4. **#57 Stone Backfill:** The stone shall be one hundred percent quarried material. The stone shall pass the ASTM soundness test and abrasion test. Soundness loss shall not exceed fifteen percent when subjected to five cycles of the magnesium sulfate soundness test in accordance with AASHTO 104. The stone shall show an abrasion loss of not more than forty percent when tested in accordance with AASHTO 96. The 57 Stone backfill shall meet the following gradation:

Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	90-100
1/2 inch	25-60
No. 4	0-10
No. 8	0-5
No. 200	0-1

5. **Imported Clay Fill:** Where shown on the Drawings or as directed by the Engineer, clay shall be imported from a borrow site approved by the Engineer. Soils meeting the Unified Soil Classification CL and free of organic material are acceptable clay fill. The clay material shall have the following properties:

   i. Maximum Liquid Limit of 50
   ii. Maximum Plasticity Index of 30
   iii. Organic content less than 5%.

6. **Geotextile Fabric:** The geotextile fabric shall consist of a nonwoven geotextile fabric Class B, C, or D, as contained in the latest edition of the LADOTD QPL.

7. **Controlled Low-Strength Material (CLSM)**: CLSM shall consist of Type I Portland Cement, Class C or F Fly Ash, sand, and water in the following proportion per cubic yard:

i. Portland Cement	50 pounds
ii. Fly Ash – Class C or F	125 pounds
iii. Sand	2900 pounds
iv. Water	50 to 65 gallons

   Mixing and hauling equipment shall conform to Section 1005.

8. **Select Imported Material**: Selected soils are natural soils with a maximum PI of 20, maximum Liquid Limit of 35, and a maximum organic content of 5 percent. Soils with a silt content of 50 percent or greater and also a PI of 10 or less will not be allowed. Any select material used to supplement or replace unusable excavated soil shall meet these requirements and must be approved by the Engineer.

9. **Granular Material:** Granular material shall be non-plastic and siliceous material, and shall comply with the following gradation:

Sieve Size	Percent Passing
1/2 inch	100
No. 10	75-100
No. 200	0-10

b. **General:** The Contractor shall notify the Engineer of the source of each material. At the request of the Engineer, the Contractor shall furnish for testing and approval a representative sample of each material weighing approximately fifty (50) pounds, at least ten (10) calendar days prior to the date of anticipated use of such material.

Select materials shall be furnished as required from approved off-site sources and hauled to the site. Disposal of unsuitable material is specified in Section 801-7.

c. **Structural Fill:** Structural fill shall be used below spread footing foundations, slab-on-grade floors, and other portions of structures. Structural fill material shall be as defined on the drawings. If not defined elsewhere in the Contract Documents acceptable structural fill materials are non-expansive clay with a Plasticity Index between 10 and 25, a maximum Liquid Limit of 45, less than 5% organics, and free of degradable material or debris. Well-graded crushed stone aggregate such as an ASTM D1241 gradation C stone may also be acceptable.

Any structural fill material encountered during the excavation may be stored in segregated stockpiles for reuse. All material that, in the opinion of the Engineer, is not suitable for reuse shall be handled as specified herein for disposal of unsuitable materials.

d. **Trench Backfill:** Backfill methods for trenches, as shown on the Contract Documents, are classified into three zones, bedding, initial backfill, and secondary backfill. Bedding and initial backfill material shall be the sand-aggregate mixture as described in Section 801-3.a.1. Secondary backfill material shall be as follows:

In locations where any part of the trench pay limit (as defined on the Contract Documents) falls under existing asphaltic or PCC roadways and/or existing parking lots, the secondary backfill shall be:

1. #610 Stone material in dry trenches,
2. #57 Stone in wet trenches or in wet trench bottoms,
3. #610 Stone material above the groundwater line in wet trenches,
4. CLSM when shown on the Contract Documents or as directed by the Engineer.

In locations where any part of the trench pay limit (as defined on the Contract Documents) falls within 10 feet of an existing major structure foundation, the edge of an existing road/shoulder/back of curb, or under the limits of a future asphaltic or PCC roadway/parking lot to be constructed subsequent to sanitary sewer installation; the secondary backfill shall be the sand-aggregate mixture as described in Section 801-3.a.1. In these situations the sand-aggregate material shall be placed and compacted to within 3.5 feet of the surrounding grade, and usable excavated soils or select imported fill shall be placed and compacted for the remainder of the backfill to surrounding or specified grade.

e. In areas outside those described above, secondary backfill material shall consist of

usable excavated soils supplemented by select imported fill or the materials listed above to replace unsuitable excavated soil.**Manhole and Pump Station Bedding and Backfill:** Bedding material used below base foundations of manhole and pump station structures shall be #57 stone material, encapsulated in geotextile fabric. The material shall be placed in maximum 12 inch lifts with each lift rodded and vibrated to orient the stone and eliminate voids to create uniform bedding support for the pipe.

The manhole and pump station structures shall be backfilled with granular material or as specified on the Plans. In the case of manholes within existing or planned roadways alignments, the granular material shall be placed and compacted to within 2 feet of the surrounding grade, and #610 stone shall be placed and compacted for the remainder of the backfill to surrounding or specified grade. In the case of manholes located in unimproved surface areas, the granular material shall be placed and compacted to within 2 feet of the surrounding grade, and useable excavated soil shall be placed and compacted for the remainder of the backfill to surrounding or specified grade.

f. **Geotextile Fabric:** In trenches requiring the use of #57 Stone, this material shall be encapsulated in geotextile fabric. Geotextile fabric shall be class B, C, or D.

g. **Controlled Low-Strength Material (CLSM):** CLSM shall be used to backfill trenches where shown on the Drawings or as directed by the Engineer.

801-4 PRE-INSTALLATION INSPECTION PROCEDURE: Prior to the start of any pipe laying activities, the Contractor shall perform proposed pipe installation procedures for inspection purposes at the location shown on the Drawings or as determined by the Engineer. Contractor shall submit all relevant submittals, and have received approval from Engineer prior to scheduling of pre-installation inspection procedure. The purpose of this inspection is to demonstrate how the trench will be excavated, the bedding will be placed, and the initial and secondary backfill placed and compacted. In addition, at the time of the final surface restoration for paved areas, a mock-up pavement restoration sample will be performed. At least one mock-up will be performed for each type of pavement restoration (asphalt and PCC) required on the Project. This mock-up will demonstrate how the pavement will be restored in accordance with the Contract Documents and serve as the standard required for all remaining pavement restoration for the Project.

a. At a minimum, the following pre-installation inspections are required:

    1. Linear pipeline projects – Contractor shall lay first 200 linear feet of pipe.

    2. Rehabilitation projects – Contractor shall perform first 4 point repairs (2 under pavement and 2 outside of pavement). Also first 200 linear feet of removal and replacement of pipe.

b. The pre-installation inspection procedure shall be as follows:

    1. Contractor shall schedule timing of the pre-installation inspection with the Engineer and provide a minimum 72 hour notice prior to inspection.

    2. Contractor shall layout pavement removal limits in agreement with the Engineer and perform pavement removal as specified.

    3. Contractor shall excavate trench as specified.

    4. Pipe bedding shall be placed and compacted in bottom of trench as specified.

    5. Pipe sections shall be placed on pipe bedding in trench as specified.

6. Initial and secondary backfill shall be placed and compacted as specified. The in-place density shall be measured after each lift of initial and secondary backfill as specified. Additional lifts of initial and secondary backfill shall not be placed until the previous lift has met the specified density. If tests on a lift of backfill show that the specified density is not obtained, the Contractor shall increase the amount of coverages, decrease the lift thicknesses or obtain a different type of compactor until the specified densities are obtained.

7. The Contractor shall demonstrate to the Engineer precautions taken to maintain the compaction of the backfill when moving the trench box.

8. Pipe deflection shall be measured 48 hours after the completion of backfilling. The maximum deflection shall be as specified. If the pipe deflection exceeds the specified deflection, the installation shall be judged to not meet this Section and the Contractor shall repeat the pre-installation inspection procedure.

9. After concurrence of the procedures, the Contractor may continue work. The Contractor shall use the pipe pre-installation procedure, which no exception was taken by the Engineer, for the installation of the pipeline. If during the course of work, it is determined that the established procedure is not producing the specified results, the Contractor shall repeat the pre-installation inspection procedure to determine a new installation procedure which will produce the desired results and is acceptable to the Engineer. The Contractor shall repeat as many times as necessary, the pre-installation inspection procedure at no cost to the Owner.

10. The Contractor shall submit in writing to the Engineer, the established procedure in such detail that it can be followed and repeated consistently by any personnel change that may occur throughout the project. Any change to the established procedure, including but not limited to means, methods, or equipment shall require another successful pre-installation inspection procedure and revised detailed procedure write-up before additional pipe installation.

c. Contractor shall schedule timing of the pavement restoration mock-up with the Engineer and provide a minimum 72 hour notice prior to mock-up. Contractor shall remove temporary surfacing and base, install and finish permanent pavement restoration as specified. After concurrence of the procedures and final pavement restoration product, the Contractor may continue pavement restoration work. This mock-up pavement restoration will serve as the established standard for all remaining pavement restoration for the Project.

801-5 PLACEMENT OF FILL:

a. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills.

b. Material placed in fill areas shall be deposited within the lines and to the grades shown on the Contract Documents or as directed by the Engineer, making due allowance for settlement/shrinkage of the material. Fill shall be placed only on properly prepared surfaces that have been inspected and approved by the Engineer. If sufficient fill material is not available from excavation on site, the Contractor shall provide select material as may be required.

c. Fill shall be brought up in substantially level loose lifts of maximum of eight (8) inches in depth and compacted throughout the site, starting in the deepest portion of the fill. During the process of dumping and spreading, all roots, debris, and other objectionable material shall be removed from the fill areas. The entire surface of the Work shall be

maintained free from ruts and in such condition that construction equipment can readily travel over any section. All fill materials shall be placed and compacted "in-the-dry."

d. Where trench backfill and compaction work is following pipe laying or where the entire area of the backfilling cannot be completed with full area lifts, the trench backfill will be benched.

    1. Benches shall be a maximum of three lifts tall.

    2. Benches shall be separated by a minimum 8 foot horizontal distance.

e. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layer, it shall be loosened by harrowing or by another approved method before the succeeding layer is placed.

f. Fill shall not be placed against concrete structures until they have been in place a minimum of fourteen (14) days or have been shown to reach a minimum of 75% of their design compressive strength.

801-6 EXCAVATION: Excavation consists of removal and handling of material encountered when establishing required grade elevations in accordance with the Contract Documents.

a. **Trench Excavation:** Excavation of trenches required for the installation of pipes and ducts shall be made to the depths required to accommodate placement of bedding material as shown in the Contract Documents. Widths shown on the Contract Documents are the established pay limits and may be adjusted to provide appropriate room for bracing, supporting, and dewatering facilities if necessary with prior approval of the Engineer. Excavation outside the established pay limits shall be at no additional cost to the Owner.

b. **Additional Excavation:** When excavation has reached required subgrade elevations, notify the Engineer or his representative who will make an inspection of conditions. If unsuitable, unsatisfactory bearing materials are encountered at the required subgrade elevation, carry excavation deeper and replace the additional excavated material with #57 Stone wrapped in geotextile fabric or CLSM as directed by the Engineer. Sand-aggregate bedding shall then be placed and compacted over the #57 Stone separated by the geotextile fabric or placed and compacted over the CLSM.

    Removal of unsuitable material and its replacement as directed beyond the authorized limits will be paid on the basis of the Contract Documents and in accordance with Section 10.

c. **Excavation for Pipelines, Manholes, Pump Stations and Structures:** Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection, or as shown on the Contract Documents.

    Care shall be taken not to disturb the bottom of excavation. Trim bottoms to required lines and grades to leave solid base to receive required bedding material. The pipe or duct shall be evenly supported on the bedding material. Bell holes shall be made as required.

    The bottom of the excavations shall be firm and dry. Sides of excavations are to be maintained in a safe condition until the completion of backfilling.

801-6.1 Shoring and Bracing in Excavations:

a. The Contractor shall be fully responsible for designing, constructing, and maintaining cofferdams consisting of shoring and bracing, as required, to support the sides of excavations to prevent any movement which could in any way reduce the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing utilities, and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the shoring, but if voids are formed they shall be immediately filled with suitable material (either useable excavated soils or selected imported material if approved by Engineer), compacted by hand or mechanical means to condition judged visually comparable to condition of adjoining native soil.

b. As part of the submittal of schedules and other data indicating the plan of Work, the Contractor shall provide drawings of the planned supporting system (including the sequence of installation and removal). This submittal is not for review by the Engineer but for informational purposes only. The Engineer shall use the schedule in tracking the progress of the Work. The drawings shall be stamped by a Professional Engineer licensed in the State of Louisiana and be of sufficient detail to adequately disclose the method of operation that the Contractor plans to use for each of the various stages of construction. The Work shall not begin until such drawings are reviewed and any questions posed by the Engineer have been adequately addressed by the Contractor.

c. Wooden trench shoring for pipes is not to be withdrawn when driven below mid-diameter of any pipe, and no wood shoring shall be cut off at a level lower than two (2) feet above the top of any pipe or no more than two (2) feet below natural ground, unless otherwise directed by the Engineer.

d. All steel trench shoring and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, existing utilities, existing piping, or personnel and property. Care shall be taken not to disturb or otherwise injure any finished facility. All voids left or caused by withdrawal of shoring shall be immediately refilled with **Sanitary Sewer Bedding/Backfill Materials as defined herein** and rammed/compacted with tools especially adapted for that purpose, by hydraulic compaction, or as otherwise directed.

e. The right of the Engineer to order shoring and bracing left in place shall not be construed as creating any obligation on the Engineer's part to issue such orders. In addition, the Engineer's failure to exercise this right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or on the Work occasioned by negligence or other cause, growing out of a failure on the part of the Contractor to leave in place sufficient shoring and bracing to prevent any caving or moving of the ground.

f. The Contractor may construct the cofferdams and shoring outside the neat lines of the foundation for pipes and manholes, unless indicated otherwise, to the extent deemed desirable for the planned method of operation so long as it does not encroach on areas outside the limits of the Work. Shoring shall be plumb and securely braced and tied in position. Shoring, bracing, and cofferdams shall be adequate to withstand all pressures to which the existing or new structure or excavation will be subjected. Pumping, bracing, and other work within the cofferdam shall be done in a safe manner and shall avoid disturbing any completed construction. The Contractor shall provide the necessary clearances and dimensions to correct any movement or bulging that may occur.

g. The Contractor shall maintain shoring and bracing in excavations regardless of time

period excavations will be open, and shall carry down shoring and bracing as excavation progresses.

h. As an alternate to shoring, the Contractor is authorized to utilize an OSHA approved mechanical trench box or slide-rail system, the size and construction of which shall be designed for the intended depth/loads. Documentation of the trench box or slide-rail system shall be submitted to the Engineer for informational purposes only.

801-6.2 Dewatering, Drainage and Flotation:

a. The Contractor shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems necessary for handling groundwater and surface water encountered during construction of structures, pipelines, and compacted fills. The Contractor is responsible for providing temporary power for any pumping operation that may be required.

b. The Contractor is responsible for complying with the requirements and obtaining necessary permits of all agencies having jurisdiction and control over use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Because the review and permitting process may be lengthy, the Contractor is required to take early action to pursue and submit for the required approvals so that construction is not delayed beyond that represented to the Engineer.

c. Prior to excavation, the Contractor shall submit detailed drawings and design calculations descriptive of the proposed means and method of dewatering and maintaining dry conditions to the Engineer. This submittal shall be prepared and sealed by a professional engineer licensed in the State of LA. The Contractor shall be responsible for the satisfactory performance of the system and for correcting any disturbance of natural bearing of soils or damage to structures caused by the dewatering system or by interruption of the continuous operation of the system as specified.

d. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding, and base course in-the-dry (no standing water in the trench). In addition, the Contractor shall make the final twenty-four (24) inches of excavation for this work in-the-dry, and not until the groundwater level is a minimum of twelve (12) inches below proposed bottom of excavation. The Contractor shall provide means and methods to control the potential for excavation base instability from either excess hydrostatic water pressures or basal heave in the design of their shoring system.

e. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to promptly remove and dispose of all water entering excavations and shall keep such excavations dry to obtain a satisfactory undisturbed subgrade foundation condition. Dewatering shall be required until the fill, structure, or pipes to be built have been completed to the extent that they will not be floated or otherwise damaged by allowing water levels to rise or return to natural elevations.

f. Wellpoints or larger wells may be required, with the approval of the Engineer, for predrainage of the soils prior to final excavation for deeper below-ground structures or piping, and for maintaining the lowered groundwater level. If so, this system shall be designed by a professional engineer licensed in the State of LA. A copy of the subsurface characterization, calculations, layout, and narrative descriptive of operation through removal and/or abandonment shall be submitted for information and comment. After comment has been offered and questions answered, the Contractor may proceed with installation. Wellpointing and larger wells shall be maintained until construction has

been completed to such an extent that the structure, pipeline, or fill will not be floated or otherwise damaged. Wellpoints or larger wells shall be surrounded by suitable filter sand and no fines shall be removed by pumping. The Contractor may be required to demonstrate the adequacy of the proposed system and filter sand by means of a test installation at the direction of the Engineer. Discharge water shall be clear, with no visible soil particles in a one-quart sample.

g. If requested by the Engineer, the Contractor's proposed method of dewatering shall include a minimum of two (2) each 2-inch diameter, Schedule 40 PVC operating groundwater observation wells, with factory slotted screen and appropriate sand pack. The observation wells shall be screened within each stratum to be dewatered at each structure as directed by the Engineer. A bentonite seal and grout shall be provided above the screened depth to the surface. Observation wells are to be used to determine/monitor the water level during construction of the structure. Locations of the observation wells shall be at structures and along pipelines as approved by the Engineer and at no additional cost to the Owner. During backfilling and construction, water levels shall be measured in observation wells at frequencies as directed by the Engineer. Contractor shall be responsible for maintaining and repairing/replacing damaged observation wells during the project. Removal or abandonment of observation wells shall be as directed by the Engineer.

h. While dewatering for new construction in the vicinity of existing structures, depletion of the groundwater level underneath these existing structures may cause settlement of within the site footprint and at some distance beyond the footprint. To avoid this settlement, the groundwater level under these structures shall be maintained by appropriate methods. In conditions where dewatering in excess of 20 gpm for over 24 hours is anticipated, a professional engineer specializing in geotechnical engineering should evaluate the potential for settlements created by dewatering that may be detrimental to existing structures. This evaluation should include an investigation of the specific soil and groundwater conditions to a depth of at least 2 times the depth of the excavation including the permeability and compressibility of the various soil strata (either by direct measurement or by empirical methods), an interpretation of the water table drawdown at the location of any potentially affected structure(s), the duration of the dewatering program, and the resulting amount of settlement that will be created at the structure(s).

801-7 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL: If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extras will be considered for the stockpiling or double handling of excavated material. Unsuitable and surplus excavated materials, unless specified otherwise, shall become the property of the Contractor. Contractor shall remove and dispose of unsuitable or surplus material off of the project site at an appropriate disposal site approved by the Engineer. Unsuitable material includes all paving removed for the Work.

801-8 BACKFILLING AROUND STRUCTURES, MANHOLES, PUMP STATIONS AND PIPELINES:

a. All backfill shall be placed in layers having a maximum thickness of eight (8) inches in loose state and shall be compacted as specified in 801-9 of this Section.

b. Backfilling shall be carried up evenly on all walls of an individual structure simultaneously. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength as described previously. Backfilling shall be subject to approval by the Engineer.

c. Backfilling shall be carried up evenly on both sides of the pipeline. Contractor shall take special care to ensure proper support, compaction and elimination of voids under the

haunches of the pipe.

d. In the case of trenches across or along roadways with open ditch drainage refer to subsection 801-11c for backfill and protection of roadside ditch sloped areas.

e. In locations where pipes pass through structure walls, the Contractor shall take the following precautions to consolidate the backfilling up to an elevation of at least one (1) foot above the bottom of the pipes:

    1. Place sand-aggregate bedding and initial backfill in such areas for a distance of not less than three (3) feet either side of the centerline of the pipe in level loose layers not exceeding eight (8) inches in thickness. Compact each layer.

    2. Place and thoroughly compact adjacent layers simultaneously.

f. The final finished surface of filled areas shall be graded to smooth, true lines, strictly conforming to grades indicated on the grading plan, and no soft spots or uncompacted areas will be allowed in the Work.

g. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure, and earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling. Contractor shall take precautions as to not disturb the compaction of the backfill when removing the bracing.

g. Controlled Low Strength Material placement will cause hydrostatic uplift pressure on the pipe in cases where bedding and initial backfill material may not be used. Therefore, the Contractor shall anchor the pipe to remain on its intended alignment and grade. Contractor shall submit to the Engineer a pipe anchorage plan for the use of CLSM backfill. The plan shall include at a minimum:

    1. Anchor/ballast material,

    2. Size and weight of each,

    3. Required spacing

    4. Dams to confine the CLSM

    At a minimum the anchorage shall be located at the pipe joints and midpoints. The anchoring/ballasting system shall be designed and stamped by a Professional Engineer licensed in the State of Louisiana. In addition to the anchorage system the CLSM shall be placed in incremental lifts around the pipe. Each lift shall be allowed to attain partial set before placing the next lift. The recommended incremental lifts are as follows:

    1. First lift = 1/4 pipe outer diameter (OD)

    2. Second lift = 1/3 OD

    3. Third lift placed to the pipe crown

    4. Remainder of backfill may be placed in one lift

    Anchoring system is not required when bedding and initial backfill material is used in accordance with Standard Plan 801-01.

801-9 COMPACTION:

a. **General:** Contractor shall control soil compaction during construction and obtain the minimum required percentage of the maximum dry densities as specified herein and as shown on the Contract Documents. **Soil compaction with a backhoe bucket or any other heavy apparatus not designed specifically for soil compaction is not allowed**. The Contractor shall maintain the backfill for a period of one year after Final Acceptance and shall restore any backfill that fails and repair any pavement or other structures, which may be damaged as a result of backfill failure. It shall be the Contractor's responsibility to notify the Engineer in writing that the compaction tests as required can be performed.

The frequency for density tests will be a minimum of one test per lift per 100 linear feet of trench excavation and one randomly selected test per 2,500 square feet of excavation for open areas. If the density tests indicate that the Work does not meet specified density requirements, the Engineer may require additional density tests to determine the extent of the deficient Work at the Contractor's expense. The Contractor will not be allowed an extension of Contract Time as a result of any density testing. The Contractor shall be required to remove, replace and compact deficient Work at no additional cost to the Owner.

It is the Contractor's responsibility to provide equipment and labor as needed to achieve the required compaction as specified herein. Should the rates of compaction fall below the values specified herein; the Engineer has the right to instruct the Contractor to alter his work and/or to provide different equipment to assure that the required backfill quality is consistently achieved. Any decision by the Engineer to forgo such instructions shall in no way relieve the Contractor of his responsibility to provide backfill of the specified quality.

b. **Percentage of Maximum Density Requirements:** Compact subgrade, and fill materials to not less than the following percentages of maximum dry density as determined in accordance with ASTM 698, the Standard Proctor Test.

1. **Structural Fill below Spread Footing Foundations, Slabs-on-Grade, and other Portions of Structures**: Structural fill shall be place in horizontal lifts not exceeding eight-inch (8") loose thickness, or less if necessary to obtain proper compaction. Moisture content shall be within 3% of optimum as determined in accordance with ASTM D698, with stability present. Clay structural fill shall be compacted full depth to a minimum of 95 percent of the maximum dry density. Granular structural fill, with less than 5% passing the No. 200 Sieve shall be compacted full depth to at least 75% of the relative density as determined by ASTM D4253 and D4254.

2. **Manholes, Pump Stations, Structures, and Buildings:** Areas adjacent to structures shall be compacted with vibratory mechanical compaction equipment approved by the Engineer. Compact eight-inch (8") loose lifts to a minimum of 95 percent of the maximum dry density as determined by ASTM D698. Moisture content of backfill material shall be within 3% of optimum as determined in accordance with ASTM D698. Granular backfill, with less than 5% passing the No. 200 Sieve, shall be compacted to at least 75% of the relative density as determined by ASTM D4253 and D4254.

   The #57 stone bedding shall be placed in maximum 12" loose lifts, rodded and vibrated to orient the stone and eliminate voids to create uniform bedding support for the pipe, with the material compacted to 100% of the materials maximum dry rodded weight in accordance with ASTM C29.

3. **Compaction of Bedding and Initial Backfill Material:** Bedding and initial backfill shall be compacted. Compact eight-inch (8") loose lifts to a minimum of 95 percent of the maximum dry density as determined by ASTM D698. Bedding material will be rodded and vibrated to orient the stone and eliminate voids to create uniform bedding support for the pipe. Bedding material will not be compacted until rodding is complete. Moisture content of bedding and initial backfill material shall be within 3% of optimum as determined in accordance with ASTM 698.

4. **Compaction of Backfill Directly Under Existing Pavements:** Secondary backfill directly under existing pavements (roadways and parking lots) shall be #610 Stone material and placed in loose layers of eight (8) inches and compacted. Backfill shall be compacted with vibratory compaction equipment to not less than 95 percent of the maximum dry density as determined by ASTM D698. Moisture content of backfill material shall be within 3% of optimum as determined in accordance with ASTM 698.

5. **Compaction of Backfill Near Existing Structures and Pavements or Directly Under Future Pavements:** Secondary backfill within 10 feet of an existing structure foundation, the edge of an existing road/shoulder/back of curb, and/or directly under the limits of a future asphaltic or PCC roadway/parking lot to be constructed subsequent to sanitary sewer installation shall be bedding and initial backfill (sand-aggregate) material. In this situation the sand aggregate material shall be placed and compacted to within 3.5 feet of the surrounding grade, and usable excavated soils or select imported fill for the remainder of the backfill to surrounding or specified grade. Both materials shall be placed in loose layers of eight (8) inches and compacted. All backfill shall be compacted with vibratory compaction equipment to not less than 95 percent of the maximum dry density as determined by ASTM D698. Moisture content of backfill material shall be within 3% of optimum as determined in accordance with ASTM 698.

6. **Unsuitable Subgrades or Wet Trench Bottoms:** If trench bottoms contain unsuitable subgrades, muck bottoms, or wet bottoms that cannot be pumped dry, then at the direction of the Engineer, #57 Stone encapsulated in geotextile fabric, shall be used in accordance with the Standard Detail 801-01. #57 Stone shall be placed and compacted in lifts suitable to provide a suitable, non-yielding working surface for the required construction operations.

7. **Compaction of All Other Backfill:** Where a trench is in open ground and the backfill is not influenced by loading conditions, secondary backfill shall be as shown on the Contract Documents and compacted in loose layers of eight (8) inches and compacted to a minimum 90 percent of the maximum dry density. If the Contractor is unable to dry the excavated soil to an appropriate moisture content in order to achieve the required rate of compaction, he shall request authorization from the Engineer to deem the excavated soil as unusable and replace with imported select material for backfill. The final surface shall be left in a condition equal to that originally found at the start of the Work. The backfill shall be finished over the trench flush with the ground surface. The Contractor will add backfill material monthly during the contract duration and during the warranty period to compensate for settlement and erosion.

c. **Moisture Control:** Contractor shall condition subgrade or fill material to moisture content sufficiently near optimum to accommodate compaction meeting the required percent compaction. When the material is too dry to be compacted efficiently, the Contractor shall uniformly apply water to soil material and thoroughly mix the soil to achieve moisture content near the optimum level to facilitate compaction. Contractor

shall remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

d. Incidental compaction due to traffic by construction equipment will not be credited toward the required minimum compaction as required for any material.

801-10 GRADING:

a. **General:** Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades as are required or shown on the Contract Documents.

b. **Grading Outside Building Lines:** Grade areas adjacent to building lines, as shown on the Drawings, to drain away from structures and to prevent ponding. Finish surface free from irregular surface changes and to within not more than 0.10 feet above or below the required elevation.

c. **Grading Surface of Fill under Building Slabs:** Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of one-half inch when tested with a ten (10) foot straightedge.

d. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed by the Engineer, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the prosecution or condition of the Work.

e. The Engineer reserves the right to make adjustments or revisions in lines or grades if found necessary as the Work progresses, in order to obtain satisfactory construction.

801-11 MAINTENANCE:

a. **Protection of Graded Areas:** Protect newly graded areas from traffic and erosion. Keep areas free of trash and debris and repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

b. **Protection of Sloped Areas:** If a fill section or backfilled trench zone falls within a sloped area then Contractor shall place an erosion control blanket over the slope. Areas requiring an erosion control blanket shall be approved prior to placement. After materials are placed and spread, lumps, stones, roots and other foreign matter shall be removed from the area. Erosion control blanket shall be placed in a timely manner to prevent erosion. Payment for the erosion control blanket shall be in accordance with Section 903.

c. **Protection of Roadside Ditch Sloped Areas:** In the case of roadways with open ditch drainage - when any portion of a sewer (sanitary or storm) excavation trench limit falls within 1 foot inside or 5 feet outside the pavement edge the Contractor shall place and compact Imported Clay Fill for the length of the trench excavation as shown on the Roadside Ditch Slope Stability Treatment Detail included at the end of this Section.

After placement and compaction of the clay material, a layer of topsoil shall be placed on the slope. The topsoil shall be seeded and fertilized in accordance with subsection 903-3.2.1. Once the topsoil has been seeded and fertilized the Contractor shall overlay the topsoil with an Erosion Control Mat in accordance with subsection 903-3.2.4. The Contractor shall maintain existing roadside slopes, ditch side slopes and ditch flow lines by undercutting existing grades for placement of the clay fill and topsoil. The cost

of the topsoil, seeding, and erosion control matting shall be included in the Imported Clay Fill pay item.

d. **Reconditioning Compacted Areas:** Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

801-12 MEASUREMENT:

a. **Sewer Point Repair Excavation, Backfill, and Compaction:** Measurement for the excavation, bedding, backfill and compaction for each sewer line point repair shall be made on a linear foot basis, measured to the nearest whole foot, for the depths listed under this Item of the Bid Form. Payment for excavation on each sewer point repair will be based on the actual length of main line pipe replaced plus one (1) additional foot of excavation on each end, up to and including twenty-two (22) feet in length. When tying into a manhole, measurement will be based on the actual length of main line pipe replaced (from outside face of manhole) plus one (1) additional foot of excavation on one end only. The other end will be paid for under the Bid Item for connection to existing manhole. Any additional excavation, authorized by the Engineer, beyond the twenty-two (22) foot sewer point repair excavation limit will be paid for under the Sewer Remove and Replace Excavation, Backfill, and Compaction Bid Item.

   The depth will be the average of measurements taken every twenty (20) feet, or as determined by changes in ground elevation, measured from ground elevation to the pipe invert along the horizontal centerline of the existing pipe. Trench width shall be as specified in the Contract Documents.

b. **Sewer Remove and Replace Excavation, Backfill, and Compaction:** Measurement for the excavation, bedding, backfill, and compaction for each sewer line remove and replacement as designated in the Contract Documents, shall be made on a linear foot basis, measured to the nearest whole foot, for the depths listed under this Item of the Bid Form. Payment for excavation will be based on the actual length of main line pipe replaced plus one (1) additional foot of excavation on each end. When tying into a manhole, measurement will be based on the actual length of main line pipe replaced (from outside face of manhole) plus one (1) additional foot of excavation on one end only. When tying into a manhole on both ends, measurement will not include one (1) additional foot of excavation on either end that is tied into the manhole. It will be paid for under the Bid Item for connection to existing manhole.

   The depth will be the average of measurements taken every 25 feet, or more often as determined by changes in ground elevation, measured from ground elevation to the pipe invert along the horizontal centerline of the existing pipe. Trench width shall be as specified in the Contract Documents.

c. **Sewer Service Lateral Excavation, Backfill, and Compaction:** Measurement for the excavation, bedding, backfill, and compaction for sewer service laterals shall be made on a linear foot basis, measured to the nearest whole foot, from the edge of the mainline trench pay limit of excavation, bedding, backfill, and compaction to the end of the each sewer service lateral repair. The additional footages on the ends do not apply to sewer service laterals.

d. **#57 Stone Backfill:** Measurement for #57 stone backfill shall be the in-place measure of the number of cubic yards of limestone required to be used as needed and as authorized by the Engineer due to unsuitable material encountered in the trench bottom.

e. **#610 Stone Backfill:** Measurement for #610 stone backfill shall be the in-place measure of the number of cubic yards of backfill required to be used as needed and as authorized by the Engineer.

f. **Select Material for Backfill:** The Contractor shall use all such usable excavated soils available from excavations made in this Contract prior to supplying select material from other sources. Measurement for select material for backfill shall be the in-place, compacted measure of the number of cubic yards of select material required to be used as needed and as authorized by the Engineer. Select material does not include transporting, placing, and compacting usable excavated soils from excavations made in the Contract.

   Select material used to fill voids resulting from unauthorized excavation outside the established pay limits, or where required for dewatering, shall not be measured for payment even though the Engineer ordered their use.

g. **Imported Clay Fill:** Measurement for this item shall be the in-place measure of the number of cubic yards of imported clay fill required to be used as needed and as authorized by the Engineer.

h. **Controlled Low Strength Material:** Measurement for CLSM will be by the cubic yard from plant batch tickets.

i. **Sand-Aggregate for Secondary Backfill:** Measurement for sand-aggregate mixture for secondary backfill shall be the in-place measure of the number of cubic yards of secondary backfill required to be used as needed and as authorized by the Engineer.

801-13 PAYMENT:

a. **Sewer Point Repair Excavation, Backfill, and Compaction:** Payment for this Item will be full compensation for miscellaneous clearing and grubbing, traffic control, trench excavation, trench dewatering, shoring and bracing, bedding, backfilling, compaction, restoring the trench surface to grade, top soiling, test pits, and driving and removing shoring and bracing, in accordance with the Contract Documents. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item. Sewer pipe and fittings required for sewer point repairs will be paid for under the relative pay item in Section 802.

b. **Sewer Remove and Replace Excavation, Backfill, and Compaction:** Payment for this Item will be full compensation for miscellaneous clearing and grubbing, traffic control, trench excavation, trench dewatering, shoring and bracing, bedding, backfilling, compaction, restoring the trench surface to grade, top soiling, test pits, and driving and removing shoring and bracing, in accordance with the Contract Documents. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item. Sewer pipe and fittings required for sewer point repairs will be paid for under the relative pay item in Section 802.

c. **Sewer Service Lateral Excavation, Backfill, and Compaction:** Payment for this Item

will be full compensation for miscellaneous clearing and grubbing, traffic control, trench excavation, trench dewatering, shoring and bracing, bedding, backfilling, compaction, restoring the trench surface to grade, top soiling, test pits, and driving and removing shoring and bracing, in accordance with the Contract Documents. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item. Sewer pipe and fittings required for sewer point repairs will be paid for under the relative pay item in Section 802.

d. **#57 Stone Backfill:** Payment for this Item will be full compensation for geotextile fabric and #57 stone backfill furnished transported, placed, and compacted as shown in the Contract Documents and not specifically included under other Bid Items.

e. **#610 Stone Backfill:** Payment for this Item will be full compensation for #610 stone backfill furnished transported, placed, and compacted as shown in the Contract Documents and not specifically included under other Bid Items.

f. **Select Material for Backfill:** Payment for this Item will be full compensation for select material furnished from sources other than excavations made in this Contract, transported, placed, and compacted as ordered by the Engineer and not specifically included under other Bid Items. No payment will be made for usable excavated soil obtained from excavations made in this Contract.

g. **Imported Clay Fill:** Payment for this Item will be full compensation for imported clay material, transported, placed, and compacted as ordered by the Engineer. The cost of the topsoil, seeding, and erosion control matting associated with the Roadside Ditch Slope Stability Treatment shall be included in the included in this pay item.

h. **Controlled Low Strength Material:** Payment for this Item will be full compensation for CLSM backfill, including pipe anchorage, furnished, transported and placed as ordered by the Engineer.

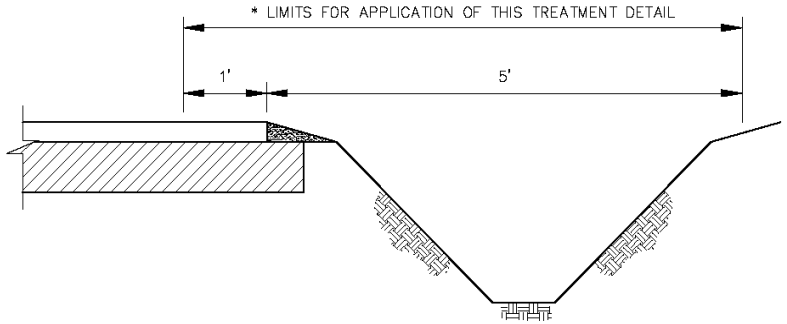
i. **Sand-Aggregate for Secondary Backfill:** Payment for this Item will be full compensation for sand-aggregate mixture required as secondary backfill furnished transported, placed, and compacted as shown in the Contract Documents and not specifically included under other Bid Items.

801-14 PAY ITEMS:

Trench Depth Schedule

0	=	0	-	6	Feet
1	=	6.1	-	8	Feet
2	=	8.1	-	10	Feet
3	=	10.1	-	12	Feet
4	=	12.1	-	16	Feet
5	=	16.1	-	20	Feet
6	=	20.1	-	24	Feet
7	=	24.1	-	28	Feet
8	=	28.1	-	32	Feet
9	=	32.1	-	36	Feet

Item No.	Item	Unit
801100_	Sewer Point Repair Excavation, Backfill, and Compaction (_' – _' depth)	Linear Foot
801200_	Sewer Remove and Replace Excavation, Backfill, and Compaction (_' – _' depth)	Linear Foot
8012100	Sewer Service Lateral Excavation, Backfill, and Compaction	Linear Foot
8013000	#57 Stone Backfill	Cubic Yard
8013100	#610 Stone Backfill	Cubic Yard
8013200	Select Material for Backfill	Cubic Yard
8013300	Imported Clay Fill	Cubic Yard
8013400	Controlled Low Strength Material	Cubic Yard
8013500	Sand-Aggregate for Secondary Backfill	Cubic Yard



(1) EXISTING PAVEMENT BASE TO REMAIN

(2) EXISTING ASPHALTIC CONCRETE SURFACING TO REMAIN

(3) REQUIRED FULL DEPTH ASPHALT CONCRETE BASE (PG 64-22)

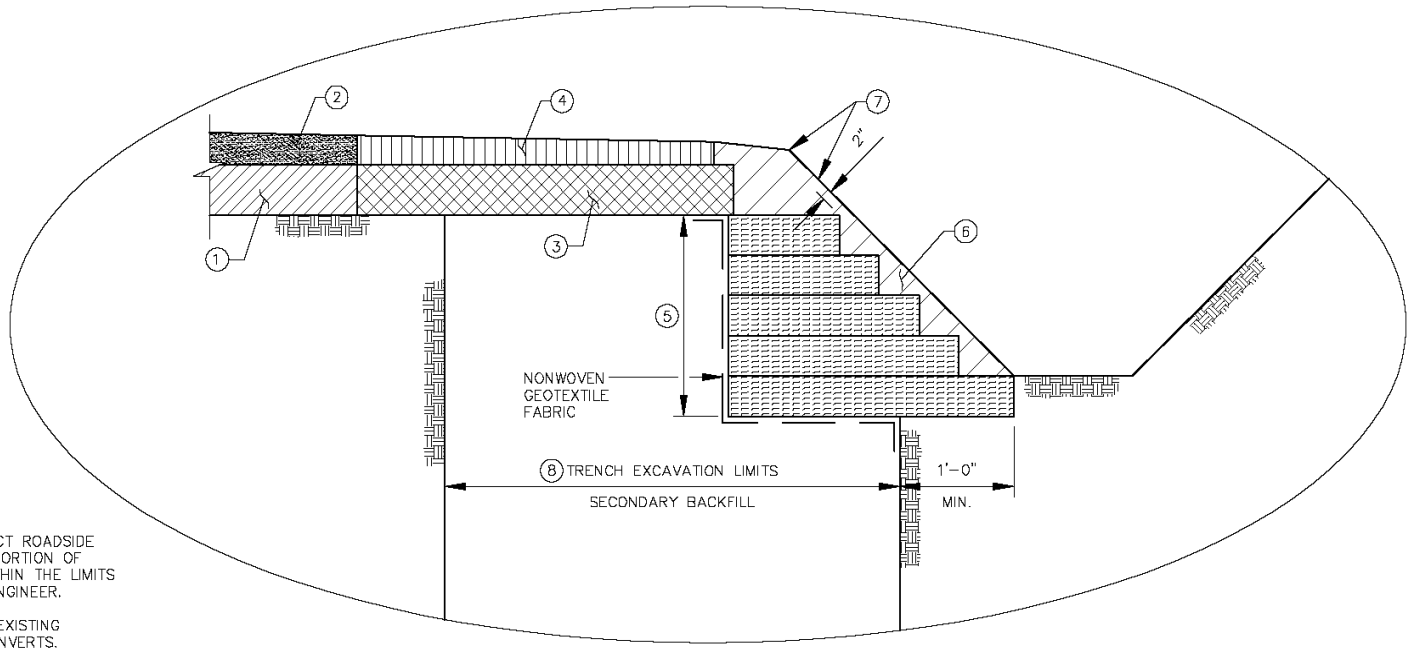
(4) REQUIRED ASPHALTIC CONCRETE SURFACING (TYPE B MIX, (PG-76-22M) 4" MIN. DEPTH)

(5) REQUIRED COMPACTED CLAY, 8" LOOSE LIFTS. THE COST OF IMPORTING, PLACING, AND COMPACTING THE CLAY SHALL BE INCLUDED IN THE PRICE PER CUBIC YARD FOR IMPORTED CLAY FILL

(6) REQUIRED TOPSOIL (SEEDED PER SPECIFICATION SECTION 903)

(7) REQUIRED EROSION CONTROL BLANKET

(8) SEWER PIPE REPAIR EXCAVATION (SEE STANDARD PLAN 801-01)



NOTES:

1. *CONTRACTOR SHALL CONSTRUCT ROADSIDE DITCH TREATMENT WHEN ANY PORTION OF TRENCH EXCAVATION FALLS WITHIN THE LIMITS SHOWN, OR AS DIRECTED BY ENGINEER.
2. CONTRACTOR SHALL MAINTAIN EXISTING ROADSIDE SLOPES AND DITCH INVERTS.
3. PLACEMENT AND COMPACTION OF CLAY, TOPSOIL (INCLUDING SEED) AND EROSION CONTROL BLANKET SHALL BE INCLUDED IN THE IMPORTED CLAY FILL PAY ITEM.

ROADSIDE DITCH SLOPE STABILITY TREATMENT DETAIL

N.T.S.

SECTION 802

GRAVITY SEWER PIPE

SECTION 802
GRAVITY SEWER PIPE

802-1 DESCRIPTION: This Work shall consist of furnishing all labor, materials, equipment, and incidentals required to remove and dispose of existing gravity sewer pipe if required, perform point repairs, remove and replace repairs and install new gravity sanitary sewer lines and fittings.

802-2 MATERIALS: Materials shall conform to the following Sections and Subsections:

a.	Plastic Pipe	1016-1.1
b.	Ductile Iron Pipe	1016-1.2
c.	Steel Pipe	1016-1.3
d.	Fiberglass Reinforced Polymer Pipe	1016-1.4

When a foreign manufactured material is proposed for use, have material tested for conformance to applicable ASTM requirements by certified independent testing laboratory located in the United States. Certification from any other source is not acceptable. Furnish copies of test reports to the Engineer for review. Cost of testing shall be borne by the Contractor.

Contractor shall provide sewer pipes with the inside diameter shown on the Contract Documents. Diameters shown on the Drawings and listed in the pay items represent the required inside diameters, regardless of pipe material.

When an item for gravity "Sewer Pipe" is included in the contract, the Contractor has the choice to select from the following list of pipe materials in accordance with the specified inside diameters:

- Less than 18” (inside diameter) – PVC, HDPE and Ductile Iron
- 18” up to but not including 21” (inside diameter) – PVC, HDPE, Ductile Iron, or FRP
- 21” up to and including 24” (inside diameter) – PVC, HDPE, FRP, Ductile Iron, or Large Diameter Closed Profile PVC
- 27” up to and including 54” (inside diameter) – HDPE, FRP, Large Diameter Closed Profile PVC, or Ductile Iron
- Greater than 54” (inside diameter) – FRP or Ductile Iron

802-3 SUBMITTALS:

a. The Contractor shall submit to the Owner prior to receiving the Notice to Proceed at the pre-construction meeting, a list of materials to be furnished and the names of the suppliers.

b. The Contractor shall submit for approval, complete, detailed shop drawings of all pipe and fittings.

c. The Contractor shall submit and shall comply with the pipe manufacturer’s recommendations for handling, storing and installing pipe and fittings.

d. The Contractor shall submit pipe manufacturer’s certification of compliance with these Contract Documents.

802-4 CONSTRUCTION:

802-4.1 Open Trench: Trenching construction consists of trench excavation, bedding, laying of pipe on grade, backfill, compaction, grading and incidentals in accordance with Section 801.

802-4.1.1 Pipe Laying: Pipe shall be handled, stored, and laid in accordance with the manufacturer's instructions and as specified as follows:

a. During pipe laying, trenches shall be kept dry. After each day's operations, and at other times when pipe laying is discontinued for more than one (1) hour, ends of the pipe shall be capped or plugged until pipe laying is resumed.

b. Pipe laying shall not advance backfilling by more than 100 feet without approval by the Engineer.

c. The pipes and fittings shall be so laid in the trench that after the sewer is completed, the interior surface of the bottom thereof shall conform accurately to the line and grade shown in the Contract Documents. Pipe laying shall begin at downstream end of line. Bell or groove ends of pipe shall be placed facing upstream. Bell holes shall be excavated to assure that only the pipe barrel shall bear upon the trench bedding material. No blocking under the pipe will be permitted.

d. Extreme care shall be used when handling and installing pipe and fittings. Under no circumstances shall pipe or fittings be dropped either into the trench or during unloading. The interior of the pipe shall be thoroughly cleaned of oil, dirt, and foreign matter, then closely inspected for damage to coatings, walls, bells, gaskets, and ovality, prior to installation. Nonconforming or damaged pipe, gaskets, or coatings shall not be installed.

e. When necessary to cut and machine all pipe in the field, the appropriate tools as recommended by the pipe manufacturer, shall be used. A "full insertion mark" shall be provided on each field cut pipe end. Field-cut pipe shall be beveled with a beveling tool specifically made for the pipe material.

f. The Contractor shall make every effort to conform to the line and grade of the plans. The grade shown on the Plans is that of the invert to which the Work must conform. The Owner reserves the right to make adjustments to the grades and slopes to fit actual field conditions.

g. After completion of pipe installation, no sag in the line greater than the maximum allowed sag tolerances noted in the Standard Plan 802-01 shall be acceptable. Any section of pipe that does not conform to these specifications shall be replaced or re-laid at the contractor's expense.

802-4.1.2 Pipe Jointing: The jointing of the pipe shall be done in strict accordance with the pipe manufacturer's instructions and shall be done entirely in the trench. Joints and gaskets shall comply with Subsection 802-2 and the relative pipe material. Workmen who are certified by the pipe manufacturer to join the pipe shall only perform pipe jointing. They should perform the work as follows:

a. Expend extreme care to keep the bells of the pipe free from dirt and rocks so joints may be properly assembled without overstressing the bells.

b. Provide lubricant, place and drive home newly laid sections. Use of backhoes or similar powered equipment will not be allowed unless protective measures are provided and approved in advance by the Engineer.

c. Install pipe to "full insertion mark" where provided.

802-4.2 Trenchless: Trenchless construction consists of technologies and methods utilized for

installing sewer pipelines and services with minimal surface disruption and destruction resulting from excavation. Trenchless Construction shall conform to the following sections:

Pipe Bursting	811
Jacked & Bored Pipe / Casing	817
Horizontal Directional Drilling	818
Microtunneling & Pipe-Jacked Tunnels	819

802-4.3 Remove and/or Abandonment of Existing Gravity Sewer Pipe: This section addresses the removal and/or abandonment of the existing gravity sewer pipe and all appurtenances which are being removed (or abandoned) as detailed on the Contract Documents.

a. Abandon Sewer Pipe: If an existing sewer pipe is shown to be abandoned in place on the Contract Documents, the Contractor shall be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, the entire length of the pipe shall be filled with flowable fill and capped as noted on the Drawings or as directed by the Engineer.

b. Plug and Abandon Sewer Pipe: If an existing sewer pipe is shown to be plugged and abandoned in place on the Contract Documents, the Contractor shall be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, the pipe shall be plugged approximately 18 inches into each end of the pipe and capped as noted on the Drawings or as directed by the Engineer.

c. Remove Sewer Pipe: If an existing sewer pipe is shown to be removed on the Contract Documents, the Contractor shall completely remove the sewer pipe. The removal trench shall be backfilled in accordance with the provisions of Section 801 or as directed by the Engineer. The Contractor shall be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is removed. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality.

d. Remove and/or Abandon Sewer Pipe:

    1. If an existing sewer pipe is shown as remove and/or abandon in place on the Contract Documents, the Contractor has the option to either completely remove the sewer pipe or abandon the sewer pipe. The Contractor shall be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned or removed. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality.

    2. If removed, the removal trench shall be backfilled in accordance with the provisions of Section 801 or as directed by the Engineer.

    3. If abandoned, the entire length of the pipe shall be completely filled with flowable fill.

802-5 NEW PIPE-EXISTING PIPE CONNECTIONS: Connections between existing and new pipe, with the exception of HDPE pipe, shall be jointed with non-shear repair couplings conforming to

ASTM C425 and ASTM C1173. The stainless steel shear rings and clamping bands used in conjunction with the molded rubber sleeve shall conform to ASTM A 240 Series. When using the non-shear repair coupling, the gap between the two pipes shall be no more than ¼".

When non-shear repair couplings are not available for a particular size or material, connections between existing and new pipe shall be jointed using flexible elastomer couplings with a 300 stainless steel band for each end and adjusting screws capable of sustaining an applied torque in excess of 80 inch-pounds. When dissimilar pipe materials are joined, the Contractor shall use flexible couplings that are resistant to the corrosive action of the soils and sewage, and that provide a permanent watertight joint.

Connections between existing and new HDPE pipe shall be jointed with HDPE electrofusion couplings in accordance with subsection 1016-1.1.2. Prior to ordering materials, Contractor shall check existing pipe diameters and take care to provide matching pipe and coupling to make proper connection.

802-6 PIPE-MANHOLE CONNECTIONS: All sewer pipe shall be connected to new manholes with either flexible rubber boot connectors or integrally cast flexible connectors installed in accordance with the manufacturer's instructions. Then the opening on the inside and outside of the manhole shall be grouted (non-shrink) if necessary, to achieve a watertight seal.

For existing manhole connections, pipe shall be connected with a hydraulic cement material having a set time of no more than two (2) minutes; compressive strength of 600 psi at one (1) hour, 1,000 psi at twenty-four (24) hours; bond of 40 psi at one (1) hour, 80 psi at twenty-four (24) hours. These requirements apply whether it is a connection to an existing sanitary sewer manhole or connections through a storm water conflict manhole, junction box, or inlet.

In the case of HDPE pipe, in addition to the flexible manhole connectors and non-shrink grout, electrofusion flex restraints shall be permanently attached to the pipe to prevent movement. HDPE flex restraints shall be in conformance with subsection 1016-1.1.2.

802-7 SERVICE LATERAL CONNECTIONS: Connections between the existing service lateral and the new/rehabilitated sewer main line shall be in accordance with the Contract Documents. Existing sewer service lateral and house connections shall be adjusted as required avoiding conflicts with the new Work. New pipe and fittings shall be furnished and installed as necessary and in accordance with the Contract Documents.

a. Service lateral connections located within the limit of a rehabilitation method or repair are required to be replaced (regardless of construction method) in both directions up to the property line with a clean-out and pad installed at the property line. Construction shall be in accordance with the appropriate typical drawings in the Contract Documents. The exception to this is with service lateral connections on mainlines to be rehabilitated with CIPP lining. In this case, unless a point repair or remove and replace repair is shown on the plans, service lateral connections on mainlines to be CIPP lined will receive a lateral connection sealing and repair product (top hat) in accordance with Sections 808 and 809.

b. Service lateral vertical connection stacks shall be required in accordance with the Contract Documents.

c. New service lateral terminations, required prior to private service connection and cleanout installation, shall be required in accordance with the Contract Documents and stubbed a minimum of 3 feet above ground and capped.

d. In association with mainlines previously rehabilitated with CIPP lining:

1. Connections between the service lateral and a main line, which has previously been repaired by a CIPP lining process, shall be made with six (6)-inch Flexible saddle wyes with corrosion resistant series 300 stainless steel clamps capable of sustaining an applied torque of 60 inch-pounds. In cases where a vertical stack is repaired, the PVC saddle wye shall be used in place of the flexible wye.

2. Host pipe shall be removed to expose the full circumference of the CIPP liner around the wye connection, to allow for installation of the saddle with a sealant product such as Hydrophilic Water Stop. The interface between pipe and CIPP liner shall be sealed around the entire circumference of the wye connection with an approved non-shrink grout.

e. In association with Slip Lining:

1. After the liner pipe has been inserted in the host pipe, given the appropriate relaxation period, and secured in the upstream and downstream manhole, all existing services shall be reconnected. A portion of the host pipe, at the liner pipe around each service connection shall be removed to expose the liner pipe to provide adequate working space for making the new service connection. The Contractor shall reconnect the services to the liner pipe using compressive-fit service connections such as Inserta-Tee or approved equal.

2. Prior to backfilling, the portion of the host pipe removed for service reconnection shall be sealed to preclude migration of the backfill material into the annular space or loss of grout material during grouting of the annular space between the liner pipe and host pipe. This area may be sealed with an approved non-shrink grout or the portion of host pipe removed may be replaced and grouted.

f. In association with HDPE (HDPE Pipe or Lining Material):

1. The method of saddle connection to the main line shall be by Gasketed Electrofusion Branch Saddles by Central Plastics, or approved equal in conformance with subsection 1016-1.1.2. Personnel certified by a manufacturer of polyethylene pipe in the proper methods of installing electrofusion fittings shall carry out installation of electrofusion saddles in strict conformance with the manufacturer's printed instructions. Installation shall include all equipment, labor, materials, and incidentals. Saddle material shall be compatible with the main line pipe or lining material.

802-8 ACCEPTANCE TESTS FOR NEW PIPE: Installed sewer lines shall pass one or more of the following tests performed by the Contractor as directed by the Engineer. Contractor shall perform the test in the presence of the Engineer or his representative. Contractor shall coordinate testing with surface restoration requirements of Section 4-5. Any removal or replacement of temporary or final surface restoration by the Contractor to investigate leaks shall be done so at no additional cost to the Owner.

802-8.1 Leakage Tests: Sewer lines shall be tested for leakage as follows:

Low Air Pressure Test - manhole to manhole reach of pipe for sewer pipe 36" in diameter and smaller; individual joints for sewer pipe larger than 36" in diameter

Infiltration Test - for sewer pipe greater than 36" in diameter with groundwater equal to or greater than 2 feet above top of pipe (with approval of Engineer)

Exfiltration Test - for sewer pipe greater than 36" in diameter with groundwater less than 2 feet above top of pipe (with approval of Engineer)

802-8.1.1 Low **Air Pressure Test:** This practice defines the proper procedures for acceptance testing of installed gravity sewer pipe using low-pressure air, to provide assurance that the pipe, as installed, is free from significant leaks. Included are requirements for equipment accuracy, safety precautions, line preparation, test method, and minimum holding times. Applicable sections of ASTM F1417 shall also apply.

a. For Pipes 36" in Diameter and less (Manhole to Manhole Reach)

1. Only lines tested after backfilling to final grade will be considered for acceptability. Acceptance will be dependent on a passing test. However, the installer as a presumptive test to determine the condition of the line prior to backfilling may also use this test. During sewer construction, all service laterals, stubs and fittings into the sewer test section shall be properly capped or plugged to prevent air loss that could cause an erroneous air test result. It may be necessary and is always advisable for the Contractor to restrain gasketed caps, plugs, or short pipe lengths with bracing stakes, clamps, and tie-rods or wire harnesses over the pipe bells.

2. Unless otherwise specified, the Contractor shall furnish all the necessary equipment and be responsible for conducting all low-pressure air tests. In addition, the Contractor shall be responsible for any necessary repair work on sections that do not pass the test at no additional cost to the Owner.

3. The Engineer shall witness all low-pressure air tests and verify the accuracy and acceptability of the equipment utilized. The Engineer will inform the Contractor regarding acceptable methods of repair in the event one or more sections fail to pass the low-pressure air test.

4. Ensure that all plugs are installed and braced to prevent blowouts. As an example of the hazard, a force of 250 pounds is exerted on an 8-inch plug by an internal pipe pressure of 5 psig, and a force of 2,250 pounds is exerted on a 24-inch plug by an internal pressure of 5 psig. The Contractor must realize that sudden expulsion of a poorly installed plug, or of a plug that is partially deflated before the pipe pressure is released, can be very dangerous. For this reason, it is recommended that every plug be positively braced against the manhole walls, and that no one be allowed in the manhole adjoining a line being tested while as pressure is maintained in the line.

5. Internal pressure of more than 9 psig shall not be permitted except for leak location equipment where the plugs are firmly tied together. Contractor should verify maximum allowable pressure recommended by pipe manufacturer.

6. Use either mechanical or pneumatic plugs. All plugs shall be designed to resist internal testing pressures without the aid of external bracing or blocking. However, the Contractor shall internally restrain or brace the plugs to the manhole wall as an added safety precaution throughout the test.

7. Air test gauges shall be laboratory-calibrated test gauges, and if required by the Engineer, shall be recalibrated by a certified laboratory prior to the leakage test.

Air gauges shall have a size and pressure range appropriate for the pipe being tested.

8. All pressurizing equipment used for low-pressure air testing shall include a regulator or relief valve set no higher than 9 psig to avoid over-pressurizing and displacing temporary or permanent plugs. As an added safety precaution, the pressure in the test section should be continuously monitored to make certain that it does not, at any time, exceed 9 psig. (It may be necessary to apply higher pressure at the control panel to overcome friction in the air supply hose during pressurization.)

9. To facilitate test verification by the Engineer, all air used shall pass through a single, above ground control panel. The aboveground air control equipment shall include a shut-off valve, pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge having a pressure range from 0 to at least 10 psi. The continuous monitoring gauge shall be no less than 4 inches in diameter with minimum divisions of 0.10 psi and an accuracy of plus or minus 0.04 psi. Two separate hoses shall be used to: 1) connect the control panel to the sealed line for introducing low-pressure air, and 2) a separate hose connection for constant monitoring of air pressure build-up in the line. This requirement greatly diminishes any chance for over-pressurizing the line.

10. If pneumatic plugs are utilized, a separate hose shall also be required to inflate the pneumatic plugs from the above ground control panel.

11. After a manhole-to-manhole reach of pipe has been backfilled to final grade and compacted, prepared for testing, and a 24-hour waiting period has elapsed, the plugs shall be placed in the line at each manhole and secured.

12. The Contractor is advised to seal test all plugs before use. Seal testing may be accomplished by laying one length of pipe on the ground and sealing it at both ends with the plugs to be checked. The sealed pipe should be pressurized to 9 psig. The plugs shall hold against this pressure without bracing and without any movement of the plugs out of the pipe. No persons shall be allowed in the alignment of the pipe during plug testing. It is advisable to plug the upstream end of the line first to prevent any upstream water from collecting in the test line. This is particularly important in high groundwater situations.

13. When plugs are being placed, the pipe adjacent to the manhole shall be visually inspected to detect any evidence of shear in the pipe due to differential settlement between the pipe and the manhole. A probable point of leakage is at the junction of the manhole and the pipe, and this fault may be covered by the pipe plug, and thus not revealed by the air test.

14. Low-pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig. If the groundwater table is above the sewer being tested, the air pressure shall be increased 0.43 psi for each foot that the water table is above the invert of the sewer, up to a maximum of 9.0 psig. After a constant pressure of 4.0 psig (greater than the average groundwater back pressure) is reached, the air supply shall be throttled to maintain that internal pressure for at least 2 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.

15. When temperatures have been equalized and the pressure stabilized at 4.0 psig (greater than the average groundwater backpressure), the air hose from the

control panel to the air supply shall be shut off or disconnected. The continuous monitoring pressure gauge shall then be observed while the pressure is decreased to no less than 3.5 psig (greater than the average backpressure of any groundwater over the pipe). At a reading of 3.5 psig, timing shall commence with a stopwatch.

16. If the time shown for the designated pipe size and length (see Table 8-1 1.0 PSIG Air Test Pressure Drop) elapses before the air pressure drops 0.5 psig, the section undergoing test shall have passed. The test may be discontinued once the prescribed time has elapsed even though the 0.5 psig drop has not occurred. If the pressure drops 0.5 psig before the appropriate time shown in Table I has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.

17. If the section fails to meet these requirements, the Contractor shall determine at their own expense the source, or sources, of leakage, and shall repair or replace all defective materials or workmanship to the satisfaction of the Engineer. The extent and type of repair, which may be allowed, as well as results, shall be subject to the approval of the Engineer. The completed pipe installation shall then be retested and required to meet the requirements of this test.

TABLE 8-1
1.0 PSIG Air Test Pressure Drop

Pipe Diameter	Minimum Time Lapse (min:sec)							
Inch	*100 ft*	*150 ft*	*200 ft*	*250 ft*	*300 ft*	*350 ft*	*400 ft*	*450 ft*
4	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33

b. **For Pipes Larger than 36" in Diameter (Individual Joint Testing):**

1. Individually test each sewer pipe joint with an approved joint air testing apparatus to an air pressure of 4.0 psig. If the groundwater table is above the sewer being tested, the air pressure shall be increased 0.43 psi for each foot that the water table is above the invert of the sewer, up to a maximum of 9.0 psig unless otherwise restricted by pipe manufacturer's recommendation.
2. The testing apparatus shall be positioned within the pipe in such a manner as to straddle the joint to be tested.
3. The apparatus packer ends shall be expanded so as to isolate the joint from the remainder of the pipe and create a void area between the packer and the pipe joint. The ends of the testing device shall be expanded against the pipe in

accordance with the manufacturer's recommendations.

4. After void pressure is observed to be equal to or greater than the required test pressure, the air flow shall be stopped. If the void pressure drops by more than 1.0 psi within 15 seconds, the joint will have failed the test.
5. Upon completing the testing of each individual joint, the packer shall be deflated with the void pressure meter continuing to display void pressure. Contractor shall note and record the pressure display reading before each joint test. Should the void pressure meter fail to drop to 0.0 (±0.5) psig, Contractor shall make necessary equipment repairs to provide for an accurate void pressure reading.

802-8.1.2 Infiltration Test: Where the natural groundwater is 24 inches or more above the top of a section of pipe, the Contractor shall measure the flow of water in the pipe and the rates of seepage and infiltration. Contractor shall measure the flow rate by using a calibrated weir. The Contractor shall leave the weir in the line until the flow rate has stabilized. The Contractor is responsible for verifying the groundwater level by providing sight gauges in manholes or digging test holes at suitable locations.

a. The total seepage and infiltration of groundwater as determined by the test shall in no case exceed 50 gallons per 24 hours per inch-mile of pipe.

b. Make infiltration tests on all sewer construction before placing the lines in service and before making any connections to other sewers.

c. If the amount of infiltration into the sewer(s) is in excess of the maximum quantity specified above, then repair the joints, relay the sewer (if necessary), or perform other remedial construction, at the Contractor's expense, in order to reduce groundwater infiltration to within the specified limits.

802-8.1.3 Exfiltration Test: Where the groundwater is not 24 inches or more above the top of the pipe section being tested, the Contractor shall perform an exfiltration test.

a. The Contractor shall bulkhead the pipe below the lower manhole of the section being tested with a pneumatic plug or other device. Insert a vent pipe 48 inches long in the stopper of the upper end of that section. Then fill the lower manhole with water, or add water until there is a minimum of 4 feet over the upper end; make certain that all air is forced out through the vent tube.

b. Contractor will measure the drop in the level of the water in the manhole due to exfiltration over a specific time, and calculate the water loss due to exfiltration. The total exfiltration shall not exceed that specified above for infiltration.

802-8.2 Mandrel Test (Plastic & Fiberglass Pipe): Pipe shall not exceed a deflection of more than 5%. Unless otherwise directed by the Engineer, after pipe has been backfilled for at least 30 days, a mandrel sized at 95% of the inside pipe diameter shall be pulled through pipe.

802-8.3 Smoke Test:

a. All new sewer lines including service laterals with diameters up to & including 15 inches shall be smoke tested prior to backfilling in accordance with Section 814.

b. At the discretion of the Owner, a final smoke test shall be performed a minimum of nine (9) months after final acceptance up to the end of the twelve (12) month warranty period.

c. Leaks detected during smoke testing must be repaired as part of the Work and shall be considered incidental to and included in the cost of Work.

802-9 SANITARY SEWER PIPE REPAIRS:

802-9.1 Point Repair: A Point Repair is the task of excavating to a pipe and performing a corrective measure to repair a defect on a length of sewer pipe less than or equal to twenty (20) feet long. Point repairs shall address, but not be limited to, cracked pipe, broken pipe, faulty tap, protruding tap, sheared joint, dropped joint, or other similar conditions.

802-9.2 Remove and Replace: Remove and Replace is the task of excavating to a pipe and performing a corrective measure to repair a defect on a length of sewer pipe as designated on the Contract Documents. Remove and Replace operations shall address, but not be limited to, cracked pipe, broken pipe, faulty tap, protruding tap, sheared joint, dropped joint, or other similar conditions.

802-9.3 Trenchless Point Repair: A Trenchless Point Repair is the task of providing a localized trenchless sealing and structural repair to a defect on a length of sewer pipe less than or equal to three (3) feet long with an internally installed stainless steel repair sleeve. Trenchless Point repairs shall address, but not be limited to, leaking joints, cracked pipe, broken pipe, deformed pipe, or other similar conditions where excavation is not practical due to surface conflicts.

802-9.3.1 Design: The design of the stainless steel repair sleeves shall be in accordance with AWWA Manual 11 standards for design of Flexible Tunnel Liners. The repair sleeve shall be structurally designed to carry 5psi uniformly distributed hydraulic working load having a minimum factor of safety of 2.5 after 100-year chemical erosion of stainless steel material has been subtracted. Corrosion tables based on Stainless Steel Industry reports shall be used for calculating general surface erosion of the stainless steel plate thickness over the required 100-year service life due to corrosion. Calculations prepared by a Licensed Professional Engineer shall be submitted containing structural design, calculated effect of ovality and calculated structural effect of a 100-year chemical erosion of the structural element.

Where repair sleeve is fully enclosed in the damaged host pipe, the structural element of the sleeve shall be designed for 5psi hydraulic load with a minimum 2.5 factor of safety.

Where repair sleeve is expected to come in direct contact with the surrounding soil in excess of one third of the sleeve length, the structural element of the sleeve shall be designed for a hydraulic load of 10psi using a minimum 2.5 factor of safety. In lieu of a single sleeve, it is permissible to use a double sleeve assembly consisting of two single sleeves with 5psi capacity each joined together by a manufacturer approved resin matrix as a load transfer medium.

In case the host pipe has become oval, not exceeding 10 percent out of round, the repair sleeve with wall thickness of next thicker gauge from the one specified for standard repair sleeves shall be used.

802-9.3.2 Materials:

a. Sleeve: The structural component of the repair device shall be 316 stainless steel in the form of sleeves of the required length to cover the repair. The inner diameter reduction of the host pipe shall not exceed one (1) inch.

b. Sealant: Only manufacturer specified resin with physical properties set out by the requirements of the structural design shall be used. The sealant must be appropriate for transmitting all external loads to the stainless steel structural core, providing adequate support for the structural core against buckling and bonding the device in place.

1. Sealing Grout: The sealant used shall be as specified by the manufacturer for sealing infiltration.

2. Structural Grout: The sealant used shall be as specified by the manufacturer and shall be capable of transmitting all external loads to the structural core of the repair sleeve. If any infiltrating water is present, infiltration shall be sealed prior to installation of sleeve using structural grout.

802-9.3.3 Preparation:

a. Contractor shall notify the Engineer prior to beginning cleaning activities and pre-construction CCTV inspection. Contractor shall plan cleaning and pre-construction CCTV inspection activities far enough in advance of Trenchless Point Repair activities to allow Engineer time to review any Critical Damage Reports that may develop from the CCTV inspection results.

b. Experienced personnel trained in locating breaks, obstacles, and service connections by CCTV will perform CCTV of pipe in accordance with Section 815. The interior of the pipe should be carefully inspected to determine the location of any conditions that may prevent proper installation of the repair sleeve, such as protruding service taps, collapsed or crushed pipe, and reductions in the cross-sectional pipe area of more than 10%. The Contractor will notify the Engineer immediately if the inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or that will interfere with the proper installation an acceptable repair. This should be submitted to the Engineer as a Critical Damage Report (CDR). The CDR shall include all adverse conditions for each pipe segment from manhole to manhole. The CDR shall include:

    1. Two letters of transmittal.

    2. A CDR standard form including screen capture of adverse condition and location footage.

    3. A hardcopy printout of the video cut sheet (video report).

    4. A DVD containing:

        i. Electronic pdf files of the video cut sheets
        ii. Digital copy of the pipe video

    5. Recommendation from the Contractor for each adverse condition.

c. It shall be the responsibility of the Contractor to remove all loose debris that is located within the sewer pipe in accordance with Section 812. This cleaning will be incidental to the cost of the Trenchless Point Repair. If an obstruction is encountered that cannot be cleared with conventional sewer cleaning equipment, the Engineer should be notified immediately.

a. Any roots, protruding gaskets, or protruding laterals in the existing sewer pipe shall be cut and removed from the sewer pipe prior to the sewer liner installation. With the approval of the Engineer, this removal work associated with Trenchless Point Repairs will be paid for under the relative pay items in Section 808.

802-9.3.4 Installation:

a. The entire process of transporting and installing the sleeve shall be recorded on digital media and a copy provided to the Engineer at the completion of each sewer section.

b. The sewer must remain in full operation during the repair process allowing for a maximum of 5 minutes of flow interruption.

c. In case of offset joints, bells, and deformed or irregular pipe with disarranged pipe pieces, the pipe bore shall be opened by application of a hydraulic expander.

d. Pipe deformation shall reversed back to the round configuration and repair sleeves installed capable of restoring the full structural capacity of the host pipe.

e. In case the host pipe has completely collapsed and re-rounding is not possible without complete removal of the damaged pipe parts, an opening at least equal to the inside diameter of the host pipe must be cleared through the debris and the repair devices capable of sustaining the full soil load extended throughout the collapsed area at least 12 inches into the undamaged pipe.

f. When a cracked host pipe has formed randomly directed elements the host pipe must be re-rounded with the repair sleeve, or the re-rounding must be completed before installing a sleeve, in the backfill is compacted too tight around the pipe. In this case re-rounding should be accomplished by using a hydraulic jack before the sleeve is inserted.

g. The repair must extend at least 8” into undamaged pipe or joint adjacent to both extremities of the damage. If access to the line is limited such that shorter than specified sleeves must be used, or the length exceeds the manufacturer standard sleeve lengths, two or more sleeves shall be used with an overlap where two adjacent sleeves meet following manufacturer specified standards for overlapped repair sleeves.

h. Upon completion of the repair, the entire sewer section shall be inspected and the inspection recorded on digital media at no additional cost to the Owner. This video inspection shall be submitted to the Engineer for verification of work quality and completion of repair.

802-9.3.5 Acceptance:

a. All stainless steel sleeve locks have been engaged.

b. All the pre-measured grout supplied by the manufacturer has been applied to each stainless steel sleeve as specified by the manufacturer.

c. All host pipe leaking joints, cracks and holes are fully covered by the repair sleeve.

d. The entire pipe damage has been repaired per these specifications.

802-9.4 Smoke Testing: Smoke Testing shall be performed on each mainline or service lateral repair once all repairs are complete on a segment and prior to backfill according to Section 814 of the Specifications.

802-10 MEASUREMENT:

a. **Sewer Pipe**: Measurement of new pipe shall be made from center of manhole to center of manhole as identified on the Contract Documents. Quantities of pipe for payment will be the contract quantities, adjusted as required due to plan errors or plan changes. Excavation, bedding, backfill, compaction, testing, and bypass flow are included in the measurement of new pipe.

b. **Rehab Sewer Pipe:** Measurement for the removal of existing sewer pipe and its replacement with sewer rehab pipe shall be made on a linear foot basis of pipe installed. Measurement will be made to the nearest whole foot for the various diameters listed in the Bid Form. When tying into a manhole or manholes, measurement will be to the inside face of the manhole structure. It is recognized that the Contractor must purchase pipe material at the minimum manufactured length based on the pipe material used; therefore, the unit bid price shall be based on a minimum main line length of six (6) feet at each point repair and will be recorded accordingly by the Engineer's field representative. Excavation, bedding, backfill, and compaction are NOT included in the measurement of sewer rehab pipe.

c. **Connections to Existing Manholes:** Connections to existing manholes (sanitary sewer manhole or storm water conflict/junction/inlet box) will be measured each for the connections required.

d. **Adjusted Sanitary Sewer Service Lateral Connections:** Adjusting existing services will be measured each for the service adjustments required and includes up to twenty (20) feet of adjusted sewer service lateral to avoid conflict with new utility. Excavation, bedding, backfill, compaction, testing, and bypass flow are included in the measurement of new pipe.

e. **Sewer Service Lateral:** Measurement of new service lateral shall be made from the nearest outside edge of the mainline or lateral connection stack to the limits of the sanitary sewer clean-out as identified on the Contract Documents. Quantities of service lateral for payment will be the contract quantities, adjusted as required due to plan errors or plan changes. Measurement for sewer service laterals shall be made to the nearest linear foot of pipe installed.

f. **Sewer Service Lateral Connection Stack:** Measurement of new service lateral connection stack shall be made from top outside edge of the mainline to the top of the stack as identified on the Contract Documents. Quantities of service lateral connection stack for payment will be the contract quantities, adjusted as required due to plan errors or plan changes. Measurement for sewer service lateral connection stacks shall be made to the nearest vertical foot of pipe installed.

g. **Sewer Service Lateral Termination:** Measurement for the sewer service lateral termination shall be the actual count of termination assemblies installed and accepted.

h. **Non-Shear Couplings:** Non-shear couplings will be counted each for the diameter required.

i. **Electrofusion Couplings:** Electrofusion couplings for jointing existing HDPE pipe to new HDPE pipe will be counted each for the diameter required.

j. **Sanitary Sewer Clean-out:** Measurement for the sanitary sewer clean-out shall be the actual count of clean-outs installed and accepted.

k. **Service Lateral Mainline Connection Associated with CIPP:** Measurement for the

service lateral mainline connection associated with mainline that has been previously rehabilitated with a CIPP liner shall be the actual count of each service lateral connection installed and accepted.

Excavation, bedding, backfill, and compaction associated with this item shall be paid for under the Sewer Point Repair Excavation, Backfill, and Compaction item by the appropriate depth range in accordance with Section 801. The pay limit length for this excavation, bedding, backfill, and compaction shall be limited to 6 feet at the depth range of the mainline beginning at the backside mainline excavation width pay limit. The pay limit width of excavation shall be the trench pay limit as shown on the Contract Documents.

l. **Service Lateral Mainline Connection Associated with Slip Lining:** Measurement for the service lateral mainline connection associated with slip lining shall be the actual count of each service lateral connection installed and accepted.

Excavation, bedding, backfill, and compaction associated with this item shall be paid for under the Sewer Point Repair Excavation, Backfill, and Compaction item by the appropriate depth range in accordance with Section 801. The pay limit length for this excavation, bedding, backfill, and compaction shall be limited to 6 feet at the depth range of the mainline beginning at the backside mainline excavation width pay limit. The pay limit width of excavation shall be the trench pay limit shown on the Contract Documents.

m. **Service Lateral Mainline Connection Associated with HDPE:** Measurement for the service lateral mainline connection associated with HDPE pipe or lining material shall be the actual count of each service lateral connection installed and accepted.

Excavation, bedding, backfill, and compaction associated with this item shall be paid for under the Sewer Point Repair Excavation, Backfill, and Compaction item by the appropriate depth range in accordance with Section 801. The pay limit length for this excavation, bedding, backfill, and compaction shall be limited to 6 feet at the depth range of the mainline beginning at the backside mainline excavation width pay limit. The pay limit width of excavation shall be the trench pay limit as shown on the Contract Documents.

n. **Abandon Sewer Pipe:** Abandonment of gravity sewer pipe will be measured on a lump sum basis or by the cubic yard of flowable fill required to complete all work indicated on the Contract Documents and as provided in the bid form. Abandonment shall include any equipment, cleaning, flowable fill throughout the full length of pipe, and disposal in accordance with the plans and specifications.

o. **Plug and Abandon Sewer Pipe:** Plug and abandonment of gravity sewer pipe will be measured on a lump sum basis upon completion of all work indicated on the Contract Documents. Plug and abandonment shall include any equipment, cleaning, disposal and flowable fill required to cap the pipe ends in accordance with the plans and specifications.

p. **Remove Sewer Pipe**: Removal of gravity sewer pipe will be measured on a lump sum basis upon completion of all removal work indicated on the Contract Documents including appurtenances. Removal work shall include any equipment, cleaning, disposal, trenching, and backfilling required to remove the existing gravity sewer pipe in accordance with the plans and specifications.

q. **Remove or Abandon Sewer Pipe**: Removal or abandonment of gravity sewer pipe will be measured on a lump sum basis upon completion of all removal work indicated on the Contract Documents. Removal work shall include any equipment, cleaning, disposal, trenching, and backfilling required to remove the existing gravity sewer pipe in accordance with the plans and specifications. Abandonment in-place with this item shall include insertion of flowable fill throughout the full length of pipe.

r. **Trenchless Point Repair:** Measurement for trenchless point repair shall be made on a linear foot basis of sleeve installed. Measurement will be made to the nearest whole foot for the various diameters listed in the Bid Form.

802-11 PAYMENT:

a. **Sewer Pipe:** Payment for this Item will be full compensation for equipment, excavation, bedding, backfill, compaction, pipe, fittings, removal and disposal of existing sewer pipe and/or manholes if necessary, plugging, sewer flow control, traffic control, connections to new manholes, connections to service lateral, laying, jointing, cleaning new pipe, and testing, in accordance with the Contract Document. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item in Section 801.

b. **Rehab Sewer Pipe:** Payment for this Item will be full compensation for pipe, fittings (excluding non-shear couplings), plugging, removal and disposal of existing sewer pipe, sewer flow control, connections to existing pipe and service lines, laying, jointing, and cleaning new pipe, smoke testing of the repair, in accordance with the Contract Documents. Payment will be made for new pipe only when it is installed in the ground. No payment shall be made for pipe stored on the site but not yet installed. This item shall be used in conjunction with point repairs or remove and replace rehabilitation only. Excavation, bedding, backfill, and compaction required for Work associated with Rehab Sewer Pipe will be paid for under the relative pay item in Section 801.

c. **Connections to Existing Manholes:** Payment for this Item will be full compensation for all equipment, labor, materials required to connect the pipe to an existing manhole (sanitary sewer manhole or storm water conflict/junction/inlet box).

d. **Adjusted Sanitary Sewer Service Lateral Connections:** Payment for this item shall be full compensation for all equipment, labor, excavation, bedding, backfill, compaction, pipe, fittings, removal and disposal of existing sewer pipe if necessary, plugging, sewer flow control, traffic control, materials, and testing required to adjust up to twenty (20) feet of sanitary sewer service connections in accordance with the Contract Documents.

e. **Sewer Service Lateral:** Payment for this Item will be full compensation for equipment, excavation, bedding, backfill, compaction, pipe, fittings, removal and disposal of existing sewer pipe if necessary, plugging, bypass pumping, traffic control, laying, jointing, cleaning new pipe, and testing, in accordance with the Contract Document. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill,

Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item in Section 801.

f. **Sewer Service Lateral Connection Stack:** Payment for this item shall include all material, labor, pipe, fittings, bedding material.

g. **Sewer Service Lateral Termination:** Payment for this Item will be full compensation for SDR 35 PVC pipe, PVC fittings, and PVC cap.

h. **Non-Shear Couplings:** Payment for this Item will be full compensation for all equipment, labor, and materials required to install non-shear couplings.

i. **Electrofusion Couplings:** Payment for this Item will be full compensation for all electrofusion couplings, equipment, labor, and materials required to install electrofusion couplings.

j. **Sanitary Sewer Clean-out:** Payment for this Item will be full compensation for SDR 35 PVC pipe, PVC fittings, PVC clean-out fittings, cast iron frame and cover, and 24" square concrete pad surrounding the top of the clean-out.

k. **Service Lateral Mainline Connection Associated with CIPP:** Payment for this item will be full compensation for removal of host pipe (as required), saddle wyes, all fittings, grout, smoke testing, all equipment, labor, and materials.

l. **Service Lateral Mainline Connection Associated with Slip Lining:** Payment for this item will be full compensation for removal of host pipe (as required), compressive-fit service connection, patching of host pipe, grout, all fittings, smoke testing, all equipment, labor, and materials.

m. **Service Lateral Mainline Connection Associated with HDPE:** Payment for this item will be full compensation for electrofusion branch saddles, all fittings, smoke testing, all equipment, labor, and materials.

n. **Abandon Sewer Pipe:** Payment for this Item will be full compensation for equipment, bypass pumping, connections, cleaning, disposal and flowable fill, in accordance with the Contract Document.

o. **Plug and Abandon Sewer Pipe:** Payment for this Item will be full compensation for equipment, bypass pumping, connections, cleaning, disposal and flowable fill at the pipe ends (18 inches min.), in accordance with the Contract Document.

p. **Remove Sewer Pipe**: Payment for this Item will be a lump sum full compensation for equipment, bypass pumping, connections, cleaning, excavation, backfill and delivery/disposal, in accordance with the Contract Document. Payment will be made for removed pipe.

q. **Removal or Abandon Sewer Pipe**: Payment for this Item will be a lump sum full compensation for equipment, bypass pumping, connections, cleaning, excavation, backfill, delivery/disposal, and flowable fill throughout full length of pipe, in accordance with the Contract Document. Payment will be made for removed pipe and/or completely filled abandoned pipe.

r. **Trenchless Point Repair:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, sewer pipe cleaning, repair device,

installation of the repair device, pre- and post-construction CCTV inspection, and clean-up in accordance with the Contract Documents.

802-12 PAY ITEMS:

Pipe Inner Diameter (I.D.) Schedule
(as Shown on Drawings)

A	=	4" Pipe	N	=	27" Pipe
B	=	6" Pipe	O	=	30" Pipe
C	=	8" Pipe	P	=	32" Pipe
D	=	10" Pipe	Q	=	36" Pipe
E	=	12" Pipe	R	=	42" Pipe
F	=	14" Pipe	S	=	48" Pipe
G	=	15" Pipe	T	=	54" Pipe
H	=	16" Pipe	U	=	60" Pipe
I	=	18" Pipe	V	=	64" Pipe
J	=	20" Pipe	W	=	66” Pipe
K	=	21" Pipe	X	=	72” Pipe
L	=	24" Pipe	Y	=	76” Pipe
M	=	26" Pipe	Z	=	80” Pipe

Pipe Depth Schedule

0	=	0	-	6	Feet
1	=	6.1	-	8	Feet
2	=	8.1	-	10	Feet
3	=	10.1	-	12	Feet
4	=	12.1	-	16	Feet
5	=	16.1	-	20	Feet
6	=	20.1	-	24	Feet
7	=	24.1	-	28	Feet
8	=	28.1	-	32	Feet
9	=	32.1	-	36	Feet

Item No.	Item	Unit
80200_ _	Sewer Pipe (depth) (diameter)	Linear Feet
80210_ _	PVC Sewer Pipe (depth) (diameter)	Linear Feet
80211_ _	HDPE Sewer Pipe (depth) (diameter)	Linear Feet
80212_ _	Ductile Iron Sewer Pipe (depth) (diameter)	Linear Feet
80213_ _	Steel Sewer Pipe (depth) (diameter)	Linear Feet
80214_ _	Fiberglass Sewer Pipe (depth) (diameter)	Linear Feet
802200_	PVC Rehab Sewer Pipe (diameter)	Linear Feet
802210_	HDPE Rehab Sewer Pipe (diameter)	Linear Feet
802220_	Ductile Iron Rehab Sewer Pipe (diameter)	Linear Feet
802230_	Steel Rehab Sewer Pipe (diameter)	Linear Feet
802240_	Fiberglass Rehab Sewer Pipe (diameter)	Linear Feet
8023000	Connections to Existing Manholes	Each
8024000	Adjusted Sanitary Sewer Service Lateral Connections	Each
8024100	Sewer Service Lateral	Linear Feet
8024200	Sewer Service Lateral Connection Stack	Vertical Feet
8024300	Sewer Service Lateral Termination	Each
802500_	Non-Shear Couplings (diameter)	Each
802501_	Electrofusion Couplings (diameter)	Each

8026000	Sanitary Sewer Clean-out	Each
8027000	Service Lateral Mainline Connection Associated with CIPP	Each
8027001	Service Lateral Mainline Connection Associated with Slip Lining	Each
8027002	Service Lateral Mainline Connection Associated with HDPE	Each
8028000	Abandon Sewer Pipe (w/flowable fill in-place)	Lump Sum
8028001	Abandon Sewer Pipe (w/flowable fill in-place)	Cubic Yard
8028100	Plug and Abandon Sewer Pipe (cap each end)	Lump Sum
8028200	Remove Sewer Pipe	Lump Sum
8028300	Remove or Abandon Sewer Pipe	Lump Sum
802900_	Trenchless Point Repair (diameter)	Linear Feet

SECTION 803

SEWER MANHOLES

SECTION 803
SEWER MANHOLES

803-1 DESCRIPTION: This Work consists of removal and disposal of existing manholes, if necessary, and furnishing and constructing new precast concrete sanitary sewer manholes, drop lines, and adjusting existing manholes. Manholes shall be constructed of specified material to the sizes, shapes and dimensions and at the locations and elevations shown on the Drawings. The expectation is that all new manholes will be completely sealed, thereby, eliminating infiltration and exfiltration from the manhole.

803-2 MATERIALS:

a. Materials shall conform to the following Sections and Subsections:

Precast Concrete Riser Rings	806-3.1a
Cast Iron Riser Rings	806-3.1b
Stainless Steel Insert	806-3.4
Portland Cement Concrete	1005
Reinforcing Steel	1006-1
Frames and Covers	1011-5
Precast Concrete Manhole Units	1017-2

b. Manhole walls, transitions, conical sections, and base shall conform to the requirements of ASTM C 478 for the depths indicated on the Contract Documents. Conical sections shall be designed to support cast iron frames and covers under an AASHTO HS-20 loading. Axial length of sections shall be selected to provide the correct total height required with the fewest joints.

c. Riser rings shall be precast concrete or cast iron.

1. Concrete riser rings shall be free from cracks, voids and other defects and shall conform to ASTM C 478. Concrete riser rings shall be of a nominal thickness of not less than four (4) inches and not more than six (6) inches for reconstruction and/or adjustment of the manhole frame and cover. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803-4.7.

2. Cast iron riser rings shall conform to the latest edition of AASHTO M306. Cast iron riser rings shall be used for adjustment of the manhole frame and cover of less than four (4) inches. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803-4.7.

d. Manhole joint types may be either tongue and groove, confined groove, or single offset joint, and shall be sealed accordingly with either a flexible soil-tight butyl mastic gasket or flexible watertight rubber gaskets conforming to ASTM C 990 or C 443 respectively.

e. Prior to backfilling, rubber external seal wraps shall be applied to each manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

f. Conical sections shall be concentric, unless otherwise specified. Where the manhole barrel diameter is greater than 48 inches, a flat slab transition, concentric unless otherwise specified, may be used to transition to 48 inch diameter riser sections. Underside of the transition shall be at least 7 feet above the top of the bench.

g. Sewer pipe to manhole barrel section connections shall be sealed with resilient connectors complying with ASTM C 923. Mechanical devices shall be stainless steel.

h. Concrete manholes shall include the following protective admixtures:

1. Crystalline Waterproofing Additive:

i. Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.

ii. Crystalline waterproofing additive shall include an approved coloring that will tint the finished concrete as proof of additive. Coloring must be provided by the additive manufacturer.

iii. Installer of crystalline waterproofing additive shall be approved by the manufacturer or manufacturer's representative in writing.

iv. Crystalline waterproofing additive shall be added to concrete mix at time of batching, and dosage rates and installation shall be in accordance with manufacturer's recommendations.

v. Crystalline waterproofing additive shall be as manufactured by Xypex Chemical Corporation or approved equal.

2. Anti-microbial Additive:

i. Antimicrobial additive shall provide long term prevention of bacterial corrosion if concrete in Microbial Induced Corrosive (MIC) sanitary sewer environments. It shall render the concrete uninhabitable for bacteria growth.

ii. The liquid antibacterial additive shall be an EPA registered material. Product must include an approved coloring that will tint the finished concrete as proof of additive. Coloring must be provided by the additive manufacturer.

iii. Installer of anti-microbial additive shall be certified by the manufacturer or manufacturer's representative in writing.

iv. The additive shall be added into the concrete mix water to insure even distribution throughout the concrete mixture. The amount to be used shall be as recommended by the manufacturer of the antibacterial additive. This amount shall be included in the total water content of the concrete mix design.

v. The anti-microbial additive shall have successfully demonstrated prevention of MIC in sanitary sewers for ten or more years. Anti-microbial additive shall be as manufactured by Conshield Technologies or approved equal.

Any patching or grout materials used on the interior of the manhole after casting must also include the both admixtures.

i. All interior surfaces (including benches) of new sanitary sewer manholes at force main entry locations, one manhole upstream and downstream of force main entry locations, and other locations shown in the Drawings, shall be given an interior protective coating in accordance with Section 822.

j. Cast-iron frames, covers, and riser rings shall be completely coated with an environmentally safe, water-based asphaltic coating which is non-toxic, non-flammable, colorless, and dries to a hard black finish. This coating shall be applied to the casting

prior to the installation of the external seal wrap.

803-3 SUBMITTALS:

a. Complete product data on all standard manhole bottoms, riser sections (concrete and steel), cone sections, frames and covers, concrete and steel riser rings, rubber boots and external seal wrap shall be submitted.

b. The precast concrete producer shall submit a mix design for each strength and type of concrete that will be used, regardless of whether listed on the QPL or not. Submitted mix designs shall include the quantity, type, brand and applicable data sheets for all mix design constituents as well as documentation indicating conformance with this specification.

c. If required by the Contract Documents, the manhole epoxy liner system manufacturer's literature (cut sheets) describing the system, material/chemical properties, material handling and storage requirements, mixing and proportioning requirements, maximum pot life, MSDS sheets, environmental requirements for application and worker safety requirements shall be submitted.

d. Written certification by the protective admixture manufacturers stating the precast manufacturer is approved to install the admixtures specified shall be submitted.

e. Written certification by the manhole liner system manufacturer stating the installation Contractor is approved to install the liner system specified shall be submitted.

f. Written certification from the liner product manufacturer that each of the proposed liner and patching products are compatible with each other shall be submitted.

g. Detailed instructions and methodology for finishing all pipe and manhole connections to prevent infiltration and exfiltration shall be submitted.

h. Detailed methodology and materials for repairing surface imperfections or minor chipping of manhole structures shall be submitted

i. Wastewater Flow Control/Bypassing Plan shall be submitted.

j. Traffic Control Plan with site Contractor's telephone numbers for emergencies and copies of any necessary permits for lane closures shall be submitted.

k. Epoxy liner and vacuum test results shall be submitted to Engineer.

803-4 CONSTRUCTION:

803-4.1 Excavation, Bedding, and Backfill: Excavation, bedding, backfill, and compaction required for the installation of manholes shall be in accordance with Section 801 and as shown in the Contract Documents.

803-4.2 Precast Concrete Manholes:

a. Base for precast manholes may be either precast or cast-in-place. Cast-in-place bases shall be used for manholes built over existing sewer lines only. If base is cast-in-place, lowermost precast unit shall be set in place at the time base is poured; additional precast units shall not be placed until 24 hours after base is poured. Cast-in-place reinforced concrete manhole bases shall be constructed in accordance with Section 601 Concrete Structures. Concrete for base and channel formation shall be 6A4000 concrete conforming to Section 1005 and shall include admixtures described in subsection 803-2h. If required for the manhole, interior of cast-in-place base must field

coated in accordance with Section 822.

b. Precast manhole structures shall have a normal plant-run finish produced in forms that impart a smooth finish to concrete. Surface holes smaller than 1 inch caused by air bubbles, form joint marks, and minor chips are acceptable. Fill air holes greater than 1 inch in width or 1/4 inch in width that occur in high concentration (more than one per 2 sq. inch). Major or unsightly imperfections, honeycombs, exposed reinforcing steel, exposed aggregate, or structural defects are not permitted.

c. Protective admixture tint shall be uniform in color and appearance throughout wall thickness of precast concrete structure. If cross-sectional views of precast concrete structure, such as pipe cutouts or across joints, are not available for visual inspection or do not provide satisfactory evidence of color uniformity, at the request of the Engineer, the Contractor shall have the structure cored to provide evidence. Coring and repair shall be at no cost to the Owner. Any unapproved coatings or paints applied to the manhole structure may be cause for rejection of the manhole by the Engineer.

d. For manholes requiring an epoxy protective coating on the interior surface: surface preparation and protective coating shall be in accordance with Section 822. Manholes may be coated “in the shop” prior to delivery to project site. Any damage to the protective coating during shipping or installation shall be repaired by the Contractor in accordance with the manufacturer’s recommendations at no additional cost to the Owner. Upon completion of manhole and pipe installation the protective coating shall be free of bugholes, pinholes, and continuous across the section joints. Coating shall extend over the top rim of the cone opening by one inch.

e. Manholes shall be constructed such that their walls are plumb. The spigot end of the precast sections shall be set at the top of each section.

f. Gaskets and gasket seats shall be cleaned of dirt and debris just prior to placing precast units.

g. If holes must be cut in precast units, they shall be cored or drilled for proposed mains 18 inches in diameter or smaller. Manholes requiring larger pipe connections may be enlarged using a jack hammer, but must be neatly grouted to provide an airtight seal.

h. There shall be at least 12" horizontal clearance between adjacent pipes.

All inverts shall be of 4000 psi concrete meeting the requirements of Section 1005 of these specifications and include the anti-microbial additive. The invert shall be carefully formed to the required size and grade by gradual and even changes in sections. Changes in directions of flow through the inlet shall be made to a true curve with as large a radius as the size of the inlet will permit.

803-4.3 Manhole Drop Connections: If inlet pipe enters the manhole 2 feet above the manhole invert or higher, an external drop line is required and shall comply with details in the Contract Documents. The drop line shall be of the same material as that of the inlet pipe and one nominal pipe size smaller (minimum 8 inch diameter). Backfill drop assembly with #610 Stone Backfill material. Extend the bedding material a minimum of 4 inches outside bells.

803-4.4 Adjusting Sewer Manholes: If grade adjustments of existing manholes are required, frames and covers shall be removed and manhole shall be adjusted to new grade as specified for new Work. Adjustment shall be made using precast concrete riser rings or cast iron riser rings in accordance with Section 806-6.1. Frames and covers shall be handled in accordance with Section 806-6.3.

After removal of existing manhole cover, a suitable temporary cover shall be placed over manhole to prevent debris from entering manhole and to provide for safety of workmen and the public until new

manhole cover is in place. If rubble or debris falls into a "live" manhole during adjustment operations, the Contractor shall remove and dispose of debris at no cost to the Owner. Upon completion of the manhole adjustment an external seal wrap shall be install in accordance with Section 803-4.7.

803-4.5 Riser Rings, Frames and Covers:

a. The top of the manhole frame will be at the finished grade of the pavement or 3-inches above the ground surface in accordance with the details of the Contract Documents.

b. In paved areas the frame and cover should match the slope and crown of the finished pavement.

c. Concrete riser rings shall be set in a full bed of mortar. Mortar shall be struck smooth on the inside of the manhole using a hard trowel followed by a sponge float. An epoxy system designed for metal-to-metal adhesion shall be used to connect individual cast iron riser rings and the cast iron riser rings to the frame.

803-4.6 Stainless Steel Insert: A stainless steel insert shall be installed in manholes located in areas below the base flood elevation as shown on the Contract Documents.

803-4.7 External Seal Wrap:

a. Riser Rings and Frame: The sewer manhole riser rings and frame shall be externally sealed with rubber seal wraps or mechanically locked corrugated rubber seals.

1. Rubber seal wraps:

i. Rubber seal wraps and required band widths shall conform to ASTM C 877 (Type I – Rubber and Mastic Bands).

ii. The number of bands required will depend on the number of adjusting rings needed. A minimum 3 inch overlap below the cone-riser ring joint shall be required. A 2 inch overlap shall be required to fold over the frame base to seal the frame-riser ring joint. If there are more adjusting rings per installation there will be a requirement for an additional band. Each additional band will overlap the upper band by two inches.

2. Mechanically locked corrugated rubber seals:

i. The frame seal shall remain flexible throughout a 25 year design life. The sleeve portion of the seal shall be corrugated with a minimum unexpanded vertical height of 10 inches and be capable of being mechanically locked to the base flange of the manhole frame casting.

ii. The sleeve and any extension shall be made from high quality EPDM rubber suitable for both above and below grade applications. Minimum thickness of rubber sleeve and extension shall be 0.085 inches. Rubber material shall conform to the applicable material requirements of ASTM C 923 and have a hardness (durometer) of 45±5.

iii. The sealing area that compresses against the base flange of the manhole frame casting and the chimney or cone shall have a series of sealing fins to facilitate a watertight seal. The top compression band shall be “C” shaped to uniformly compress and mechanically lock the sleeve into the base flange of the manhole frame casting. Both the top and bottom compression bands shall have a take-up mechanism capable of developing a minimum of 400 lbs. of torque.

3. The external seal shall be installed after the adjusting rings are set and all

castings are coated.

b. Riser Section Joints:

1. Each manhole section joint shall be sealed with an external rubber seal wrap conforming to ASTM C 877 (Type I – Rubber and Mastic Bands, Type II – Plastic Film and Mesh Reinforced Mastic Bands, or Type III – Chemically-Bonded Adhesive Butyl Bands).

2. The seal shall be designed to prevent leakage of water through the joint sections of a manhole.

3. Any excess joint sealant material or gaskets that protrudes on the outside of the manhole section joint shall be removed prior to the installation of the external rubber seal wrap.

c. The external seal wrap shall be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

803-4.8 Abandoning Manholes: The Contractor shall clean the manhole to be abandoned in accordance with Section 812 to remove and dispose of all sewage and debris. Contractor shall permanently plug both upstream and downstream pipes at the manhole, and thoroughly crack or drill holes in the manhole bottom to allow any water to drain out. Plug shall consist concrete or flowable fill extending a minimum of 18" into the pipe end. Finally the Contractor shall completely remove the manhole structure down to a minimum three (3) feet below natural ground and fill and compact with an approved backfill sand. Removed material shall become property of the Contractor and shall be disposed of at no additional cost to the Owner.

803-5 ACCEPTANCE TESTING:

803-5.1 Air Vacuum Test: After completion of manhole construction, wall sealing, and backfilling, the Contractor shall conduct a vacuum test as follows:

a. All manholes are to be vacuum tested following backfill and compaction. The ring and lid casting assembly shall be installed prior to testing. The testing equipment shall consist of a gasoline-powered vacuum pump with sufficient vacuum hose length and a test head of proper size to fit the inside opening of the manhole. The test head shall be equipped with an inflatable rubber bladder to affect the seal to the manhole, an air pressure gauge, and a safety valve for filling the bladder, a 30-inch Hg liquid-filled vacuum gauge, a double air exhaust manifold with quarter turn ball valves, three bolt-on feet, and a bridge assembly with height adjustment rod.

b. Contractor shall plug all pipe openings, taking care to securely brace the plugs and the pipe. The plugs shall be placed a minimum of 6 inches beyond the manhole wall.

c. With the vacuum tester in place, inflate the compression to affect a seal between the vacuum base and the structure. Connect the vacuum pump to the outlet port with the valve open and evacuate the manhole to 10 inches Hg (0.3 bar) for 48-inch diameter manholes and 5 inches Hg (0.15 bar) for 60-inch and greater diameter manholes.

d. Close vacuum inlet/outlet ball valve, disconnect the vacuum pump, and monitor the vacuum for the specified time period. If the vacuum does not drop in excess of 1-inch Hg over the specified time period, the manhole if considered acceptable passes the test. If the manhole fails the test, identify the leaking areas by removing the head assembly, coating the interior surfaces of the manhole with a soap and water solution, and repeating the vacuum test for approximately thirty seconds. Once the leaks have been identified, complete all necessary repairs by sealing the leaks of the manhole to the satisfaction of the Engineer, and repeat test procedures until satisfactory results are

obtained.

Vacuum Test Timetable			
Depth (Feet)	Manhole Diameter (Inches)		
	48”	60”	72”
4’	10 sec.	13 sec.	16 sec.
8’	20 sec.	26 sec.	32 sec.
12’	30 sec.	39 sec.	48 sec.
16’	40 sec.	52 sec.	64 sec.
20’	50 sec.	65 sec.	80 sec.
24’	60 sec.	78 sec.	96 sec.
*T	5.0 sec.	6.5 sec.	8.0 sec.
*Add extra testing time “T”, for each additional 2-foot depth. (The values listed above have been extrapolated for ASTM designation C924-85.)			

e. The Owner reserves the right to reject any and all manholes that do not pass vacuum testing requirements, and replacement shall be at the Contractor’s expense. A significant number of leaks on a single manhole or significant number of manholes leaking shall be considered as a basis for rejection and replacement of manholes.

803-5.2 Epoxy Liner Test:

a. Wet Film Thickness Gage: During application a wet film thickness gage, meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to check coating thickness.

b. Holiday Detection: After a minimum of 24 hours following completion, the lining system shall be spark tested to assure a pinhole-free lining. Defects shall be marked and repaired per the manufacturer’s instructions. The holiday detector shall be a Tinker Razor Model AP/W or an approved equal. Reference NACE RPO 188-99 for performing holiday detection. Manhole repair shall not be measured for payment when required as surface preparation for a manhole lining rehabilitation operation.

c. Adhesion Test: A minimum of 10% of the manholes coated shall be tested for adhesion/bond of the coating to the substrate. Testing shall be conducted in accordance with ASTM D7342-05.

803-6 MEASUREMENT:

a. **Sanitary Sewer Manholes:** Manholes constructed will be measured as a unit by manhole diameter and depth.

b. **Adjusting Sewer Manholes:** This item will be measured as a unit.

c. **Manhole Drop Lines:** Drop lines will be measured by line diameter per vertical foot of drop from the invert of the main line entering the manhole.

d. **Abandon Sewer Manholes:** Manholes to be abandoned shall be measured as a unit.

e. **New Manhole Protective Coating:** Measurement for payment of this Item shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5’ or 6’) then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5’ diameter = 1.25 x vertical footage of standard; 6’ diameter = 1.50 x vertical

footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification.

803-7 PAYMENT:

a. **Sanitary Sewer Manholes:** Payment for new manholes include materials, labor, excavation, bedding, backfill, compaction, removal and disposal of existing manhole (if required), new manhole, geotextile fabric, rings, frames, covers (frame and cover type as shown on drawings), external seals, venting pipes (as required by the drawings), concrete admixtures, connections with pipe, and testing.

b. **Adjusting Sewer Manholes:** Payment for adjusted sewer manholes shall include materials, labor, excavation, bedding, backfill, compaction, riser rings, removal and replacement of existing frame and cover, external seals, and testing.

c. **Manhole Drop Lines:** Payment for drop lines shall include all material, labor, pipe, fittings, hardware, removal and disposal of existing manhole drop line (if required), and bedding material.

d. **Abandon Sewer Manholes:** Payment for abandoned manholes include materials, labor, excavation, backfill, compaction, pipe plug(s), drilling of manhole base, removal and disposal of existing manhole, manhole frame and cover 3 foot minimum below grade.

e. **New Manhole Protective Coating:** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, cementitious underlayment, sewer flow control, traffic control, and testing.

803-8 PAY ITEMS:

Drop Line Inner (I.D.) Diameter Schedule			Pipe Depth Schedule					
A	=	4" Pipe	0	=	0	-	6	Feet
B	=	6" Pipe	1	=	6.1	-	8	Feet
C	=	8" Pipe	2	=	8.1	-	10	Feet
D	=	10" Pipe	3	=	10.1	-	12	Feet
E	=	12" Pipe	4	=	12.1	-	16	Feet
F	=	14” Pipe	5	=	16.1	-	20	Feet
G	=	15” Pipe	6	=	20.1	-	24	Feet
H	=	16” Pipe	7	=	24.1	-	28	Feet
I	=	18” Pipe	8	=	28.1	-	32	Feet
			9	=	32.1	-	36	Feet

Item No.	Item	Unit
803148_	48” Sanitary Sewer Manhole (depth)	Each
803160_	60” Sanitary Sewer Manhole (depth)	Each
803172_	72” Sanitary Sewer Manhole (depth)	Each

803200_	Sanitary Sewer Drop Line (diameter)	Vertical Foot
8033000	Adjusting Sewer Manhole	Each
8034000	Abandon Sewer Manhole	Each
8035000	New Manhole Protective Coating	Vertical Foot

SECTION 806

MANHOLE REHABILITATION

SECTION 806
MANHOLE REHABILITATION

806-1 DESCRIPTION: This specification consists of all work, materials, labor and equipment required for manhole rehabilitation for the purpose of eliminating infiltration and exfiltration, providing corrosion protection, adjusting final grade of manhole top, repair of voids and restoration of the structural integrity of the manhole.

806-1.1 General:

a. Do not use or retain contaminated, outdated, or diluted materials for resurfacing. Do not use materials from previously opened containers.

b. Use only products of the approved Manufacturer. Use products of one manufacturer in any one resurfacing system with compatible materials. Provide same material product for touch-up as for original material.

c. If any requirements of this specification conflict with a referenced standard, the more stringent requirement shall apply.

d. Make available all locations and phases of the work for access by the Engineer or other personnel designated by the Engineer. The Contractor shall provide ventilation and egress to safely access the coating work areas for inspection.

e. Conduct work so that the resurfacing system is installed as specified herein and according to manufacturer's recommendation. Inspect work continually to ensure that the resurfacing system is installed as specified herein. The Contractor shall inspect the work to determine conformance with the specifications and referenced documents. The Contractor shall inform the Engineer of the progress and the quality of the work through daily reports, which should at a minimum include EBROSCO manhole number, closest physical address, site and weather conditions, manhole existing conditions, rehabilitation work required, surface preparation, environmental conditions, lining application, quality control, and testing. Any nonconforming coating system work shall be corrected as specified herein or as recommended by the Manufacturer.

f. The methods of construction shall be in accordance with all requirements of this specification.

g. Job site environmental conditions such as air and surface temperatures, relative humidity, precipitation, wind, etc. shall be controlled and maintained by the Contractor in accordance with the Manufacturer's instructions.

806-2 SUBMITTALS:

a. Manhole rehabilitation system manufacturer's literature (cut sheets) describing the rehabilitation system and equipment components, material/chemical properties, MSDS sheets and environmental requirements for application and worker safety requirements. Provide samples of testing, certification and warranty statements.

b. References of projects successfully completed, incorporating not less than 250 manholes in total which were successfully performed within the last 10 years. Each reference shall include the name of the agency, the name of the project, the date of the project, and an agency contact.

c. Written certification by the manhole rehabilitation system manufacturer stating the installation Contractor is approved to install the rehabilitation system specified.

d. Written certification from the product manufacturer that each of the proposed rehabilitation products is compatible with each other.

e. Warranty affidavit for MCP lining system in accordance with subsection 806-3.9c of this specification.

f. Manufacturer's written recommendations for product handling and storage requirements including temperature, humidity, and ventilation for resurfacing system materials.

g. Traffic Control shall be the responsibility of the Contractor. Any necessary lane closures shall require a permit from the Traffic Division of the DPW or the La DOTD. Copies of the permits shall be submitted to the Engineer prior to commencing Work.

h. Submit with Each Project:

    1. Description, layout, and application sequencing plan.

    2. Rehabilitation system application requirements including material handling and storage requirements, mixing and proportioning requirements (as applicable), maximum pot life, film/coating thickness, curing, testing and certification requirements of all rehabilitation materials. Product Material Safety Data Sheets.

    3. Detailed instructions and methodology for finishing all pipe and manhole connections to rehabilitated manholes to prevent infiltration and exfiltration.

    4. Wastewater Flow Control/Bypassing Plan.

    5. Confined Space Entry Plan/Permit.

    6. Plan for capturing extraneous debris during rehabilitation processes and debris disposal.

    7. Liner and vacuum test results.

806-3 MATERIALS: The materials used shall be designed, manufactured and solely intended for sewer manhole rehabilitation. The materials shall have a proven history of performance in sewer manhole rehabilitation for a minimum of 10 years nationally, of similar age, groundwater levels and circumstance. Contractor shall comply with all manufacturers' recommendations for the approved products.

Products will not be considered by Engineer as an "or-equal" or substitute unless a written request for approval has been submitted by Contractor. Requests for approval shall include all of the following information:

a. A cover sheet stating the name of the proposed product and the name of the currently specified product (with applicable specification section number) which the proposed product is requesting to be approved as an "or-equal."

b. A letter from the Installer stating that the proposed product is in compliance with all aspects of the specifications including all physical properties, thicknesses, dimensions, cure-times, and warranty requirements; and the Installer shall also include with the

letter complete references (with current contact information) showing exactly how many successful installations of the proposed product that the Installer has completed to date.

c. A letter from the Manufacturer stating that the proposed product is in compliance with all aspects of the specifications including all physical properties, thicknesses, dimensions, cure-times, and warranty requirements; and the Manufacturer shall also include with the letter complete references (with current contact information) showing that the exact proposed product has been successfully installed in at least 5,000 wastewater structures within the last 5 years.

d. Affidavits signed by both an Officer of the Manufacturer and the Installer declaring that all of the information submitted is true and that the proposed product is not currently involved in any unsettled disputes over patent infringement.

e. Product(s) seeking an "or-equal" approval that have not previously performed work with the Owner shall perform a demonstration of their product within the Owner's collection system at no cost to the Owner. Following a successful field installation of the product and the Owner's assessment and approval of said product for a period of six (6) months, the Owner, at their discretion, may elect to approve the product for the project.

The burden of proof of the merit of the proposed item is upon Contractor. Engineer's decision of approval or disapproval of a proposed item will be final. Contractor shall not rely upon approvals made in any other manner.

806-3.1 Riser Rings:

a. **Precast Concrete:** New precast concrete riser rings free from cracks, voids and other defects and shall conform to ASTM C478. Contractor shall use precast concrete riser rings of a nominal thickness of not less than four (4) inches and not more than six (6) inches for reconstruction and/or adjustment of the manhole frame and cover. Concrete riser rings shall include the protective admixtures in accordance with Section 803. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803.

b. **Cast Iron:** New cast iron riser rings shall be of domestic origin, conform to the latest edition of AASHTO M306. Contractor shall use cast iron riser rings for reconstruction and/or adjustment of the manhole frame and cover of less than 4 inches.

806-3.2 Cone Replacement: The new precast concrete cone shall be concentric, unless otherwise specified, conforming to ASTM C478 and Section 1017-2. Concrete manhole cones shall include the protective admixtures in accordance with Section 803. Joints shall be sealed with gaskets conforming to ASTM C990 or C443. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803.

806-3.3 Manhole Frame and Cover: New manhole and Air Release Valve vault frames and/or covers shall conform to Section 1011-5 and the Contract Documents. Frames and covers shall be completely coated with an environmentally safe, water-base asphaltic coating which is nontoxic, nonflammable, colorless, and dries to a hard black finish. Manhole frames shall also be externally wrapped with an external seal wrap as specified in Section 803. Air Release Valve vault frames are not required to be wrapped with an external seal wrap.

806-3.4 Stainless Steel Inserts: The insert body shall be manufactured of 304 stainless steel with a thickness of not less than 18 gauge. The dish shall have a handle of 3/16" plastic coated stainless steel cable installed on the body of the dish. The handle shall be attached with a #6 high grade stainless steel rivet. The gasket shall be made of close cell neoprene, and shall have a pressure

sensitive adhesive on one side. The gas relief valve shall be designed to release at a pressure of .5 to 1.5 psi. The valve shall be made of Nitrile for prevention of corrosion from contact with hydrogen sulfide, diluted sulfuric acid and other gases associated with waste-water collection systems. Each dish shall have a factory installed five foot long, 3/16" stainless steel cable retaining tether that shall pass through a water tight grommet in the bottom of the dish with a high grade stainless steel adjustable locking device located between the bottom of the dish and lift loop at the top end of tether. The cable terminal and eye end shall be made of stainless steel.

806-3.5 Cementitious Mortar: Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet the requirements of ASTM C 144.

806-3.6 Patching Material: A quick setting fiber reinforced cementitious material shall be used as a patching material and is to be mixed and applied according to manufacturer's recommendations.

806-3.7 Hydraulic Cement: A rapid setting, high-early-strength, cementitious product specifically formulated for leak control shall be used to stop water infiltration. The material shall be mixed and applied according to the manufacturer's recommendations.

806-3.8 Chemical Grout: A chemical grout shall be used for stopping very active infiltration and filling voids. Chemical grout shall be an acrylic, acrylate, or urethane base grout for non-structural infiltration control with the following properties:

a. Acrylic or Acrylate Base Grout:

1. Minimum 25% acrylic or acrylate base material by volume.
2. Controllable reaction time: 30 seconds to 1 hour.
3. Viscosity: 1 to 3 centipoises water.
4. Tolerates dilution and reacts in moving water.
5. Final reaction:
    i. Produces chemically, continuous irreversible, non-biodegradable, flexible gel, impermeable to water at pressures up to 15psi in pure form.
    ii. Produces stabilized soil in ground that will not become brittle or rigid.
6. Gel does not bleed water under stress.
7. Dehydrated gel returns to 90% of its original volume and form after prolonged period of low ground water.
8. Do not use catalyst containing dimethyl amino propionitrile (DMAPM).
9. Tinted to allow detection of grout in drill holes or at leakage locations.

b. Urethane Base Grout:

1. Ratio: One part urethane prepolymer to 10 parts water by volume (10 to 50% prepolymer).
2. Liquid Prepolymer:
    i. Solids content: 77 to 83%
    ii. Specific gravity: 1.04
    iii. Flash Point: 20 degrees F
    iv. Viscosity: 200 to 1200 centipoises water at 70 degrees F
3. Water for reaching prepolymer: pH of 5 to 9.
4. Use manufacturer recommended gel control agent to control cure time as required.
5. Final reaction:
    i. Produces chemically, continuous irreversible, non-biodegradable, flexible gel, impermeable to water at pressures up to 15psi in pure form.

ii. Produces stabilized soil in ground that will not become brittle or rigid.

6. Dehydrated gel returns to 90% of its original volume and form after prolonged period of low ground water.
7. Do not use catalyst containing dimethyl amino propionitrile (DMAPM).
8. Tinted to allow detection of grout in drill holes or at leakage locations.

Chemical grouts shall be as manufactured by Avanti International, De Neef, Inc., or approved equal.

806-3.9 Liner Materials:

a. **Cementitious Liner Material:** Cementitious liner products shall be used to form a structural monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements:

1. Compressive Strength (ASTM C109): 6,000 psi, 28days
2. Tensile Strength (ASTM C496): 600 psi, 28 days
3. Flexural Strength (ASTM C293): 1,000 psi, 28 days
4. Shrinkage (ASTM C596): 0.02% at 28 days
5. Minimum Bond (ASTM C952): 200 psi, 28 days

When used as the final rehabilitation liner material (no epoxy liner), product shall be made with calcium aluminate cement. Calcium aluminate is not required when the cementitious liner is used as the underlayment for the epoxy liner application.

b. **Epoxy Liner Material:** 100% solids epoxy liner is to be applied where structural enhancement is needed and severe corrosion is anticipated. The epoxy liner material shall be applied over the completed cementitious liner material (without the calcium aluminate). The liner shall be spray applied or spin cast. The manufacturer of the selected epoxy liner material shall approve in writing that their epoxy liner is compatible with cementitious repair and liner material. The epoxy liner material shall have the following minimum requirements:

1. Hardness, Shore D (ASTM D2240): 85 (±2)
2. Adhesion (ASTM D4541), Concrete: Substrate Failure
3. Abrasion: ASTM D 4060 – Requirement: No more than 180 mg loss after 1,000 cycles
4. Corrosion Resistance: Suitable for environments PH of .5 or higher. Highly resistant to hydrogen sulfide, sulfuric acid, MIC and treatment chemicals.

c. **Multi-Component Polyurea (MCP) System Liner Material:** A multi-component, non-volatile, silicone modified polyurea stress panel liner is to be applied where an infiltration barrier is needed, severe corrosion is anticipated, and where service turnaround time is extremely limited.

1. The liner components shall be as follows:

Component	**Material**
Moisture Barrier	Silicone Modified Polymer (polyurea)
Surfacer	Polyurethane/Polymeric blend
Final Corrosion Barrier	Silicone Modified Polymer (polyurea)

2. The Barrier coat material is a two component 100% solids Silicone Modified Polyurea with the following minimum requirements and properties:

i. Tensile Strength (ASTM D412): 2,600 psi

ii. Elongation (ASTM D412): 420%
iii. Tear Strength (ASTM D624): 280 pli
iv. Hardness, Shore D (ASTM D2240): 42 (±2)
v. Flexibility (ASTM D522): Pass (1/ 8 "Mandrel)
vi. Taber Abrasion (ASTM D4060): No more than 25 mg loss after 1,000 cycles (CS 17 Wheel 1kg)
vii. Corrosion Resistance: Suitable for environments PH of .5 or higher. Highly resistant to hydrogen sulfide, sulfuric acid, MIC and treatment chemicals.
viii. Processing Properties:
A. Gel Time: 1-2 seconds
B. Tack Free Time: 15 seconds
C. Cure Time: 30 seconds

3. The Surfacer coat material is a two component premium, closed cell, specially formulated polyurethane foam with the following minimum requirements and properties:

i. Density (ASTM D1622): 4 pcf
ii. Compressive Strength (ASTM D1621): 90 psi
iii. Closed Cell Content (ASTM D1940): >95%
iv. Water Absorption (ASTM D2842): 0.020 gm/cc
v. Water Vapor Transmission (ASTM E96): 0.61 perms
vi. Processing Properties:
A. Cream Time: 1-4 seconds
B. Tack Free Time: 5-8 seconds
C. Rise Time: 6-10 seconds

4. Modified polymer shall be sprayable, solvent free, two component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.

5. A mechanical anchoring system shall be imbedded and sprayed into the liner at all leaks and at the wall/floor termination.

6. MCP System Warranty: The supplied lining system shall include a 10-year limited warranty covering both materials and installation beginning on the date of final acceptance. Both the Manufacturer and the Applicator shall stand behind this warranty for 10 years. Contractor shall submit the following:

i. An affidavit executed under seal by an officer of the Manufacturer and the Installer stating that if their proposed MCP lining system is used on this project; the Manufacturer will warrant the finished, in-place, lining system against infiltration and corrosion for a minimum of 10 years from the installation date.

MCP liner products shall be SpectraShield with AnchorShield as manufactured by CCI Spectrum, Inc., or approved equal.

d. **Water:** Water shall be clean and potable.

806-3.10 Internal Manhole Chimney Seal Material: An aromatic urethane rubber material or flexible epoxy mastic used to prevent leakage of water into the manhole through the frame joint area and the area above the manhole cone and shall have the following minimum requirements:

a. Elongation (ASTM D412): 600%
b. Tensile Strength (ASTM D412): 1,150 psi

c. Adhesive Strength (ASTM D903): 175 lb. l/in.
d. Tear Resistance (ASTM D1004): 155 lb. l/in.

The seal shall extend from the inside of the manhole frame down to the cone or corbel of the manhole.

806-3.11 External Manhole Seal Wrap: When work consists of adjusting manholes or cone replacements, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. The external seal wrap shall conform with Section 803 and be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

806-3.12 Manhole Cover Vent System: A simple device that is installed on existing manhole covers that allows airflow in and out of a manhole. The dome-shaped device is slightly raised which forces a majority of storm water runoff to flow around the device rather than inflow into the manhole, while still safe for vehicle traffic.

The device shall be made of a nylon resin material that is:

a. Highly impact resistant (HS-20 vehicle loading)
b. Chemical resistant
c. UV light resistant
d. Heat and cold resistant

The device shall be installed with a commercial grade EPDM rubber gasket for water tightness and shall meet the following:

a. Minimum 1000 psi tensile strength
b. Accommodates temperatures from -20 to 230 °F
c. Resistant to ozone and many oxidizing chemicals and acids
d. Highly resistant to sunlight

A high-strength adhesive that is suitable for hot and cold environments, does not crack or loose bond, cures quickly, and is environmentally friendly shall be utilized for the devices installation. The device shall have an optional vent pipe extension. This extension pipe shall be a pultruded fiberglass tube made of isophthalic polyester resign and e-glass. The tubing shall be UV resistant, corrosion resistant, flexible but strong, and available in a non-fading bright yellow color that is integral to the tubing (not painted on). The manhole cover vent extension shall be 4 ft. in height. Manhole cover vent system and extension pipe shall be as manufactured by Sewer Sentry or approved equal.

806-4 EQUIPMENT: Contractor shall utilize equipment approved by the material supplier for the specific application. Hard to reach areas, primer application and touch-up may be performed using hand tools as approved by the manufacturer. Contractor shall be trained by, or have their training approved and certified by the coating product manufacturer for the handling, mixing, application and inspection of the coating product(s) to be used as specified herein.

806-5 PREPARATION:

a. Perform traffic control in accordance with the approved traffic control submittal.

b. Store materials in accordance with manufacturer's recommendations.

c. Schedule and perform the work in a manner that does not cause or contribute to overflows or spills of sewage from the sewer system.

d. Install devices to prevent extraneous material from entering the sewer system and to prevent upstream line from flooding the manhole. If extraneous material or debris falls into a "live" manhole during adjustment operations, the Contractor shall remove debris at no cost to the Owner.

e. Dispose of wastes in accordance with applicable regulations.

f. Schedule and perform any bypass pumping that will be necessary to properly rehabilitate the manhole. Refer to section 813 for sewer flow requirements.

g. If present in the manhole, Contractor shall remove all access steps. Removal shall consist of neatly cutting steps flush with the wall prior to any lining installation. Contractor shall be responsible for proper disposal of steps.

h. For manholes that are located within pavement areas and require resetting or replacement of concrete riser rings, cones, and /or frames, the Contractor shall sawcut, remove, and replace a 6 ft. x 6 ft. square section of pavement and base for rehabilitation operations. Costs for removal and replacement of pavement and base beyond these limits shall be borne by the Contractor.

806-6 INSTALLATION: Prior to any lining all other miscellaneous work must be complete.

806-6.1 Cone Replacement: The Contractor shall replace existing deteriorated manhole cone section with new precast concrete cone section. A preformed gasket material shall be placed in all keyways between existing manhole riser section and cone joints. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7. If the existing manhole is of brick construction, the cone shall be set in a full bed of mortar on the top course of bricks.

806-6.2 Riser Rings: The Contractor shall replace existing, deteriorated riser rings with new precast concrete riser rings and/or cast iron riser rings. All manholes designated to receive casting adjustment and/or alignment shall be adjusted to meet existing finished grade unless an alternative elevation is specified. A cementitious mortar shall be placed in between individual precast concrete riser rings, and precast concrete riser ring and cone joints. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils. An epoxy system designed for metal-to-metal adhesion shall be used to connect individual cast iron riser rings and the cast iron riser rings to the frame. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

806-6.3 Frame and Cover: Existing frames and covers which must be removed to facilitate manhole and/or Air Release Valve vault rehabilitation, riser reconstruction, and/or casting alignment or grade adjustments shall be salvaged, cleaned and given two coats of an approved bituminous coating by the Contractor for replacement unless determined to be defective by Engineer. If frame and/or cover are determined to be defective, Contractor shall replace with new frame and/or cover. Replacement frames and/or covers shall be furnished and installed in accordance with the Contract Documents. Frames shall be set in full mortar bed. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

806-6.4 Cementitious Liner:

a. All manholes to be lined shall be cleaned and scarified with a minimum of 5,000 psi water jet at a minimum water temperature of 180 degrees F. The water jet shall hit the manhole wall surface at as near perpendicular angle as possible. Cleaning the

manhole walls from the ground surface without the appropriate angled nozzles will not be accepted. Manhole surface build-up of debris and loose manhole construction materials shall be removed during the cleaning process.

b. The intent of the surface preparation and cleaning work is to remove debris, films or unsound, deteriorated concrete and to provide a structurally sound, clean surface that will enable lining materials to bond to the original substrate at adhesion strengths of that specified herein, a substrate pH of 8.3 is the minimum pH that will be considered acceptable to demonstrate that the surface preparation and cleaning have been properly performed.

c. Additional aggressive surface preparation and cleaning methods may be necessary to remove carbonated cementitious lining concrete or contaminants that remain after the cleaning performed as described above. The Contractor shall test the pH of the cleaned manhole interior surface at various locations of the manhole and when the results indicate a pH less than 8.3 then additional surface preparations and cleaning will be required. As a minimum level of effort the Contractor shall either dry sand blasting or pneumatic jackhammering with a bushing bit followed by a minimum 5,000 psi water blast.

d. Active leaks shall be stopped using hydraulic cement and/or chemical grout as necessary. Installation of chemical grout shall follow ASTM F2414 and as specified herein:

    1. Brick Manholes:
        i. Drill only the amount of holes necessary to stop leakage following industry standards and chemical grout manufacturer's recommendations.
            A. Do not use curtain of grout sealing method.

        ii. Proceed with manhole repairs and/or reconstruction.

    2. Precast manholes:
        i. Seal pipe connections as specified by drilling between pipe and manhole opening and injecting grout.
        ii. When specified, seal precast manhole base by drilling holes at leakage points along bench to wall, and in channel.
        iii. At precast joints inject grout through holes drilled at leaking joint.

    3. Equipment: The basic equipment shall consist of chemical pumps, chemical containers, injection packers, hoses, valves, and necessary equipment and tools required to seal manholes. The injection pumps shall be equipped with pressure gages that will provide for monitoring pressure during the injection process.

e. Chemical grout shall be pumped through grout injection ports until material refusal is recorded on the pumping unit pressure gage or a predetermined quantity of sealant has been injected. Care shall be taken during the pumping operation to insure that excessive pressures do not develop and cause damage to the manhole structure. Upon completion of the injection, the ports shall be removed and the remaining holes filled with mortar or patching material and troweled flush with the surface of the manhole walls or other surfaces..

f. Any bench, invert or service line repairs shall be made at this time using quick setting grout or repair mortar per the manufacturer's recommendations.

g. Invert repair shall be performed on all inverts with visible damage or where infiltration is present. After blocking flow through the manhole and thoroughly cleaning the invert,

quick setting patch material shall be applied to the invert in an expeditious manner. The finished invert surfaces shall have a smooth surface and form a continuous monolithic conduit with the sewer pipe entering and leaving the manhole. The bench and invert shall form a watertight seal with the manhole walls, base and pipe seal.

h. Wastewater flow shall be controlled by methods which prevent contact with the new bench and invert for 6-8 hours after mortar placement. If 6-8 hours set time is not possible, a fast setting, high early strength mortar shall be used with provisions for flow control until concrete has set.

i. Fill all cracks, holes and joints what have voids using non-shrink grouts in accordance with the manufacturer's recommendations. Repair exposed rebar, defective pipe penetrations or inverts, etc. with non-shrink grouts or other approved alternative method.

j. Apply Cementitious Liner Material per the Manufacturer's recommendations. Apply Cementitious Liner material so that the final thickness is 0.5-inch minimum or per the thickness required by the manufacturer's minimum specification, whichever is greater. The material shall start at the bottom of the manhole frame and extend to the water level of the invert.

k. Finish repair material to a hard trowel finish and then finish with a sponge float. The sponge float finish shall have a surface profile of 8-10 mils.

l. If the cementitious lining material is not immediately coated with epoxy, apply a seal coat compatible with the repair material to aid in curing and minimize recontamination of the substrate prior to application of the epoxy liner material.

806-6.5 Epoxy Liner:

a. Prior to any Epoxy lining perform all work shown in Section 806-6.4 above.

b. Remove any curing compounds, sealers or contaminates prior to epoxy lining.

c. Apply epoxy lining material in accordance with the manufacturer's recommendations over the waterproofing/structural repair material shown in Section 806-6.4.

d. Epoxy liner shall be 125 mils, minimum, dry film thickness.

806-6.6 Multi-Component Polyurea (MCP) System Liner:

a. Prior to any MCP System lining perform all work shown in Sections 806-6.4 a. through h. above.

b. Mechanical anchoring system shall be imbedded and sprayed into the liner at all wall seams and at the wall/floor termination.

c. Application of multi-component system shall be in strict accordance with manufacturer's recommendation and must be performed by a contractor licensed and trained by the Manufacturer. A permanent identification number and date of work performed shall be affixed to the structure in a readily visible location.

1. Apply Moisture Barrier. This layer of polyurea shall be spray applied to all surfaces.

2. Apply Surfacer. This layer of polyurethane rigid structure foam shall be spray applied to all surfaces previously lined with the moisture barrier. Layer thickness may vary depending on the condition of the substrate and the level of deterioration. Mechanical anchoring system shall be embedded in this layer.

3. Apply Final Corrosion Barrier to all surfaces lined with the Surfacing layer.

d. Total MCP System lining thickness shall be 500 mils, minimum, dry film thickness.

806-6.7 Internal Manhole Chimney Sealant:

a. Perform all work shown in Sections 806-6.4 and 6.5 (if 6.5 is required) prior to any Internal Manhole Chimney Sealant.

b. Clean all contaminates from manhole frame by sandblasting or mechanical methods as recommended by the chimney sealant manufacturer.

c. Install Internal Manhole Chimney Sealant in accordance with the manufacturer's recommendations. The Contractor shall contact the manufacture for thickness recommendations; however, the final liner material shall be made no less than 170 mils.

806-6.8 External Manhole Seal Wrap: When Work consists of adjusting sewer manholes or cone replacement, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. Frame and cover shall be completely coated prior to installation of the external seal wrap. The external seal wrap shall be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

806-6.9 Stainless Steel Insert: If existing manhole is equipped with a non-stainless steel insert, Contractor shall remove and dispose of existing insert and furnish and install a new stainless steel insert in accordance with manufacturer's recommendations. Rivet used for attaching insert to manhole shall be installed into the casting. If existing manhole is equipped with a stainless steel insert pan to prevent intrusion of storm water, pan shall be cleaned and reinstalled by the Contractor unless determined to be defective by the Engineer. If insert is determined to be defective, Contractor shall furnish a new stainless steel insert and install in accordance with manufacturer's recommendations at the completion of manhole rehabilitation operations.

806-6.10 Manhole Cover Vent System: Preparation and installation of the manhole cover vent system shall be in accordance with the manufacturer's recommendations. When directed by the Engineer, a vent extension pipe shall also be installed. The extension pipe shall be installed into the manhole cover vent with the use of high-strength adhesive so as not to be easily removed. Contractor shall take care that adhesive does not restrict vent opening.

806-7 TESTING: After completion of any rehabilitation operation and backfilling (if required), the Contractor shall conduct the following tests on the manholes:

a. Vacuum Test: Manhole shall be vacuum tested in accordance with Subsection 803-5.

b. Visual Inspection: The Engineer and Applicator shall make a final visual inspection.

Any deficiencies in the finished system shall be marked and repaired.

If an epoxy or MCP liner is applied, the following additional tests will be required:

a. Wet Film Thickness Gage: During application a wet film thickness gage, meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.

b. Holiday Test: Upon full cure, the installed lining system shall be checked by high voltage spark detection in accordance with NACE RP0188-90 to verify a pinhole-free surface. Voltage shall be set at 11,000 volts. Areas which do not pass the spark detection test shall be corrected and rechecked at no additional cost to the Owner.

806-8 MEASUREMENT:

a. **Manhole Riser Ring (Concrete):** Measurement for precast concrete manhole riser rings shall be made on a vertical inch basis.

b. **Manhole Riser Ring (Cast Iron):** Measurement for cast iron manhole riser rings shall be made on a vertical inch basis.

c. **Manhole Cone Replacement**: Measurement of Work for payment of this Item shall be made at the unit price bid per vertical foot based on manhole diameter. Measurement shall be made from the bottom of cone to top of cone. Excavation, backfill, disposal of deteriorated cones and surplus excavated material is considered incidental to and, if required, shall be included in this Bid Item. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

d. **Reset Existing Manhole Frames and Covers:** Measurement for removing, cleaning, and resetting existing manhole and/or Air Release Valve vault frames and covers shall be the actual count (each).

e. **Manhole Frame:** Measurement for new manhole frame shall be the actual count (each).

f. **Manhole Frame (Oversized):** Measurement for new oversized manhole frame that is larger than the standard 25” diameter manhole frame shall be the actual count (each).

g. **Manhole Frame (Bolt Down Watertight):** Measurement for new bolt down watertight manhole frame shall be the actual count (each).

h. **Manhole Frame and Cover (Hinged):** Measurement for new hinged manhole frame and cover assembly shall be the actual count (each).

i. **Air Release Valve Vault Frame:** Measurement for new Air Release Valve vault frame shall be the actual count (each).

j. **Manhole Cover:** Measurement for new manhole cover shall be the actual count (each).

k. **Manhole Cover (Oversized):** Measurement for new oversized manhole cover that is larger than the standard 23 ¼” diameter manhole cover shall be the actual count (each).

l. **Manhole Cover (Bolt Down Watertight):** Measurement for new bolt down watertight manhole cover shall be the actual count (each).

m. **Air Release Valve Vault Cover:** Measurement for new Air Release Valve vault cover shall be the actual count (each).

n. **S.S. Manhole Insert:** Measurement for new stainless steel manhole insert shall be the actual count (each).

o. **Manhole Repair (Patching):** Measurement for manhole repair shall be made on a cubic foot basis as determined by the actual volume of water seal, solid filler, or waterproof grout mix used to make repairs to wall sections, bench, and invert to manhole connections. All application shall be in accordance with manufacturer's recommendations. All work under this Item is considered to be performed from the interior of the manhole. Manhole repair shall not be measured for payment when required as surface preparation for a manhole lining rehabilitation operation.

p. **Chemical Grouting for Leakage Control:** Measurement for chemical grouting for leakage control shall be made on a per gallon basis as determined by the actual volume of chemical sealing material used to seal manhole from active leaks. All application shall be in accordance with ASTM F 2414 and manufacturer's recommendations. All work under this Item is considered to be performed from the interior of the manhole.

q. **Manhole Rehabilitation (Cementitious Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification. Manhole rehabilitation (cementitious lining) shall not be measured for payment when required as underlayment for a manhole rehabilitation (epoxy lining) operation.

r. **Manhole Rehabilitation (Epoxy Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification.

s. **Manhole Rehabilitation (MCP Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification.

t. **Internal Manhole Chimney Sealant**: Measurement for payment of this Item shall be based on the actual number of vertical inches depending on the depth of each seal applied. The depth of each seal will be measured as the distance from the manhole frame joint to the top joint of the manhole cone for which final liner material is to be applied. Fractional measurement will be rounded down to the nearest whole number as reported in inches.

u. **Removal of Interior Manhole Steps:** Measurement of Work for payment of this Item shall be made at the unit price bid per manhole containing steps, regardless of the number of steps in each.

v. **Manhole Cover Vent System:** Measurement for a new manhole cover vent system shall be the actual count (each) installed per manhole cover.

w. **Manhole Cover Vent Extension:** Measurement for a new manhole cover vent extension 4 ft. pipe shall be the actual count (each) installed per manhole cover.

806-9 PAYMENT:

a. **Manhole Riser Ring (Concrete):** Payment for precast concrete manhole riser rings will be full compensation for all labor, materials, and equipment necessary to remove and dispose of existing deteriorated concrete manhole riser rings and replace with new precast concrete manhole riser rings; including traffic control, external seal wraps, excavation, backfill, and disposal of surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

b. **Manhole Riser Ring (Cast Iron):** Payment for cast iron manhole riser rings will be full compensation for all labor, materials, and equipment necessary to remove and dispose of existing deteriorated cast iron manhole riser rings and replace with new cast iron manhole riser rings; including traffic control, external seal wraps, excavation, backfill, and disposal of surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

c. **Manhole Cone Replacement:** Payment of the unit price amount bid for this Item shall be full compensation for furnishing all materials, labor, and equipment; including traffic control, excavation, backfill, external seal wraps, and disposal of deteriorated cones and surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

d. **Reset Existing Manhole Frames and Covers:** Payment for resetting existing manhole and/or Air Release Valve vault frames and covers will be full compensation for all materials, labor, equipment; including traffic control, external seal wraps, excavation, backfill, and disposal of deteriorated cones and surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

e. **Manhole Frame:** Payment for this item includes full compensation for furnishing and installing a new manhole frame, disposal of damaged manhole frame, external seal wraps, and traffic control.

f. **Manhole Frame (Oversized):** Payment for this item includes full compensation for furnishing and installing a new oversized manhole frame, disposal of damaged oversized manhole frame, external seal wraps, and traffic control.

g. **Manhole Frame (Bolt Down Watertight):** Payment for this item includes full compensation for furnishing and installing a new bolt down watertight manhole frame, disposal of damaged manhole frame, external seal wraps, and traffic control.

h. **Manhole Frame and Cover (Hinged):** Payment for this item includes full compensation for furnishing and installing a new hinged manhole frame and cover, disposal of damaged manhole frame and cover, external seal wraps, and traffic control.

i. **Air Release Valve Vault Frame:** Payment for this item includes full compensation for furnishing and installing a new Air Release Valve vault frame, disposal of damaged Air Release Valve vault frame, and traffic control.

j. **Manhole Cover:** Payment for this item includes full compensation for furnishing and installing a new manhole cover, disposal of damaged manhole cover, and traffic control.

k. **Manhole Cover (Oversized):** Payment for this item includes full compensation for furnishing and installing a new oversized manhole cover, disposal of damaged oversized manhole cover, and traffic control.

l. **Manhole Cover (Bolt Down Watertight):** Payment for this item includes full compensation for furnishing and installing a new bolt down watertight manhole cover, disposal of damaged manhole cover, and traffic control.

m. **Air Release Valve Vault Cover:** Payment for this item includes full compensation for furnishing and installing a new Air Release Valve vault cover, disposal of damaged Air Release Valve vault cover, and traffic control.

n. **S.S. Manhole Insert:** Payment for this item includes full compensation for furnishing and installing a new stainless steel manhole insert, and traffic control.

o. **Manhole Repair:** Payment for manhole repair will be full compensation for cleaning and preparing surfaces; drilling for access or infiltration relief purposes; and for labor, materials and equipment necessary to purchase, store, transport, mix and apply all patching and preparatory items required to complete the Work; sewer flow control, traffic control and testing.

p. **Chemical Grouting for Leakage Control:** Payment for chemical grouting for leakage control will be full compensation for cleaning and preparing surfaces; drilling for sealant injection ports; and for labor, materials and equipment necessary to seal manhole from

active leaks through chemical grouting and preparatory items required to complete the Work; sewer flow control, traffic control and testing.

q. **Manhole Rehabilitation (Cementitious Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, sewer flow control, traffic control, and testing.

r. **Manhole Rehabilitation (Epoxy Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, cementitious underlayment, sewer flow control, traffic control, and testing.

s. **Manhole Rehabilitation (MCP Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, multiple-component polyurea liner system, sewer flow control, traffic control, and testing.

t. **Internal Manhole Chimney Sealant**: Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, sealant system accessories, equipment, surface cleaning and preparation, patching and/or grouting, sewer flow control, traffic control, and testing.

u. **Removal of Interior Manhole Steps**: Payment for this item will be full compensation for labor, materials and equipment necessary to remove steps from the interior of the manhole, patch any voids created by the removal, sewer flow control, and traffic control.

v. **Manhole Cover Vent System:** Payment for this item will be full compensation for labor, materials and equipment necessary to install manhole cover vent system including, but not limited to the manhole cover vent system, rubber gaskets for system and manhole frame/cover, drilling into manhole cover, high-strength glue, and all incidentals; in accordance with the Contract Documents.

w. **Manhole Cover Vent Extension:** Payment for this item will be full compensation for labor, materials and equipment necessary to install manhole cover vent extension including, but not limited to the manhole cover vent extension pipe (4 ft. height), high-strength glue, and all incidentals; in accordance with the Contract Documents.

806-10 PAY ITEMS:

Item No.	Item	Unit
8061100	Manhole Riser Ring (Concrete)	Vertical Inch
8061200	Manhole Riser Ring (Cast Iron)	Vertical Inch
80620_ _	_ _" Manhole Cone Replacement	Vertical Foot
8063000	Reset Existing Manhole Frames and Covers	Each
8063100	Manhole Frame	Each
8063101	Manhole Frame (Oversized)	Each
8063102	Manhole Frame (Bolt Down Watertight)	Each
8063103	Manhole Frame and Cover (Hinged)	Each
8063104	Air Release Valve Vault Frame	Each

8063200	Manhole Cover	Each
8063201	Manhole Cover (Oversized)	Each
8063202	Manhole Cover (Bolt Down Watertight)	Each
8063203	Air Release Valve Vault Cover	Each
8064000	S.S. Manhole Insert	Each
8065000	Manhole Repair (Patching)	Cubic Foot
8066100	Manhole Rehabilitation (Cementitious Lining)	Vertical Foot
8066200	Manhole Rehabilitation (Epoxy Lining)	Vertical Foot
8066250	Manhole Rehabilitation (MCP Lining)	Vertical Foot
8066300	Internal Manhole Chimney Sealant	Vertical Inch
8067000	Removal of Interior Manhole Steps (Per M.H.)	Each
8068000	Manhole Cover Vent System	Each
8068001	Manhole Cover Vent Extension	Each

SECTION 808

CURED-IN-PLACE-PIPE (CIPP)

SECTION 808
CURED-IN-PLACE-PIPE (CIPP)

808-1 DESCRIPTION: This Work consists of providing labor, materials, equipment, and supervision necessary to accomplish the CIPP lining of all sewer mains designated in the Contract Documents.

808-2 SCOPE OF WORK:

a. Contractor shall provide materials, labor, equipment, and services necessary for: sewer flow control, pre-installation cleaning, rehabilitation of existing sanitary sewer mains by lining, initial and final Closed Circuit Television inspection (CCTV), and final testing of the CIPP system.

b. It is the intent of this Section to provide for the rehabilitation of existing sewer host pipe. A resin-impregnated flexible felt tube will be inserted utilizing an inversion process to fit against the original host pipe. The liner is then heated to cure the resin to a hard smooth liner.

808-2.1 Qualifications:

a. CIPP Contractors shall have a minimum of three (3) years of active continuous experience installing CIPP liners in pipe of similar size, length and configuration as proposed in the project. In addition, Contractor shall have successfully installed at least 1,000,000 feet of CIPP liner product in wastewater collection system applications.

b. Field supervisory personnel employed by the CIPP Contractor will have at least two (2) years of experience in the performance of the work and tasks as stated in the Contract Documents.

808-3 MATERIALS:

a. The Contractor shall use a thermosetting resin impregnated inversion liner conforming to the requirements of the latest version of ASTM F1216 (Rehabilitate Pipelines by Inversion and Curing a Resin Impregnated Tube), ASTM D5813 (Cured-in-Place, Thermosetting Resin Sewer Pipe), and ASTM F1743 (Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)). All products shall be as shown on the Quality Products List (QPL) or approved equal.

b. The tube shall consist of one or more layers of absorbent non-woven fabric capable of carrying resin, and capable of withstanding installation pressures and curing temperatures. The tube material shall be able to stretch to fit irregular pipe sections and negotiate bends. The outside layer of the tube shall be plastic coated with a material that is compatible with the resin system used. The tube should be fabricated to a size that will fit the internal circumference and the length of the existing pipe when installed. Allowance should be made for circumferential stretch during installation. The inside of the installed tube shall be marked along its full length at regular intervals not to exceed ten (10) feet. Markings shall also include the manufacturer of the liner that must appear in at least one location per setup.

c. Unless otherwise specified, the Contractor shall furnish a general purpose, unsaturated, polyester or thermosetting vinyl ester resin and catalyst system compatible with the reconstruction inversion process that provides the cured physical strengths and properties specified herein. The approved thermosetting resin and catalyst systems are found in the QPL. The resin shall be cured in the presence of

steam or water as specified in the curing section in this specification.

d. Resins shall be shipped directly to the wet-out facility from the resin manufacturer.

e. PET resins, resin filters, resin additives, and resin enhancement agents are prohibited. Only neat resins are acceptable. Old resins and reworked resins are prohibited, regardless of whether or not they are mixed with new resin.

f. Catalysts: Primary catalyst shall not exceed 1 percent of resin by volume; secondary catalyst shall not exceed ½ percent of resin by volume.

g. The wall color of the interior pipe surface of the CIPP after installation shall not be of a dark or non-reflective nature that could inhibit proper closed circuit television (CCTV) inspection.

h. The bond between all CIPP layers shall be strong and uniform. All layers, after cure, shall be completely saturated with resin.

808-4 SUBMITTALS:

a. Prior to receiving the Notice to Proceed at the pre-construction meeting, the Contractor or manufacturer shall submit all data sheets for CIPP materials to be used on the project. These include at a minimum the tube, resin, and catalyst materials.

b. **Qualifications:** Submit documentation showing that the Contractor and personnel meet the minimum required qualifications stated in Section 808-2.1. Include a list of projects showing Contractor's experience with the use of the same pipe material, length and diameter (or larger). Information must include, but not be limited to date and duration of work, location, pipe information (i.e. length, diameter, depth of installation, pipe material, etc.), project owner information (i.e. name, address, telephone number, contact person), and the contents handled by the pipeline (water, wastewater, etc.). **The apparent low bidder shall complete and submit the required qualifications to the Engineer within ten (10) days after the bid opening.**

c. The Standard Dimension Ratio (SDR) is the ratio of the outside diameter (OD) of the pipe to its minimum wall thickness. All CIPP wall thicknesses, SDR's by diameters, and depth ranges corresponding to the requirements of the Contract Documents, must be submitted to the Engineer for approval prior to installation.

d. Critical Damage Reports, if applicable.

e. The Contractor shall submit to the Engineer, at least 24 hours prior to installation, a "wet-out" schedule detailing time and location.

f. The manufacturer, prior to installation, shall provide the inversion pressures necessary for proper installation. Tube installation forces or pressures shall be limited so the tube is not stretched longitudinally by more than 5% of the original length.

g. Before the installation begins, the tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing host pipe, and the maximum allowable pressure that will not damage the tube.

h. Acceptance testing samples as described in Section 808-21.

i. Traffic Control shall be the responsibility of the Contractor. Any necessary lane

closures shall require a permit from the Traffic Division of the DPW or the LaDOTD. Copies of the permits shall be submitted to the Engineer prior to commencing Work.

j. Post-construction CCTV inspection videos.

808-5 DESIGN PARAMETERS:

a. The CIPP system felt and resin composite shall have the minimum physical properties given below and in accordance with the guidelines in the appendix of the latest version of ASTM F1216.

1.	Design Life:	50 years
2.	Pipe Diameters:	Per Contract Documents
3.	Ovality:	2%
4.	Pipe Condition:	Fully deteriorated
5.	External Water:	ground surface
6.	Flexural Strength:	4,500 psi
7.	Short Term Flexural Modules:	250,000 psi
8.	Reduction Factor:	50%
9.	Long Term Flexural Modules:	125,000 psi
10.	k Enhancement Factor:	7
11.	Soil Modules:	1,000 psi
12.	Soil Density:	120 pcf
13.	Highway Live Load:	AASHTO HS20-44
14.	Safety Factor:	2 minimum
15.	Min. Thickness(=<10"):	6 mm
16.	Min. Thickness (>10") :	7.5 mm

17. If calculations require thicker wall round to the next higher multiple of 0.5 mm.

b. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the required design structural CIPP wall thickness.

808-6 EQUIPMENT: The basic equipment shall consist of a CCTV system as described in Section 815, necessary liner materials, stand pipes, pumps, regulators, valves, hoses, boilers, blowers, winches, etc. The equipment shall be capable of performing the specified operations required to install the sewer liner material.

808-7 CLEANING, ROOT REMOVAL, PROTRUDING GASKET REMOVAL, AND INSPECTION:

a. Contractor shall notify the Engineer prior to beginning cleaning activities and pre-construction CCTV inspection. Contractor shall plan cleaning and pre-construction CCTV inspection activities far enough in advance of CIPP lining activities to allow Engineer time to review any Critical Damage Reports that may develop from the CCTV inspection results.

b. Experienced personnel trained in locating breaks, obstacles, and service connections by CCTV will perform CCTV of pipe in accordance with Section 815. The interior of the pipe should be carefully inspected to determine the location of any conditions that may prevent proper installation of the impregnated tube, such as protruding service taps, collapsed or crushed pipe, and reductions in the cross- sectional pipe area of more than 10%. The Contractor will notify the Engineer immediately if the inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or that will interfere with the proper installation an acceptable liner. This should be submitted to the Engineer as a Critical Damage Report (CDR). The CDR shall include all adverse conditions for each pipe segment from manhole to manhole. The CDR shall

include:

1. Two letters of transmittal.

2. A CDR standard form including screen capture of adverse condition and location footage.

3. A hardcopy printout of the video cut sheet (video report).

4. A DVD containing:

    i. Electronic pdf files of the video cut sheets
    ii. Digital copy of the pipe video

5. Recommendation from CIPP Contractor for each adverse condition.

c. It shall be the responsibility of the Contractor to remove all loose debris that is located within the sewer pipe in accordance with Section 812. This cleaning will be incidental to the cost of sewer pipe lining. If an obstruction is encountered that cannot be cleared with conventional sewer cleaning equipment, the Engineer should be notified immediately.

d. Any roots and/or protruding gaskets in the existing sewer pipe shall be cut and removed from the sewer pipe prior to the sewer liner installation. This root and/or protruding gasket cutting and removal shall be incidental to the cost of the sewer pipe lining, and there shall be no direct payment to the Contractor.

808-8 PROTRUDING SERVICE CONNECTIONS: When service connections protrude into the existing pipe more than ½" as measured from the inside pipe wall, then the Contractor shall remove the protruding portion of the service connection to within ½" of the inside pipe wall. Removal of the protruding portion of the service connection shall be accomplished using a television camera and internal cutting device, which shall not damage the collection line or the portion of the service line to remain in place. This work shall be accomplished prior to the installation of the liner pipe.

808-9 RESIN IMPREGNATION:

a. The tube shall be vacuum-impregnated with resin (wet out) under controlled conditions. The volume of resin used should be sufficient to fill all voids in the tube material at nominal thickness and diameter. The volume should be adjusted by adding excess resin for the change in resin volume because of polymerization and to allow for any migration of resin into the cracks and joints in the original pipe. A roller system shall be used to uniformly distribute the resin throughout the tube.

b. The Contractor shall designate a location where the CIPP will be vacuum impregnated prior to installation. The Contractor shall allow the Engineer to inspect the materials and procedures used to vacuum impregnate the tube if desired.

c. Delivery, storage and handling of approved products are the responsibility of the Contractor. The Contractor shall keep them safe from damage and stored with the proper environmental containment as outlined by the manufacturer. No products should be used that have exceeded the designated shelf life as outlined by the manufacturer. Remove damaged products from Site. Promptly replace damaged products with new products at no additional cost to the Owner.

d. Maintain resin-impregnated tubes in refrigerated truck trailers at a temperature below 45-degrees F to prevent premature curing. Prior to beginning inversion, no portion of

the resin-impregnated tubes liner shall be subjected to sunlight or ultraviolet radiation. Resin-impregnated tubes with signs of premature curing shall not be installed and shall be removed from the Project Site.

808-10 FLOW CONTROL PRECAUTIONS:

a. The Contractor shall be completely responsible for preventing service line backups during the liner installation and curing period.

b. The Contractor shall follow the additional flow control precautions in accordance with Section 813. Notification to homeowners will be made in accordance with Section 813-2(e).

808-11 INSTALLATION OF CIPP:

a. The wet out tube shall be inserted through an existing manhole or approved access point by means of an inversion process and the application of a hydrostatic head sufficient to extend it to the next designated manhole or termination point.

b. Alternately, the tube can be pulled into place and expanded with an inflation bladder.

c. Once the installation has begun, the pressure shall be maintained between the minimum and maximum pressures until the installation has been completed.

d. The existing host pipe shall be dewatered for any CIPP installation that does not use an inversion method to expand the tube against the pipe wall.

808-12 USE OF LUBRICANT: Lubricant shall be used to reduce friction between the host pipe and the liner during the inversion or pulled-in process. This lubricant should be poured into the water in the downtube or applied directly to the tube or inflation bladder. The lubricant used should be a nontoxic, oil-based product that has no detrimental effects on the tube, heating source and pump system, will not support the growth of bacteria, and will not adversely affect the fluid to be transported. Lubricant shall be used in processes with permeable coatings.

808-13 CURING WITH WATER:

a. After installation is completed, suitable heat source is required to circulate heated water throughout the pipe. The equipment should be capable of delivering hot water throughout the section to uniformly raise the water temperature above the temperature required to affect a cure of the resin. Temperature gauges shall be installed in the following areas: incoming water supply; outgoing water supply and between the impregnated tube and the pipe invert at the lining termination point.

b. Curing Time: 3 hours minimum

c. Minimum interface temperature between liner and tube shall be 120 degrees F.

d. Water Temperature: 180 degrees F minimum.

808-14 CURING WITH STEAM:

a. After installation is completed, suitable heat source is required to circulate steam throughout the pipe. The equipment should be capable of delivering steam throughout the section to uniformly raise the steam temperature above the temperature required to affect a cure of the resin. Temperature gauges shall be installed in the following areas: incoming steam supply; outgoing steam supply and

between the impregnated tube and the pipe invert at the lining termination point.

b. Curing Time: 2 hours minimum

c. Minimum interface temperature between liner and tube shall be 120 degrees F.

d. Steam Temperature: 230 degrees F minimum.

e. Pressure required to keep tube inflated while curing 5 psi.

808-15 COOL-DOWN:

a. Water cured CIPP should be cooled to a temperature below 90 F before relieving the hydrostatic head. Cool-down may be accomplished by the introduction of cool water into the CIPP to replace water being drained from the small hole made in the downstream end. Care should be taken in the release of the static head to prevent a vacuum that could damage the newly installed CIPP.

b. Steam cured CIPP. Send air through the liner until it cools down to 120 F interface temperature. Once 120 F has been reached water may be introduced to finish cooling the line down to 90 F. Care should be taken in the release of the water to prevent a vacuum that could damage the newly installed CIPP.

808-16 INFLATION BLADDER REMOVAL: For pulled-in place installation techniques where the inflation bladder is designed not to bond to the CIPP, all portions of the bladder material must be removed from the CIPP.

808-17 CURING WITH ULTRA VIOLET LIGHT (UV):

a. If this method of curing is selected the material must be a polyester needle felt or fiberglass based CIPP liner impregnated with ISO NPG. The liner is cured with the standard UV curing method. A control panel operating a UV curing unit Light chain inside an end fitting with a light chain implemented installation drum, can be pulled on a trailer attached to the UV unit.

b. The Liner gets inverted into the pipe to be lined with the standard pressure drum. After completion of the inversion process the method does not distinguish at all from the standard method applied for the installation of the known glass liner systems. The light chain is introduced in the liner and the ends closed with the couplings.

c. The UV liner may be stored for as much as 3 months before installation.

808-18 FINISHED CIPP:

a. Be continuous over entire length from manhole to manhole and be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, fins, pinholes, wrinkles, and other deformities. Such defects and deformities may (at the discretion of the Owner) be cause for rejection of the entire liner, in which case the lined pipe will be removed and replaced at no additional cost to the Owner.

b. When passing through or terminating in a manhole shall be carefully cut out in a shape and manner approved by Engineer.

c. Each pipe opening into manhole, a hydrophilic rubber joint seal shall be bonded with adhesive to the manhole and CIPP.

d. Meet leakage requirements as specified in Section 802.

808-19 SERVICE LINE CONNECTION RESTORATION: The service laterals to be excavated and restored shall be done prior to the CIPP lining of the mainline in accordance with Section 802 and all re-established services shall be smoke tested prior to backfilling. After the liner has properly cured, the service line connections shall be cut without excavation using an internal cutting device and a television camera. All coupon materials from this action shall be collected at the next downstream manhole and submitted to the Engineer. Service line connections shall be fully reopened and trimmed to a neat, clean, circular opening concentric with the service line pipe, free of jagged edges, "sawteeth", resin plugs or resin shelves.

If internal cuts to existing lined pipes are required by the Contract Documents in order to re-establish service line connections, the work shall be done similarly as described above. This work is in association with rehabilitation of pipes that have been previously lined and payment for this work will be included under the removal of protruding service connection pay item.

808-20 PARTIAL (SPOT REPAIR) CIPP LINERS:

a. The partial CIPP liner shall be installed in accordance with ASTM F 2599 and same requirements as for a full length liner.

b. The dimensions of the liner shall be fabricated to a size that when installed, will neatly fit the circumference of the existing conduit. The materials and physical properties of the partial liner shall conform to the same requirements as for a full length liner.

c. The tube, in good condition, shall be vacuum impregnated with the thermo-set resin. All air in the tube shall be removed by vacuum allowing resin to thoroughly impregnate the tube. A resin-impregnated sample shall be retained by the installer for each installation to provide verification of the curing process taking place in the host pipe. This sample shall be hung in the entry manhole to simulate ambient conditions of the host pipe.

d. The saturated tube along with the inversion bladder will be inserted into the carrying device and pulled into the host pipe. The pull is complete when the end of the launching device is aligned with the beginning of the section to be repaired. The resin and tube shall be completely protected during the pull such that no resin is lost by contact with manhole walls or pipe. The resin that provides a structural seal shall not contact the pipe until positioned at the point of repair.

e. The installer shall be capable of viewing the beginning of the liner contacting the host pipe verifying the exact placement of the liner. No measuring from a CCTV counter or estimating will be allowed.

f. The tube will be extracted out of the carrying device by controlled air or water pressure. The tube is held tightly in place against the wall of the host pipe by the pressure until the cure is complete.

g. Once the sample piece in the manhole has cured, the inflation bladder is deflated, and bladder and launching device are removed from the host pipe. Any materials used in the installation other than the CIPP liner is to be removed from the host pipe by the installer. Contractor shall recover the sample piece and label with upstream and downstream manhole numbers and footage from upstream manhole to service connection. Sample shall be submitted for testing in accordance with Section 808-21.

h. Any service lateral connections covered by the sectional repair are to be restored in accordance with Section 808-19.

808-21 INSPECTION AND TESTING:

a. PROPERTIES TEST: The following test requirements apply to all CIPP installations, regardless of installation method, for each setup:

1. One minimum 12 inch long restrained pipe section shall be cut from the cured liner and labeled with upstream and downstream manholes numbers for that setup. Contractor shall submit the sample to the Owner and measurements of sample thickness will be taken by the Owner from four locations on each section. The average thickness of the measurements shall be equal to or greater than the required minimum or design thickness (whichever is greater). In addition, Contractor shall collect the coupons from the service line connection restoration for each setup, label with upstream and downstream manhole numbers, and submit to the Owner. These coupons may also be used for testing. Failure of the thickness test shall be grounds for rejection of the CIPP liner.

2. "Wet-out" facility resin mixing equipment shall have a valve downstream of the mixing functions and immediately upstream of the application of the mixed resin to the tube where the Owner can draw resin samples. Contractor's batch mix facilities, if any, shall provide for sampling of the mixed batch. Submitted "wet-out" schedule cannot be modified without 24-hour notice to Owner. Resin samples shall be drawn at times determined by Owner. The Owner representative drawing the samples will arrive unannounced and shall be afforded immediate access to the equipment.

b. CCTV VISUAL TEST: The Contractor and the Engineer shall inspect each installation visually by CCTV. Variations from true line and grade may be inherent because of the conditions of the original piping. No infiltration of groundwater should be observed. All service entrances should be accounted for and be fully functional unless otherwise directed by the Engineer in writing. No visible leak around liner at manhole connection will be allowed. The pre- and post-installation documentation in DVD format will become the property of the Owner.

c. Contractor shall correct failed liner or liner deemed unacceptable by the Owner as a result of the post-video inspection and/or thickness test. Remedy for failed thickness test shall be defined as shown in the following table. Where pipe removal and replacement is required, it shall be for the entire segment length from manhole to manhole and payment shall be made in full for the cured-in-place pipe. No payment will be made to construct a new sewer segment (i.e. pipe replacement). The test shall be repeated at no additional cost to the Owner until the results are satisfactory to the Engineer.

PIPE CORRECTION			
Test	**Required Value**	**Test Result**	**Remedy**
Thickness	Minimum or Design, whichever is greater	≥ 90% to 100%	No Unit Price Reduction
		≥ 80%, but less than 90%	15% Unit Price Reduction
		< 80%	Pipe Replacement

808-22 POST INSTALLATION CLEANING: At the conclusion of the work, the Contractor shall thoroughly clean the entire new pipe by flushing with water or other means to remove all dirt, stones, and pieces of wood or other material that may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed.

808-23 PATENTS: The Contractor shall warrant and hold harmless the Owner against all claims of patent infringement and any loss thereof for any type of sewer pipe lining process used in the work.

808-24 MEASUREMENT:

a. **Sewer CIPP Lining:** Measurement for installed cured-in-place pipe lining shall be on a linear foot basis, to the nearest whole foot, measured from center of manhole to center of manhole, for the host pipe sizes listed under this item in the Contract Documents.

b. **Sewer CIPP Partial Lining:** Measurement for installed cured-in-place pipe partial lining shall be on a linear foot basis (6 foot minimum), to the nearest whole foot, for the host pipe sizes and repair lengths listed under this item in the Contract Documents.

c. **Remove Protruding Service Connections:** Measurement for the removal of the protruding portion of a service connection shall be the actual count of protruding service connections internally removed from the host pipe.

808-25 PAYMENT:

a. **Sewer CIPP Lining:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, any required excavation and restoration, uncovering buried manhole covers, sewer pipe cleaning, root removal, installation of the liner, inspection, pre- and post-construction CCTV inspection, equipment retrieval, service line connection restoration, coupon retrieval, testing, and clean-up in accordance with the Contract Documents. Payment for point repairs necessary prior to lining will be paid for separately under the appropriate Bid Items.

b. **Sewer CIPP Partial Lining:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, any required excavation and restoration, uncovering buried manhole covers, sewer pipe cleaning, root removal, installation of the partial liner, inspection, pre- and post-construction CCTV inspection, equipment retrieval, service line connection restoration, coupon retrieval, testing, and clean-up in accordance with the Contract Documents.

c. **Remove Protruding Service Connections:** Payment for this Item will be full compensation for all equipment, labor, materials, and incidentals required to internally remove the protruding portion of a service connection from the host pipe.

808-26 PAY ITEMS:

Pipe Diameter Schedule

A	=	4" Pipe	N	=	27" Pipe
B	=	6" Pipe	O	=	30" Pipe
C	=	8" Pipe	P	=	32" Pipe
D	=	10" Pipe	Q	=	36" Pipe
E	=	12" Pipe	R	=	42" Pipe
F	=	14" Pipe	S	=	48" Pipe
G	=	15" Pipe	T	=	54" Pipe
H	=	16" Pipe	U	=	60" Pipe
I	=	18" Pipe	V	=	64" Pipe
J	=	20" Pipe	W	=	66” Pipe
K	=	21" Pipe	X	=	72” Pipe
L	=	24" Pipe	Y	=	76” Pipe
M	=	26" Pipe	Z	=	80” Pipe

Item No.	Item	Unit
808100_	__” Diameter Sewer CIPP Lining	Linear Foot
808110_	__” Diameter Sewer CIPP Partial Lining	Linear Foot
8082000	Remove Protruding Service Connections	Each

SECTION 809

CURED-IN-PLACE-PIPE (CIPP) LATERALS

SECTION 809
CURED-IN-PLACE PIPE (CIPP) LATERALS

809-1 DESCRIPTION: This Work consists of installing a cured-in-place pipe (CIPP) liner to stabilize structural defects and construction inadequacies in sanitary sewer service laterals and service/mainline connections.

809-2 SCOPE OF WORK:

a. Contractor shall provide materials, labor, equipment, and services necessary for: sewer flow control, pre-installation cleaning, rehabilitation of existing sanitary sewer service laterals by lining, sealing connections to existing sewer main, pre- and post-construction Closed Circuit Television inspection (CCTV) in accordance with Section 815, and final testing of the CIPP system.

b. The rehabilitation of service lateral main line connections shall be done by the installation of a resin-impregnated, flexible, felt tube inverted into the existing service lateral, approximately 12 – 24 inches, utilizing a pressure apparatus positioned in the mainline pipe. Curing shall be accomplished by ambient cure or other approved method to cure the resin into a hard impermeable pipe-within-a-pipe. When cured, the service lateral connection repair shall extend over the length of inversion in a tight fitting, watertight pipe-within-a-pipe to effect a watertight seal with the rehabilitated service lateral pipe. In addition, the lateral connection repair shall seal to the mainline pipe by means of a resin-impregnated flexible felt flange integral with the service lateral felt tube portion or by means of a resin-impregnated one-piece main and lateral cured-in-place liner that will have a watertight seal with the mainline

c. The Work required by the Contract Documents may include just the installation of a service lateral connection sealing and repair product or the installation of this and a service lateral liner. If the work requires both products, the completed product may either be a one piece liner from the main line seal to the cleanout or a two piece liner consisting of service lateral main line connection overlapped by the service lateral liner. The completed product will be a watertight pipe-within-a-pipe, mechanically bonded to the host pipe from the cleanout to the main line with a watertight seal with the main line pipe. The liner shall be smooth, hard, strong, and chemically inert.

809-2.1 Qualifications:

a. CIPP Contractors shall have a minimum of two (2) years of active continuous experience installing CIPP lateral liners in pipe of similar size, length and configuration as proposed in the project. In addition, Contractor shall have successfully installed CIPP liner product in at least 2,000 laterals in wastewater collection system applications.

b. Field supervisory personnel employed by the CIPP Contractor will have at least two (2) years of experience in the performance of the work and tasks as stated in the Contract Documents.

809-3 MATERIALS:

a. All components used in this process will be selected from the Qualified Product List (QPL) or an approved equal. The required principal components are based on materials developed by the impregnation of an absorbent carrier material shaped into a tube of the correct size to fit the host pipe. This sleeve is expanded to the inner wall of the host pipe and cured in place to obtain a hard plastic sleeve mechanically bonded to the host pipe.

b. The flexible polyester felt top hat is a tube insert that shall be fabricated to the proper size for the lateral and host pipe. The proper fit will allow the top hat to key into the internal surface irregularities of the lateral joint and neatly fit tight to the internal circumference of the lateral. The top hat tube shall be a laminate made of non-woven fiber materials that allows for circumferential stretching and angular alignment with the lateral pipe connection geometry during insertion.

c. The carrier material for the tubes shall be of fibrous absorbent composition tailored to achieve the following:

1. Allow the migration of resin from its internal structure by compressing to a thickness of less than 90% of its uncompressed thickness under a pressure of 1psi.

2. The carrier material must consist of non-degradable fibers such as polyester or polypropylene or corrosion resistant fiberglass. The carrier may use stitched or glued joints of material with sufficient strength to comply with the minimum requirement of this specification (Table 1).

Table 1
CIPP Initial Structural Properties
(ASTM F1216)

Property	ASTM Method	Minimum Value
Tensile Strength	D638	3,000 psi
Flexural Strength	D790	4,500 psi
Modulus of Elasticity	D790	250,000 psi

3. The material must have an abrasion resistant, chemically resistant, fully bonded coated surface in the lateral portion to ensure that on curing a smooth surface free from blemishes, pinholes or loose non wetted fibers.

4. Where fiberglass is used, a surface veil or a layer of felt must be used to prevent osmosis or wicking of the strands.

5. The resin used to impregnate the liner must be a resin cured by light, heat or chemicals via the use of accelerators. As an alternative, any other safe energy source, which does not involve the use of electrical current within the main sewer, may be used when evidence can be supplied of the intrinsic safety of the method. PET resins, resin filters, resin additives, and resin enhancement agents are prohibited. Only neat resins are acceptable. Old resins and reworked resins are prohibited, regardless of whether or not they are mixed with new resin.

6. Proven resistance to the municipal wastewater environment that may comprise, as a minimum, all of the following factors:

i. Immersion in septic sewage at temperatures up to 75 degrees F.

ii. Exposure in hydrogen sulfide gas from septic sewage at temperatures up to 75 degrees F.

iii. Proven resistance to ultra-violet light (sunlight) at any stage prior to installation.

iv. Solvent free epoxy, polyester, silicate, and vinyl ester resins are acceptable.

v. Shall not contain silicones, stereates, or natural waxes that would adversely affect the adhesives properties or any other chemical or physical properties of the CIPP liner.

809-4 SUBMITTALS:

a. Prior to receiving the Notice to Proceed at the pre-construction meeting, the Contractor or manufacturer shall submit all data sheets for CIPP materials to be used on the project. These include at a minimum the tube, resin, and catalyst materials.

b. **Qualifications:** Submit documentation showing that the Contractor and personnel meet the minimum required qualifications stated in Section 809-2.1. Include a list of projects showing Contractor's experience with the use of the same pipe material, length and diameter (or larger). Information must include, but not be limited to date and duration of work, location, pipe information (i.e. length, diameter, depth of installation, pipe material, etc.), project owner information (i.e. name, address, telephone number, contact person), and the contents handled by the pipeline (water, wastewater, etc.). **The apparent low bidder shall complete and submit the required qualifications to the Engineer within ten (10) days after the bid opening.**

c. The Standard Dimension Ratio (SDR) is the ratio of the outside diameter (OD) of the pipe to its minimum wall thickness. All CIPP wall thicknesses, SDR's by diameters, and depth ranges corresponding to the requirements of the Contract Documents, must be submitted to the Engineer for approval prior to installation.

d. Prior to installation, the manufacturer shall provide the inversion pressures necessary for proper insertion and tube installation. The tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing host pipe, and the maximum allowable pressure that will not damage the tube. Forces or pressures shall be limited so the tube is not stretched longitudinally by more than 5% of the original length.

e. The proposed bypassing system shall be approved in advance by the Engineer. The acceptance of the bypassing system in advance by the Engineer shall, in no way, relieve the Contractor of responsibility or public liability.

f. Traffic Control shall be the responsibility of the Contractor. Any necessary lane closures shall require a permit from the Traffic Division of the DPW or the La DOTD. Copies of the permits shall be submitted to the Engineer prior to commencing Work.

g. Post-construction CCTV inspection videos.

809-5 DESIGN PARAMETERS:

a. The CIPP system felt or fiberglass and resin composite shall have the minimum physical properties given below and in accordance with the guidelines in the appendix of ASTM F1216.

1. Design Life: 50 years
2. Pipe Diameters: Per Contract Documents

3. Ovality: 2%
4. Pipe Condition: Fully deteriorated
5. External Water: ground surface
6. Flexural Strength: 4,500 psi
7. Short Term Flexural Modulus: 250,000 psi
8. Reduction Factor: 50%
9. Long Term Flexural Modulus: 125,000 psi
10. k (enhancement Factor): 7
11. Soil Modules: 1,000 psi
12. Soil Density: 120 pcf
13. Highway Live Load: AASHTO HS20-44
14. Safety Factor: 2 minimum
15. Min. Thickness 3 mm
16. If calculations require thicker wall, round to the next higher multiple of 0.5 mm.

b. Any layers of the tube that are not saturated with resin prior to insertion into the existing host pipe shall not be included in the required design structural CIPP wall thickness.

809-6 PREPARATIONS:

a. Temporary flow control shall be carried out in accordance with Section 813. Prior to shutdown of private service laterals, provide notification and comply with the requirements as specified in Section 808. Contractor shall provide for the transfer of flow, through or around the section or sections of host pipe that are to be repaired.

b. Delivery, storage and handling of approved products are the responsibility of the Contractor. The Contractor shall keep them safe from damage and stored with the proper environmental containment as outlined by the manufacturer. No products should be used that have exceeded the designated shelf life as outlined by the manufacturer. Remove damaged products from site. Promptly replace damaged products with new products at no additional cost to the Owner.

c. Contractor shall video inspect the service lateral immediately prior to the repairs of the lateral and connection. The Contractor shall use a self-leveling camera to determine the structural condition of the service lateral in accordance with Section 815. The Contractor will notify the Engineer immediately if the inspection reveals an obstruction or other condition exists that will interfere with the proper installation an acceptable lateral liner or lateral connection sealing and repair product.

d. The section of lateral pipe to be lined must be free of debris, obstructions, scale or any other material that reduces the effective diameter of the pipe.

e. All necessary work to repair the lateral-main joint shall be completed prior to commencing any service lateral pipe lining operation described herein.

f. If the service lateral lining process requires the installation of a cleanout, the Engineer must approve the Work before it is done.

809-7 LATERAL CONNECTION SEALING AND REPAIR PRODUCT INSTALLATION: All service lateral connections along a mainline to be CIPP lined shall receive a lateral connection sealing and repair product after installation of the mainline liner, unless the lateral has been recently replaced by a point repair or remove and replacement resulting in a new connection. After suitable cleaning and video inspection, introduce the fiberglass lateral connection sealing and repair product (top hat) from the mainline into the lateral as follows:

a. A flexible resin impregnated top hat tube that is sized to the service laterals will be inserted into the service lateral by means of a robotic manipulator device. The robotic device, together with a television camera, will be used to align the repair product with the service lateral connection opening. Air pressure, supplied to the applicator through an air hose, shall be used to insert the top hat into the service lateral pipe. The insertion pressure will be adjusted to fully deploy the top hat into the service lateral connection and hold it tight to the main and lateral pipe walls.

b. A resin-impregnated sample shall be retained by the installer for each installation to provide verification of the curing process taking place in the host pipe. This sample shall be hung in the entry manhole to simulate ambient conditions of the host pipe.

c. The inserted product will be inspected using a CCTV camera to confirm the product is correctly positioned and/or centered in the lateral opening prior to curing.

d. The pressure apparatus shall include a bladder of sufficient length in both the main and service lateral lines to extend beyond the ends of both the lateral tube and main line brim segments. A smooth transition from top hat to the pipe diameters without a step, ridge or gap between the product and the inner diameters of the service lateral and mainline host pipes must be achieved.

e. After insertion is completed, the manufacturer's recommended pressure must be maintained on the impregnated product for the duration of the curing process. The liner is chemically cured at ambient temperatures or by a suitable heat source. The heating equipment shall be capable of delivering a mixture of steam and air throughout the liner bladder assembly to uniformly raise the temperature above the temperature required to cure the resin. The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of the soil). The heat source temperatures shall be monitored and logged during the cure and cool down cycles. Once the sample piece in the manhole has cured, the bladder is deflated, removed from connection and returned to the manhole to repeat the cycle. Contractor shall recover the sample piece and label with upstream and downstream manhole numbers and footage from upstream manhole to service connection. Sample shall be submitted for testing.

f. The top hat insert shall seal to the inside wall of the mainline at least 2.5 - 3 inches around the host lateral opening and to the lateral wall 12-24 inches into the lateral pipe from the main host pipe. This bond seal shall be created by the resin cure and aided with the use of hydrophilic gaskets or hydrophilic caulk. The cured top hat must attain the cured physical strength of the lateral liner.

g. The Contractor shall install the top hat into the service lateral connection within five (5) days of the main line CIPP liner installation.

809-8 LATERAL CIPP INSTALLATION:

a. After the top hat connection has properly cured, the CIPP service lateral pipe is installed. See Section 808-11 of these specifications for the proper installation method.

b. The internal wall color of the cured liner must be a light reflective color so that clear detailed CCTV inspection can be accomplished.

c. The lateral CIPP must overlap the top hat installation a minimum of six (6) inches in the lateral host pipe and be properly cured and sealed according to manufacturer's recommendations.

d. Install CIPP as outlined in the latest version of ASTM F1216 for direct inversion installations.

809-9 INSPECTION AND TESTING:

a. Finished liner shall be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, fins, pinholes, wrinkles, and other deformities.

b. All re-established services shall be smoke tested prior to backfill. Failures shall be completely removed and replaced until a successful test is achieved at no additional cost to the Owner.

c. Testing requirements of Section 808-21(a) and (c) shall also apply to service lateral lining and lateral connection sealing and repair products. The resin-impregnated sample for each installation shall be retained, labeled in accordance with Section 809-7 (e), and submitted to an independent laboratory, approved by the Owner.

d. The Engineer and the Contractor shall inspect each installation visually by CCTV. No infiltration of groundwater should be observed. The repair sleeve should be monitored for excessive wrinkling, exposed unwetted fibers, pinhole leaks, and infiltration around the terminations. The pre- and post-construction CCTV inspection documentation in DVD format will become the property of the Owner. The test shall be repeated at no additional cost to the Owner until the results are satisfactory to the Engineer.

809-10 POST INSTALLATION CLEANING: At the conclusion of the Work, the Contractor shall thoroughly clean the entire new lined pipe by flushing with water or other means to remove all debris or other material that may have entered during the construction period.

809-11 PATENTS: The Contractor shall warrant and hold harmless the Owner against all claims of patent infringement and any loss thereof for any type of sewer pipe lining process used in the Work.

809-12 MEASUREMENT:

a. **Sewer CIPP Service Lateral Lining:** Measurement for service lateral rehabilitation by a cured-in-place process shall be on a linear foot basis, to the nearest whole foot, measured from the lateral cleanout to the mainline connection point minus 12 inches.

b. **Lateral Connection Sealing and Repair Product:** The lateral connection sealing and repair product or top hat (12” – 24” in length) shall be paid for each.

809-13 PAYMENT:

a. **Sewer CIPP Service Lateral Lining:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, any required excavation and restoration to uncover cleanouts, sewer pipe cleaning, root removal, installation of the lateral liner, inspection, pre- and post-construction CCTV inspection, equipment retrieval, testing, and clean-up in accordance with the Specifications.

b. **Lateral Connection Sealing and Repair Product:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, any required excavation and restoration to uncover cleanouts, sewer pipe cleaning, root removal, cutting & brushing service line connection (if necessary); installation of the top hat,

inspection, pre- and post-construction CCTV inspection, equipment retrieval, testing, and clean-up in accordance with the Specifications.

809-14 PAY ITEMS:

Item No.	Item	Unit
8091000	Sewer CIPP Service Lateral Lining	Linear Foot
8092000	Lateral Connection Sealing and Repair Product (12-24" top hat)	Each

SECTION 812

SEWER LINE, MANHOLE AND WET WELL CLEANING

SECTION 812
SEWER LINE, MANHOLE AND WET WELL CLEANING

812-1 SCOPE OF WORK:

a. The Contractor shall provide all labor, materials, equipment, and incidentals necessary to perform the cleaning of sewer lines, manholes and wet wells as specified in this specification. Sewer line cleaning shall include post-cleaning television inspection to assure satisfactory results.

b. The intent of sewer line, manhole and wet well cleaning is to remove all sludge, dirt, sand, rocks, grease, and other solids or semisolid material from the pipe, manhole or wet well so that defects are not obscured and to allow the water level to drop so that defects are visible. The pipe, manhole and/or wet well interior shall be clean enough to allow viewing of the entire pipe, manhole and/or wet well interior during inspection in accordance with Section 815. Since the success of the other phases of work depends a great deal on the cleanliness of the lines, manholes and wet wells, the importance of this phase of the operation is emphasized.

c. Preparatory cleaning shall be performed prior to closed circuit television inspection, point repair, sewer lining or robotic point repairs, etc. Upon request of the Contractor, the Owner may provide Inspection Reports performed prior to the current contract for reference.

d. Preparatory cleaning shall be performed prior to sewer manhole inspections. This preparatory cleaning shall include the use of hydraulic cleaning equipment and Vacuum Trucks to remove sludge, dirt, grease, etc. from the interior walls and benches of the manhole so that defects are visible. **Preparatory cleaning of sewer manholes shall be incidental to the manhole inspection.**

e. Heavy cleaning of sewers shall be conducted on lines at the direction of the Engineer. Heavy cleaning shall be conducted using bucket machines and mechanical cleaning equipment such as scrappers, scooters, heavy duty brushes, metal pigs and other approved debris removing equipment as specified herein. Heavy cleaning shall remove all foreign materials from the lines. The Contractor shall not be responsible for removing mortar or other similar material that is permanently attached to the pipe walls.

f. Heavy cleaning of sewer manholes shall be conducted on manholes at the direction of the Engineer. Heavy cleaning of manholes shall include entire manhole interior, including manhole benches and walls. It also includes removal of all foreign object or debris from the manholes which shall be removed either manually or mechanically.

g. Cleaning of sewer wet wells shall be conducted on wet wells at the direction of the Engineer. Cleaning shall include the use of hydraulic cleaning equipment and Vacuum Trucks to remove sludge, dirt, grease, etc. from the interior walls and bottoms of the wet well. Incorporate into line cleaning operation by scouring walls with high velocity nozzle after pipe segment cleaning operation is complete. It also includes removal of all foreign object or debris from the wet wells which shall be removed either manually or mechanically.

812-2 ACCEPTABLE METHODS: Sewer line cleaning shall be performed by electronically or manually operated, directly or remotely controlled, mechanically or hydraulically propelled cleaning equipment as described in this specification. Normal line cleaning shall be performed by high velocity water jetting or movable dam used to loosen and transmit material for extraction. Heavy line cleaning shall be performed by mechanical equipment when water jetting is unsuccessful. In NO case shall

Heavy line cleaning be used on PVC pipe. Root Removal is a special operation to cut and remove roots from specific areas of a pipe segment. Selection of equipment for each type of operation shall be made by the Contractor with the concurrence of the Engineer and shall be based on the type of work to be performed, field conditions, such as wet well access, type of debris to be removed, depth of sewage flow, and pipe material.

812-3 LIMITATIONS:

a. Satisfactory precautions shall be taken to protect the sewer lines from damage that might be inflicted by improper use of the cleaning equipment. Whenever hydraulically propelled cleaning tools that depend upon water pressure to provide their cleaning force, or any tools that retard the flow of water in the sewer line, are used, precautions shall be taken to ensure that the water does not cause damage or flooding to public or private property.

b. No fire hydrant shall be obstructed or used when there is a fire in the area.

c. Contractor shall remove the water meter(s)/piping, etc. from all fire hydrants at the end of each working day.

812-4 SEWER CLEANING:

a. Sewer line sections shall be cleaned using mechanically powered, hydraulically propelled, or high velocity sewer cleaning equipment. Selection of the equipment used shall be based on the conditions of the lines at the time the work begins. The equipment and methods selected shall be satisfactory to the Engineer. The equipment selected for cleaning shall be capable of removing dirt, grease, rocks, sand, sticks, branches, leaves and other deleterious materials and obstructions from the sewer lines and wet wells. If cleaning of an entire section cannot be successfully performed from one manhole or wet well, the equipment shall be re-setup at the manhole or wet well on the opposite end of the pipe segment being cleaned and cleaning shall be re-attempted.

b. Water for sewer cleaning shall be purchased by the Contractor and obtained at locations in accordance with the utility owner, as directed. If the water is obtained from a potable supply, appropriate backflow prevention devices as identified in Part XII Water Supplies by the La. Department of Health and Hospitals shall be provided to protect the potable system from cross connections and contamination. Contractor shall be solely responsible for preventing cross contamination of any public or private water systems used for this purpose.

c. During all sewer-cleaning operations, satisfactory precautions shall be taken to protect the sewer lines from damage that might be inflicted by the improper use of cleaning equipment. Whenever hydraulically propelled cleaning tools or tools which retard the flow in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not cause any damage or flooding to public or private property. The flow of sewage in the sewer lines shall be utilized to provide necessary pressures for hydraulic cleaning devices whenever possible.

d. When additional water from fire hydrants is necessary to avoid delay in normal working procedures, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed in case of a fire in the area nor shall a hydrant be used for the purpose described unless an appropriate backflow preventer is provided.

e. Contractor will be solely responsible and held liable for any claims or damages arising from any action or lack of action arising from reckless, negligent, or careless behavior.

f. The retrieval of equipment lodged in pipes or a wet well is the Contractor's responsibility and will be performed at the Contractor's expense.

812-5 CLEANING EQUIPMENT:

812-5.1 Regular Sewer Line Cleaning:

a. Hydraulic Cleaning Equipment: The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to allow the sewage flow past the cleaning head to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure total removal of grease. If cleaning balls or other such equipment that cannot be collapsed instantly are used, special precautions against flooding of the sewers and causing damage to public or private property shall be taken.

b. High Velocity Jet (Hydro-Cleaning) Equipment: All high velocity sewer cleaning equipment shall be designed for ease and safety of operation. The equipment shall have a selection of two or more high velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 degrees to 45 degrees in all sizes designated to be cleaned. Cleaning shall be accomplished by using a pump capable of delivering water from 800 to 1500 psi to the self-propelled nozzles. Equipment shall also include a high velocity gun for washing and scouring wet well walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel. All controls shall be located so that the equipment can be operated above ground.

812-5.2 Heavy Sewer Line Cleaning:

a. Mechanical Cleaning (Heavy Cleaning Equipment): Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed.

b. Power rodding machines shall be either sectional or continuous type capable of holding a minimum of 750 feet of rod. The rod shall be heat-treated steel. To ensure safe operation, the machine shall have a fully enclosed body and an automatic safety throw-out clutch or relief valve.

c. Chain knockers may be used in a back and forth motion to loosen heavy deposits of material. Chain knockers may be used in ductile iron pipe ONLY.

d. Contractor may recommend other heavy cleaning equipment for use with the approval of the Engineer.

812-5.3 Root Removal:

a. Roots shall be removed in the designated sections where there is root intrusion. Root removal shall be sufficiently completed to satisfy the following objectives: to restore the hydraulic capacity of the sewer line to at least 95% capacity after cleaning, to allow for complete CCTV inspection of the sewer line in question to the satisfaction of the requirements of Section 815, and to decrease the probability of the damming of debris

at the location of the root removal. Special attention shall be used during the cleaning operation to assure complete removal of roots from the joints.

b. Procedures may include the use of mechanical equipment such as rodding machines, winches using root cutters and porcupines. Also hydraulically driven root cutting blade or saw assemblies, hydraulic jetting equipment specifically design for root cutting, and hydraulically propelled chain or wire root cutters.

c. Sanitary sewer service lateral root cutting may be performed from the mainline or from a public sewer clean out if one exists. Sanitary sewer service lateral root cutting shall be approved by Engineer prior to Contractor performing root removal in the service lateral.

d. The Contractor shall perform an initial setup of his equipment so that sanitary sewer service lateral root cutting can be performed on all designated and/or approved service laterals along a mainline segment. Multiple additional setups on the same mainline segment will not be paid due to the preferred method of root removal in the service lateral chosen by the Contractor.

e. All lines that require root cutting will be both cleaned and inspected after root cutting is completed. The cost of this additional work will be considered incidental to the unit cost of root cutting. After root removal, re-televising the entire sewer line is not required, but the pipe in the locations where the roots have been removed, and any part of the line not yet videoed, must be re-televised after root removal so that any piping, connections, defects, etc., hidden before root removal may be identified. Televising may be stopped and the root cutting executed while the CCTV recording is paused.

812-5.4 Heavy Sewer Manhole Cleaning:

a. Cleaning equipment that uses a high velocity water jet for moving debris shall be capable of producing a minimum volume of 50 GPM with a pressure of 3500 PSI for the wet well structure at the pump. Any variations to this pumping rate must be approved, in advance, by the Engineer. A working pressure gauge shall be used on the discharge of all high pressure water pumps. The Contractor shall operate the equipment so that the pressurized nozzle continues to move at all times. The pressurized nozzle shall be turned off or reduced anytime the hose is held or delayed in order to prevent damage to the wet well.

b. Contractor shall remove foreign objects or debris from wet well by manual or mechanical means approved by the Engineer.

812-5.5 Pump Station Wet Well Cleaning: Cleaning of pump station wet wells shall be in accordance with Subsection 815-5.4.

812-6 MATERIAL REMOVAL:

a. All sewer lines to be cleaned shall be plugged at the discharge end prior to cleaning.

b. All sludge, dirt, sand, rocks, grease, and other solid or semi-solid material resulting from the cleaning operation shall be removed at the downstream manhole or wet well of the section being cleaned. Passing material from one sewer line section to another sewer line section, or from manhole section to manhole section shall not be permitted except when using high velocity jet equipment. The maximum limit before material is removed will be approximately 600 feet.

c. All roots shall be removed prior to sewer line inspection, robotics repair and sewer liner pipe installation. If roots are encountered during line inspection, remove inspection equipment, then perform root removal and re-inspect with no additional cost to the Owner.

812-7 DISPOSAL OF MATERIAL:

a. All debris, solids or semi-solids resulting from the cleaning operations shall be removed from the site and disposed of at a legally permitted site for that purpose. At a minimum all materials shall be removed from the site at the end of each workday. Under no circumstances will the Contractor be allowed to accumulate debris, etc., on the site of work beyond the stated time, except in totally enclosed containers and as approved by the Engineer.

b. Contractor shall be responsible for all fees and tipping charges for disposal.

c. The Contractor must follow all current applicable local, state and federal rules and laws regarding the appropriate disposal of waste materials from cleaning operations.

d. Under no circumstances shall sewage or solids removed in the cleaning process be dumped into streets, ditches, catch basins, storm drains, sewer manholes, wet wells, cleanouts, or dumps.

e. Sanitary sewer dewatering of the Vacuum Truck or tank may be discharged into the sanitary sewer system at a manhole downstream of the pipe segments that have been cleaned. Storm water dewatering may be discharged to a downstream location, as approved by the Engineer.

812-8 INSPECTION: Inspection of all cleaning operations will be made on a daily basis by the Engineer.

812-9 ACCEPTANCE: Television inspection shall be performed to ensure the satisfaction of the Engineer that proper cleaning of the line or wet well has been performed. If inspection shows the cleaning to be unsatisfactory to the Engineer, the Contractor will be required to re-clean and re-inspect the sewer line section or wet well until the cleaning is acceptable at no additional cost to the Owner.

812-10 MEASUREMENT:

a. **Sewer Line Cleaning:** Measurement for this item shall be on a linear foot basis, measured to the nearest whole foot, from center of upstream manhole to center of downstream manhole for the various sizes listed on the Bid Form.

b. **Wet Well Cleaning:** Measurement for this item shall be per each wet well based on the capacities listed. This shall include the first 40 feet of piping required for cleaning operations.

c. **Treatment Facility Cleaning:** Measurement for this item shall be per hour of cleaning operation. This may include, but not be limited to, the cleaning of Grit Chamber Drain Pits, Settling Basin's Scum Boxes, Clarifier Scum Boxes, Bar Screen Channels, or Influent Chambers at the three treatment facilities and/or the parish prison.

d. **Heavy Sewer Manhole Cleaning:** Measurement for this item shall be based on each manhole.

e. **Root Removal:** Measurement for this item shall be by the linear foot of mainline sewer pipe obstruction. The minimum length for Root Removal payment shall be twenty (20) feet per line segment from manhole to manhole. Measurement shall be for location of roots only. Travel length of root removal equipment to root location will not be measured as root removal.

f. **Sanitary Sewer Lateral Root Removal:** Measurement for this item shall be based on each sanitary sewer lateral requiring root or pipe obstruction removal up to twenty (20) feet of sewer service lateral.

g. **Sanitary Sewer Lateral Root Removal Set-up:** Measurement for this item shall be made per each initial equipment set-up per mainline segment requiring sanitary sewer lateral root removal.

h. **Additional Piping for Wet Well Cleaning:** Measurement for this item shall be based on the actual linear footage of pipe after the initial 40 feet paid under the Wet Well Cleaning item as approved by the Engineer. This item should only be used when the wet well is not accessible from the roadway or driveway.

i. **Emergency Call Out:** Measurement for this item shall be per each based on the actual number of call outs outside of normal business hours as authorized by the Engineer. Normal business hours are considered to be 6:30 a.m. to 3:00 p.m. Monday thru Friday, excluding City-Parish holidays. Personnel shall be available 24 hours a day, seven (7) days a week for call out and shall respond within three (3) hours of notification. Failure to respond within the specified time limit for three (3) call outs shall result in the Contractor being placed in default and the cancellation of the Contract.

812-11 PAYMENT:

a. **Sewer Line Cleaning:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

b. **Wet Well Cleaning:** Payment for this Item shall be full compensation for all labor, initial set-ups, equipment, first 40 feet of piping, plugging, debris removal, confined space entry where required, and disposal in accordance with the specifications under the specific pay items provided.

c. **Treatment Facility Cleaning:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

d. **Heavy Sewer Manhole Cleaning:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

e. **Root Removal:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

f. **Sanitary Sewer Lateral Root Removal:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

g. **Sanitary Sewer Lateral Root Removal Set-up:** Payment for this Item shall be full

compensation for the initial equipment set-up cost per mainline segment requiring sanitary sewer lateral root removal. This will be the total payment whether mainline or cleanout introduction of the root removal equipment is used.

h. **Additional Piping for Wet Well Cleaning:** Payment for this Item shall be full compensation for all additional labor, equipment, pipe after the initial 40 feet paid under the wet well cleaning item, and all other materials needed in accordance with the specifications under the specific pay items provided.

i. **Emergency Call Out:** Payment for this Item shall be full compensation for all expenses incurred for a crew to respond to call outs outside of normal business hours as authorized by the Engineer.

812-12 PAY ITEMS:

Item No.	Item	Unit
8125101	Regular Sewer Line Cleaning Less Than or equal to16”	Linear Foot
8125102	Regular Sewer Line Cleaning Greater than 16” up to 36”	Linear Foot
8125103	Regular Sewer Line Cleaning Greater than 36” up to 60”	Linear Foot
8125104	Regular Sewer Line Cleaning Greater than 60”	Linear Foot
8125201	Heavy Sewer Line Cleaning Less Than or equal to 16”	Linear Foot
8125202	Heavy Sewer Line Cleaning Greater than 16” up to 36”	Linear Foot
8125203	Heavy Sewer Line Cleaning Greater than 36” up to 60”	Linear Foot
8125204	Heavy Sewer Line Cleaning Greater than 60”	Linear Foot
8125211	Heavy Sewer Manhole Cleaning	Each
8125301	Root Removal	Linear Foot
8125302	Sanitary Sewer Lateral Root Removal	Each
8125303	Sanitary Sewer Lateral Root Removal Setup	Each
812640_	Wet Well Cleaning (__ - __ GPM Capacity)	Each
8126501	Additional Piping for Wet Well Cleaning	Linear Foot
8126601	Treatment Facility Cleaning	Hour
8126701	Emergency Call Out	Each

SECTION 813

SEWER FLOW CONTROL

SECTION 813
SEWER FLOW CONTROL

813-1 DESCRIPTION: Sewer flow control is a set of methods to adjust the flow in the sewer system to allow for inspection, maintenance, repair or replacement. This is accomplished by either blocking or plugging the incoming lines to restrict flow or through the use of pumps to bypass the flow around the work area until the work is completed.

813-2 SCOPE OF WORK:

a. The Contractor shall be required to furnish all materials, labor, equipment, power, maintenance, etc. to implement the necessary flow control system and control the flow around and/or through the work area for the duration of the work.

b. The design and installation of the necessary systems as well as the operation of the temporary pumping systems (if necessary) shall be the Contractor's responsibility.

c. If bypass pumping and/or pump station shut down is required, the Contractor shall coordinate with the Wastewater Collection Pump Maintenance Superintendent.

d. Flow control will be required to conduct inspection or other maintenance/rehabilitation operations when the existing flow in the lines is above the following levels:

1. Maximum Depth of Flow for CCTV Inspection:

   The entire circumference of the pipe (360 degrees) shall be viewable to the satisfaction of the Engineer. Contractor shall dewater the pipe as necessary to allow the required visibility.

2. Maximum Depth of Flow for Joint Sealing:

6" - 12" Pipe	40% of pipe diameter
15" - 24" Pipe	45% of pipe diameter
>24" Pipe	50% of pipe diameter

e. Public notification and coordination with the homeowners shall be identified in the submittals and accomplished according to the following:

1. At least 7 days prior to any work, shutdown of service, or reduction in service to any line segment, the Contractor shall go door-to-door to distribute an Owner approved Homeowner Door Knocker describing the work to be performed.

2. On the day the service is to be shutdown or reduced, prior to commencing the work, the Contractor shall knock on the doors of all structures potentially impacted by the work and personally notify the occupants.

3. The Contractor shall notify by fax or email to the Owner's designated office the location of line segment in which service is to be shutdown or reduced prior to 7:00 a.m.

813-3 SUBMITTALS: At the request of the Engineer, the Contractor shall submit the following information:

a. Flow Control Plan: At the request of the Engineer, the Plan shall be submitted a minimum of 48 hours prior to controlling flows and shall include the following

information:

1. Estimate of peak flow to be controlled
2. Detailed procedures for handling peak estimated flow
3. Schedule for controlling flow
4. Listing of equipment needed for flow control
5. Operation plan
6. Emergency procedures
7. Permits to close roads or lanes if necessary
8. Drawing of plug, bypass pump and pipeline locations (if bypass pumping is required)
9. Bypass pump sizes, capacities, number of each size to be onsite (including standby equipment) and power requirements (if bypass pumping is required)
10. Bypass pipeline sizes and material types (if bypass pumping is required)

813-4 FLOW CONTROL PRECAUTIONS: Whenever flows in a sewer line are blocked, plugged or bypassed, sufficient precautions shall be taken to protect the sewer lines from damage that might be inflicted by excessive sewer surcharging. Further precautions shall be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

In situations where flow is running through an open trench during a sewer repair or replacement, Contractor shall take precautions to ensure that debris, bedding/backfill material, sediment, etc. do not enter into the sewer system possibly causing damage to downstream pump stations. In the event debris, bedding/backfill material, sediment, etc. does enter the downstream sewer system due to Contractor negligence, the Contractor shall be responsible for cleaning and videoing the downstream system and also any damage to the downstream pump station equipment at no additional cost to the Owner.

813-5 PLUGGING OR BLOCKING:

a. A sewer line plug permanently marked with a Contractor identification tag, shall be inserted into the line upstream of the pipe segment being inspected or repaired. Where necessary, plugs permanently marked with a Contractor identification tag, shall also be installed into the storm sewer pipe. Plugs shall be so designed that all or any portion of the flow can be released. All plugs shall have a tag line attached to them that extends outside of the manhole or wet well in addition to the air line in case of air line rupture. During CCTV inspection and sealing operations, flow shall be reduced to within the limits specified in Subsection 813-2.d.

b. After the Work has been completed and restricting the flow is no longer needed for the work, then the flow shall be restored to normal. Flow shall be restored by removing the plugs in an order that permits flow to slowly return to normal without surcharging or causing other major disturbances downstream.

c. Temporary plugs shall be removed and the flow restored to normal at the end of each working day. If downstream work is not or cannot be completed during the workday then the Contractor shall be required to provide, operate, and maintain bypass pumping system on a 24 hour basis.

d. The Contractor shall use bypass pumping if the work cannot be scheduled or cannot be completed at a time when flow is within the flow levels specified by Subsection 813-2.d.

813-6 PERFORMANCE REQUIREMENTS:

a. It is essential that the sewer service have no interruption through the duration of the Work. If the storage capacity of the upstream line is not adequate to store the flow during the duration of the work or if the line is to be shut down for a period greater than 8 hours, then the Contractor shall provide adequate bypass pumping so that there is no interruption in the flow throughout the duration of the work. Therefore, Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units) as necessary to intercept the flow before it impacts the work area, carry it past the work area and return it to the existing sewer system downstream of the work.

b. Discharge of sewage into the construction trench, private or public property, gutters, streets, sidewalks or storm sewers shall not be permitted.

813-7 FLOW ELIMINATION:

a. The flow shall be completely eliminated when required for sewer pipe replacement, structural concrete repairs in deteriorated manholes, or installation of cured-in-place pipe.

b. Flow elimination may be accomplished by temporary shutdown of pump stations where possible, or by plugging upstream sewers and pumping of flows, if required. Temporary shutdown of pump stations shall be done by Wastewater Maintenance personnel only.

c. All requests of the Contractor to eliminate or adjust the flow within the system shall be made in writing to the Owner. Owner and Contractor recognize and acknowledge that the elimination and/or adjustment of the flow are a cooperative effort and that the time and effort required achieving the desired flow varies. Owner and Contractor declare and agree that Contractor shall not be allowed, due, or paid any additional compensation, whatsoever, for Contractor's work, effort, time, material, labor, rentals, equipment, expenses, etc., during, as a result of, or arising from the elimination or adjustment of the flow.

813-8 PUMPING AND BYPASSING:

a. The Contractor shall obtain approval and secure all permits for placement of temporary bypass pumping system and pipeline within public right-of-way.

b. Bypass pumping may be required whenever pump stations are shut down or flow in gravity sewer lines are restricted or blocked. The Contractor shall supply the necessary pumps, conduits, and other equipment to divert the flow around the pump station, restriction, blockage, or other structure in which work is to be performed. Temporary shutdowns shall be performed by Wastewater Collection Pump Maintenance Personnel only. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during periods of a rainfall. Electric pumps or diesel silent pack pumps shall be used. No other type of pump will be acceptable without prior approval of the Owner.

c. The Contractor shall be responsible for furnishing the necessary equipment, power, labor, and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, all equipment shall be operated in a manner to keep the pump noise at a minimum, and in accordance with City/Parish noise ordinance.

d. The Contractor shall be solely responsible for clean-up, repair, property damage costs

and claims resulting from failure of the diversion system.

e. Bypass pumping shall not damage private or public property, or create a nuisance or public menace. Pumped sewage shall be in an enclosed pipe that is adequately protected from traffic, and shall be redirected into sanitary sewer system or alternatively into an enclosed tank for hauling to the wastewater treatment plant. Dumping or free flow of sewage on private or public property, gutters, streets, sidewalks, or into storm sewers is prohibited. Dumping of storm water may be discharged at a downstream location, as approved by the Engineer.

f. The Contractor shall make all arrangements for bypass pumping during the times when the main is shut down for any reason. The Contractor shall also perform the work during a low-flow period whenever possible.

g. The Contractor shall furnish, install, and maintain power, primary and standby pumps, equipment, and bypass piping required to maintain existing flows and services.

    1. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

    2. The Contractor shall provide the necessary stop/start controls for each pump.

    3. The Contractor shall included one stand-by pump of each size to be maintained on site. Back-up pumps shall be on-line and isolated from the primary system by a valve.

    4. In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of a secure, tight, leak free discharge pipe. Under no circumstances will aluminum “irrigation” type piping or glued PVC pipe be allowed.

h. The Contractor shall be responsible for continuity of sewer service to each facility connected to the section of sewer main during the execution of the work, and shall also bypass the main sewer flow around the pipe to be replaced, or into adjacent sewers.

i. The pumps and the bypass lines shall be of adequate capacity and size to handle all flows without backup to private property.

j. Costs of bypass pumping, when needed, shall be included in the Contractors bid and shall be considered incidental to the work, unless a specific bid item is provided in the bid form.

813-9 SERVICE LATERAL DISCONNECTION:

a. Disconnected sewer service lateral connections shall be accommodated by bypass pumping or containment of the flow from time of disconnection to time of reconnection. This shall be accomplished by a mechanical pump and manifold system or by a storage system such as a bladder tank system. The storage system shall be capable of holding adequate sewage from each sewer service lateral connection for a period of 24 hours. Each storage system shall be emptied or pumped during each 24-hour period and properly disposed of.

b. When a service lateral must be disconnected from the main for more than 1 work day,

the lateral shall be positively drained or pumped a minimum of once every 24 hours. The Contractor shall monitor status of flow and storage, and pump lateral more frequently if flows exceed the storage capacity of the lateral or the temporary storage.

c. Reconnect services in uncompleted sections during times of construction inactivity.

d. Notify building occupants when work is complete and full uninterrupted service restored.

e. No service is to remain shutdown for more than a period of 8 hours, unless Contractor provides substitute services for the residents. If the service is to be shutdown for more than 8 hours and Contractor cannot provide substitute services, then Contractor shall be required to provide temporary living quarters (i.e. hotel) for the resident at no additional cost to Owner or the resident. Temporary living quarters shall be approved by Engineer.

813-10 FIELD QUALITY CONTROL AND MAINTENANCE:

a. Testing: The Contractor shall perform leakage tests of the bypass pumping discharge piping using clean water prior to operation.

b. Inspection: The Contractor shall inspect the bypass-pumping system no less than once every 2 hours to ensure that the system is working correctly.

c. Maintenance of Service: The Contractor shall ensure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

813-11 CLEANING:

a. Before the bypass pumping system is dismantled, either to be moved to the next section or at the completion of the work, discharge sewage remaining in the bypass discharge pipeline and pumping equipment into the working sanitary sewer. Storm water is to be discharged at a downstream location, as approved by the Engineer.

b. Upon completion of the bypass pumping operation, disturbed areas shall be cleaned and restored to their original condition. This restoration should restore the site to a condition which is at least equal to or better than the condition which existed prior to the start of the work.

813-12 LIABILITY: The Contractor shall be responsible for damages to private or public property that may result from the sewer flow control operations. The Contractor shall be responsible for any violations of laws, regulations or permits and shall indemnify and hold the Owner harmless for any and all damages, including but not limited to, fines, penalties and law suits which arise from such violations.

813-13 MEASUREMENT: If a pay item for bypass pumping is included in the Contract, measurement will be as follows:

a. **Bypass Pumping Greater than 16” up to 36”:** Measurement for this item shall be per each line segment bypassed.

b. **Bypass Pumping (Capacity):** Measurement for this item shall be per each set-up for an initial operation period of eight (8) hours. Measurement for any operation beyond the initial eight (8) hour period shall be on an hourly basis.

813-14 PAYMENT: If no pay item for bypass pumping is included in the Contract, bypass pumping shall be at no direct cost and the Contractor shall include the cost in the price bid on other items. If a pay item for bypass pumping is included in the Contract, payment will be made as follows:

a. **Bypass Pumping Greater than 16" up to 36":** Payment for this Work will be full compensation for furnishing all labor, materials, equipment, and incidentals required to complete the Work. This work shall include all bypass pumping and temporary flow control when no separate specific Bid Item is included for these functions. Any other miscellaneous Work not specifically included for payment under any other Items in the Bid Form but obviously necessary to complete the Contract and fulfill all requirements of these Specifications and Contract Documents shall be included.

b. **Bypass Pumping (Capacity) per each:** Payment for this Work will be full compensation for furnishing all labor, materials, equipment, set-up, and incidentals required to complete the Work during the initial eight (8) hours of operation. This work shall include all bypass pumping and temporary flow control when no separate specific Bid Item is included for these functions. Any other miscellaneous Work not specifically included for payment under any other Items in the Bid Form but obviously necessary to complete the Contract and fulfill all requirements of these Specifications and Contract Documents shall be included.

c. **Bypass Pumping (Capacity) per hour:** Payment for this Work will be full compensation for furnishing all labor, materials, equipment, and incidentals required to continue the operation of the bypass pumping after the initial eight (8) hours of operation.

813-15 PAY ITEMS:

Item No.	Item	Unit
8130001	Bypass Pumping Greater than 16" up to 36"	Each
8136001	Bypass Pumping (__ - __ GPM Capacity)	Each
8137001	Bypass Pumping (__ - __ GPM Capacity)	Hour

SECTION 815

SEWER LINE, MANHOLE AND WET WELL INSPECTION

SECTION 815
SEWER LINE, MANHOLE AND WET WELL INSPECTION

815-1 SCOPE OF WORK: The Contractor shall use a closed circuit color video system (CCTV) to remotely inspect and defect code the pipe, manhole, or pump station wet well in “real time” or other methods approved by the Engineer. The television camera used for the inspection and defect coding of the sewer features shall be one specifically designed and constructed for such inspection. The camera must be capable of tolerating a hazardous and corrosive environment.

a. After the required cleaning is completed in accordance with Section 812, the Contractor will proceed with the television inspection of pipes and defect classification will be based on the latest revision of the Pipeline Assessment and Certification Program (PACP) Condition Grading System as developed by the National Association of Sewer Service Companies (NASSCO) as amended by the Owner.

b. Direction of the CCTV inspection shall be from upstream to downstream, unless otherwise approved by the Engineer.

c. The Owner makes no guarantee that the sewers proposed to be inspected after the cleaning, are clear for the passage of the camera set-up. The equipment, tools and method(s) used for securing the passage of the camera are to be at the discretion of the Contractor with the approval of the Engineer.

d. The Contractor shall comply with all requirements of local, state, and federal confined space entry laws and regulations.

e. CCTV inspection required for pre-installation assessments and acceptance of work does not require defect coding.

815-2 SUBMITTALS:

a. A Traffic Control Plan will be submitted to DPW. The plan shall include an outline of the permit acquisition procedure for lane closure, methods for proper signing and barricades, which complies with local requirements and the MUTCD, and site Contractor telephone numbers for emergencies.

b. Schedules of work shall be submitted to the Engineer on a weekly basis. Any deviation from the submitted plan not caused by weather or natural causes shall be preceded by a 24-hour notice.

c. Copies of all the technical certifications for the Characterization Technicians that will work on the project must be submitted to the Engineer prior to commencing work.

d. Contractor shall submit a signed affidavit stating that all required OSHA regulations are adhered to.

815-3 PREPARATION:

a. Public notification and coordination with the homeowners shall be identified in the submittals and accomplished according to the following:

    1. At least 7 days prior to the inspection of any line segment or manhole and prior to beginning the inspection, the Contractor shall go door-to-door to distribute an Owner approved Homeowner Notification Door Knocker describing the work to be performed.

2. On the day of inspection, prior to commencing operations, Contractor shall knock on the doors of all structures potentially impacted by the testing to personally notify occupants.

3. Contractor shall notify by fax or email to the Owner's designated office the location of the work to be performed daily prior to 7:00 a.m.

b. Prior to CCTV inspections Contractor shall clean the pipelines, manholes and wet wells of debris in accordance with Section 812. Immediately after cleaning, the sewer line section, manhole or wet well shall be visually inspected by means of CCTV. Sewer line sections shall be characterized according to specifications from manhole to manhole.

c. With the agreement of the Engineer, a Traffic Control Director may be utilized onsite where equipment is in or near to a roadway to assist in alerting or directing traffic near the work area.

815-4 TELEVISION INSPECTION OF SEWER LINES:

a. The system shall have the capability of recording on the digital video disk (DVD) written information identifying each pipe segment inspected and a metering device measuring distance to the nearest whole foot. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. Digital videos of poor and unacceptable quality will be rejected. Re-recording will be at no additional cost to the Owner.

b. The television camera used for the inspection shall be one specifically designed and constructed for such inspection. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 500-line resolution picture. The camera shall have an imager with minimum 0.7 lux sensitivity and utilize high intensity discharge lamps for illumination. Maintenance of video equipment is a must. Camera distortions, inadequate lighting, dirty lens or blurred/hazy picture will be cause for rejection. A backup camera, in good working conditions, shall be available on the project site. Camera shall be operative in a hazardous and corrosive environment.

c. All internal pipe damage shall be still photographed in color by the Contractor utilizing picture capture equipment, and shall be clearly labeled with the date, upstream manhole (UM) number, footage to the UM, and type of defect generated in a _.JPEG file format. These files will be recorded on a DVD and delivered to the Owner with the video. All videos, photos and data acquired are the property of the Owner.

d. The entire circumference of the pipe (360 degrees) shall be viewable. The Contractor will be required to pause and pan all service lateral connections. The Contractor will also be required to dewater pipe as necessary to allow the required visibility. This dewatering will be considered incidental to the television inspection

e. The camera shall be moved through the line at a uniform rate and at a maximum camera speed of 30 ft/minute, stopping when necessary to insure proper documentation of the pipe's condition. Digital video shall be captured at a minimum video bit rate of 5.0 M Bit/second. Manual winches, power winches, TV cable, and powered rewinds or crawler device or other devices that do not obstruct the camera view or interfere with proper documentation of the pipe conditions shall be used to move the camera through the line.

f. If during the inspection operation the television camera will not pass through the entire section because of an obstruction such as a dropped joint, crushed pipe, etc., with the approval of the Engineer, the Contractor shall perform an additional setup of his equipment so that the inspection can be performed from the opposite end in order to obtain a “full” section (returning unimpeded to the original blockage). If, again the camera fails to obtain a “full” section because of a second obstruction preventing passage, the inspection shall be considered incomplete and marked survey abandoned at this time. If an additional setup is required, the Contractor will get paid for only one (1) additional setup per mainline segment.

g. When remotely operated methods are used to move the television camera through the line, radios or other suitable means of communication shall be set up between the two ends of the section being inspected to insure good communications between members of the crew.

h. Any obstructions causing a stuck camera are the responsibility of the Contractor. Likewise the retrieval of equipment or cameras is the Contractor’s responsibility and will be performed at the Contractor’s expense.

i. Metering equipment will be accurate to two percent (2%) over the length of the sewer line section being inspected. Accuracy of the meters shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device. Also a distance between all manholes will be recorded by a surface measure center to center in the provided database.

j. The location of all pipe defects shall be noted in accordance with the PACP code as amended by the Owner. All CCTV operators must be PACP certified. The defects shall be recorded in “real time” or as approved by the Engineer in accordance with the latest revision of the PACP code as noted, and on the inspection sheet. The inspection sheet shall also show pipe type, size, depth, manhole locations, street addresses of all manholes, and location of all service lateral connections.

k. The camera height shall be adjusted within the pipe to maintain a centered position for filming. The lighting should always be sufficient for high quality pictures. A reflector light system in front of the camera may be required to enhance the lighting of a dark colored pipe.

l. Camera footage counter shall be set to measure and record length of each sewer line segment from centerline of its terminal manholes. If multiple sewer line segments are to be videoed from one setup, footage counter shall be reset for each line segment at its starting manhole.

815-5 TELEVISION INSPECTION OF LATERALS:

a. Service laterals will be photographed and characterized in accordance with this specification.

b. A self-leveling radial view camera (360 degree optical lens) will be used for lateral inspection. Cameras incorporating mirrors for viewing sides or cameras using exposed rotating heads are not acceptable. The camera must be an auto-iris type with remote controlled manual override. The camera light head includes a high-intensity side viewing lighting system to allow illumination of internal sections of lateral sewer connections.

c. A main sewer television camera is used to position the lateral camera launcher. The lateral sewer camera is used to inspect each lateral from the mainline to the cleanout.

d. The television inspection of the lateral must be attempted from the mainline to the cleanout. After an unsuccessful attempt, the inspection may be performed from the cleanout to the mainline by using a mini-push camera if necessary.

e. Lateral inspection will be performed with the same minimum criteria for mainline inspections. Cleaning, conditions, classifications, and recording of datum will also apply.

f. The Contractor may request permission from the Engineer not to perform lateral inspections in conjunction with mainline inspections. However if approved by the Engineer, the Contractor shall complete lateral inspections within one working day of the mainline inspection.

g. If an additional set-up is approved for the mainline inspection for a mainline segment, another additional set-up will not be approved for the lateral inspection for the same mainline segment. Multiple additional setups on the same mainline segment will not be paid for due to the preferred method of inspection chosen by the Contractor.

815-6 SONAR INSPECTION OF SEWER LINES:

a. **Description:** Contractor will be required to introduce equipment to create a volumetric section of the pipe in "difficult to see" and opaque submerged environments. This equipment, capable of withstanding harsh environments, will use sound to acoustically locate and document features and defects in the pipe to be investigated.

b. **Data Acquisition**: The sonar system shall be designed to provide accurate dimensional data on silt level, grease accumulation, pipe deformation, offsets, etc, below the waterline. In full flowing lines or siphons, the system shall provide visual profile, profile comparison, and dimension data of significant items or defects. A sonar inspection of a fully or partially flowing line shall provide a two-dimensional profile of the interior pipe wall. In partially flowing lines, the sonar may be required to be combined with CCTV to provide a simultaneous composite image of the pipe both above and below the waterline.

c. **General Sonar Specifications:**

Minimum Deployment Specifications	
Above or Below Waterline:	Below
Wet or Dry Operating Environment	Wet
Minimum Pipe Diameter	36"
Maximum Pipe Diameter	144”
Manhole Minimum Diameter	24"
Maximum Inspection Length	600’

815-7 TELEVISION INSPECTION OF MANHOLES OR WET WELLS: This specification covers “non-entry” inspection of manholes and wet wells using internal video equipment for the purposes of assessing thoroughness of cleaning, observing and recording structural and service lateral defects and construction features and to verify new sewer construction prior to acceptance.

a. **Operations**:

1. Each manhole or wet well inspection unit is to consist of a self-contained vehicle with separate areas for viewing and storage complete with the following equipment as a minimum:

    i. Fans and blowers capable of removing fog that may be present in sewers at the time of the inspection.
    ii. Video cameras, lighting, cables and power source.
    iii. Video monitor, DVD recorder and digital video recorder.
    iv. Computer system with video capture card or dedicated unit and other related equipment.

b. **Video Inspection Equipment**

1. Video equipment is to consist of a minimum of the following:

    i. Video camera capable of panning 360° and tilting 270° with optimum picture quality provided by focus and iris adjustment. Focal range to be adjustable from 100 millimeters to infinity.
    ii. Adjustable light source to allow an even distribution of light around the manhole perimeter without loss of contrast, flare out of picture, or shadowing. Ensure lighting illuminates the sewer or manhole ahead of the camera to be able to determine general condition, features and upcoming defects.
    iii. Video overlay equipment capable of superimposing a minimum of 15 lines with up to 30 characters per line of alphanumeric information onto the video recording.

c. **Manhole and Wet Well Camera Transport Equipment:**

1. Video camera transport equipment to consist of the following:

    i. A pole mounted device for manhole or wet well inspections that will securely orient the camera with the 12:00 video position facing north and capable of moving the camera through the entire vertical length of the manhole or wet well in a systematic manner.

d . **Manhole Inspections:**

1. Manhole inspections are used to determine the location and the physical condition and isolate current and possible infiltration and inflow sources. Each component of the manhole is inspected to establish a complete inventory, update existing records, and/or identify defects.

2. When performing manhole inspections, always follow all safety rules and regulations. All crew members are required to have the necessary safety training prior to performing any field work.

3. Do not spend more than ½ hour trying to find a manhole. If the manhole cannot be found in that time, list it as CNL in the designated location on the Manhole Inspection Form. If the manhole can be located outside of the roadway but is buried by less than or equal to one foot, then the manhole shall be exposed with hand tools, inspected, and restored to its original conditions.

4. Once the location has been secured for safety, always open the manhole cover and verify that;

i. You are at the correct manhole.
ii. That the manhole can be inspected (MH is not surcharged, broken lid, unsafe, gas etc.).

5. Gather the following information for MH inspection:

i. General Data - Document the following items:
   A. MH Number
   B. Project Number
   C. Date/Time
   D. Inspector/Company Initials
   E. Digital Photo Numbers & File Names
   F. MH location
   G. Surface Type
   H. Precipitation
   I. Traffic
   J. Details of Incoming Pipes
   K. MH Depth
   L. MH Diameter
   M. Flow Depth

ii. Manhole Cover- Inspect the cover before and after it has been removed from the frame. Be sure to inspect both sides of the cover. The cover inspection should include:
   A. Cover Diameter
   B. Cover Type
   C. MH Cover Condition
   D. MH Cover to Rim fit
   E. Distance above or below grade

iii. Frame and Grade Adjuster- The frame is the "seat" for the manhole cover. The grade adjuster is used in construction to adjust for difference between the top of the cone and the surface. It is important to understand that not all manholes will have an adjuster. inspection includes:
   A. Frame Condition
   B. Frame to MH Seal
   C. Insert
   D. Riser Type
   E. Riser Condition
   F. Evidence of I/I from Riser

iv. Inspect MH Cone - The cone is used to reduce the size of the manhole body to the size of the adjuster or the cover. The cone inspection includes:
   A. MH Wall and Cone Type
   B. Cone Condition
   C. Evidence of I/I from Cone

v. Document the Cone Shape:
   A. Concentric
   B. Eccentric
   C. Flat Top

vi. Document the MH Wall Construction:
   A. Wall Condition
   B. Evidence of I/I from Wall
   C. No. of Steps

vii. Bench - The bench is the floor or the base of the manhole. Clean the debris and/or redirect flow prior to inspection if necessary to reveal bench.

viii. Inspect bench for Defects - Depending on the construction several different defects are possible. Most common defects are cracks, leaking construction joints and roots:
   A. Bench and Invert Type
   B. Bench and Invert Condition
   C. Evidence of Infiltration at Bench and Invert
   D. Bench Deposits
   E. Work Order Issued

e. **Operator Qualifications for Inspection and Condition Coding:**

1. Provide a minimum one operator on site at all times with each inspection unit who holds a valid certificate in Manhole Assessment & Certification Program (MACP) or an acceptable alternate training program. Ensure each operator is fully trained in all aspects of manhole inspection and capable of making accurate observations and recording all conditions that may be encountered in manholes.

2. Perform inspection work only when MACP certified operators are operating on site.

3. Submit a valid copy of the MACP Operators Certificate for each operator to the Engineer as outlined in Submittals.

f. **Manhole Condition Coding:**

1. Perform manhole condition coding in accordance with the requirements of the latest revision of MACP as developed by the National Association of Sewer Service Companies (NASSCO) as amended by the Owner.

2. Record GPS coordinates (+/- 1 meter accuracy), manhole designation, place names and other data in accordance with this specification. If GPS coordinates cannot be obtained due to tree or cloud cover, Contractor shall note this on the inspection form. Conventional surveying is not required.

815-8 DELIVERABLES:

a. A DVD recording shall be made by the Contractor of all pipe and manhole sections television inspected and photographed. Each line segment and manhole shall be recorded and saved in a continuous single digital video file labeled in accordance with the format shown below. The digital video will include a complete "color" video and audio record of the entire inspection. The digital video shall have the capability of permanently displaying information concerning the segment inspected, including the date, upstream and downstream manhole (MH) numbers, GPS manhole coordinates, the size of pipe, and the footage counter.

b. All digital video files shall also be submitted on DVD-ROM with a file reference number, which have been scanned for viruses. The DVD index sheet shall be labeled with the DVD reference number, the project name, project number, date of inspection, and upstream and downstream manhole numbers listed by line segments as they appear on the DVD. The television inspection shall be recorded directly to digital format as specified herein. Recording to VHS or other media and converting to digital format are not acceptable.

   File Naming: xxx-xxxxx_yyy-yyyyy.mpg where

   x= upstream manhole and y= downstream manhole.
   xxx, yyy - Numerical 3-digit Pump Station Area
   xxxxx, yyyyy – Numerical 5-digit Manhole Number

c. The inspection sheets, electronic database, and DVD of all television inspections of sewer lines and manholes shall be kept by the Contractor and submitted to the Owner with monthly Payment Request. Contractor shall include an electronic spreadsheet listing all manholes inspected and included in the submittal. All inspection sheets shall be submitted on a standard inspection form which has been reviewed and approved by the Owner and shall be completed electronically. PDF electronic copies of the inspection sheets, CNL forms and Map Edit Forms shall be submitted on a DVD. The digital videos, images, files and disks shall become the property of the Owner.

d. The Engineer shall provide an unpopulated electronic database. The Contractor shall populate the database with pipe defects/condition information as indicated in the PACP. The Contractor shall not make any design changes to the database prior to submittal. The Engineer will perform a quality assurance check of the defect database. Any inconsistencies, irregularities, errors, or incomplete data will be returned to the Contractor for resolution and correction at no additional cost to the Owner.

e. Unless authorized by the Engineer, television inspection shall not be conducted in sewer lines with sewer flow. It shall be the Contractor's responsibility to dewater the lines as necessary in order to achieve the above criteria and shall be included in the cost of the television inspection. If plugging, blocking or bypassing is necessary 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 and as outlined more specifically in Specification 813 Sewer Flow Control.

f. The Contractor shall complete and submit a Map Edit form provided by the Owner for any field condition that is not shown or is different from that shown on the original maps. These forms shall be submitted with the monthly inspection forms.

g. GPS coordinates (+/- 1 meter accuracy) will be recorded for the upstream and downstream manholes based on the La. State Plane Coordinate System (south) whenever any physical inspection is performed.

815-9 MEASUREMENT:

a. **Television Inspection:** Measurement for this Item shall be made on a linear foot basis, measured to the nearest whole foot, from center of upstream manhole to center of downstream manhole. One setup shall be included in each mainline segment.

b. **Sonar Inspection**: Sonar may be substituted for television inspection with the permission of the Engineer. Measurement for Sonar Inspection shall be made on a linear foot basis, measured to the nearest whole foot, from the center of the upstream manhole to the center of the downstream manhole. One setup shall be included in each mainline segment.

c. **Lateral Television Inspection:** Measurement for this item shall be made on a linear foot basis, measured to the nearest whole foot, from the mainline to the cleanout or from the cleanout to the mainline.

d. **Additional Television Set-up:** Measurement for this Item shall be made per each for one additional equipment set-up after the initial set-up per mainline segment.

e. **Manhole Inspection:** Measurement for this Item shall be made per each manhole inspected.

f. **Pump Station Wet Well Inspection:** Measurement for this Item shall be made per each wet well inspected.

815-10 PAYMENT:

a. **Television Inspection:** Payment of this Item will be full compensation for television inspection, one equipment set-up per mainline segment, dewatering, camera retrieval, defect coding, report, DVD production and other deliverables in accordance with the specifications. No mainline segment will be paid until lateral television inspection has been attempted and/or completed for that mainline segment.

b. **Sonar Inspection:** Payment of this Item will be full compensation for sonar inspection, one equipment set-up per mainline segment, dewatering, equipment retrieval, defect coding, report, and DVD production in accordance with the specifications.

c. **Lateral Television Inspection:** Payment of this item will be full compensation for television inspection of laterals to the main sewer line. This will be the total payment whether mainline or cleanout introduction of the camera is used. For lateral television inspection, setup shall be included in this pay item and no additional setups will be paid for this Work.

d. **Additional Television Set-up:** Payment for this Item will be full compensation for the additional equipment set-up cost for full length mainline camera inspection after encountering blockage.

e. **Manhole Inspection:** Payment of this item will be full compensation for television inspection of the full depth of the manhole, top and bottom conditions.

f. **Pump Station Wet Well Inspection:** Payment of this item will be full compensation for television inspection of the full depth of the wet well, top and bottom conditions.

815-11 PAY ITEMS

Item No.	Item	Unit
8150015	Television Inspection of Sewer Line Less Than or Equal to 16”	Linear Feet
8150020	Television Inspection of Sewer Line Greater Than 16”	Linear Feet

8150101	Additional Television Setups	Each
8150102	Television Inspection Lateral of Sewer Line	Linear Feet
8150103	Sonar Inspection of Sewer Line	Linear Feet
8150104	Television Inspection of Manhole	Each
8150105	Television Inspection of Pump Station Wet Well	Each

SECTION 821

MISCELLANEOUS WORK AND CLENUP

SECTION 821
MISCELLANEOUS WORK AND CLEANUP

821-1 SCOPE OF WORK: This Section includes operations which cannot be specified in detail as separate Items, but can be sufficiently described as to the kind and extent of Work involved. The Contractor shall furnish all labor, materials, equipment and incidentals to complete the Work under this Section.

The Work of this Section includes, but is not limited to, the following:

a. Restoring servitudes, rights-of-way and private property.

b. Cleaning up.

c. Incidental work.

821-2 WORK SPECIFIED UNDER OTHER SECTIONS: All Work shall be completed in a workmanlike manner by competent workmen in full compliance with all applicable sections of these Specifications.

821-3 MATERIALS: Materials required for this Section shall be of at least the same type and quality as materials that are to be restored. Where possible, the Contractor shall reuse existing materials that are removed and then replaced, with the exception of paving.

821-4 RESTORING OF FENCES AND GUARD RAILS: At several locations, it may be necessary for the Contractor to remove, store and replace existing fences and guard rails during construction. Only the sections directed by the Engineer or those sections required to access the work site shall be removed. The Contractor shall provide adequate temporary fences and gates if necessary to contain or restrict domesticated and farm animals within their proper areas during the work and shall provide access where and when required. If any section of fence or guard rail is damaged due to the Contractor's negligence, it shall be replaced with fencing or guard rail equal to or better than that damaged, and the Work shall be satisfactory to the Engineer.

821-5 REMOVAL AND REPLACEMENT OF SMALL TREES, SHRUBS, AND LANDSCAPING (ANNUAL, PERENNIAL, AND ORNAMENTAL PLANTINGS): Contractor shall be responsible for removing all trees, shrubs, and landscaping located within the servitude or right-of-way that are in conflict with the required Work. Contractor shall coordinate with the property owner prior to removal and replacement in accordance with Section 7-7.3. Removal of existing trees less than 13 inches in diameter shall be included under this item. Larger diameter trees shall be paid in accordance with Section 201. Tree diameter shall be measured at a location four feet from ground level and approved by the Engineer. Trees, shrubs, and landscaping shall be replaced in kind or of reasonable size (5 gallon minimum, up to 25 gallon for mature growth plantings) as directed by the Engineer.

821-6 RESTORING SERVITUDES, RIGHTS-OF-WAY, AND PRIVATE PROPERTY:

a. When portions of the construction occur in servitudes through private property, the Contractor shall be responsible for all damage to private property due to his operations. Contractor shall protect from damage all walls, fences, cultivated shrubbery, pavement, buildings, signs, underground facilities such as water pipe, sprinkler systems, or other utilities, or other improvements that may be encountered. If removal and replacement are required, it shall be done in a workmanlike manner so that the replacement is equivalent to that which existed prior to construction. If this is not feasible, a reasonable settlement shall be made with the owner of the damaged property.

b. Existing lawn, pasture or other grassed surfaces damaged by construction shall be regraded and resodded. Contractor shall restore area to ensure positive drainage to and/or through disturbed area. These areas shall be maintained until all Work under this Contract has been completed and accepted.

821-7 CLEANING UP: The Contractor shall remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall render the site of the Work in a neat and orderly condition.

821-8 INCIDENTAL WORK: Perform all incidental Work not otherwise specified (such as erosion control when no specific pay items are included), but obviously necessary for the proper completion of the Contract as specified and as shown on the Drawings.

821-9 MEASUREMENT: Measurement for miscellaneous work and cleanup shall be on a lump sum basis or per each site as specified in the Contract Documents.

821-10 PAYMENT: Payment for miscellaneous work and cleanup will be full compensation for furnishing all labor, materials, equipment, and incidentals required to complete the miscellaneous work and cleanup specified herein and/or as shown on the Contract Documents; including restoration of lawns and grasses outside the established pay limits of the slab sod pay item described in Section 903 and replacement of fences outside of public servitudes or rights-of-way; and any other miscellaneous work not specifically included for payment under any other Items in the Bid Form but obviously necessary to complete the Contract and fulfill all requirements of these Specifications and Contract Documents.

Payment under this Item can be made on a monthly basis, based on the percentage of work completed. However, the final payment cannot be made until the Contract is complete

821-11 PAY ITEMS:

Item No.	Item	Unit
8211100	Miscellaneous Work and Cleanup	Each
8211101	Miscellaneous Work and Cleanup	Lump Sum

SECTION 903

EROSION CONTROL

SECTION 903 EROSION CONTROL

Delete this Section in its entirety and replace with the following:

SECTION 903
EROSION CONTROL

903-1 DESCRIPTION: This work consists of providing all; administrative, labor, materials, equipment, and accessories required to permit, install, monitor, maintain, and remove where required, temporary and permanent sedimentation and erosion control measures.

903-2 MATERIALS: Materials shall comply with the following Sections and Subsections.

Topsoil	1022-1
Fertilizer	1022-2
Seed	1022-3
Straw Mulch & Fiber Mulch	1022-5
Straw Mat	1022-7.1
Excelsior Mat	1022-7.2
Slab Sod	1022-9

Materials not covered by project specifications shall meet commercial grade standards and shall be approved before being incorporated into the project. No testing of materials used in temporary erosion control features will be required. Acceptance of temporary erosion control materials will be by visual inspection.

903-3 CONSTRUCTION: Installation of temporary erosion control features shall be coordinated with construction of permanent erosion control features to ensure effective erosion control at all times. The contractor shall install or construct temporary erosion control features prior to initiation of land disturbance activities.

903-3.1 Temporary Erosion Control and Storm Water Pollution Prevention Plan: In accordance with Section 7-7 the contractor will abide by the terms and conditions of the appropriate LPDES General Permit. The Contractor shall prevent to the maximum extent practicable the transmission of soil particles into streams, canals, lakes, reservoirs or other waterways. Except as necessary for construction, excavated material shall not be deposited in streams or impoundments, or in a position close enough to be washed into waterways by high water or runoff. Lands or waters outside construction limits shall not be disturbed, except as authorized. The contractor shall not unnecessarily strip vegetation near stream banks.

The engineer may limit exposure of unprotected earth and may direct the contractor to provide immediate permanent or temporary erosion or pollution control measures to prevent contamination of streams, lakes, reservoirs, canals or other impoundments or prevent detrimental effects on property outside the right-of-way.

For projects with a total cumulative disturbed area greater than 1 acre including but not limited to: project construction limits, staging and disposal areas, temporary access roads, detours, and borrow areas, the contractor shall be required to develop a SWPPP (Storm Water Pollution Prevention Plan) by completing the current EPA SWPPP template. The contractor shall contact LADEQ for the latest specific requirements regarding the appropriate LADEQ Storm Water General Permit, Notice of Intent, and Notice of Termination forms.

As required by the contract documents and as detailed in the contractors SWPPP, the contractor shall place, monitor, and maintain; temporary seed, fertilizer, mulch, sandbags, hay bales, silt fences, slope drains, sediment check dams, sediment basins, and other best management practices/stormwater containment measures. Earth berms shall be constructed as needed to direct water away from slopes.

The use of erosion control features or methods other than those in the contract shall be as contained in the Contractors SWPPP and shall be considered included in the lump sum cost for the development and maintenance of the SWPPP.

a. **Temporary Seeding, Fertilizing and Mulching:** Seeding, fertilizing and mulching shall be performed in accordance with Subsection 903-3.2, modified as follows. Ground preparation shall be limited to blading the area; grass seed shall be a fast-growing species suitable to the area; application rates of seed, fertilizer and mulch may be reduced when directed.

b. **Sandbags and Hay Bales:** Sandbags shall be 1 cubic foot burlap bags, filled at least 3/4 full with sand. Hay bales shall be standard size bales and shall be secured by stakes.

c. **Slope Drains:** Slope drains shall be constructed of pipe, riprap or other suitable material, with riprap protection at the discharge end.

d. **Sediment Basins:** Sediment basins shall be excavated to collect silt, and shall be cleaned out as necessary to maintain their effectiveness. Basin outfall shall be riprap protected.

e. **Sediment Check Dams:** Check dams shall be constructed in ditches, and shall consist of logs and brush or fencing.

f. **Silt Fencing:** Silt fencing shall be geotextile fabric, either wire-supported or self-supported, attached to posts. Silt fencing shall be trenched in to ensure effectiveness.

g. **Curb Inlet Protection**: Temporary sediment control device or measure to prevent silt, sediment and debris from entering storm drain curb inlets. Inlet protection is to be implemented at existing curb inlets prior to construction. The device shall be centered against the curb inlet with a minimum of 12 inches of the device overhanging on each side of the inlet opening. No part of the device, or ponding created by the device, shall interfere with the flow of traffic, create a safety hazard, or cause property damage. Effective curb inlet protection must be provided throughout the project until all sources with potential for discharging into inlets have been paved or stabilized. Contractor shall remove curb inlet protection once surface restoration in the contributing drainage area is complete. Due care shall be taken to ensure sediment does not fall into the inlet and impede the intended function of the device. Any material falling into the inlet shall be removed. Contractor shall maintain devices and remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by Engineer in order to provide adequate sediment holding capacity and performance of device.

h. **Maintenance of Erosion Control Features:** Temporary erosion control features shall be inspected at least once every 14 calendar days, in advance of any anticipated rain events, and within 24 hours after a rainfall event of 0.5 inches or greater. The features are to be maintained as described below or replaced as directed at no direct pay.

    1. **Temporary Seeding**: The seeded areas showing erosion after inspection shall be reseeded if necessary.

    2. **Mulches:** Mulched areas showing erosion shall be repaired and the mulch reapplied if necessary.

    3. **Straw or Hay Bale Barriers:** The bale barriers shall be inspected after each rainfall and time frame as defined above and at least daily during

prolonged rainfall. Close attention shall be paid to the repair of damaged bales, "end runs" and undercutting beneath bales.

4. **Slope Drains:** Slope drains shall be inspected weekly and after each rainfall as defined above, and repairs made if necessary. The contractor shall avoid the placement of any material on and prevent construction traffic across the slope drain.

5. **Sediment Check Dams:** Sediment deposits shall be removed when the deposits reach one-half the height of the check dam. Inspections shall be made to insure that the center of the dam is lower than the edges. Erosion around the edges shall be corrected immediately.

6. **Silt Fencing:** Sediment deposits shall be removed when the deposits reach one-half the height of the fence. If the fabric on the silt fence decomposes or becomes ineffective, the fabric shall be replaced promptly.

7. **Temporary Stone Construction Entrance and/or Wash Racks:** The construction entrance shall be maintained to allow for removal of mud from the tires. The sediment from the wash rack runoff shall be removed once the wash rack is no longer performing as intended.

i. **Removal of Temporary Erosion Control Features:** Temporary erosion control features existing at the time of construction of permanent erosion control features shall be removed or incorporated into the soil in such manner that no detrimental effect will result. The engineer may direct that temporary features be left in place.

903-3.2 Permanent Erosion Control:

903-3.2.1 Seeding and Fertilizing: Seed beds shall be disked and pulverized at least 3" deep; then leveled and lightly rolled prior to seeding. Seed shall be applied by one of the following methods:

a. **Broadcast:** Seed and fertilizer shall be uniformly spread by hand or mechanical methods. If hand spreading is used, seed and fertilizer shall be sown in 2 directions at right angles to each other.

1. **Fertilizer:** Fertilizer shall be applied at the following rate:

Type	Pounds Per Acre
8-8-8	1,000
12-12-12	667
13-13-13	615
16-16-16	500

2. **Seed:** Seed shall be sown at the following rate:

	Seed Mixture and Rate/1000 SF
March-September	1 Lb Hulled Bermuda
October-February	1 Lb Unhulled Bermuda and 2 Lb Winter Rye

b. **Hydroseeding:** Seed, fertilizer, mulch and tackifier shall be placed in a single mechanical operation at the following rates:

	Planting Mixture and Rate (Lb/1000 SF)					
	Hulled Bermuda Seed	Unhulled Bermuda Seed	Winter Rye Seed	Water Soluble Fertilizer	Fiber Mulch	Soil Tackifier
March-September	1	-	-	30	35	1.5
October-February	-	1	2	30	35	1.5

903-3.2.2 Watering: Seeded and sodded areas shall be watered at a rate of 5 gal/sy immediately after seed is broadcast or sod is placed. When necessary, additional water shall be applied to seeded or sodded areas to supplement natural rainfall until the Owner accepts the work. Water shall be applied with approved sprinkling equipment what will spread the water evenly and in a manner that will not cause erosion of the soil surface.

903-3.2.3 Mulching:

903-3.2.3.1 Straw Mulch: Straw mulch shall be spread on seeded areas at rate of 2 ton/acre.

903-3.2.3.2 Fiber Mulch: Fiber mulch shall be spread on seeded areas at rate of 1-1½ tons/acre.

903-3.2.4 Erosion Blanket: Erosion control blankets shall be straw or excelsior mats and shall be placed on seeded areas.

On slopes, blanket strips shall be placed either transverse or parallel to slope. Blanket shall be turned down into 6" anchor slots at top and bottom of slope. Mats shall be stapled to ground at maximum 6-foot intervals staggered on adjacent rows. Straw mats shall be overlapped 6" on ends and sides; excelsior blanket strips shall be tightly butted with adjacent strips at ends and sides.

In ditches, blanket strips shall be placed parallel to ditch, beginning at downstream end. Sides and ends of excelsior strips shall be tightly butted with adjacent strips; sides and ends of straw mats shall be turned down into 6" deep anchor slots at ends and sides. Mats shall be stapled to ground at maximum 4-foot intervals, staggered on adjacent rows.

903-3.2.5 Slab Sod: When the trench backfill has stabilized sufficiently and for a period of time not to exceed fourteen (14) days from the completion of the repair, the Contractor shall commence work on lawns and grassed areas. Prior to slab sodding, topsoil shall be uniformly spread over areas and lightly compacted. Areas to be sodded shall be finish graded, tilled, raked and debris removed. The Engineer shall approve the finish grade of all areas prior to application of sod. The Contractor shall furnish sod equal to and similar in type as the surrounding area.

Approximately 90% of the required fertilizer shall be placed on the area prior to placing sod, and the remainder of the fertilizer shall be broadcast after the sod is placed. Sod shall be rolled or tamped after placement.

Upon completion of sodding operations, all excess soil, stones, and debris remaining shall be removed from the construction area. Sodded areas shall be protected against traffic or other use by placing warning signs or erecting barricades as necessary. The Contractor, at no additional cost, shall repair any areas damaged prior to actual acceptance by the Owner.

The sodded area will not be accepted until a satisfactory stand of grass has been established. A satisfactory stand of grass is defined as a full lawn cover of the predominant vegetative species existing prior to the beginning of the Work over the disturbed areas, with grass free of weeds, alive and growing, leaving no bare spots larger that ¾ square yard within a radius of ten (10) feet. If a

satisfactory stand of grass has not been obtained within a reasonable period of time, the Engineer shall instruct the Contractor in writing that the vegetative cover is not adequate and that additional measures shall be undertaken by the Contractor to establish the required satisfactory stand of grass.

903-4 MEASUREMENT:

a. **Temporary Erosion Control:** When temporary erosion and pollution control measures are required due to the contractor's negligence or failure to install permanent controls, such work shall be performed by the contractor at no direct pay. Required temporary erosion and pollution control work which is not due to the contractor's negligence will be measured as follows:

1. **Seed, Fertilizer and Mulch:** Measurement will be made in accordance with Heading (b) below.

2. **Sandbags, Hay Bales, Sediment Basins and Sediment Check Dams:** Measurement will be made per each.

3. **Silt Fencing and Slope Drains:** Measurement will be made by the linear foot.

4. **Temporary Curb Inlet Protection:** Measurement shall be made by the linear foot.

When temporary erosion control work is ordered and is not covered by contract items, the work shall be performed as extra work in accordance with Sections 4-2 and 10-4 except that no extra work order will be required prior to starting work.

The construction of temporary earth berms along edges of the roadway to prevent erosion during grading and subsequent operations will not be measured for payment.

In case of failure of the contractor to control erosion, or siltation, the engineer may employ outside assistance or use his own forces to provide the necessary corrective measures, and the cost thereof will be deducted from payments for the work. Partial payments will be withheld until satisfactory temporary erosion control is established.

b. **Permanent Erosion Control:**

1. **Seed:** Seed will be measured by the pound.

2. **Fertilizer:** Fertilizer will be measured by the pound. The estimated quantity shown in the plans is based on Type 8-8-8 fertilizer. If other types are used, the measured quantities will be multiplied by the following factors to determine pay quantities:

Type	Factor
12-12-12	1.5
13-13-13	1.625
16-16-16	2.0

3. **Water:** Water will be measured in units of 1,000 gallons; however, water used in hydroseeding slurry will not be measured for payment.

c. **Slab Sod:** This item shall be measured per square yard of sod installed within the pay limits and as approved by the Engineer. The pay limits shall be in

accordance with the standard trench details and as shown on the drawings or as directed by the Engineer. When the Work falls within a right-of-way or servitude wider than 25 feet, the pay limit width shall be limited up to a maximum 12.5 feet measured from centerline of existing or proposed pipe on both sides (up to right-of-way or servitude limit) for a maximum 25 feet total. In the case of parallel pipes, overlapping areas will not be double paid. Payment shall not be made for sod placed outside of the pay limits in areas damaged by the Contractor.

d. **Mulch and Erosion Control Mats:** Quantities of mulch and erosion control mats for payment will be the contract quantities, adjusted as necessary if the engineer makes changes to fit field conditions, if plan errors are proven, or if design changes are made.

e. **Stormwater Pollution Prevention Plan:** Other than the contract items and items directed to be installed by the engineer, no measurement will be made for the development, administration, permitting, install, monitoring, maintenance, and removal where required, of the stormwater control measures required in the Contractor's SWPPP.

903-5 PAYMENT: Payment for temporary and permanent erosion control items that are included as contract items will be made at the contract unit prices.

Payment for devices used to correct unforeseen conditions will be made at the contract unit price for similar devices shown on the plans, or as extra work if plan details are not applicable.

Payment for sod will be full compensation for topsoil, finish grading, tilling, raking, debris removal, sod, water, fertilizer, rolling or tamping, and protection.

Payment for obtaining and maintaining the necessary permits; development of a complete Storm Water Pollution Prevention Plan (SWPPP) and associated documentation (to include but not limited to the NOI and the NOT if necessary), and all labor, equipment or materials required for the implementation of the SWPPP, except for the installation and maintenance of those erosion control pay items already included in the plan, shall be made under Item 9031600. Partial payments for the Storm Water Pollution Prevention Plan items will be made in accordance with the following schedule.

% of Total Contract Amount Earned	% of SWPPP Price to be Paid
1st Partial Estimate	15
10	25
25	30
50	50
75	75
100	100

903-6 PAY ITEMS:

Item No.	Item	Unit
9030100	Temporary Sand Bags	Each
9030200	Temporary Hay Bales	Each
9030300	Temporary Sediment Basins	Each
9030400	Temporary Sediment Check Dams	Each
9030500	Temporary Silt Fencing	Linear Foot
9030600	Temporary Slope Drains	Linear Foot
9030610	Temporary Curb Inlet Protection	Linear Foot
9030700	Topsoil	Cubic Yard
9030800	Seed	Pound

9030900	Fertilizer	Pound
9031000	Water	M-Gallons
9031100	Straw Mulch	Square Yard
9031200	Asphalt Mulch	Square Yard
9031300	Fiber Mulch	Square Yard
9031400	Erosion Control Mat	Square Yard
9031500	Slab Sod	Square Yard
9031600	Storm Water Pollution Prevention Plan	Lump Sum

SECTION 909

MOBILIZATION

SECTION 909

MOBILIZATION

909-1 DESCRIPTION: This work consists of preparatory work and operations, including those necessary for movement of personnel, equipment, supplies and incidentals to the project site; the establishment of offices, buildings and other facilities necessary for work on the project; the cost of bonds and any required insurance; and other preconstruction expenses necessary for start of the work excluding the cost of construction materials.

909-2 PAYMENT:

(a) When the contract does not include a pay item for mobilization, no direct payment will be made for mobilization.

(b) When a contract contains a pay item for mobilization, payment will be made at the contract lump sum price, subject to the following provisions:

Partial payments for mobilization will be made in accordance with the following schedule up to 10% of the original total contract amount, including this item. Payment of any remaining amount will be made upon completion of all work under the contract.

% of Total Contract Amount Earned	% of Mobilization Price to be Paid
1st Partial Estimate	15
10	25
25	50
50	75
75	100

No payment adjustment will be made for this item due to change in the work in accordance with Section 10.

909-3 PAY ITEM:

Item No.	Item	Unit
9090100	Mobilization	Lump Sum

END OF SECTION

SECTION 1016

SEWER PIPE

SECTION 1016
SEWER PIPE

1016-1 GRAVITY SEWER PIPE: Contractor shall provide sewer pipes with the inside diameter shown on the Contract Documents. Diameters shown on the Drawings and listed in the pay items represent the required inside diameters, regardless of pipe material.

1016-1.1 Plastic Pipe: Pipe may be any of the following types:

1016-1.1.1 Polyvinyl Chloride (PVC) Pipe and Fittings:

a. Polyvinyl chloride sewer pipe shall be green in color.

1016-1.1.1.1 PVC for Direct Bury Application:

a. Solid Wall PVC

1. Pipe shall be of solid-wall construction and be available in laying lengths not exceeding 20 feet.

2. Pipe 15" diameter or smaller shall conform to ASTM D 3034; pipe larger than 15" diameter shall conform to ASTM F 679.

3. Material for PVC pipe from 4” to 15” shall conform to the requirements of ASTM D 1784 for cell classifications 12454. Material for PVC pipe from 18” to 36” shall conform to the requirements of ASTM D 1784 for cell classifications 12364 or 12454. Maximum filler content shall be 10 percent.

4. All pipe shall have an SDR of 35 and a minimum pipe stiffness of 46 psi when tested in accordance with ASTM D 2412. Where pipe depth is greater than 12 ft., provide pipe in SDR 26 with minimum pipe stiffness of 115 psi.

5. Joints shall be an integral bell and spigot-type with solid cross section elastomeric or rubber gasket ring conforming to ASTM D 3212. Gaskets shall meet the requirements of ASTM F 477. Use elastomeric factory installed gaskets to make joints flexible and watertight. Lubricant for rubber-gasketed joints shall be water soluble, non-toxic, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets. The manufacturer shall test a sample from each batch conforming to the requirements of ASTM D 2444.

6. All sewer fittings and accessories shall conform to the requirements of ASTM F 1336 and ASTM D 3034 or ASTM F 679 and shall have bell and/or spigot compatible with pipe. The stiffness of the fittings shall not be less than the stiffness of the adjoining pipe.

b. Large Diameter Closed Profile PVC (21” – 54” only)

1. PVC closed profile pipe shall be permitted for 21” through 54” direct bury gravity sewer pipe.

2. The pipe shall meet the requirements of ASTM F-1803, Closed Profile, and have a smooth interior and effectively smooth exterior. Fittings shall be

fabricated from pipe meeting these standards.

3. Pipe and fittings shall be fabricated from PVC compounds meeting the minimum requirements of cell classification 12364 as defined by ASTM D-1784.

4. Joints shall have an integral bell and spigot with an elastomeric gasket and shall conform to the requirements of ASTM D-3212 and ASTM F-477. Gaskets shall be factory installed and chemically bonded to the bell end of the pipe. The use of putty, fillers, rubber or plastic inserts or wedges to form either the inner or outer wall of the pipe will not be allowed on spigots or bells. Jointing shall be accomplished in accordance with the manufacturer's recommendations.

5. PVC closed profile pipe shall be designed to provide a minimum pipe stiffness value of 60 psi for all sizes when tested in accordance with ASTM D-2412.

6. Each pipe length and fitting shall be clearly marked with the name of the manufacturer, nominal size, cell classification, ASTM designation F-1803, pipe stiffness designation "PS-60", and manufacturer's date code.

7. Handling and storage shall be in accordance with the pipe manufacturer's recommendations.

1016-1.1.1.2 Non-metallic Restrained Joint PVC:

a. Pipe shall be manufactured only from water distribution pipe and couplings conforming to AWWA C900 (4-inch through 12-inch) and AWWA C905 (14-inch through 48-inch). The restrained pipe joint system shall meet all short and long-term pressure test requirements of AWWA C900 and AWWA C905, respectively.

b. The compound shall qualify for a Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4 degrees F., in accordance with the requirements of ASTM D2837.

c. Nominal outside diameters and wall thicknesses of thrust-restrained pipe shall conform to the requirements of AWWA C900 and AWWA C905. Pipe shall be furnished in standard lengths of 20 feet.

d. PVC pipe shall be in accordance with Table 1016-1.

e. Green or white pipe shall be supplied, unless otherwise agreed upon at time of purchase.

f. Pipe and couplings shall be made from unplasticized PVC compounds having minimum cell classification of 12454, as defined in ASTM D1784.

g. Pipes shall be joined using non-metallic couplings which have been designed as an integral system for maximum reliability and interchangeability. High-strength flexible thermoplastic splines shall be inserted into mating precision-machined grooves in the pipe and coupling to provide full 360-degree restraint with evenly distributed loading. No external pipe-to-pipe restraining devices, which clamp onto or otherwise damage the pipe surface as a result of point-loading, shall be permitted.

h. Couplings shall be designed for use at the rated pressures of the pipe with which

they are utilized, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F477. Joints shall be designed to meet the leakage requirements of ASTM D3139.

i. Every pipe and machined coupling shall pass AWWA C900/C905 hydrostatic proof test requirements.

j. Pipe shall be legibly and permanently marked in ink with the following information:

1. Manufacturer and Trade Name

2. Nominal Size and DR Rating / Pressure Class

3. Hydrostatic Proof Test Pressure (NSF-61)

4. Manufacturing Date Code

1016-1.1.1.3 Fusible Polyvinylchloride (FPVC) Pipe:

a. Fusible PVC pipe shall be permitted for only 4" through 16" diameter gravity sewer pipe.

b. All piping shall be made from a PVC compound conforming to cell classification 12454 per ASTM D1784.

c. Fusible polyvinylchloride pipe shall conform to ASTM D3034 or ASTM F679.

d. Fusible polyvinylchloride pipe may instead conform to AWWA C900 or AWWA C905, if applicable. Testing shall be in accordance with AWWA standards for any of these pipe types. If the AWWA standards are used, pipe diameters shall be in Ductile Iron Pipe Sizes (DIPS).

e. Rework material shall be allowed per ASTM D3034, ASTM F679, AWWA C900 or AWWA C905 standards.

f. All pipe shall have an SDR of 35 and a minimum pipe stiffness of 46 psi when tested in accordance with ASTM D 2412. Where pipe depth is greater than 20 ft., provide pipe in SDR 26 with minimum pipe stiffness of 115 psi.

g. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

h. Fusible polyvinylchloride pipe shall be manufactured in a standard 20', 30' or 40' nominal length.

i. Fusible polyvinylchloride pipe shall be green in color for wastewater use.

j. Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal pipe size

2. PVC

3. Dimension Ratio, Standard Dimension Ratio or Schedule (omit for ASTM D3034 or ASTM F679 pipe)

4. Pipe legend or stiffness designation, or AWWA pressure class, or standard pressure rating for non-AWWA pipe

5. AWWA Standard designation number or pipe type for non-AWWA pipe (omit for ASTM D3034 or ASTM F679 pipe)

6. Extrusion production-record code

7. Trademark or trade name

8. Cell Classification 12454 and/or PVC material code 1120 may also be included.

k. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

l. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed with the following minimum requirements:

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

m. Handling and storage shall be in accordance with the pipe manufacturer's recommendations.

1016-1.1.2 High Density Polyethylene (HDPE) Pipe and Fittings:

a. HDPE Pipe for gravity sewers shall be as specified in Section 1016-2.2.

b. HDPE Pipe for gravity sewers shall also have a light interior color.

c. Electrofusion Fittings: Fittings shall be made of HDPE material in accordance with subsection 1016-2.2a. Electrofusion (EF) fittings shall have a manufacturing standard of ASTM F 1055.

1. These fittings shall be supplied with an integral indentification resistor and an ISO compliant 24 bit barcode which is recognized by fusion processors to set the proper fusion parameters.

2. The electrofusion processor used must be capable of reading and storing the input parameters and the fusion results for later download to a record file which will be made available to the Engineer.

3. These fittings, such as EF couplings, gasketed EF sewer saddles, and EF flex restraints, shall be for use with pipe conforming to ASTM D 2513/3035, F-714,

and with butt fittings comforming to ASTM D 3216 as applicable.

4. Fittings shall have a pressure rating equal to the pipe unless otherwise specified.

5. ASTM F2620 and the pipe manufacturer's recommended procedure shall be observed for butt fusion and saddle fusion joints.

6. ASTM F1290 and the electrofusion fitting manufacturer's recommended joining procedure shall be observed for electrofusion joints.

7. Field fusion joints shall be made by qualified fusion technicians. Qualification of the fusion technician shall be demonstrated by evidence of certified training within the past year, specific to the fusion joint type and equipment to be utilized for the project.

1016-1.2 Ductile Iron Pipe: Ductile Iron Pipe for gravity sewers shall be as specified in Section 1016-2.3.

1016-1.3 Steel Pipe: Pipe less than 6" diameter shall be galvanized steel pipe conforming to ASTM A 53, Type E or S, Grade A.

Pipe 6" diameter and larger shall conform to AWWA C 200, Class 125. Fittings shall conform to AWWA C 208. Pipe and fittings shall be coal-tar lined and coated in accordance with AWWA C 203.

1016-1.4 Fiberglass Reinforced Polymer (FRP) Pipe:

a. The pipes shall be manufactured in accordance with ASTM D3262. Pipe materials shall conform to the following:

    1. Resin Systems: The manufacturer shall use only approved polyester resin systems with a proven history of performance of in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.

    2. Glass Reinforcements: The reinforcing glass fibers to be used to manufacture the components shall be of the highest quality commercial grade of glass filaments suitably treated with binder and sizing compatible with impregnating resins.

    3. Silica Sand: Sand shall be minimum 98% silica with a maximum moisture content of 0.2%.

    4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotrophic agents, etc., when used, shall not detrimentally effect the performance of the product.

    5. Elastomeric Gaskets: Gaskets shall meet ASTM F477 and be supplied by qualified gasket manufacturers and be suitable for the service intended.

b. The internal liner resin shall be suitable for service as sewer pipe, and shall be highly resistant to exposure to sulfuric acid as produced by biological activity from hydrogen sulfide gases. Pipe shall meet or exceed requirements of ASTM D 3681.

c. Minimum pipe stiffness when tested in accordance with ASTM D2412 shall normally be 46 psi.

d. The pipe shall be field connected with glass reinforced plastic sleeve couplings that utilize elastomeric sealing gaskets as the sole means to maintain joint water tightness. The joints shall utilize elastomeric sealing gaskets and meet the performance requirements of ASTM D4161.

e. Fittings: Flanges, elbows, reducers, tees, and other fittings shall be capable of withstanding operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass fiber reinforced overlays.

f. Pipe shall be supplied in nominal lengths of 20 feet. Shorter and custom lengths will be supplied as defined by the project requirements. The minimum wall thickness shall be per the manufacturer's design in accordance with ASTM D3567. Pipe ends shall be square to the pipe axis with a maximum tolerance of 1/8".

1016-1.5 Vitrified Clay Pipe (VCP) for Microtunneling and Pipe-Jacked Tunnels:

a. Vitrified clay pipe and joints for jacking and microtunneling pipe shall conform to ASTM C 700 and ASTM C 1208.

b. Joints: All VCP joints shall consist of watertight seat, an elastomeric sealing element, a sleeve, and a load distribution medium (compression disc).

1. Elastomeric Sealing Gaskets: Gaskets shall conform to the requirements ASTM C 1208 and the test requirements of ASTM D 395, D 412, D 471 and D 573.

2. All sleeves shall bridge between pipe sections. Stainless steel joint sleeves/couplings shall meet the requirements per grade 316L of ASTM A240\240M.

3. Water tightness: Joints shall be fully watertight and shall develop the full strength of the pipe. Sealing elements shall be bonded to the bearing surface or shall be positively positioned in a recess. The manufacturer shall certify the joints to be watertight to exceed the maximum project design water head pursuant to ASTM C 828, Standard Test Methods for Low Pressure Air Testing of Vitrified Clay Pipe Lines.

4. Load Distribution Medium: All joints shall be equipped with a load distribution medium (i.e., Plywood spacer or compression disc) which shall distribute the jacking force uniformly around the pipe's jacked bearing surface. All load distribution mediums shall prevent the jacking load from being concentrated on a specific area (i.e., Point loading) of the pipe that would result in damage or failure to the pipe. The width of the compression disc shall not exceed the maximum wall thickness of the pipe, nor shall it extend into the flow line or inhibit the installation of the sleeve onto the spigot end of the connecting pipe.

5. When the pipes are assembled, the joints shall not extend beyond the pipes outside surface and shall not restrict installation during jacking.

6. Joint deflection shall be in strict accordance with manufacturer's recommendations.

c. Clay pipes shall meet applicable standards when tested in accordance with ASTM C 301.

1016-1.6 Fiberglass Reinforced Polymer (FRP) Pipe for Micro tunneling and Pipe-Jacked Tunnels:

a. The pipes shall be manufactured in accordance with ASTM D3262. Pipe materials shall conform to the following:

    1. Resin Systems: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been collected from applications of a composite material of similar construction and composition as the proposed product.

    2. Glass Reinforcements: The reinforcing glass fibers used to manufacture the components shall be of highest quality commercial grade glass filaments with binder and sizing compatible with impregnating resins.

    3. Silica Sand: Sand shall be minimum 98% silica with a maximum moisture content of 0.2%.

    4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotrophic agents, etc., when used, shall not detrimentally effect the performance of the product.

    5. Elastomeric Gaskets: Gaskets shall meet ASTM F477 and be supplied by qualified gasket manufacturers and be suitable for the service intended.

b. Pipe manufacturing process to result in a dense, nonporous, corrosion-resistant, consistent composite structure. Do not use stiffening ribs or rings.

c. The internal liner resin shall be suitable for service as sewer pipe, and shall be highly resistant to exposure to sulfuric acid as produced by biological activity from hydrogen sulfide gases. Pipe shall meet or exceed requirements of ASTM D 3681.

d. Joints: All FRP joints shall consist of watertight seat, an elastomeric sealing element, a sleeve, and a load distribution medium (compression disc). All FRP joints shall meet the performance requirements of ASTM D 4161 and conform to the following:

    1. Seat: The seat shall be formed at the time of fabrication or machined after fabrication and shall be watertight when assembled and combined with an elastomeric sealing element.

    2. Elastomeric Sealing Gaskets: Gaskets shall conform to the requirements of ASTM F 477.

    3. All sleeves shall bridge between pipe sections. Unless otherwise specified, the pipe shall be field connected with fiberglass sleeve couplings.

    4. Load Distribution Medium: All joints shall be equipped with a load distribution medium (i.e., Plywood spacer or compression disc) which shall distribute the jacking force uniformly around the pipe's jacked bearing surface. All load distribution mediums shall prevent the jacking load from being concentrated on a specific area (i.e., Point loading) of the pipe that would result in damage or failure to the pipe. The width of the compression disc shall not exceed the maximum wall thickness of the pipe, nor shall it extend into the flow line or inhibit the installation of the sleeve onto the spigot end of the connecting pipe.

5. The joint shall have the same outside diameter as the pipe so when the pipes are assembled; the joints are flush with the pipes outside surface and does not restrict the installation during jacking.

6. Allowable joint deflection shall be in strict accordance with the manufacturer's recommendations.

e. Fittings: Flanges, elbows, reducers, tees, and other fittings shall be capable of withstanding operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass fiber reinforced overlays.

f. Dimensions and Tolerances: All dimensions and sizes of pipe shall conform to the following:

1. Diameters: The actual outside diameter of the pipes shall be in accordance with Table 3 of ASTM D 3262 for gravity sewers.

2. Lengths: The pipe standard length will be approximately 10 feet. A maximum of 10 percent of the lengths, excluding special order pipes, may be supplied in random lengths.

3. Wall Thickness: The minimum average wall thickness shall be the stated design thickness. The minimum single point thickness shall not be less than 90 percent of the stated design thickness.

4. End Squareness: Pipe ends shall be square to the pipe axis.

5. Tolerance of Fittings: The tolerance of the angle of an elbow and the angle between the main and leg of a wye or tee shall be plus or minus 2 degrees. The tolerance on the laying length of a fitting shall be plus or minus 2 inches.

g. Stiffness Classes: Stiffness class of FRP pipe shall satisfy design requirements, but shall not be less than 46 psi. Stiffness class of FRP in a pipe jacking operation shall be governed either by the ring deflection limitations or by a pipe design providing longitudinal strength required by the jacking method and shall satisfy design requirements stated below:

1. Pipe stress calculations based on jacking loads shall be performed to conform with Section 819 - Microtunneling and Pipe Jacked Tunnels.

2. Ring deflection calculations shall be performed accordance to AWWA-M5 for fiberglass pipe in buried applications, to ensure that predicted pipe deflection will be less than 5 percent under long-term loading conditions (soil prism load) for the highest density of soil overburden and surcharge loads. Deflection on calculations shall be prepared using long-term (drained) values for soil parameters contained in the geotechnical investigation report for the Project, or other site-specific data obtained by the Contractor as approved by the Engineer.

1016-1.7 Polymer Concrete Pipe for Microtunneling and Pipe-Jacked Tunnels:

a. Polymer Concrete Pipe (PCP) for use in microtunneling/tunneling installations for sanitary sewers shall be manufactured in accordance with ASTM D 6783-02.

1. Minimum compression strength of 13,000 psi is required. The pipe-jacking load for the pipe shown on the Drawings shall be determined by the contractor for the geotechnical and other specific conditions of this

project. Do not use stiffening ribs or rings.

b. Wall Resin: The polyester wall resin used to bond the aggregate material shall be isophthalic, orthophthalic, or other approved resin with a minimum tensile elongation of two (2) percent. The resin content shall be no less than 9 percent by weight. The resin used shall have a proven history of performance in chemical solutions in a sanitary sewer environment ranging from pH 1.0 to pH 10.0.

c. Aggregate: All PCP shall be comprised of aggregates that have a maximum grain size of 5/8 inch and sand that contains a maximum grain size of 0.08 inches. The filler material shall be a quartzite powder. All aggregate, sand, and filler material shall be washed and dried prior to fabrication. All aggregate and sand materials used in fabrication of the pipe shall be of like material and mined from the same source.

d. Joints: All PCP joints shall consist of watertight seat, an elastomeric sealing element, a sleeve, and a load distribution medium (compression disc). All PCP joints shall meet the performance requirements of ASTM D 4161 and conform to the following:

1. Seat: The seat shall be formed at the time of fabrication and shall be watertight when assembled and combined with an elastomeric sealing element. Seats shall not be ground after fabrication.

2. Elastomeric Sealing Gaskets: Gaskets shall conform to the requirements of ASTM F 477.

3. All sleeves shall bridge between pipe sections. Stainless steel joint sleeves/couplings shall meet the requirements of ASTM A 276.

4. Water tightness: Joints shall be fully watertight and shall develop the full strength of the pipe. Sealing elements shall be bonded to the bearing surface.

5. Load Distribution Medium: All joints shall be equipped with a load distribution medium (i.e., Plywood spacer or compression disc) which shall distribute the jacking force uniformly around the pipe's jacked bearing surface. All load distribution mediums shall prevent the jacking load from being concentrated on a specific area (i.e., Point loading) of the pipe that would result in damage or failure to the pipe. The width of the compression disc shall not exceed the maximum wall thickness of the pipe, nor shall it extend into the flow line or inhibit the installation of the sleeve onto the spigot end of the connecting pipe.

6. The joint shall have the same outside diameter as the pipe so when the pipes are assembled, the joints are flush with the pipes outside surface and does not restrict the installation during jacking.

7. No joint deflection of any amount shall be allowed.

e. Dimensions and Tolerances: All dimensions and sizes of pipe shall conform to the following:

1. Length: The typical pipe lengths shall have nominal dimensions of 3 feet, 6 feet or a maximum length of 10 feet.

2. Minimum wall thickness: The minimum wall thickness shall be as needed to support the anticipated jacking forces with a factor of safety of 3.0 at the joints.

3. Out of straight: Pipes shall not deviate from straight by more than 0.06 inch per linear foot. Measurement shall be taken by measuring the gaps between the pipe wall and a straightedge placed along any longitudinal line on the pipe's exterior surface.

4. Out of round: The inside and outside diameters shall not vary from a true circle by more than 1.0 percent of its designed diameter. The out-of-round dimensions are the difference between the maximum and minimum diameters measured at any one location along the barrel. The compression disk shall be installed in the bell end of the pipe at the factory as part of the manufacturing process.

5. Out of square: The ends of the pipe shall be perpendicular to the straight long axis with a tolerance of 0.125 degrees.

6. Diameter: All diameters for PCP pipe shall be in accordance with tolerances specified by Table 2 in ASTM D 6783-02.

1016-2 FORCE MAIN SEWER PIPE:

a. Contractor shall provide sewer force main pipes with Ductile Iron Pipe (DIPS) diameters shown on the Contract Documents. Diameters shown on the Drawings and listed in the pay items represent the required DIPS diameters, regardless of pipe material, unless otherwise noted.

1016-2.1 Polyvinylchloride (PVC) Pipe and Fittings:

a. PVC pressure pipe (4-inch through 36-inch) shall conform to the applicable requirements of AWWA C900 and the additional requirements herein.

b. The pipe shall be of the diameter and pressure class indicated, shall be furnished complete with rubber gaskets, shall be provided as required in the Contract Documents.

c. Materials used in manufacture of the pipe shall be tested in accordance with the requirements of this Section and the applicable ASTM and AWWA standards.

d. Joints for the buried PVC pipe shall be an integral bell manufactured on the pipe employing a rubber ring joint. The bell shall be the same thickness as of the pipe barrel, or greater thickness. Where indicated, restrained joint pipe shall be ductile iron pipe or PVC pipe with approved Mechanical Joint (MJ) restrainer glands.

e. Joint deflection at the joint shall not exceed 75 percent of the maximum deflection recommended by the manufacturer. No deflection of the joint shall be allowed for joints that are over-belled or not belled to the stop mark.

f. PVC pipe shall be in accordance with the following table:

TABLE 1016-1
PVC PRESSURE PIPE DATA

WALL CONSTRUCTION	MANUFACTURER	AWWA DESIGNATION	SDR (MAX)	DIAMETER SIZE RANGE
Solid	See QPL	AWWA C900 (235 psi)	DR 18	4" to 12"
		AWWA C900 (165 psi)	DR 25	14" to 36"

g. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Bends, tees and other ductile iron fittings shall be restrained with the use of an approved Mechanical Joint restrainer gland or other means as indicated in the Contract Documents. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

h. All ductile iron fittings shall be lined and coated with Ceramic Epoxy: Protecto-401 by Induron Protective Coatings, Series 431 PermaShield by TNEMEC, Permox-CTF by Permite, or approved equal.

i. Each fitting shall be clearly labeled to identify its size and pressure class.

j. Gaskets shall meet the requirements of ASTM F477. Use elastomeric factory-installed gaskets to make joints flexible and watertight. Lubricant for rubber-gasketed joints shall be water soluble, non-toxic, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets.

k. Polyvinyl chloride sewer force main pipe shall be green in color.

1016-2.1.1 Fusible Polyvinylchloride (FPVC) Pipe:

a. Fusible PVC pipe shall be permitted for only 4" through 16" diameter sewer force main pipe.

b. Fusible polyvinylchloride pipe shall conform to AWWA C900.

c. Rework material shall be allowed per AWWA C900 standards.

d. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

e. Fusible polyvinylchloride pipe shall be manufactured in a standard 20', 30' or 40' nominal length.

f. PVC pipe shall be in accordance with Table 1016-1.

g. Fusible polyvinylchloride pipe shall be green in color for wastewater use.

h. Pipe generally shall be marked per AWWA C900, and shall include as a minimum:

1. Nominal pipe size

2. PVC

3. Dimension Ratio, Standard Dimension Ratio or Schedule

4. AWWA pressure class

5. AWWA Standard designation number

6. Extrusion production-record code

7. Trademark or trade name

8. Cell Classification 12454 and/or PVC material code 1120 may also be included.

i. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

j. Connections and Fittings:

1. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

2. Ductile Iron Fittings:

i. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Bends, tees and other ductile iron fittings shall be restrained with the use of an approved Mechanical Joint restrainer gland or other means as indicated in the Contract Documents. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

ii. All ductile iron fittings shall be lined and coated with Ceramic Epoxy: Protecto-401 by Induron Protective Coatings, Series 431 PermaShield by TNEMEC, Permox-CTF by Permite, or approved equal.

iii. Each fitting shall be clearly labeled to identify its size and pressure class.

3. Fusible Polyvinyl Chloride Sweeps or Bends:

i. Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe that they are joining together.

ii. Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least 2 feet of straight section on either

end of the sweep or bend to allow for fusion of the sweep to the pipe installation.

iii. Standard fusible polyvinyl chloride sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

k. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed with the following minimum requirements:

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

l. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed with the following minimum requirements:

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

m. Handling and storage of the pipe shall be in accordance with the pipe manufacturer's recommendations.

1016-2.1.2 Small Diameter PVC Pipe and Fittings:

a. Small diameter PVC pressure pipe (1 ½-inch through 3-inch) shall be Schedule 40, Iron Pipe Size (IPS) conforming to ASTM D 1785 and the additional requirements herein.

b. Materials used in manufacture shall have a Cell Class of 12454 as identified in ASTM D 1784.

c. PVC Schedule 40 (IPS) fittings shall conform to ASTM D 2466.

d. Small diameter Schedule 40 PVC pipe shall be bell end x plain end type except when plain end is necessary between two fittings. Solvent cement joints shall be made in a two-step process with primer conforming to ASTM F 656 and solvent conforming to ASTM D 2564.

e. Small diameter PVC sewer force main pipe shall be white in color.

1016-2.2 High Density Polyethylene (HDPE) Pipe and Fittings:

a. Polyethylene pipe shall be made from HDPE material having a material code of PE3408 or higher. The material shall meet the requirements of ASTM D 3350 and shall have a minimum cell classification of PE345464C (345464E for gray HDPE pipe).

b. Pipe and Fittings: The pipe shall meet the requirements of AWWA C906. Pipe shall be in ductile iron pipe sizes (DIPS). The pressure rating shall be 160 psi with a maximum dimension ratio (DR) of 11. Laying lengths shall be 40-ft standard.

c. Pipe and fittings shall be marked as prescribed by AWWA C906. Pipe markings shall include nominal size, OD base (ie: 12-inch ductile iron pipe sizing, DIPS), dimension ratio, pressure class, AWWA C906, manufacturer's name, manufacturer's production code including day, month, and year extruded, and manufacturer's plant and extrusion line.

d. Workmanship: Furnish pipe and fittings that are homogeneous throughout and free from visible defects such as foreign inclusions, concentrated ridges, discoloration, pitting, varying wall thickness, cracks, holes, foreign material, blisters, and other deformities. Pipe with gashes, nicks, abrasions, or any such physical damage which may have occurred during storage and/or handling, which are larger/deeper than 10% of the wall thickness shall not be used and shall be removed from the construction site. Provide pipe as uniform as commercially practical in color, opacity, density, and other physical properties.

e. HDPE sewer force main pipe shall have a green colored stripe on along the exterior length of the pipe.

f. Connections and Fittings:

    1. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

    2. MJ (Mechanical Joint) Adapters are to be used when connecting HDPE pipe to Ductile Iron Fitting. MJ Adapters are manufactured in standards IPS and DIPS sizes for connecting IPS sized or DIPS sized polyethylene pipe to mechanical joint fittings and appurtenances that meet AWWA C111.

    3. Ductile Iron Fittings:

        i. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Bends, tees and other ductile iron fittings shall be restrained with the use of an approved Mechanical Joint restrainer gland or other

means as indicated in the Contract Documents. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

ii. All ductile iron fittings shall be lined and coated in accordance with Section 1016-2.3.

iii. Each fitting shall be clearly labeled to identify its size and pressure class.

iv. Gaskets shall meet the requirements of ASTM F477. Use elastomeric factory-installed gaskets to make joints flexible and watertight. Lubricant for rubber-gasketed joints shall be water soluble, non-toxic, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets.

1016-2.3 Ductile Iron Pipe and Fittings:

a. Lined and polyethylene-wrapped ductile iron pipe shall conform to AWWA C150 and C151, subject to the supplemental requirements in this Section. The pipe shall be of the diameter and class indicated, and shall be provided complete with rubber gaskets, specials, and fittings as required under the Contract Documents. Nominal pipe laying lengths shall be 20 feet.

b. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi.

c. All pipe shall have a minimum pressure rating as indicated in Table 1016-2, or higher ratings as indicated in the Contract Documents.

TABLE 1016-2
MINIMUM PRESSURE CLASS

PIPE SIZES (inch)	PRESSURE CLASS (psi)
4–12	350
14–20	250
24	200
30–64	150

d. The Contractor shall legibly mark specials 24-inches in diameter and larger in accordance with the laying schedule and marking diagram. Each fitting shall be marked at each end with top field centerline.

e. Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing on the Contract Drawings. The locations of correction pieces and closure assemblies are shown on the Contract Drawings. Any change in location or number of said items shall only be as accepted by the Engineer.

f. Interior Linings:

1. Preparation: Brush-off blast cleaning conforming to SSPC-SP7.

2. Liner thickness: Minimum 40 mils, for pipe barrel interior.

3. Testing: ASTM G 62, Method B for voids and holidays; provide written certification.

4. Acceptable Lining Materials shall be Ceramic Epoxy: Protecto-401 by Induron Protective Coatings, Series 431 PermaShield by TNEMEC, Permox-CTF by Permite, or approved equal. Interior lining shall be applied in accordance with the manufacturer's recommendations.

5. Contractor shall seal cut ends, touch-up, or repair interior lining in accordance with manufacturer's recommendations.

g. Exterior Coating: – Exterior pipe coating shall be in accordance with Section 822.

h. All buried piping, fittings, steel lugs, rods, brackets, clamps and other metal components shall be polyethylene encased in accordance with subsection 1016-2.3.1.

i. The pipe shall be designed, manufactured, tested, inspected, and marked according to AWWA C150 and C151 except where modified by this Section. The pipe and fittings shall be of the diameter and class indicated.

j. Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints, or restrained joints as required. Mechanical and push-on joints including accessories shall conform to AWWA C111.

k. Flanged joints shall conform to AWWA C115. Flanged joints shall not be used in underground installations except within structures. Where threaded flanges are provided, the pipe wall thickness under the cut threads shall not be less than the calculated net thickness required for the pressure class of the pipe. All flanged piping shall be a thickness Class 53, per AWWA C115. All flanged joints shall be furnished with a minimum 1/8-inch, thick red rubber or styrene butadiene rubber gasket. The bolts and nuts shall be teflon coated high strength low alloy steel per AWWA C111 with head and nut dimensions as specified in ANSI B18.2. For bolts of 1-3/4-inches in diameter and larger, bolt studs with a nut on each end are recommended.

l. Restrained joints shall be commercially available units provided by American Ductile Iron Pipe, U.S. Pipe, or approved equal. Joint restraining devices that impart point loads and/or wedging action on the pipe wall as a means of joint restraint shall not be allowed unless there are no other options for joint restraint available. Under such circumstances, the Contractor may propose such devices provided the following conditions are met and the request is made as a substitution:

1. A statement from the pipe manufacturer is provided accepting the use of the retaining devices and indicating that the use of such devices will in no way affect the warranty of the pipe and/or the performance of the pipe.

2. The manufacturer of the device and the pipe manufacturer jointly provide instruction on the proper installation of the device to the personnel installing the units and provide certification to the Owner that the installers are adequately trained in the installation of the units and that all warranties are in full affect for the project.

3. The devices shall be MegaLug Model 1100 as manufactured by EBAA Iron or approved equal.

m. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself, will provide watertight joints under all operating conditions when properly installed. The Contractor shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

1016-2.3.1 Polyethylene Encasement:

a. Submittals:

1. Product Data: Submit product data for proposed film and tape for approval. Product shall be manufactured from virgin polyethylene, shall not be recycled and shall be purchased new for the project, clean, sound and without defects. Product shall comply with ANSI/AWWA C105/A21.5 – Polyethylene Encasement for Ductile-Iron Pipe Systems.

2. Quality Assurance Plan: Submit quality assurance plans for film manufacturing and field application.

i. Film Manufacturing: The manufacturer of polyethylene film for corrosion protection encasement of ductile iron pipe shall have a verifiable quality control system to assure that film is produced from only virgin polyethylene and that it complies with all requirements of this specification. Documentation of Quality Control procedures and test results shall be submitted and shall be made available for inspection for at least one year. A current ISO certificate may be used in lieu of other quality control documentation.

ii. Field Application: The contractor shall develop, and submit for approval, a comprehensive Quality Assurance Plan for installation of polyethylene encasement. Address all aspects of material and pipe handling, bedding, preparation of pipe surface, film installation and anchoring, service taps and backfill. Include written procedures to be used by installers.

iii. Manufacturer's Certification: Submit polyethylene film manufacturer's certification of compliance with this subsection. The polyethylene film manufacturer shall provide a notarized statement from an officer of the company that the film meets the inspection and all applicable material specifications of this specification. The manufacturer's statement of compliance must be verifiable. Statements from distributors or contractors shall not be accepted in lieu of a statement from the original manufacturer of the polyethylene film.

iv. Installer Qualifications: Polyethylene encasement shall only be installed by qualified persons who have been trained in the proper installation and handling procedures. Qualified persons shall be those that have had training and experience in the installation of polyethylene encasement for corrosion protection of ductile iron pipe. Such persons may be qualified by the Ductile Iron Pipe Research Association, ductile iron pipe manufacturers or engineering/inspection firms who offer training courses in the proper

method(s) of installation. Proof of qualifications shall be submitted with the shop drawings and shall be provided to project inspectors upon request.

b. Materials:

1. V-Bio Enhanced Polyethylene Encasement:

i. Polyethylene encasement shall meet all the requirements for ANSI/AWWA C105/A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems.

ii. Polyethylene encasement shall consist of three (3) layers of co-extruded linear low density polyethylene (LLDPE), fused into a single thickness of not less than eight (8) mils (0.008 in.).

iii. The inside surface of the polyethylene wrap to be in contact with the ductile pipe exterior shall be infused with a blend of anti-microbial biocide to mitigate microbiologically influenced corrosion (MIC) and a volatile corrosion inhibitor to control galvanic corrosion.

2. Polyethylene Tape: Provide 1½-inch wide, plastic-backed, adhesive tape for fitting and anchoring the encasement. Acceptable tapes are Fulton No. 355, Polyken No. 900, Scotchwrap No. 50, or other approved tape. Fulton Tie Strips are an approved alternative to tape. For patching or repairing the polyethylene film, use only polyethylene tape.

c. Installation:

1. Polyethylene encasement for corrosion protection of ductile iron pipe shall be installed in accordance with ANSI/AWWA C105/A21.5 and as required by the Contract Documents.

2. The wrap shall be overlapped one (1) foot in each direction at the joints and secured in place around the pipe with approved polyethylene tape.

3. All installations shall be carried out by personnel trained and equipped to meet these various requirements.

1016-2.4 Small Diameter Stainless Steel Pipe and Fittings:

a. Small diameter stainless steel pipe (1 ½-inch through 3-inch) shall be Type 316, Schedule 40, Iron Pipe Size (IPS) conforming to ASTM A 312 and the additional requirements herein.

b. Small diameter stainless steel fittings shall be Type 316, Class 150 with FNPT connections on each end conforming to ANSI B1.20.1 unless designated otherwise.

c. Gray stainless steel PTFE thread seal tape shall be used on all connections.

d. The transition from stainless steel discharge piping to PVC force main piping shall be made with a PVC female adapter, socket x FNPT.

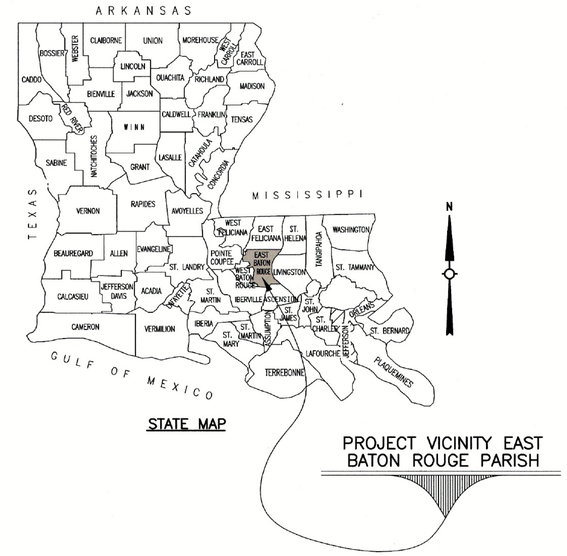
CONSTRUCTION DRAWINGS

SANITARY GRAVITY SEWER LINE IMPROVEMENTS - LIFT STATION NO. 1 TO F.G. CLARK ACTIVITY CENTER

SOUTHERN UNIVERSITY and A&M COLLEGE

BATON ROUGE, LOUISIANA

STATE ID: No. 217038
STATE F.P. & C. PROJECT No. 01-107-24-05, F.01004726
AUGUST 2026

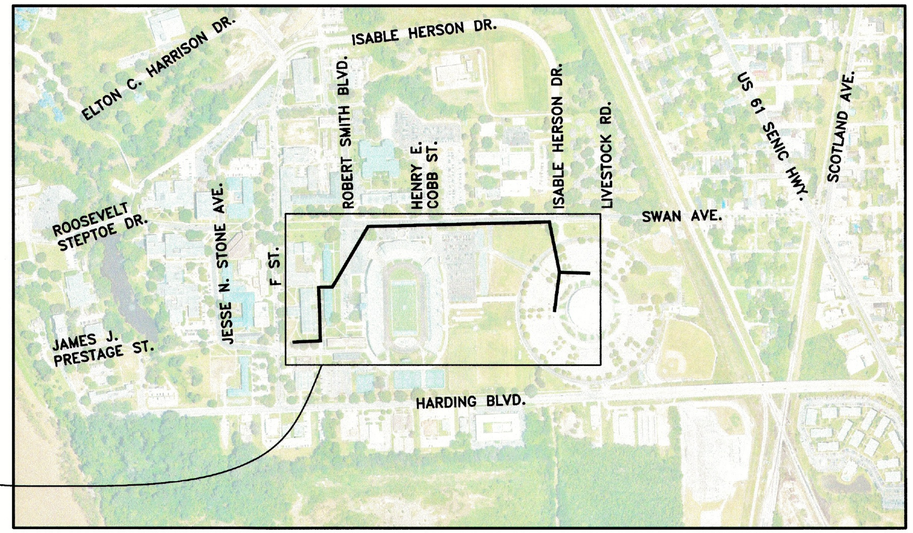


STATE MAP

INDEX TO SHEETS

SHEET No.	DESCRIPTION
1	TITLE SHEET AND INDEX
2	SUMMARY OF ESTIMATED QUANTITIES
3	GENERAL NOTES
4	SANITARY SEWER LINE LAYOUT PLAN LIFT STATION NO. 1 TO F.G. CLARK ACTIVITY CENTER
5–7	SANITARY GRAVITY SEWER LINE IMPROVEMENTS LIFT STATION NO. 1 TO F.G. CLARK ACTIVITY CENTER

SHEET No.	STANDARD PLANS	
801–01	BEDDING AND BACKFILL DETAILS FOR SANITARY SEWER PIPE, FORCE MAINS AND SERVICE LINES	(1 SHEET)
802–01	SANITARY SEWER PIPE AND CLEANOUT DETAILS	(SH. 2 OF 2)
803–01	SANITARY SEWER MANHOLES	(4 SHEETS)
905–01	TEMPORARY TRAFFIC CONTROL	(2 SHEETS)
905–02	TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS	(1 SHEET)
905–07	TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS	(1 SHEET)
905–08	TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS	(1 SHEET)
905–09	TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS	(1 SHEET)
905–30	TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS	(1 SHEET)



LAYOUT MAP

SCALE: 1:500 (500 0 250 500 1000 2000)

TYPE OF CONSTRUCTION

CURED-IN-PLACE SANITARY SEWER REHABILATION

STATE OF LOUISIANA
JEFF LANDRY, GOVERNOR

DIVISION OF ADMINISTRATION
TAYLOR F. BARRAS, COMMISSIONER OF ADMINISTRATION

OFFICE OF FACILITY, PLANNING AND CONTROL
ROGER E. HUSSER JR. DIRECTOR

SOUTHERN UNIVERSITY and A&M COLLEGE
KEN DAWSON, DIRECTOR OF FACILITIES PLANNING

SOUTHERN UNIVERSITY - BATON ROUGE
JIMMIE WADE, OFFICE OF FACILITIY SERVICES/ PHYSICAL PLANT

PROJECT PLANS AND CONTRACT DOCUMENTS
PREPARED BY AND RECOMMENDED FOR APPROVAL

DATE: 08/27/2026

STATE OF LOUISIANA
CARY A. BOURGEOIS
REG. No. 29414
REGISTERED
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

PLANS PREPARED BY:

GEC

J:\51\6095 Southern University\0051 8085103.000 - SU Gravity Sewer Line Improvements_Clark Center to Lift Station No. 1\3_Final_Design_and_CDs\3.1_Final_Plan_Sheets\01-02 SEW LN TITLE SHT SUMM.dwg

SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
	BASE BID		
2020500	REMOVAL OF ASPHALT SURFACING AND BASE	SY	34
2020600	REMOVAL OF CONCRETE WALKS AND DRIVES	SY	30
5010606	RESTORE ASPHALT CONCRETE PAVEMENT AND BASE	SY	40
8011000	SEWER POINT REPAIR EXCAVATION, BACKFILL AND COMPACTION (0.0' – 6.0' DEPTH)	LF	10
8011001	SEWER POINT REPAIR EXCAVATION, BACKFILL AND COMPACTION (6.1' – 8.0' DEPTH)	LF	10
8011002	SEWER POINT REPAIR EXCAVATION, BACKFILL AND COMPACTION (8.1' – 10.0' DEPTH)	LF	10
8011003	SEWER POINT REPAIR EXCAVATION, BACKFILL AND COMPACTION (10.1' – 12.0' DEPTH)	LF	10
8011004	SEWER POINT REPAIR EXCAVATION, BACKFILL AND COMPACTION (12.1' – 16.0' DEPTH)	LF	20
8011005	SEWER POINT REPAIR EXCAVATION, BACKFILL AND COMPACTION (16.1' – 20.0' DEPTH)	LF	20
802200C	PVC REHAB SEWER PIPE (8")	LF	80
802500C	NON–SHEAR COUPLINGS (8")	EACH	16
8031484	48" SANITARY SEWER MANHOLE (12.1 TO 16 FEET)	EACH	1
808100C	8" DIAMETER SEWER CIPP LINING	LF	2,977
9070304	4" CONCRETE WALKS	SY	30
9070406	6" CONCRETE DRIVES	SY	30
9090100	MOBILIZATION	LUMP	1

SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
	ALTERNATE NO. 1 – ADDITIVE		
8065000	MANHOLE REPAIR (PATCHING)	CF	14
8066200	MANHOLE REHABILITATION (EPOXY LINING)	VF	140

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
8-25-2026

REVISIONS

DATE:	REMARKS:	APPD

...

DESIGNED BY: J.K.
DRAWN BY: B.N.
CHECKED BY: A.F.
DATE: AUGUST 2026
SCALE: ..
JOB NO. ..

SUMMARY OF ESTIMATED QUANTITIES
LIFT STATION NO. 1 TO
F.G. CLARK ACTIVITY CENTER

SOUTHERN UNIVERSITY - BATON ROUGE

SHEET NO. 2

J:\51\6085 Southern University\0051.6085103.000 – SU Gravity Sewer Line Improvements_Clark Center to Lift Station No. 1\3_Final_Design_and_CDs\3.1_Final_Plan_Sheets\02 SUMM of Quant.dwg

GENERAL NOTES:

1. CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ALL BUILDINGS AFFECTED BY HIS WORK AND SHALL ALSO PROVIDE ACCESS TO UTILITY COMPANIES FOR MAINTENANCE AND WORK ON THEIR UTILITIES DURING THE COURSE OF WORK AT NO ADDITIONAL COST TO THE OWNER.

2. CONTRACTOR SHALL RELOCATE OR ADJUST EXISTING SEWER CONNECTIONS, AS NECESSARY.

3. THE LOCATION OF ALL PIPES, DUCTS, UTILITIES OR UNDERGROUND STRUCTURES IS NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL UNDERGROUND PIPES, DUCTS, UTILITIES OR STRUCTURES ARE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT SOUTHERN UNIVERSITY AND ALL PERTINENT UTILITY COMPANIES PRIOR TO ANY POTHOLING AND CONSTRUCTION FOR COORDINATION.

4. ANY UTILITIES THAT WILL NEED TO BE RELOCATED SHALL BE DONE SO AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL COORDINATE WITH EACH UTILITY COMPANY TO HAVE THESE UTILITIES RELOCATED.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TRAFFIC DURING CONSTRUCTION AND NOT IMPEDE TRAFFIC ON ANY STREETS OR DRIVEWAY WITHOUT WRITTEN APPROVAL FROM EITHER FACILITY SERVICES/PHYSICAL PLANT OR THE UNIVERSITY POLICE. CONTRACTOR SHALL INSTALL AND MAINTAIN ADEQUATE CONSTRUCTION SIGNING AND BARRICADES IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. CONTRACTOR SHALL COMPLY WITH ALL REGULATIONS TO ENSURE SAFETY OF THE WORKMEN AND THE PUBLIC DURING ALL PHASES OF CONSTRUCTION.

6. THE 1997 EDITION OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, DEPT. OF PUBLIC WORKS ENGINEER DIVISION AS AMENDED BY THE PROJECT SPECIFICATIONS SHALL GOVERN THIS PROJECT.

7. AT LEAST 72 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION THE CONTRACTOR SHALL CONTACT LA ONE CALL, 1-800-272-3020 AND VERIFY THE EXACT LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES. CONTRACTOR SHALL PROVIDE WRITTEN PROOF TO THE UNIVERSITY THAT THE CONTACT WAS MADE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE OCCASIONED BY FAILURE TO COMPLY WITH THESE INSTRUCTIONS. SEE ALSO NOTE NO. 20.

8. EXISTING DRIVEWAY CULVERTS REMOVED DURING CONSTRUCTION SHALL BE REPLACED WITH A NEW REINFORCED CONCRETE PIPE, MATCHING THE SIZE (15" MIN.) & LENGTH OF PIPE REMOVED & LAID ON GRADE FOR POSITIVE DRAINAGE. THIS SHALL BE PAID ON A PER LINEAR FOOT OF PIPE BASIS. THE REMOVAL OF THE EXISTING PIPE SHALL BE PAID UNDER THE CORRESPONDING NEW PIPE PAYMENT ITEM. CULVERTS TO BE REMOVED AND REPLACED SHALL BE AS INDICATED IN THE PLANS OR AS DIRECTED BY PROJECT ENGINEER.

9. DRIVEWAYS, ROADWAYS AND WALKS OR PORTIONS THEREOF SHALL BE REPLACED IN KIND OR AS NOTED IF REMOVED DURING CONSTRUCTION.

10. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL BUILDINGS DURING CONSTRUCTION.

11. THE CONTRACTOR SHALL NEATLY SAW CUT (FULL DEPTH) ALL ROADWAYS AND DRIVEWAYS PRIOR TO REMOVAL OF PAVEMENT. A NEAT EDGE OF PAVEMENT IS REQUIRED PRIOR TO PERMANENT PAVEMENT REPAIR. IF NOT CONTRACTOR SHALL PERFORM A NEW SAW CUT AT NO ADDITIONAL COST TO OWNER. DURING THE TIME BETWEEN THE FINAL BACKFILL OF PIPE INSTALLATION AND COMPLETION OF THE PERMANENT PAVEMENT REPAIR, THE CONTRACTOR SHALL MAINTAIN TRAFFIC IN ACCORDANCE WITH THE SPECIFICATIONS. IN ADDITION, THE CONTRACTOR SHALL TEMPORARILY FURNISH, PLACE, SHAPE, COMPACT, AND MAINTAIN TRAFFIC MAINTENANCE AGGREGATE UNTIL THE PERMANENT PAVEMENT REPAIR IS COMPLETE AT NO DIRECT COST TO THE OWNER. OTHERWISE CONTRACTOR MAY COMPLETE SURFACE RESTORATION, REMEDIAL OR FOLLOW-UP WORK IMMEDIATELY AFTER COMPLETION OF THE REPAIR AND FINAL BACKFILL.

12. CONTRACTOR SHALL HAVE A CONFORMED SET OF PLANS AND SPECIFICATIONS ON THE JOB SITE AT ALL TIMES.

13. ALL WORK SHALL BE PERFORMED BY A LOUISIANA LICENSED CONTRACTOR.

14. THE CONTRACTOR SHALL PROVIDE SUPPORT OF EXISTING UTILITIES EXPOSED DURING EXCAVATION TO MAINTAIN SERVICE AND INTEGRITY OF UTILITY.

15. INDICATED SCALES ARE BASED ON FULL SIZED (22" x 34") DRAWINGS. IF THE DRAWINGS ARE REDUCED OR INCREASED, SCALES MUST BE ADJUSTED ACCORDINGLY.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROJECT SITE RESULTING FROM THE CONTRACTOR'S CONSTRUCTION ACTIVITIES.

17. CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR WORKING CONDITIONS ON THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. DURING PERFORMANCE OF WORK THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

18. ALL MANHOLE, CULVERT AND PIPE REPLACEMENTS SHALL MATCH EXISTING INVERTS AND GRADE. CONTRACTOR SHALL FIELD VERIFY AND RECORD ALL INVERTS PRIOR TO ORDERING MATERIALS AND REMOVING AND REPLACING PIPES, CULVERTS AND MANHOLES.

19. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL WORK WITH SUBCONTRACTORS SUCH THAT INCONVENIENCE TO THE PUBLIC IS MINIMIZED. ANY REPAIRS SHOWN ON A LINE SEGMENT THAT REQUIRES CCTV MUST BE COMPLETED PRIOR TO PERFORMING CCTV WORK. CIPP AND CCTV WORK SHALL BE COORDINATED WITH OTHER WORK SUCH THAT REMOVAL AND REPLACEMENT OF FENCE AND SURFACE RESTORATION IS REQUIRED ONLY ONCE ON THE SAME PROPERTY. REMOVAL AND REPLACEMENT OF FENCE AND SURFACE RESTORATION REQUIRED MORE THAN ONCE IN THE SAME LOCATION DUE TO THE CONTRACTOR'S LACK OF COORDINATION SHALL BE AT NO ADDITIONAL COST TO THE OWNER.

20. AT LEAST 72 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION, THE CONTRACTOR SHALL CONTACT MR. JIMMIE WADE (225-771-5820) OR (225-650-8996) WITH THE OFFICE OF FACILITY SERVICES/PHYSICAL PLANT TO IDENTIFY ALL THE TRAFFIC SIGNAL INTERCONNECTION FIBER OPTIC LINE LOCATIONS THROUGHOUT THE PROJECT AREA. CONTRACTOR SHALL PROVIDE WRITTEN PROOF TO THE UNIVERSITY THAT THE OFFICE OF PHYSICAL SERVICES WAS CONTACTED AND HAS VERIFIED THE EXACT LOCATIONS OF THE FIBER OPTIC LINE.

21. CONTRACTOR SHALL PERFORM PRE-INSTALLATION CCTV INSPECTION OF PIPE TO BE REHABILITATED. ANY CONDITION THAT MAY PREVENT PROPER INSTALLATION OF THE CHOSEN REHAB PIPE SHALL BE SUBMITTED TO THE ENGINEER AS A CRITICAL DAMAGE REPORT (CDR). BASED ON THE CDR, THE ENGINEER MAY ADD A SEWER POINT REPAIR TO REMOVE THE CONDITION PREVENTING PROPER INSTALLATION. THE CONTRACTOR SHALL PERFORM THESE REPAIRS AT THE ESTABLISHED CONTRACT UNIT BID PRICES FOR THIS ITEM OF WORK.

22. CONTRACTOR SHALL CAREFULLY POTHOLE AND EXPOSE SELECTED SUBSURFACE UTILITIES TO OBTAIN THREE-DIMENSIONAL INFORMATION. NO CONTRACT TIME WILL BE ADDED FOR ANY CONTRACTOR DOWNTIME WHILE WAITING TO COORDINATE THE POTHOLING OPERATION WITH A GIVEN UTILITY COMPANY. IF A CONFLICT IS VERIFIED THAT WOULD PREVENT THE CONTRACTOR FROM PERFORMING THE WORK ON A PARTICULAR REPAIR, HE IS TO CONTACT THE ENGINEER IMMEDIATELY AND FOLLOW THE CONFLICT LOG PROCESS. ADD THE REPAIR TO THE CONFLICT LOG. POTHOLING TO EXPOSE SUBSURFACE UTILITIES IN VERIFYING EXISTENCE OF CONFLICTS SHALL BE PAID AT THE ESTABLISHED CONTRACT UNIT BID PRICE FOR SEWER POINT REPAIR EXCAVATION, BEDDING, BACKFILL, AND COMPACTION UP TO THE DEPTH RANGE AT WHICH THE UTILITIES ARE DISCOVERED.

23. LOCATING MANHOLES AND REPAIR LOCATIONS IS INCIDENTAL TO OTHER WORK ITEMS. TYPICAL MEANS AND METHODS FOR LOCATING MANHOLES WOULD BE USE OF GPS EQUIPMENT, MARKING OFF FOOTAGES FROM CONNECTING MANHOLES, ROD PROBING, USE OF METAL DETECTING WANDS, ETC. CONTRACTOR SHALL NOTIFY ENGINEER IF AFTER UTILIZING ALL OF TYPICAL MEANS & METHODS CONTRACTOR IS UNABLE TO LOCATE MANHOLE. ENGINEER MAY DIRECT CONTRACTOR TO USE SEWER LINE CAMERA BEACON WITH GROUND WALKOVER TO LOCATE MANHOLE. THE CONTRACTOR SHALL PERFORM THIS BEACON LOCATE WORK AS DIRECTED BY THE ENGINEER AT THE ESTABLISHED CONTRACT UNIT BID PRICES FOR REGULAR SEWER LINE CLEANING AND TELEVISION INSPECTION OF SEWER MAINLINE.

24. THE FOLLOWING IS A LIST OF THE CONTACTS FOR UTILITIES WITHIN THE PROJECT AREA:

AT&T: TRACY LAUVRAY, 225-367-0613

ATMOS ENERGY: HEATHER HATTY, 985-249-3223

B.R. WATER: RYAN SCARDINA, 225-952-7619

COX: THOMAS FLOYD, 225-806-4745

DEMCO: THEODORE MCCRAY, 225-261-1177

ENTERGY GAS: RICKEY WATTS, 225-354-3204

ENTERGY ELECTRIC: JERRY KENNEDY, 225-354-3060

GAS UTILITY DISTRICT 1: MICKEY GORE, 225-654-4020

UNITI FIBER: BRYAN KUSTENMACHER, 504-470-5190

SOUTHERN LIGHT: WALTER GOODMAN, 251-445-1048

DOTD FIBER: SAMMY WILLIAMS, 225-379-1195

SOUTHERN UNIVERSITY: JIMMIE WADE 225-771-5820 OR 225-650-8996

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

8-25-2026

REVISIONS

DATE:	REMARKS:	APPD

...

DESIGNED BY: J.K.
DRAWN BY: B.N.
CHECKED BY: A.F.

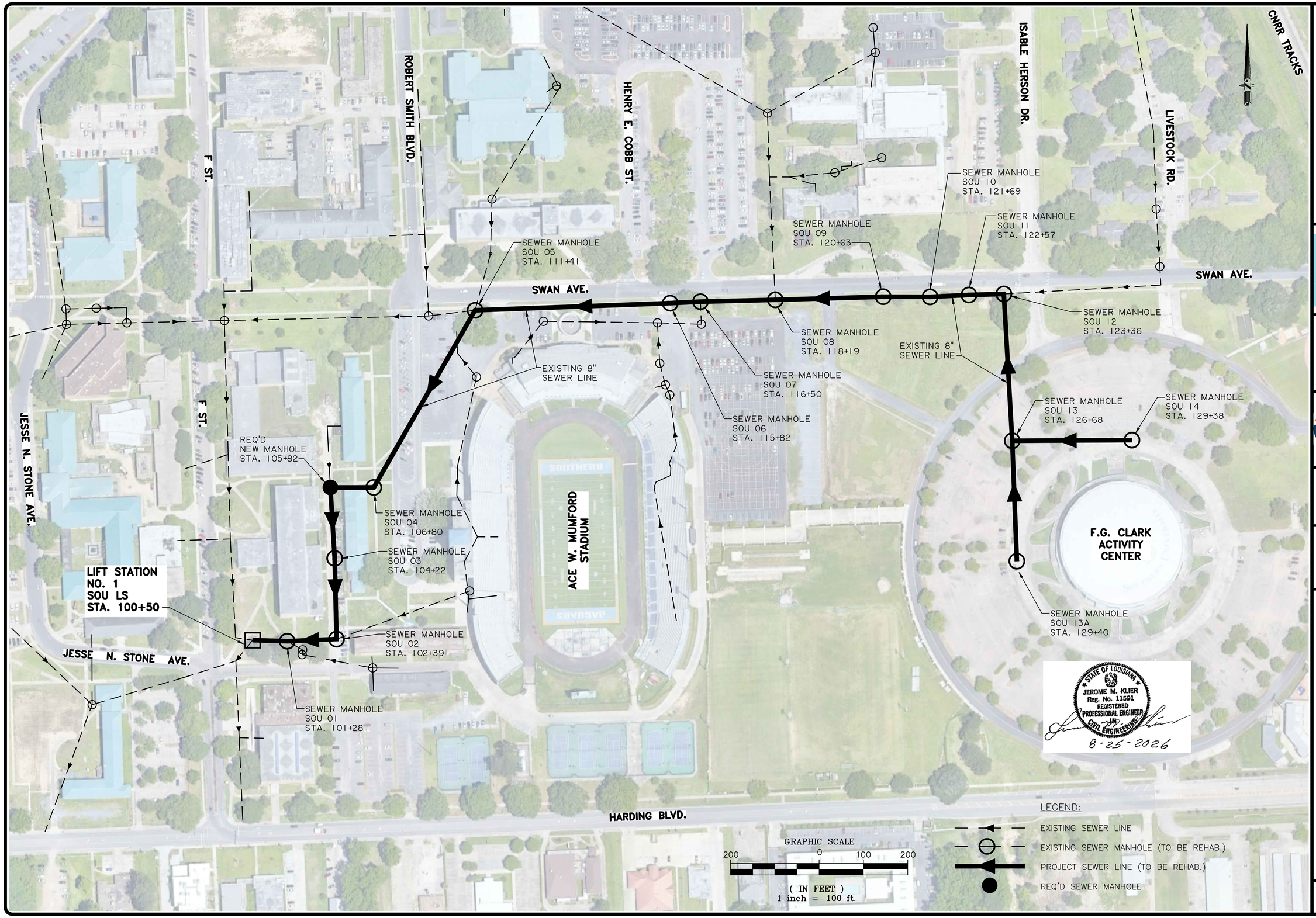
DATE: AUGUST 2026
SCALE: ::
JOB NO. ::

GENERAL NOTES
LIFT STATION NO. 1 TO
F.G. CLARK ACTIVITY CENTER

SOUTHERN UNIVERSITY - BATON ROUGE

SHEET NO. 3

J:\51\6085 Southern University\0051.6085103.000 - SU Gravity Sewer Line Improvements_Clark Center to Lift Station No. 1\3_Final_Design_and_CDs\3.1_Final_Plan_Sheets\03 SEW LN NOTES.dwg



REVISIONS

DATE:	REMARKS:	APPD

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER
IN CIVIL ENGINEERING
8-25-2026

DESIGNED BY:	DRAWN BY:	CHECKED BY:
J.K.	B.N.	A.F.

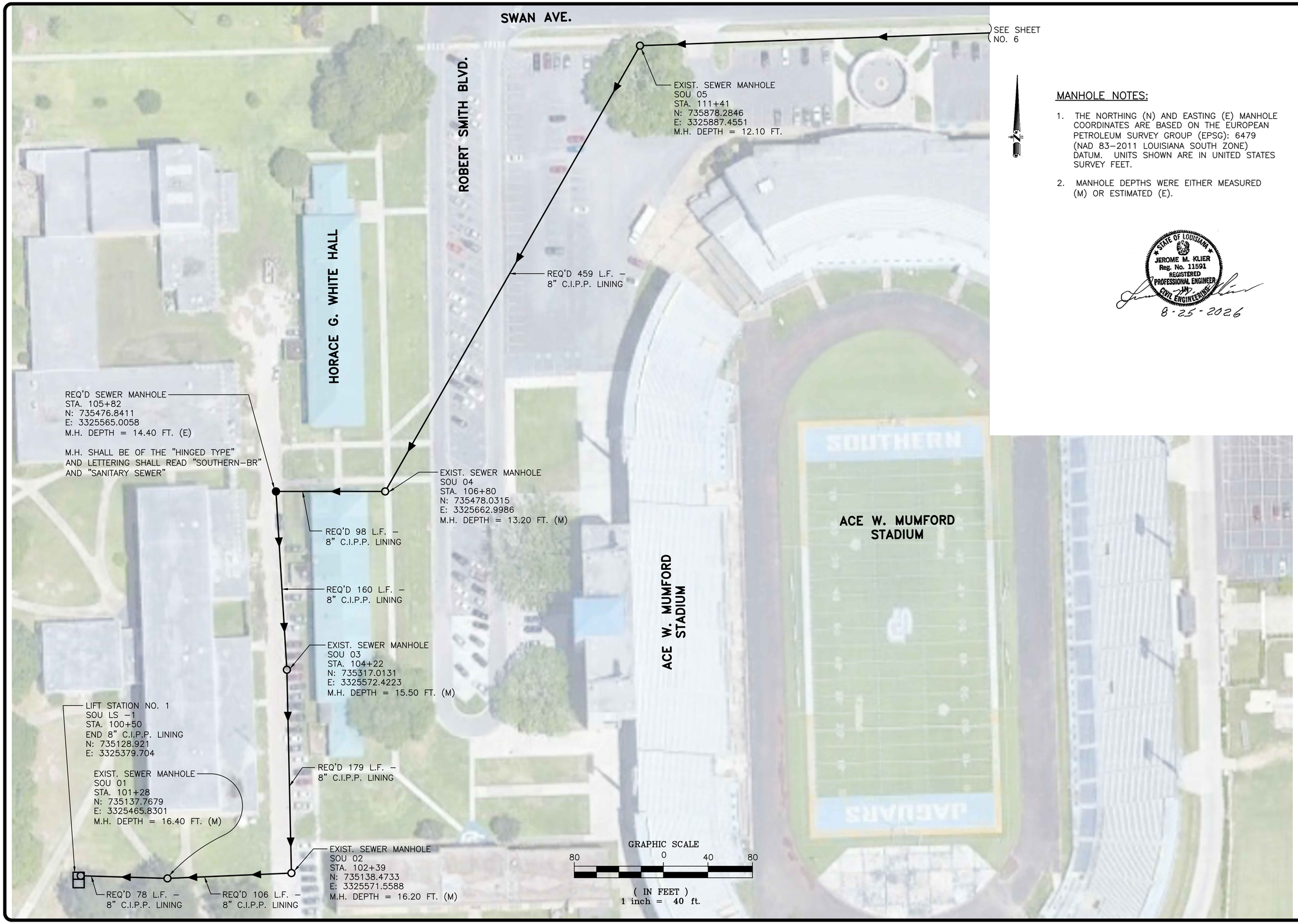
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SANITARY SEWER LINE IMPROVEMENTS
LIFT STATION NO. 1 TO F.G. CLARK ACTIVITY CENTER

SOUTHERN UNIVERSITY - BATON ROUGE

SHEET NO. 4

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MANHOLE NOTES:

1. THE NORTHING (N) AND EASTING (E) MANHOLE COORDINATES ARE BASED ON THE EUROPEAN PETROLEUM SURVEY GROUP (EPSG): 6479 (NAD 83–2011 LOUISIANA SOUTH ZONE) DATUM. UNITS SHOWN ARE IN UNITED STATES SURVEY FEET.
2. MANHOLE DEPTHS WERE EITHER MEASURED (M) OR ESTIMATED (E).

STATE OF LOUISIANA
JEROME M. KLIER
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CIVIL ENGINEERING

8-25-2026

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DATE:	REMARKS:	APPD

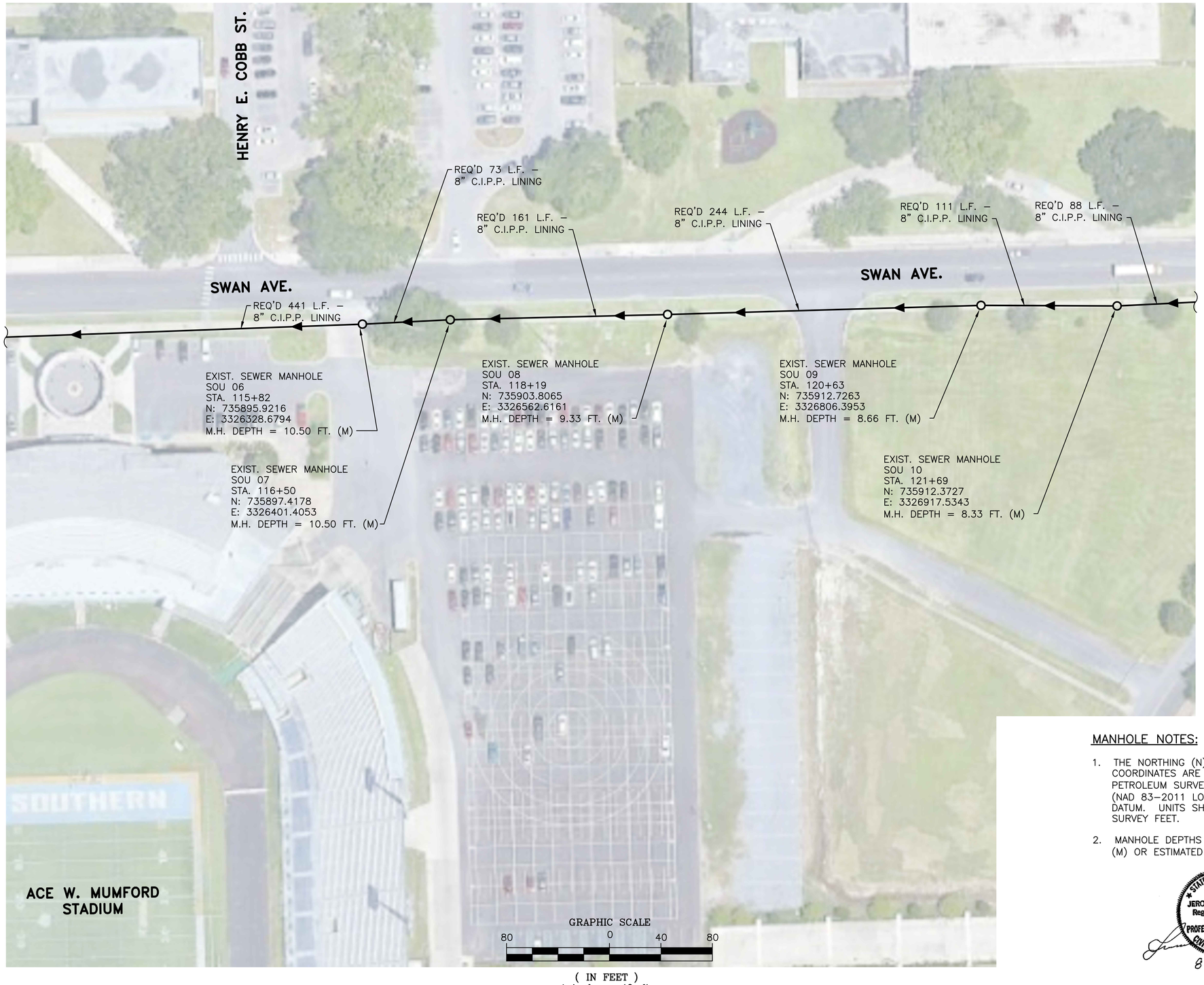
DESIGNED BY: J.K.
DRAWN BY: B.N.
CHECKED BY: A.F.
DATE: AUGUST 2026
SCALE: 1" = 40'
JOB NO. ..

WASTEWATER SYSTEM IMPROVEMENTS LIFT STATION NO. 1 TO F.G. CLARK ACTIVITY CENTER

SOUTHERN UNIVERSITY - BATON ROUGE

SHEET NO. 5

J:\51\6085 Southern University\0051.6085103.000 – SU Gravity Sewer Line Improvements_Clark Center to Lift Station No. 1\3_Final_Design_and_CDs\3.1_Final_Plan_Sheets\05-07 SEW LN PLAN SHTS.dwg



MANHOLE NOTES:

1. THE NORTHING (N) AND EASTING (E) MANHOLE COORDINATES ARE BASED ON THE EUROPEAN PETROLEUM SURVEY GROUP (EPSG): 6479 (NAD 83–2011 LOUISIANA SOUTH ZONE) DATUM. UNITS SHOWN ARE IN UNITED STATES SURVEY FEET.
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STATE OF LOUISIANA
JEROME M. KLIER
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REGISTERED
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
8-25-2026

REVISIONS

DATE:	REMARKS:	APPD

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DESIGNED BY:	DRAWN BY:	CHECKED BY:
J.K.	B.N.	A.F.

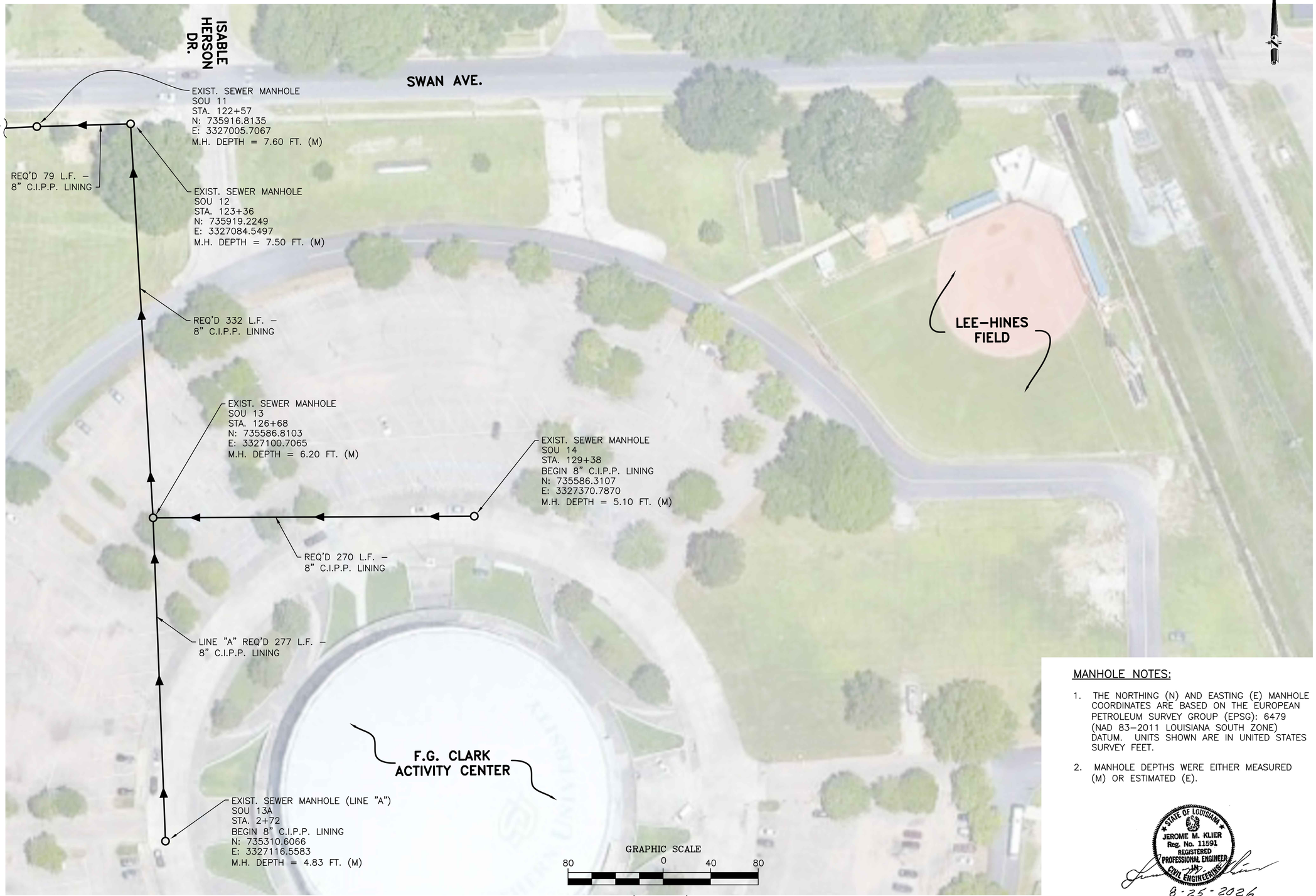
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AUGUST 2026	1" = 40'	..

WASTEWATER SYSTEM IMPROVEMENTS
LIFT STATION NO. 1 TO
F.G. CLARK ACTIVITY CENTER

SOUTHERN UNIVERSITY - BATON ROUGE

SHEET NO. 6

J:\51\6085 Southern University\0051.6085103.000 – SU Gravity Sewer Line Improvements_Clark Center to Lift Station No. 1\3_Final_Design_and_CDs\3.1_Final_Plan_Sheets\05-07 SEW LN PLAN SHTS.dwg



MANHOLE NOTES:

1. THE NORTHING (N) AND EASTING (E) MANHOLE COORDINATES ARE BASED ON THE EUROPEAN PETROLEUM SURVEY GROUP (EPSG): 6479 (NAD 83–2011 LOUISIANA SOUTH ZONE) DATUM. UNITS SHOWN ARE IN UNITED STATES SURVEY FEET.
2. MANHOLE DEPTHS WERE EITHER MEASURED (M) OR ESTIMATED (E).

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
8-25-2026

REVISIONS

DATE:	REMARKS:	APPD

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GEC

DESIGNED BY: J.K.
DRAWN BY: B.N.
CHECKED BY: A.F.

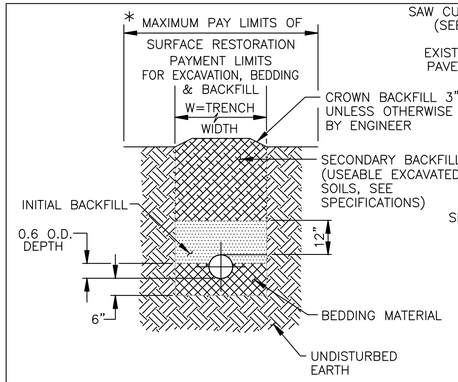
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WASTEWATER SYSTEM IMPROVEMENTS
LIFT STATION NO. 1 TO F.G. CLARK ACTIVITY CENTER

SOUTHERN UNIVERSITY - BATON ROUGE

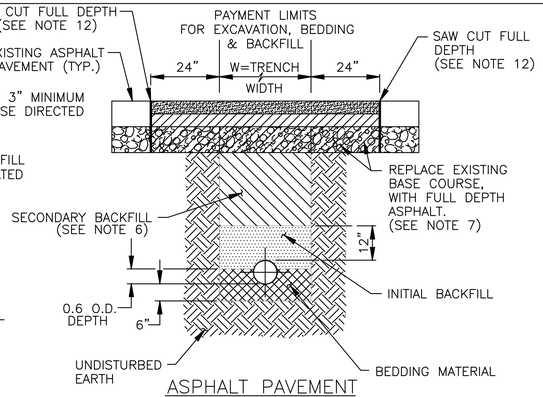
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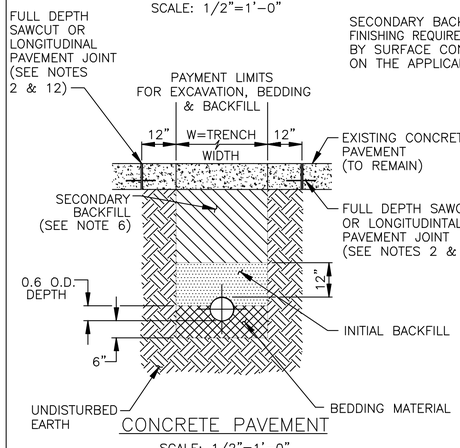
UNIMPROVED SURFACE

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



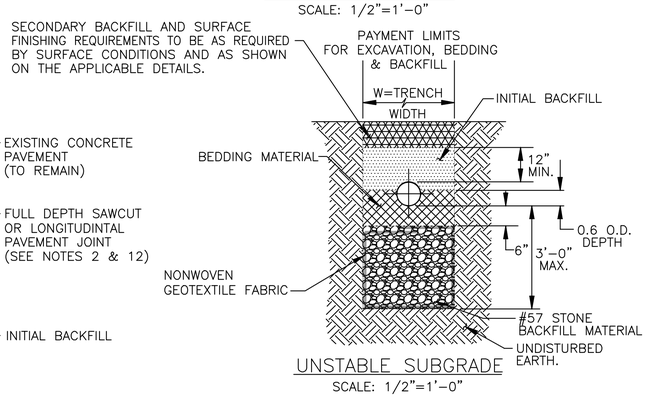
ASPHALT PAVEMENT

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



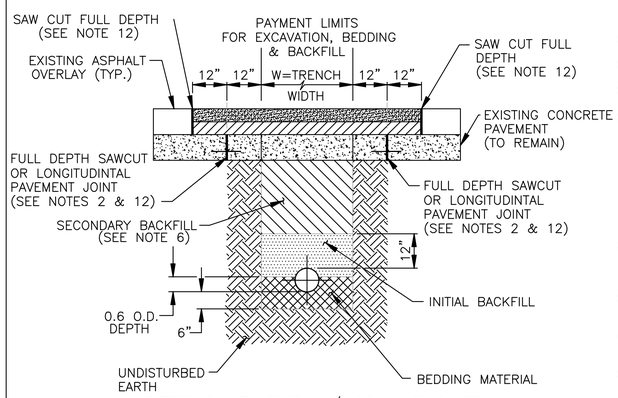
CONCRETE PAVEMENT

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



UNSTABLE SUBGRADE

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



CONCRETE PAVEMENT W/ASPHALT OVERLAY

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

NOTES:

1. TRENCH WIDTH (W) SHALL BE AS SHOWN IN THE TABLE BELOW. PIPE SHALL BE CENTERED IN TRENCH.

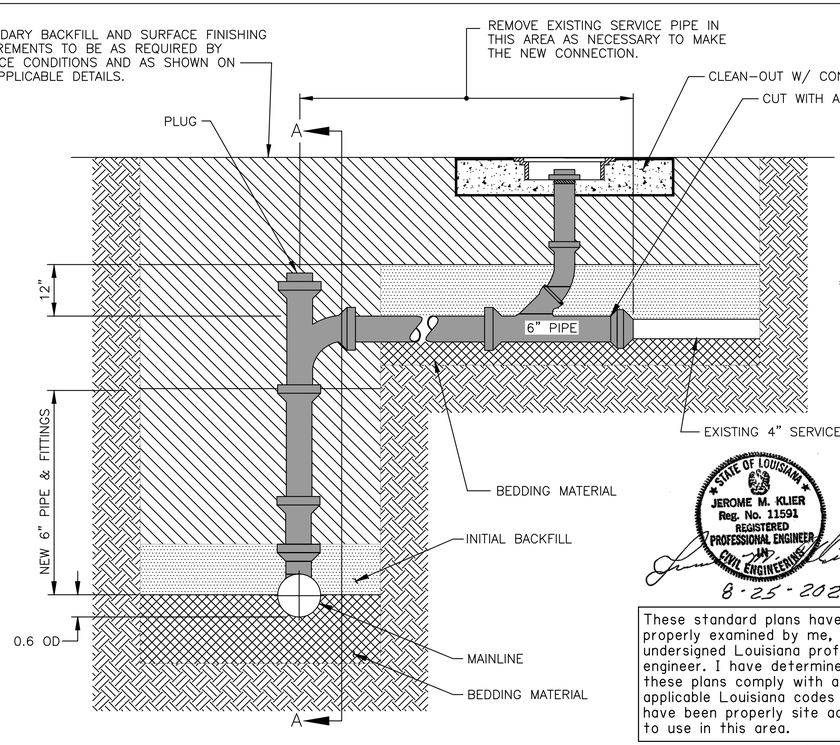
NOMINAL PIPE SIZE	"W"
UP TO 36"	36" + O.D.
OVER 36"	48" + O.D.

2. CONTRACTOR TO REMOVE AND REPLACE CONCRETE PAVEMENT SLABS AS SHOWN. IF CONCRETE PAVEMENT JOINT (OR EDGE OF ROAD/BACK OF CURB) IS WITHIN 2', REMOVE PAVEMENT TO JOINT LINE. PAVEMENT TO CONFORM TO STANDARD CPS 502-01(STANDARD PAVEMENT DETAILS). REUSE EXISTING DOWELS IF NOT DAMAGED DURING PAVEMENT REMOVAL. REPLACE ALL DAMAGED DOWEL WITH ½" x 2'-0" DEFORMED BARS ON 2'-0" CENTERS WITH EPOXY.
3. WATER SHALL NOT BE PERMITTED IN TRENCH DURING CONSTRUCTION. DEWATER AS NECESSARY.
4. USE OF THE UNSTABLE SUBGRADE PIPE BEDDING DETAIL IS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
5. GEOTEXTILE FABRIC SHALL BE OVERLAPPED 8" MINIMUM.
6. IF LIMITS OF THE PIPE TRENCH FALL UNDER EXISTING ASPHALTIC OR PCC ROADWAYS AND/OR EXISTING PARKING LOTS, THE SECONDARY BACKFILL SHALL BE #610 STONE OR AS SPECIFIED IN SECTION 801 OF THE SPECIFICATIONS.

   IF LIMITS OF THE PIPE TRENCH FALL OUTSIDE OF, BUT WITHIN 10 FT. OF THE EDGE OF AN EXISTING ROADWAY, OR UNDER THE LIMITS OF A FUTURE ROADWAY TO BE CONSTRUCTED SUBSEQUENT TO SANITARY SEWER INSTALLATION; THE SECONDARY BACKFILL SHALL BE THE SAND-AGGREGATE MIXTURE. REFER TO SECTION 801 OF THE SPECIFICATIONS FOR SPECIFIC REQUIREMENTS.

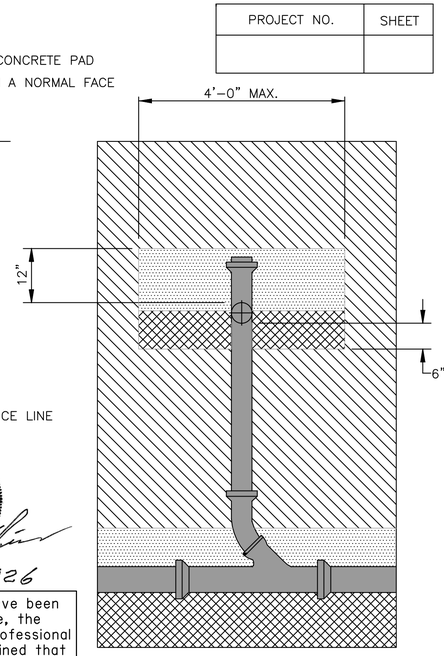
   IN AREAS OUTSIDE THOSE DESCRIBED ABOVE, SECONDARY BACKFILL MATERIAL SHALL CONSIST OF USABLE EXCAVATED SOILS.
7. ASPHALTIC CONCRETE PAVEMENT SHALL BE REPLACED WITH FULL DEPTH ASPHALT CONSISTING OF A MINIMUM 7" THICKNESS OF MIX TYPE B BASE COURSE AND 2" THICKNESS OF WEARING COURSE FOR CITY/PARISH STREETS IN ACCORDANCE WITH THE SPECIFICATIONS. MINIMUM 4" MIX TYPE B (PG64-22) FOR PARKING LOTS AND DRIVEWAYS.
8. ASPHALT OR CONCRETE PAVEMENT OR UNIMPROVED GRANULAR SURFACE REMOVED IN EXCESS OF LIMITS SHOWN SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
9. BEDDING AND BACKFILL NEEDED IN EXCESS OF LIMITS SHOWN SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
10. MAXIMUM PAYMENT LENGTHS FOR REMOVAL AND RESTORATION OF SURFACES SHALL BE THE SAME AS FOR THE EXCAVATION, BEDDING AND BACKFILL.
11. *PAY LIMITS OF SURFACE RESTORATION ON UNIMPROVED SURFACES SHALL BE LIMITED TO THE WIDTH OF THE SEWER SERVITUDE OR AS SPECIFIED ON THE DRAWINGS AND MUST BE APPROVED BY THE ENGINEER.
12. FINAL EDGES ALONG PAVEMENT REMOVAL LIMITS SHALL BE STRAIGHT, CLEAN, SOLID, VERTICAL FACES FREE FROM LOOSE MATERIAL PRIOR TO PAVEMENT RESTORATION. SAWCUTTING AT LIMITS SHOWN SHALL BE PAID ONLY ONCE PER TRENCH PATCH. ANY ADDITIONAL SAWCUTS FOR THE CONVENIENCE OF THE CONTRACTOR SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
13. IMPROVED GRANULAR SURFACE LIMITS SIMILAR TO CONCRETE PAVEMENT LIMITS.

TYPICAL TRENCH EXCAVATION & FINAL PAVEMENT REPLACEMENT DETAILS



SEWER SERVICE LATERAL CONNECTION STACK

SCALE: 3/4"=1'-0"

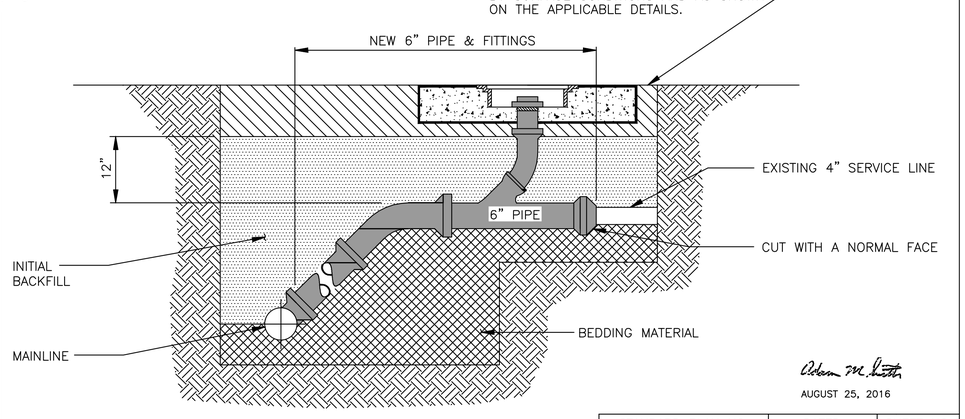


SECTION "A-A"

SCALE: 3/4"=1'-0"

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER
CIVIL ENGINEERING
8-25-2026

These standard plans have been properly examined by me, the undersigned Louisiana professional engineer. I have determined that these plans comply with all applicable Louisiana codes and have been properly site adapted to use in this area.



Adam M. Smith

AUGUST 25, 2016

SEWER SERVICE LATERAL CONNECTION

SCALE: 3/4"=1'-0"

BACKFILL FOR SERVICE LINE RECONNECTION

DATE	DESCRIPTION REVISIONS	BY
5/16	REVISED TITLE OF UNSTABLE SUBGRADE DETAIL	A.M.S.
4/15	DELETED GEOTEXTILE FABRIC EXCEPT FOR USE WITH #57 STONE AND REVISED GENERAL NOTES.	A.M.S.
4/13	REVISED STACK DETAILS AND REVISED GENERAL NOTES.	A.S.
10/12	ADDED GEOTEXTILE FABRIC ON SEC. BACKFILL	A.S.

PROJECT NO.	SHEET

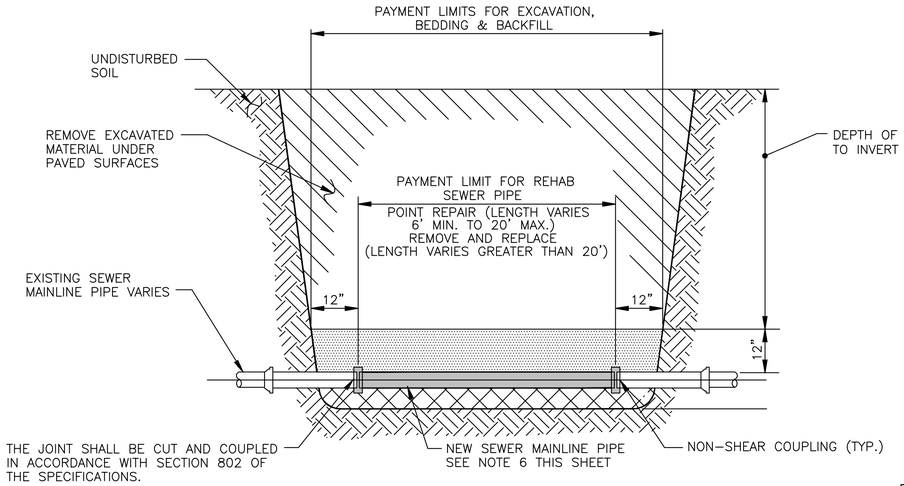
STANDARD PLAN NO. 801-01	DATED APRIL 17, 2015	SHEET NO. 1 OF 1

BEDDING AND BACKFILL DETAILS FOR SANITARY SEWER PIPE, FORCE MAINS AND SERVICE LINES

ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
A. SCHULZE	G. VANNICE	N. COBB	A. SMITH

PROJECT NO.	SHEET

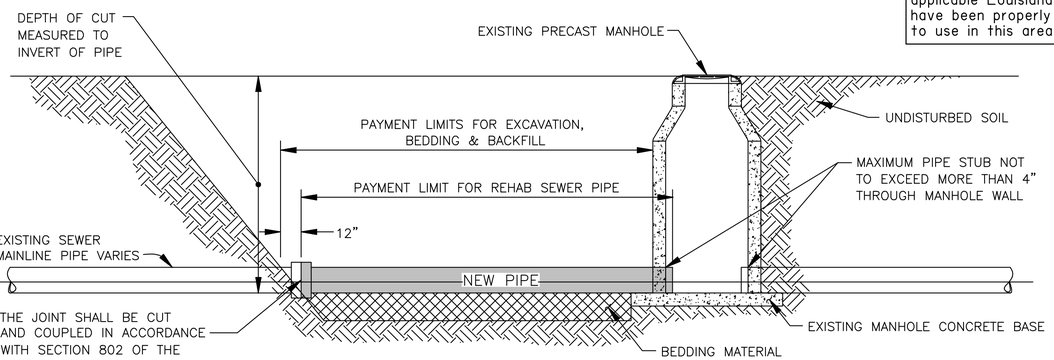


STANDARD TYPICAL SEWER PIPE REPLACEMENT AT MID SEGMENT

N.T.S.

STATE OF LOUISIANA
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These standard plans have been properly examined by me, the undersigned Louisiana professional engineer. I have determined that these plans comply with all applicable Louisiana codes and have been properly site adapted to use in this area.



STANDARD TYPICAL SEWER PIPE REPLACEMENT AT MANHOLE

N.T.S.

NOMINAL PIPE DIA. (INCHES)	MINIMUM GRADE (%)	MAX. ALLOWABLE SAG DEPTH (D)* IN INCHES OF WATER EQUAL OR LESS THAN MINIMUM GRADE	MAXIMUM SAG LENGTH (L)**	MIN. ALLOWABLE DIST. BETWEEN SAGS W/ 10% OR GREATER DEPTH (X)***
8	0.400	0.8"	6 FT	36 FT
10	0.280	1"	6 FT	36 FT
12	0.220	1.1"	9 FT	54 FT
15	0.150	1.5"	9 FT	54 FT
16	0.140	1.5"	9 FT	54 FT
18	0.120	1.5"	9 FT	72 FT
21	0.100	1.5"	9 FT	72 FT
24	0.080	1.5"	9 FT	72 FT
27	0.067	2"	9 FT	72 FT
30	0.058	2"	9 FT	72 FT
36	0.046	2"	9 FT	72 FT
42	0.037	2"	9 FT	72 FT

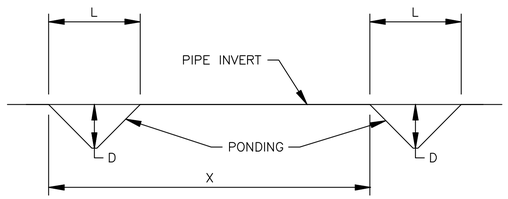
SANITARY SEWER GRADE TOLERANCE/ ACCEPTABLE SAG LIMITS

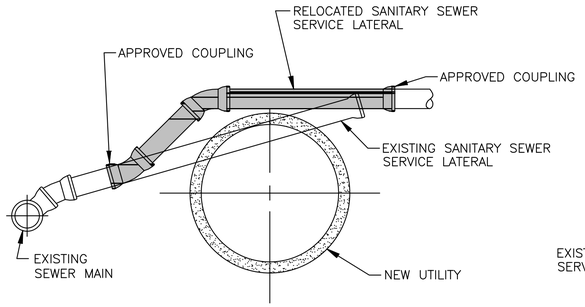
N.T.S.

*D = MAX. ALLOWABLE SAG DEPTH =ALLOWABLE DEPTH OF POOLED WATER AS MEASURED FROM WATER SURFACE TO INVERT OF PIPE BY USE OF SAG GAUGE.

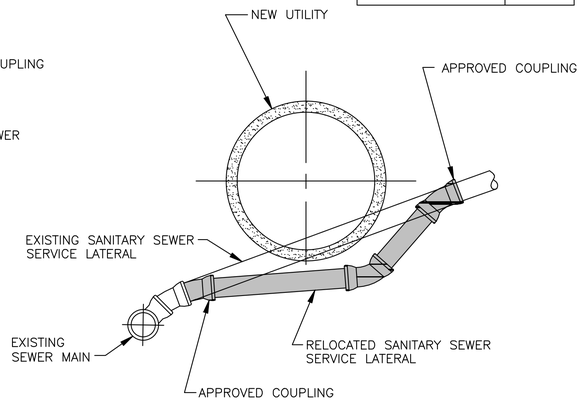
**L = SAG LENGTH = LENGTH OF POOLED WATER SURFACE AS MEASURED FROM UPSTREAM EDGE OF POOLED WATER SURFACE TO DOWNSTREAM EDGE OF POOLED WATER SURFACE.

***X = DISTANCE BETWEEN SAGS, AS MEASURED FROM UPSTREAM EDGE OF POOLED WATER SURFACES BETWEEN CONSECUTIVES SAGS.

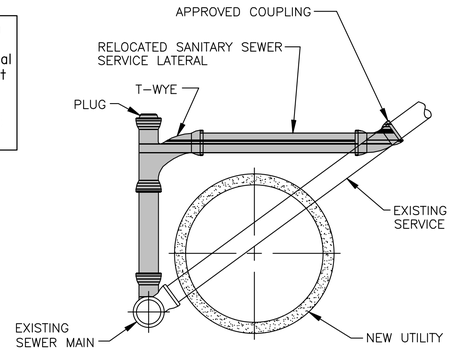




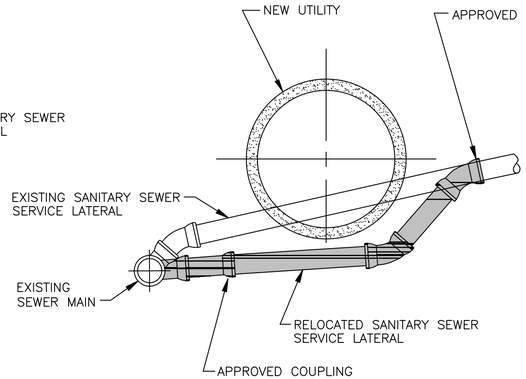
CASE "A"



CASE "C"



CASE "B"



CASE "D"

LEGEND

= RELOCATED SANITARY SEWER SERVICE LATERAL

= EXISTING SANITARY SEWER SERVICE LATERAL

ADJUSTED SANITARY SEWER SERVICE LATERAL CONNECTION DETAILS

N.T.S.

NOTES:

1. THE RELOCATED SANITARY SEWER SERVICE LATERAL SHALL BE CONSTRUCTED OF POLYVINYL CHLORIDE (PVC) PIPE EXCEPT WHERE THE SANITARY SEWER SERVICE LATERAL IS BELOW THE UTILITY OR HAS LESS THAN 3 FEET OF COVER TO FINISH GRADE. IN THESE CASES THE PIPE MATERIAL SHALL BE DUCTILE IRON.
2. THE RELOCATED SANITARY SEWER SERVICE LATERAL SHALL BE CONNECTED TO THE EXISTING PIPE WITH APPROVED NON-SHEAR COUPLINGS.
3. USE OF CASE "D" TYPE REROUTING DEPENDS ON THE LEVEL OF FLOW (PRESENT AND FUTURE) WITHIN MAINLINE SEWER - SUBJECT TO CASE APPROVAL BY ENGINEER.
4. MINIMUM SLOPE ON ANY REROUTED SEGMENT OF SANITARY SEWER SERVICE LATERAL TO BE 1.00%.
5. NEW SEWER PIPE LENGTH & TYPE TO BE DEFINED BY ENGINEER.
6. BEDDING, SECONDARY BACKFILL, INITIAL BACKFILL, AND SURFACE RESTORATION SHALL BE IN ACCORDANCE WITH SECTION 801 OF THE SPECIFICATION AND STANDARD PLAN 801-01.

Adam M. Smith
JUNE 28, 2017

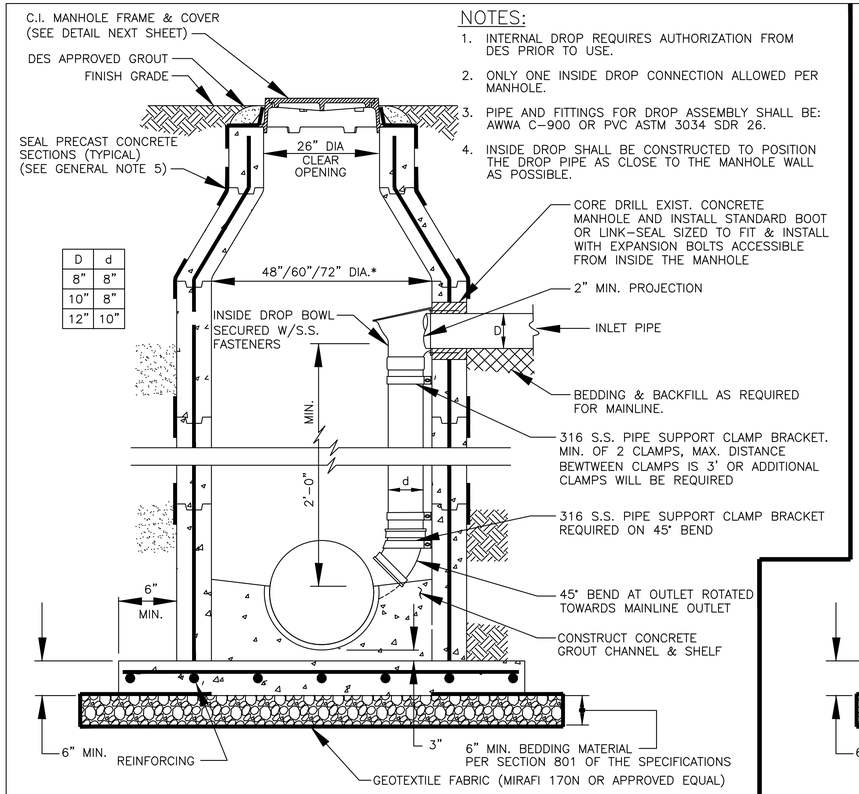
DATE	DESCRIPTION	BY
	REVISIONS	
6/17	ADDED SAG LIMIT DETAIL	AMS
7/16	REVISED NOTE 2 & DIMENSION	AMS

STANDARD PLAN NO.	DATED	SHEET NO.
802-01	AUGUST 1, 2011	2 OF 2

SANITARY SEWER PIPE AND CLEANOUT DETAILS

ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
A. SCHULZE	G. VANNICE	N. COBB	A. SMITH

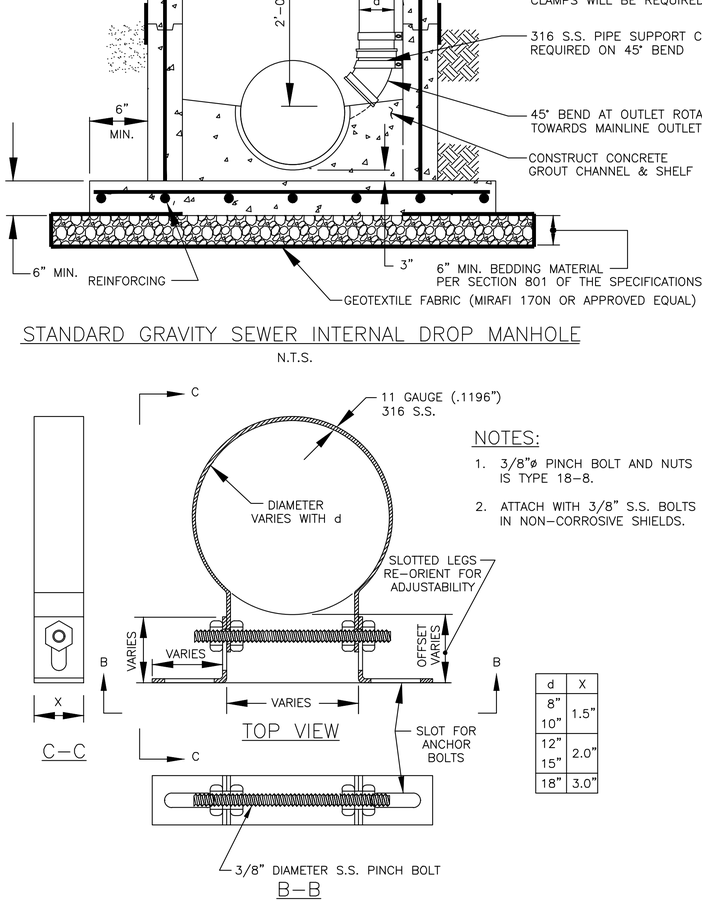


STANDARD GRAVITY SEWER INTERNAL DROP MANHOLE

N.T.S.

NOTES:

1. INTERNAL DROP REQUIRES AUTHORIZATION FROM DES PRIOR TO USE.
2. ONLY ONE INSIDE DROP CONNECTION ALLOWED PER MANHOLE.
3. PIPE AND FITTINGS FOR DROP ASSEMBLY SHALL BE: AWWA C-900 OR PVC ASTM 3034 SDR 26.
4. INSIDE DROP SHALL BE CONSTRUCTED TO POSITION THE DROP PIPE AS CLOSE TO THE MANHOLE WALL AS POSSIBLE.

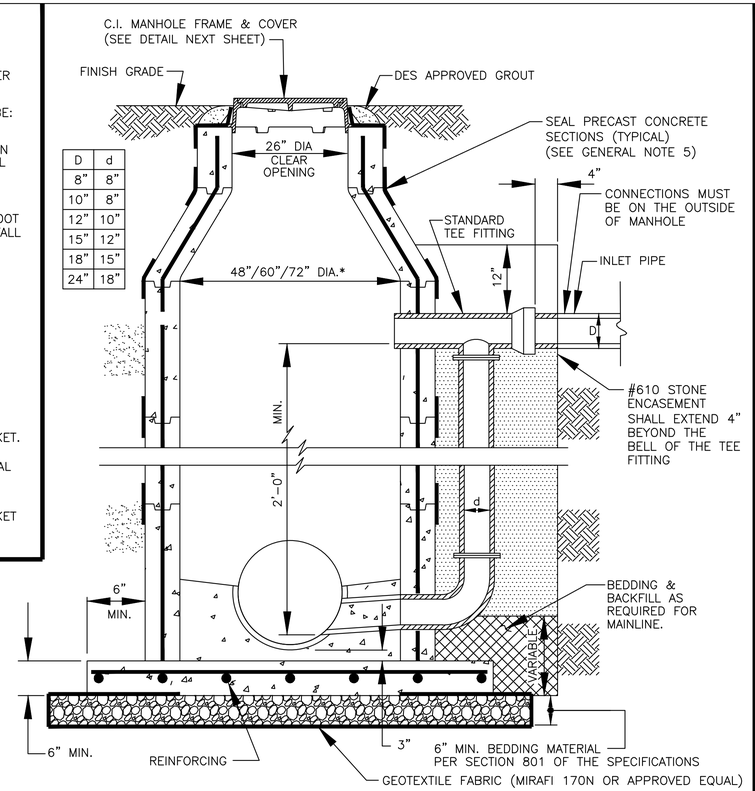


NOTES:

1. 3/8"ø PINCH BOLT AND NUTS IS TYPE 18-8.
2. ATTACH WITH 3/8" S.S. BOLTS IN NON-CORROSIVE SHIELDS.

CLAMP BRACKET DETAIL

N.T.S.



STANDARD GRAVITY SEWER DROP MANHOLE

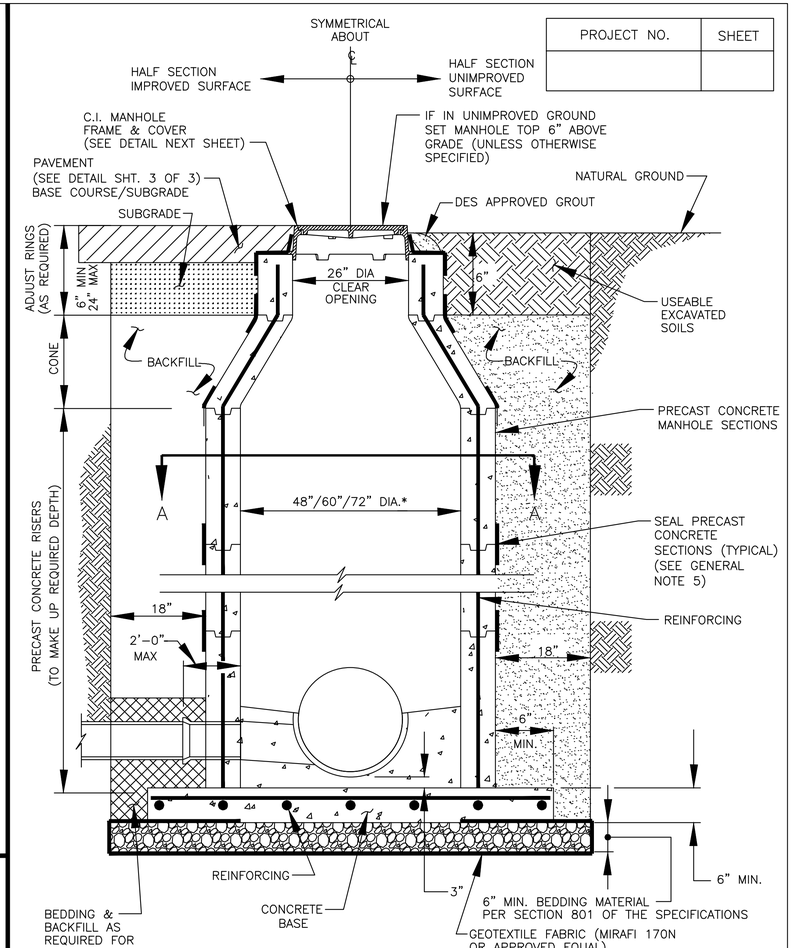
N.T.S.

MANHOLE GENERAL NOTES:

1. ALL STUBS FROM MANHOLES AND ENDS OF PIPE TO WHICH CONNECTIONS ARE TO BE MADE UNDER THIS CONTRACT SHALL BE PROVIDED WITH TEMPORARY WATER TIGHT PLUGS OR CAPS. ALL STUBS FOR CONNECTIONS TO OTHER CONTRACTS SHALL BE PROVIDED WITH WATER TIGHT PLUGS PLACED FROM INSIDE OF MANHOLE. SEWERS WHICH ARE TO BE CONNECTED TO MANHOLES WHICH WILL BE BUILT UNDER OTHER CONTRACTS SHALL BE PROVIDED WITH WATER TIGHT PLUGS AND CAPS. STUBS SHALL BE A MAXIMUM OF 2FT. INLENGTH. SUCH PLUGS LOCATED AT JUNCTIONS OF TWO CONTRACTS SHALL REMAIN IN PLACE SHALL BE REMOVED BY OTHERS.
2. THE BENCH SHALL SLOPE TOWARD THE INVERT CHANNEL AT THE RATE OF (1.5"/FT.), BUT MINIMUM OF 3" DIFFERENCE SHALL BE MAINTAINED FROM THE TOP OF CHANNEL TO THE WALL.
3. ALL CAST IRON FRAME COVERS SHALL BE TRAFFIC BEARING. FRAME AND COVERS SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE LATEST AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS DESIGNATION: M308 STANDARD SPECIFICATION FOR DRAINAGE, SEWER, UTILITY, AND RELATED CASTINGS. THEY SHALL HAVE AN ENVIRONMENTALLY SAFE, WATER-BASE ASPHALTIC COATING WHICH IS NONTOXIC, NONFLAMMABLE, COLORLESS, AND DRIES TO A HARD BLACK FINISH.
4. THE DEPTH OF THE INVERT CHANNEL SHALL BE EQUAL TO HALF THE DIAMETER OF THE LARGEST DIAMETER SEWER PIPE IN THE MANHOLE.
5. MANHOLE SECTIONS SHALL BE JOINED TOGETHER WITH FLEXIBLE WATERTIGHT RUBBER GASKETS AND EXTERNALLY SEALED AT THE JOINTS IN ACCORDANCE WITH THE SPECIFICATIONS.
6. ALL MANHOLES ARE TO BE CONSTRUCTED OF PRECAST CONCRETE (BASE, RISERS AND CONE). NO BRICK MANHOLES WILL BE ACCEPTED UNLESS APPROVED IN WRITING.
7. BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS. SEE SPECIFICATIONS FOR MATERIAL REQUIREMENTS AND PLACEMENT AND COMPACTION OF PIPE BEDDING MATERIALS.
8. PIPE PENETRATIONS SHALL CONFORM TO THE SPECIFICATIONS.
9. REINFORCING FOR PRE-CAST MANHOLES AS PER ASTM C-478.

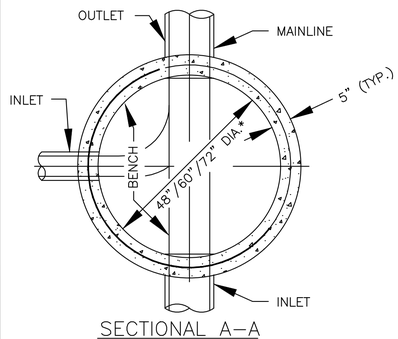
*10. FOR SEWERS 16" DIA. OR LESS CONSTRUCT 48" DIA. MANHOLE, FOR SEWERS LARGER THAN 16" UP TO 24" DIA. CONSTRUCT 60" DIA. MANHOLE, AND FOR SEWERS LARGER THAN 24" DIA. CONSTRUCT 72" DIA. MANHOLE. MANHOLE DIA. SIZING, HOWEVER IS CONTINGENT UPON THE LIMITATIONS OF THE MANUFACTURER DUE TO PIPE SIZE AND ORIENTATION AT THE MANHOLE. THE DESIGN ENGINEER MUST VERIFY THAT THE PROPER MANHOLE DIA. IS PROVIDED.

11. MANHOLE SHALL NOT INCLUDE STEPS.



STANDARD GRAVITY SEWER MANHOLE

N.T.S.



SECTIONAL A-A

N.T.S.

DATE	DESCRIPTION	BY
	REVISIONS	
1-21	ADDED NEW SHEET TO SET	A.M.S.
1-20	ADDED INTERNAL DROP MANHOLE & CLAMP BRACKET DETAIL	A.M.S.

PROJECT NO.	SHEET

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER
CIVIL ENGINEERING
8-25-2026

These standard plans have been properly examined by me, the undersigned Louisiana professional engineer. I have determined that these plans comply with all applicable Louisiana codes and have been properly site adapted to use in this area.

STANDARD PLAN NO.	DATED	SHEET NO.
803-01	AUGUST 1, 2011	1 OF 4

SANITARY SEWER MANHOLES

ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
A. SCHULZE	G. VANNICE	R. WRIGHT	A. SMITH

FOR INFORMATION PURPOSE ONLY

PROJECT NO.	SHEET

GENERAL PROVISIONS

- All Temporary Traffic Control (TTC) Devices used shall be in accordance with the City–Parish Standard Specifications for Public Works Construction, the current edition of the Manual on Uniform Traffic Control Devices (MUTCD), and the requirements of the National Cooperative Highways Research Program (NCHRP) 350 for Test Level 3. The MUTCD is available at http:mutcd.fhwa.dot.gov/
- The Contractor shall provide one or more authorized Traffic Control Supervisor (TCS) in accordance with the Standard Specifications.
- Materials used for Temporary Traffic Controls shall be in accordance with the City–Parish Standard Specifications for Public Works Construction and when applicable the City–Parish Qualified Products List (C–P QPL).
- No temporary traffic controls shall be erected without the approval of the City–Parish Traffic Engineer and until work is about to begin, unless they are covered.
- No lane closures, lane shifts, diversions, or detours shall occur without the authorization of the City–Parish Traffic Engineer.
- Responsibility is hereby placed upon the contractor for the installation, maintance, and operation of all temporary traffic control devices called for in these plans or required by the Project Engineer for the protection of the traveling public as well as all Department and construction personal. All reflective devices such as signs, drums, barricades, vertical panels, delineators of any type, etc. shall be cleaned or washed periodically to maintain their effectiveness, as required by conditions or Project Engineer.
- The contractor shall also be responsible for the maintenance of all permanent signs and pavement markings left in place as essential to the safe movement and guidance of traffic within the project limits.
- The City–Parish Traffic Engineer shall serve as a technical advisor to the Project Engineer for all Traffic Control matters.
- "Road Work XX Miles" sign shall be required on all projects and located at beginning of the project unless otherwise noted. The sign shall be a minimum Thirty–Six (36) inch X Sixty (60) inch unless otherwise noted.
- Warning signs used for lane closures or lane shifts in which the roadway shall be returned to full public use within Fourteen (14) hours or less may be placed on NCHRP350 approved portable sign frames.
- The City–Parish will approve any detour route marking required to guide travelers around the construction area, but the contractor will be responsible for the required signage.

SPEED LIMITS

- Speed limits shall be lowered by Ten (10) mph for any construction, maintenance, or utility operation that requires one or more of the following: (A) the condition of the original highway is degraded due to milled surfaces or uneven pavements; (B) work is in progress in the immediate vicinity of the travel way requiring lane closures, lane width reductions, or low speed diversions; (C) workers present on the shoulder within Two (2) ft of the edge of traveled way without barrier protection.
- The reduced speed zone shall only apply to those portions of the project limits affected. The Project Engineer may allow SPEED LIMIT WHEN FLASHING signs to supplement reduced speed zones.
- At the end of the reduced speed zone, a speed limit sign displaying the original speed limit before construction shall be installed.
- If conditions warrant, the City–Parish Traffic Engineer may authorize the reduction of the speed limit by more than Ten (10) mph.

PAVEMENT MARKINGS (see C–P QPL)

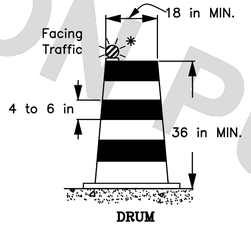
- All pavement markings within the limits of the project that are in conflict with the project signing or the required traffic movements shall be removed from the pavement by blast cleaning or grinding (Existing striping shall not be painted over with black paint or covered with tape).
- If special pavement markings are needed, they shall be reflectorized, removable, and accompanied by the proper signage.
- Temporary Raised Pavement Markers (RPMs) may be added to supplement temporary striping in areas of transition, in tapers, in detours, and in other areas of need as directed by the Project Engineer.
- Materials and placement of temporary pavement markings shall conform to Section 905 of the Standard Specifications. If no pay item exists, temporary markings will be considered incidental to traffic control.

SIGNS

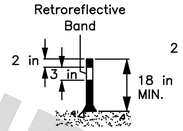
- All signs used for temporary traffic controls shall follow the Department's Standard Plans and the MUTCD. Signs shown in the Standard Plan illustrations are typical and may vary with each specific condition.
- More appropriate signing for a specific condition may be required or substituted with the approval of the Project Engineer and reviewed by the City–Parish Traffic Engineer.
- When projects are separated by less than one mile, they shall be signed as one project.
- At no time shall signs warning against a particular operation be left in place once the operation has been completed or where the obstacle has been removed.
- Signs over Ten (10) sq ft shall be mounted on two post and signs over Twenty (20) sq ft shall be mounted on at least three post.
- Signs shall have a minimum of Two (2) bolts per post.
- Permanent signs no longer applicable or in conflict shall be removed or covered with a strong, lightweight, opaque material.
- Warning signs used for temporary traffic controls shall meet the following guidelines unless otherwise noted in the plans: (A) size shall be Forty–Eight (48) ft X Forty–Eight (48) ft, (B) see the Departments Standard Specifications and the C–P QPL for sheeting information, (C) a minimum of a Two (2) lb U–Channel post may be used driven to a minimum depth of Three (3) ft, (D) sign height shall be a minimum of Five (5) ft above the roadway surface unless there is a concern for pedestrians or bicycle traffic in which it shall be a minimum of Seven (7) ft, (E) lateral distance of signs shall be a minimum of Six (6) ft from the edge of shoulder or edge of pavement if no shoulder exist and Two (2) ft from the back of curb in urban areas.
- Vinyl Roll Up signs will be allowed for short term (less than Twelve (12) hours) daytime work provided that they meet all size, color, retroreflectivity requirements, and NCHRP 350.
- Mesh rollup signs shall not be allowed on any project.
- All signs shall be removed or covered when no longer applicable.
- Contractor shall use caution not to damage existing signs which remain in place. Any signs damaged by work operations shall be replaced at the Contractor's expense.

CHANNELIZING DEVICES

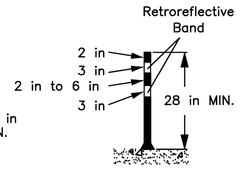
- The following devices may be used: Tubular Markers, Vertical panels, Cones, Drums, and Super Cones. Drums (at standard spacing) and Super Cones (at 1/2 Standard spacing) are the only devices allowed to be used in taper area on the interstate system during daylight hours. Only drums can be used in tapers during night operations.
- Retroreflective material pattern used on super cones shall match that used on drums and conform to Section 1020–1.2(C) of the Standard Specifications.
- Spacing of channelizing devices such as cones, panels, drums, and Type I or II barricades shall not exceed a distance in feet equal to the speed limit when used for taper channelization and a distance in feet of twice the speed limit when used for tangent channelization.
- Twenty–Eight (28) inch traffic cones are not allowed on: 1) interstates, 2) Highways with speeds greater than Forty (40) mph.
- During night time operations: 1) Twenty–Eight (28) inch and Thirty–Six (36) inch cones are not allowed, 2) drums are the only device allowed in the taper.



DRUM

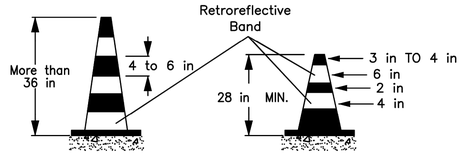


Day and Low–Speed Roadway ≤40 mph

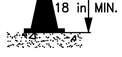


Night and/or Freeway High–Speed Roadway ≥45 mph

TUBULAR MARKERS

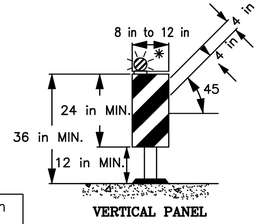


Night and/or Freeway Highway–Speed Roadway ≥45 mph



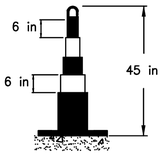
Day and Low–Speed Roadway ≤40 mph

CONES



VERTICAL PANEL

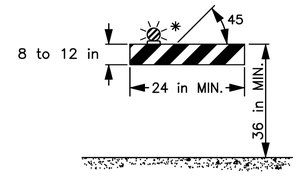
* Warning light (optional)



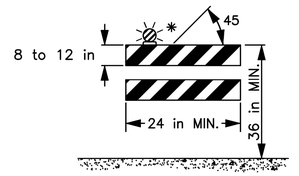
SUPER CONE

BARRICADES

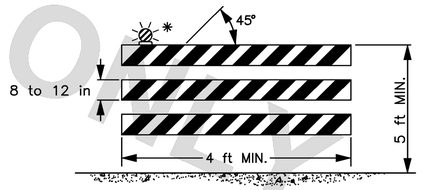
- Barricades shall be designed and applied in accordance with these Standard Plans and the current MUTCD guidance. Generally three types of barricades are used as below. Specific project applications shall be reviewed and approved by the City–Parish Traffic Engineer and shall not deployed without such approval.
- Steady burn lights shall be used when barricades are used in a series for chanelization.
- Type I barricades shall be used on low speed roads or urban streets.
- Type II barricades shall be used on high speed roads.
- Type III barricades shall be used to close a road section to traffic and shall extend completely across a roadway and its shoulders or from curb to curb.
- When signs and lights are to be mounted to a barricade, they must meet NCHRP 350 requirements.



TYPE I BARRICADE **



TYPE II BARRICADE **



TYPE III BARRICADE **

* Warning light (optional)

** Rail stripe widths shall be Six (6) inch, except that Four (4) inch wide stripes may be used if rail lengths are less than Thirty–Six (36) inch. The sides of barricades facing traffic shall have retroreflective rail faces.

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER
CIVIL ENGINEERING
8-25-2026

These standard plans have been properly examined by me, the undersigned Louisiana professional engineer. I have determined that these plans comply with all applicable Louisiana codes and have been properly site adapted to use in this area.

STATE OF LOUISIANA
INGOLF A. PARTENHEIMER
REG. No. 28190
REGISTERED PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
September 10, 2020

DATE	DESCRIPTION REVISIONS	BY

STANDARD PLAN NO.	DATED	SHEET NO.
905–01	JULY 3, 2019	1 OF 2

TEMPORARY TRAFFIC CONTROL

ENGINEERING DIVISION
DEPARTMENT OF TRANSPORTATION AND DRAINAGE
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
MUTCD	G. C.HENG	S. EDEL	I. PARTENHEIMER

PROJECT NO.	SHEET

FOR INFORMATION PURPOSES ONLY

Suggested Advance Warning Sign Spacing

Road Types	Distance Between Signs*		
	A	B	C
Urban (40 mph or less)	100	100	100
Urban (45 mph or more)	350	350	350
Rural	500	500	500

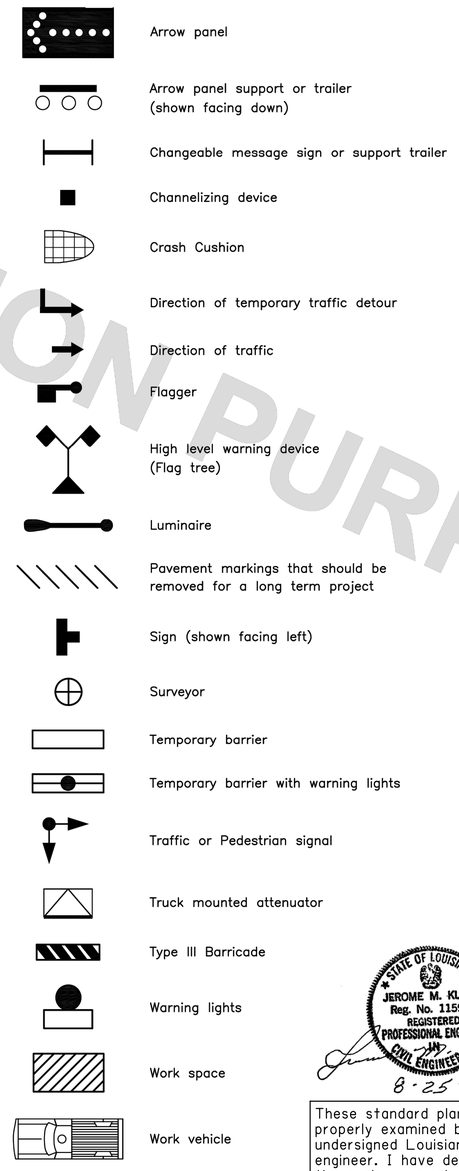
* Distances are shown in feet. The column headings A, B, and C are the dimensions shown in Typical Application Figures. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The third sign is the first one in a three–sign series encountered by a driver approching a TTC zone.)

Formulas for Determining Taper Lengths

Speed Limit (S)	Taper Length (L) Feet
40 mph or less	$L \quad \frac{WS^2}{60}$
45 mph or more	$L \quad WS$

Where:
L = taper length in feet
W = width of offset in feet
S = posted speed limit in mph.

Meaning of Symbols on Typical Application Diagrams



Index to Typical Applications

Typical Application Description	Typical Application Number	Standard Plan Number
Work Outside of Shoulder		
Work Beyond the Shoulder	TA–1	905–03
Work on the Shoulder		
Work on Shoulders	TA–3	905–03
Shoulder Work with Minor Encroachment	TA–6	905–04
Work Within the Traveled Way of Two-Lane Highways		
Road Closed with Diversion	TA–7	905–04
Road Closed with Off–Site Detour	TA–8	905–05
Lane Closure on Two–Lane Road Using Flaggers	TA–10	905–05
Lane Closure on Two–Lane Road with Low Traffic Volumes	TA–11	905–06
Temporary Road Closure	TA–13	905–06
Mobile Operations on Two–Lane Road	TA–17	905–07
Work Within the Traveled Way of Urban Streets		
Lane Closure on Minor Street	TA–18	905–07
Detour for One Travel Direction	TA–19	905–08
Detour for Closed Street	TA–20	905–08
Work Within the Traveled Way at an Intersection and Sidewalks		
Multiple Lane Closures at Intersection	TA–25	905–09
Crosswalk Closures and Pedestrian Detours	TA–29	905–09
Work Within the Traveled Way of Multi-lane, Non-access Controlled Highways		
Interior Lane Closure on Multi–lane Street	TA–30	905–10
Half Road Closure on Multi–lane, High–Speed Highway	TA–32	905–10
Lane Closure on Divided Highway	TA–33	905–11
Work in the Vicinity of Highway-Rail Grade Crossings		
Work in Vicinity of Highway–Rail Grade Crossing	TA–46	905–11

Information contained herewith was taken directly from the MUTCD 2003 version.

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
8-25-2026

These standard plans have been properly examined by me, the undersigned Louisiana professional engineer. I have determined that these plans comply with all applicable Louisiana codes and have been properly site adapted to use in this area.

STATE OF LOUISIANA
INGOLF A. PARTENHEIMER
REG. No. 28190
REGISTERED PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
September 10, 2020

DATE	DESCRIPTION REVISIONS	BY

STANDARD PLAN NO. 905–02	DATED JULY 3, 2019	SHEET NO. 1 OF 1

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS

ENGINEERING DIVISION
DEPARTMENT OF TRANSPORTATION AND DRAINAGE
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
MUTCD	G. CHENG	S. EDEL	I. PARTENHEIMER

FOR INFORMATION PURPOSE ONLY

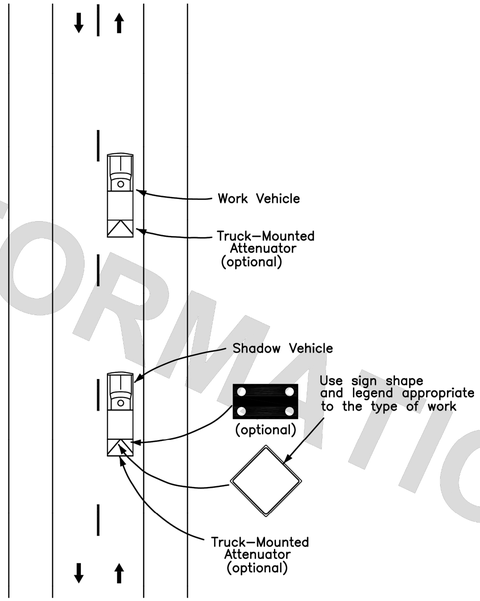


Figure TA–17
Mobile Operations on Two–Lane Road

NOTES:

1. Vehicle–mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle–mounted signs shall be covered or turned from view when work is not in progress.
2. Shadow and work vehicles shall display high–intensity rotating, flashing, oscillating, or strobe lights.
3. If an arrow panel is used, it shall be used in the caution mode.
4. Where practical and when needed, the work and shadow vehicles should pull over periodically to allow vehicular traffic to pass.
5. Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the minmum distance from the work vehicle and proceed at the same speed. The shadow vehicle should slow down in advance of vertical or horzontal curves that restrict sight distance.
6. The shadow vehicles should also be equipped with two high–intensity flashing lights mounted on the rear, adjacent to the sign.
7. The distance between the work and shadow vehicles may vary according to terrain, paint drying time, and other factors.
8. Additional shadow vehicles to warn and reduce the speed of oncoming or opposing vehicular traffic may be used. Law enforcement vehicles may be used for this purpose.
9. A truck–mounted attenuator may be used on the shadow vehicle or on the work vehicle.
10. If the work and shadow vehicles cannot pull over to allow vehicular traffic to pass frequently, a DO NOT PASS sign may be placed on the rear of the vehicle blocking the lane.
11. Shadow vechicles are used to warn motor vehicle traffic of the operation ahead.
12. Vehicle hazard warning signals shall not be used instead of the vehicle's high–intensity rotating, flashing, oscillatng, or strobe lights.

This sheet shall be used with Standard Plan No. 905–01 and 905–02.

PROJECT NO.	SHEET

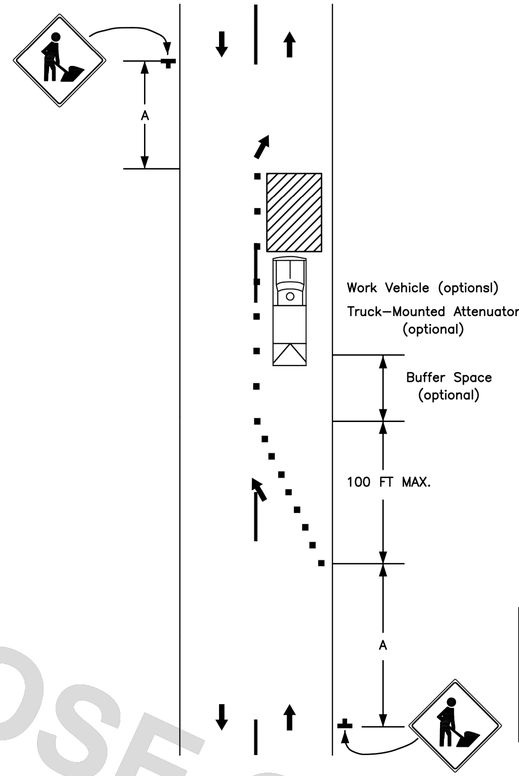


Figure TA–18
Lane Closure on Minor Street

NOTES:

1. This TTC shall be used only for low–speed facilities having low traffic volumes.
2. Where the work space is short, where road users can see the roadway beyond, and where volume is low, vehicular traffic maybe self–regulating.
3. Where vehicular traffic cannot effectively self–regulate, one or two flaggers shall be used as illustyrated in TA–10.
4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. A truck–mounted attenuator may be used on the work vehicle and the shadow vehicle.

STATE OF LOUISIANA
JEROME M. KLIER
Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER
CIVIL ENGINEERING
8-25-2026

These standard plans have been properly examined by me, the undersigned Louisiana professional engineer. I have determined that these plans comply with all applicable Louisiana codes and have been properly site adapted to use in this area.

STATE OF LOUISIANA
INGOLF A. PARTENHEIMER
REG. No. 28190
REGISTERED PROFESSIONAL ENGINEER IN ELECTRICAL ENGINEERING
September 10, 2020

STANDARD PLAN NO.	DATED	SHEET NO.
905–07	JULY 3, 2019	1 OF 1

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS

ENGINEERING DIVISION
DEPARTMENT OF TRANSPORTATION AND DRAINAGE
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
MUTCD	G. CHENG	S. EDEL	I. PARTENHEIMER

DATE	DESCRIPTION REVISIONS	BY

FOR INFORMATION PURPOSE ONLY

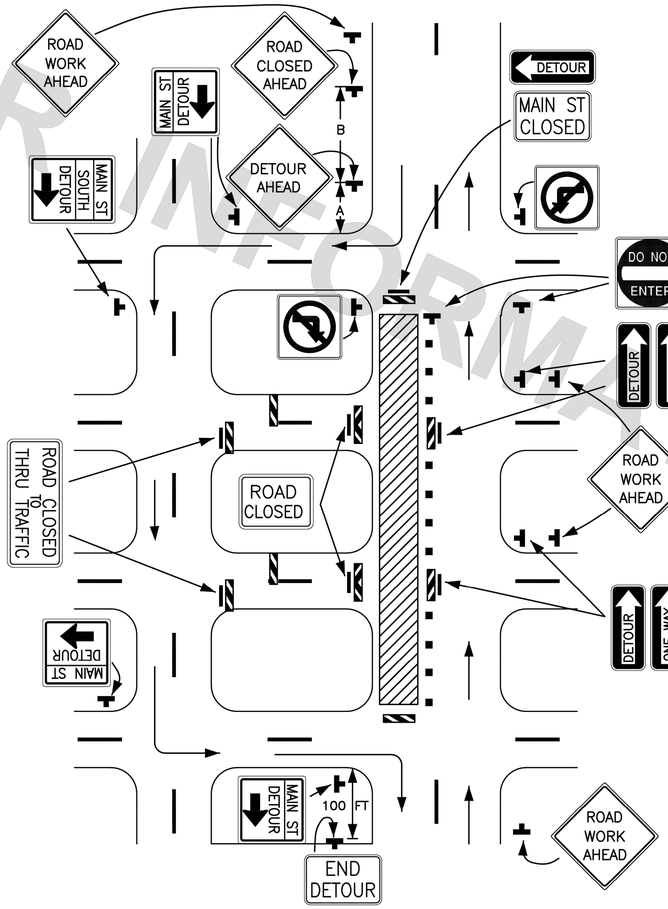


Figure TA–19
Detour for One Travel Direction

NOTES:

1. This plan should be used for streets without posted route numbers.
2. On multi–lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.
3. The STREET CLOSED legend may be used in place of ROAD CLOSED.
4. Additional DO NOT ENTER signs may be used at intersections with intervening streets.
5. Warning lights may be used on Type III Barricades.
6. Detour signs may be located on the far side of intersections.
7. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white on green or black on orange.
8. When used, the Street Name sign shall be placed above the Detour sign.

This sheet shall be used with Standard Plan No. 905–01 and 905–02.

PROJECT NO.	SHEET

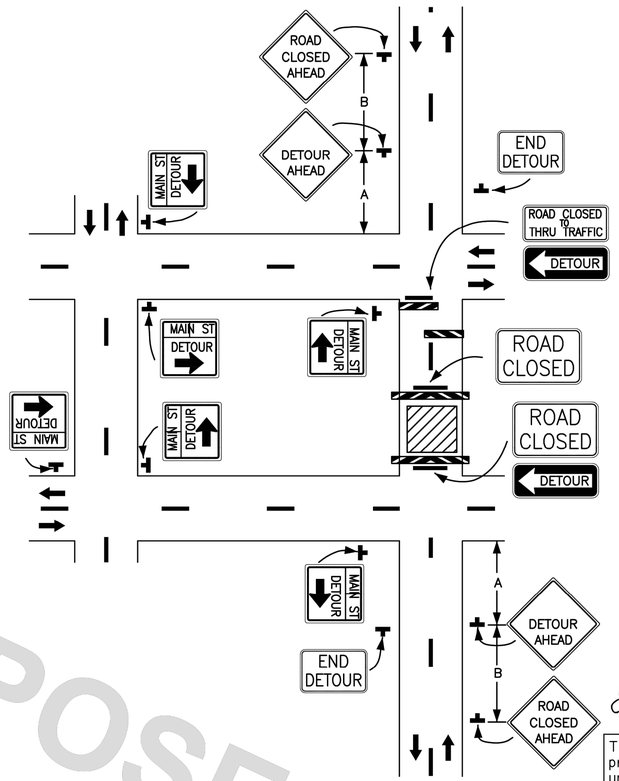


Figure TA–20
Detour for Closed Street

NOTES:

1. This plan should be used for streets without posted route numbers.
2. On multi–lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.
3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. Flashing warning lights may be used on Type III Barricades.
5. Detour signs may be located on the far side of intersections. A Detour sign with an advance arrow may be used in advance of a turn.
6. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white on green or black on orange.
7. When used, the Street Name sign shall be placed above the Detour sign.

STATE OF LOUISIANA
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IN
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September 10, 2020

STANDARD PLAN NO. 905–08	DATED JULY 3, 2019	SHEET NO. 1 OF 1

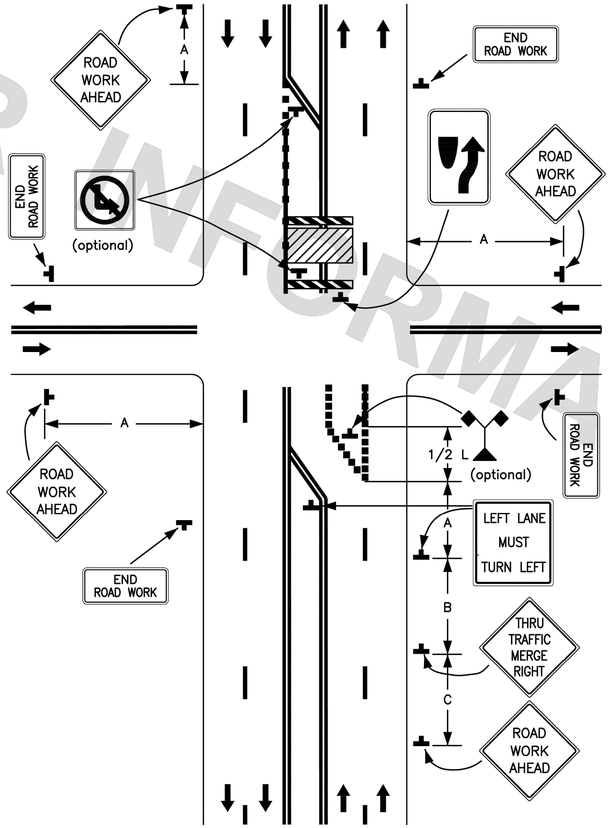
TEMPORARY TRAFFIC CONTROL
TYPICAL APPLICATIONS

DATE	DESCRIPTION REVISIONS	BY

ENGINEERING DIVISION
DEPARTMENT OF TRANSPORTATION AND DRAINAGE
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
MUTCD	G. CHENG	S. EDEL	I. PARTENHEIMER

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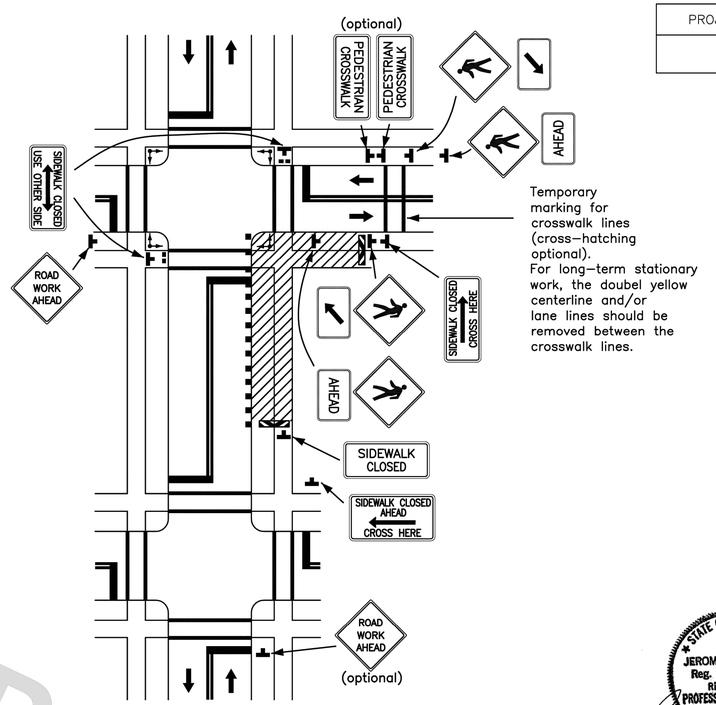
TA–25

Multiple Lane Closures at Intersection

NOTES:

1. If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure TA–14.
2. If the left through lane is closed on the near–side approach, the LEFT LANE MUST TURN LEFT sign should be placed in the median to discourage through vehicular traffic from entering the left–turn bay.
3. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. If the left–turning movement that normally uses the closed turn bay is small and/or the gaps in opposing vehicular traffic are frequent, left turns may be permitted on that approach.
4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

This sheet shall be used with Standard Plan No. 905–01 and 905–02.



Temporary marking for crosswalk lines (cross–hatching optional). For long–term stationary work, the doubel yellow centerline and/or lane lines should be removed between the crosswalk lines.

TA–29

Crosswalk Closures and Pedestrian Detours

NOTES:

1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.
2. Curb parking shall be prohibited for at least Fifety (50) ft in advance of the midblock crosswalk.
3. Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.
4. Pedestrian traffic signal displays controlling closed crosswalks should be covered or deactivated.
5. Street lighting may be considered.
6. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic. who have visual disabilities.
7. For nighttime closures, Type A Flashing warning lights may be used on barricades supporting signs and closing sidewalks.
8. Type C Steady–Burn warning lights may be used on channelizing devices separating the work space from vehicular traffic.
9. In order to maintain the systematic use of the fluorescent yellow–green background for pedestrian, bicycle, and school warning signs in a jurisdiction, the fluorescent yellow–green background for pedestrian, bicycle, and shcool warning signs may be used in TTC zones.

PROJECT NO.	SHEET

STATE OF LOUISIANA
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Reg. No. 11591
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
8-25-2026

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STATE OF LOUISIANA
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September 10, 2020

DATE	DESCRIPTION REVISIONS	BY

STANDARD PLAN NO. 905–09	DATED JULY 3, 2019	SHEET NO. 1 OF 1

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS

ENGINEERING DIVISION
DEPARTMENT OF TRANSPORTATION AND DRAINAGE
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
MUTCD	G. CHENG	S. EDEL	I. PARTENHEIMER

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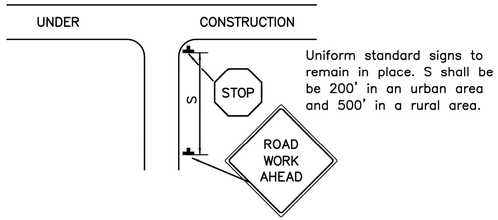
PROJECT NO.	SHEET

The Side Road Work Ahead sign shall be used in advance of an intersection where the construction project on the side road approach terminates at the crossing.



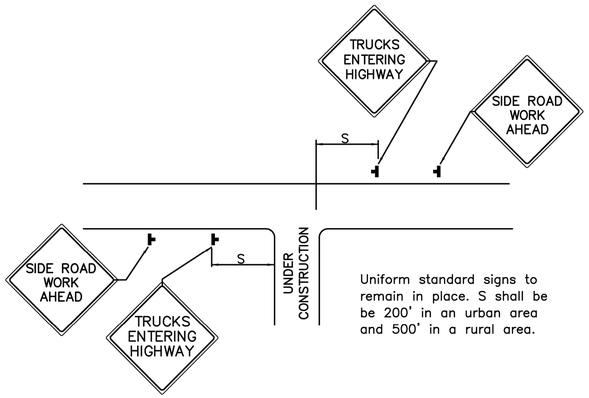
36" x 36"
Legend 5" Series C

SIDE ROAD WORK AHEAD SIGN



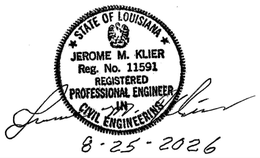
Uniform standard signs to remain in place. S shall be be 200' in an urban area and 500' in a rural area.

SIGNING FOR SIDE ROAD APPROACH TO CONSTRUCTION PROJECT

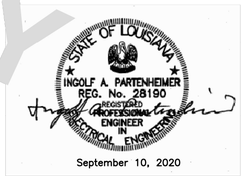


Uniform standard signs to remain in place. S shall be be 200' in an urban area and 500' in a rural area.

SIDE ROAD WORK



These standard plans have been properly examined by me, the undersigned Louisiana professional engineer. I have determined that these plans comply with all applicable Louisiana codes and have been properly site adapted to use in this area.



This sheet shall be used with Standard Plan No. 905–01 and 905–02.

DATE	DESCRIPTION REVISIONS	BY

STANDARD PLAN NO.	DATED	SHEET NO.
905–30	JULY 3, 2019	1 OF 1

TEMPORARY TRAFFIC CONTROL LOCAL APPLICATIONS

ENGINEERING DIVISION
DEPARTMENT OF TRANSPORTATION AND DRAINAGE
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
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