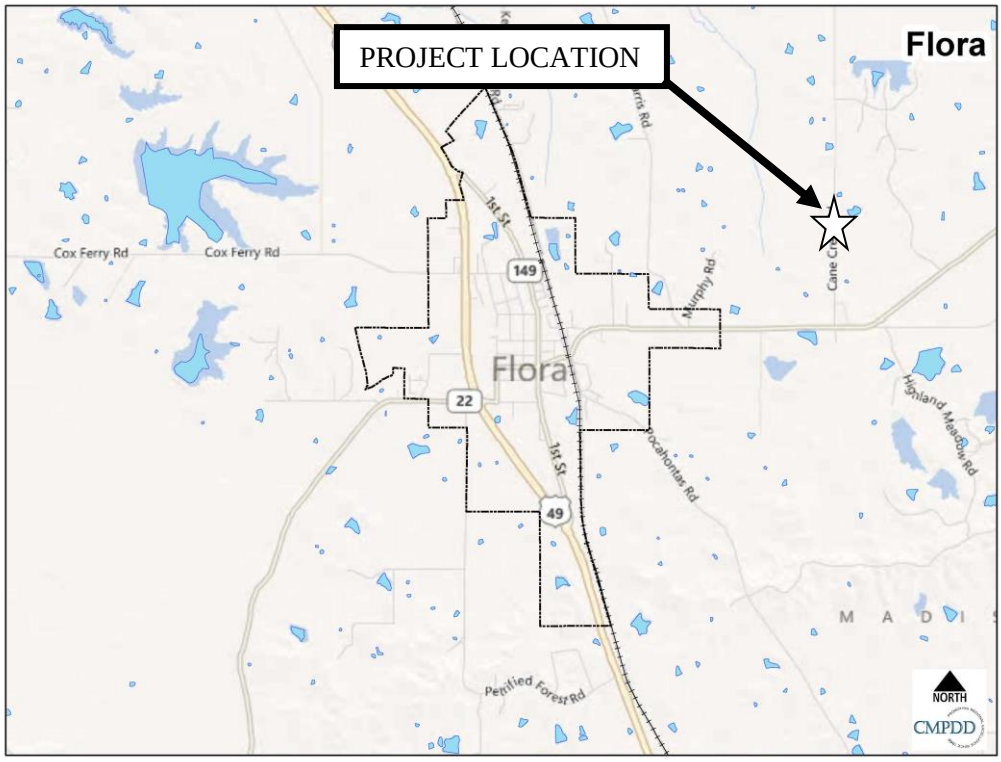
PROPOSAL & CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF:

WATER & SEWER RELOCATION

FOR CANE CREEK BRIDGE REPLACEMENT PROJECT



TOWN OF FLORA

JANUARY, 2014

PREPARED BY: GUEST CONSULTANTS, INC.
ENGINEERS AND SURVEYORS
26 EASTGATE DRIVE
BRANDON, MS

CONTRACTOR:_____

ADDRESS:_____

SURETY:_____

INDEX

Drawings dated January, 2014

SECTION 00100

INSTRUCTIONS TO BIDDERS

1. DATE, TIME AND PLACE

The date, time, and place for opening bids will be as follows:

Sealed bids will be received by the Town of Flora, Mississippi until 10:30 A.M. local time, January 24, 2014, in the office of the Town Clerk 168 Carter Street, Flora, Mississippi.

The City reserves the right to postpone the date for presentation and opening of bids and will give telegraphic notice of any such postponement to each prospective bidder.

2. LOCATION FOR BIDDERS

The site for the work is located at the existing bridge over Burnt Corn Creek on Cane Creek Road in Flora, Mississippi.

PROPOSAL FORM

All proposals must be submitted on the forms furnished and shall be addressed to

Town of Flora
168 Carter Street
Flora, Mississippi 39071

The outside of the envelope shall bear the inscription :

"Sealed Bid for the **" WATER & SEWER RELOCATION FOR CANE CREEK BRIDGE REPLACEMENT PROJECT".**

By: _____
Certificate of Responsibility No. _____
State Contractors License No. _____

3. BONDS

The successful contractor will be required to furnish a 100% (one hundred percent) Performance Bond and a 100% (one hundred percent) Payment Bond acceptable to the Town of Flora.

4. LIQUIDATED DAMAGES AND CONTRACT TIME

The entire project must be completed within 28 calendar days. The contract will be subject to liquidated damages in the amount of $500.00 per calendar day that will be assessed for late completion as provided for in the Contract Agreement.

5. WITHDRAWAL OF BIDS

Bids cannot be withdrawn for a period of thirty (30) days from the date of receipt of bids.

6. MATERIALS

Material for the construction of this project is the responsibility of the Contractor.

7. TRAFFIC CONTROL

The Contractor shall be responsible with maintaining traffic control measures in accordance with the current edition of the MUTCD throughout the duration of the project.

8. OMMISSIONS AND DESCREPANCIES

Should a bidder find discrepancies, errors, or omissions in the Specifications, or should he be in doubt as to the correctness, he should immediately notify the Engineer in order to permit checking and verification and to permit issuance of any necessary revisions or modifications.

9. MODIFICATIONS

Prior to the date set for opening bids, the right is reserved, as the interest of the Town may require, to revise or amend the Specifications or Special Provisions. Such revisions, if any, will be announced by an addendum or addenda, and numbered copies of such addenda will be furnished to all prospective bidders for acknowledgement by return mail and on the Proposal Form. If the revisions and addenda are of nature that requires material changes in quantities, or bid prices, or both, the date set of opening bids may be postponed to enable bidders to revise their bids. In such case, the addendum, or addenda, will include an announcement of the new date for opening bids.

10. INTERPRETATIONS

No oral interpretations made to any bidder as to the meaning of the Specifications shall be considered a modification of any of the provisions of the contract documents. Written requests for interpretation of the Specifications shall be submitted to the Engineer for a formal decision that will be given in writing to all prospective bidders.

11. NOTICE TO PROCEED

If the Contract is awarded, the Owner will issue the "NOTICE TO PROCEED" within twenty days after the award of the Contract.

END OF SECTION

SECTION 00300

PROPOSAL

WATER & SEWER RELOCATION FOR CANE CREEK BRIDGE REPLACEMENT PROJECT
Town of Flora

Date: _____

To: Town of Flora
168 Carter Street
Flora, MS 30071

1. The following proposal is made on behalf of the undersigned bidder and no others. Evidence of our authority to submit the Proposal is hereby furnished. The Proposal is made without collusion on the part of any person, firm, or corporation.

2. We, the undersigned bidder certify that we have carefully examined the Specifications, and Special Provisions, and other proposed Contract Documents and any and all addenda thereto.

3. We further certify that we have visited and carefully examined the site of the proposed work and have inspected the location and condition of all public utilities and existing structures or other facilities on site or adjacent thereto which may be affected by the proposed construction, and fully understand all conditions relative to construction difficulties, hazards, labor, transportation, and all other factors affecting the prosecution of the work covered by this proposal.

4. We understand that the quantities mentioned below are approximate only and are subject to either increase or decrease, and hereby propose to perform any increased or decrease quantities of work at the unit prices bid. We understand that any increase in quantities shall require written approval before exceeding bid quantities.

5. In accordance with the requirements of the Plans, Specifications, and Special Provisions, we propose to furnish all necessary materials, equipment, labor, tools, and other means of construction and will do the work called for in and by the Contract Documents within the specified contract time for the following unit prices.

Bidder has examined copies of all the Bidding Documents, the Instructions to Bidders, and of the following Addenda (receipt of all which is hereby acknowledged):

No.	_____	Dated	_____	No.	_____	Dated	_____
No.	_____	Dated	_____	No.	_____	Dated	_____

The following is our itemized proposal for construction of the

WATER & SEWER RELOCATION
FOR THE CANE CREEK BRIDGE REPLACEMENT PROJECT

We agree to finish the project within 28 calendar days and understand that this Contract is subject to liquidated damages.

The Town of Flora reserves the right to delete bid items in their entirety at the unit bid price with the deduction being taken from the Total Bid Price with no penalty or ramification to the Town of Flora.

Pay Item	Item Description	Approx. Quantity	Units	Unit Price Dollars	Item Total Dollars
1	6" HDPE (SR-11 IPS-160#) DIRECTIONAL BORE	300	L.F.		
2	10" HDPE (SR-11 IPS-160#) DIRECTIONAL BORE	300	L.F.		
3	TIE TO EX. 8" WATER MAIN	2	EACH		
4	TIE TO EX. 4" SEWER FORCEMAIN	2	EACH		
5	REMOVAL EX. WATER & SEWER MAINS & STEEL CARRIER PIPES	1	L.S.		
5	SEEDING, MULCHING & FERTILIZING	1	L.S.		

TOTAL BID: $_____

TOTAL BID
WORDS:

_____

_____

6. Any item shown on the Plans and not listed in this Proposal shall be included in the cost of other items.

7. The Town reserves the right to add or delete to the quantities shown at the unit price submitted with no other adjustment in the Contract amount.

8. We shall furnish the Town with a list of all proposed Sub-Contractors before the Contract is awarded and understand that the Town reserves the right to reject any Sub-Contractor which has any conflict with the Town in accordance with all applicable State Laws.

9. We further propose to execute the Contract Agreement as shown in the Specifications within ten (10) days after the Contract is formally awarded to us.

10. We also propose to execute Performance Bond and Payment Bond as shown in the Specifications, in an amount not less than one hundred percent (100%) to total of our bid. This Bond shall not only serve to guarantee the completion of the work on our part, but to also guarantee the excellence of both workmanship and materials until the work is finally accepted.

Respectfully submitted,

Date: _____, 2014

_____

Contractor

_____

Title

_____

Address

(To be filled in if a corporation)

Date: _____, 2014

Our Corporation is chartered under the laws of the State of _____ and the names, titles, and business addresses of the executives are as follows:

_____

_____

President Address

_____

_____

Secretary Address

_____

_____

Treasurer Address

(To be filled in if a partnership)

Date: _____, 2014

_____

_____

Name Address

_____

_____

Name Address

_____

_____

Name Address

END OF SECTION

SECTION 00480

NON-COLLUSION AFFIDAVIT

State of _____,

County of _____,

I, _____, Individually, and in my capacity as
(Name of person signing Affidavit)
_____Of_____
(Title)

_____
(Name of Firm, Partnership, or Corporation)

being duly sworn, on oath do depose and say as follows;

(A). That _____ Bidder on

WATER & SEWER RELOCATION FOR CANE CREEK BRIDGE REPLACEMENT PROJECT

has not either directly or indirectly entered into an agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this Contract; nor have any of its officers, partners, employees, or principal owners.

(B). Further, that neither said legal entity nor any of its directors, officers, partners, principal owners or managerial employees are currently debarred from bidding on public Contracts by the State of Mississippi or any of its agencies; or by one or more of the other states or any of its agencies.

_____
Signature

_____
Title

(Seal)
Sworn before me this _____ day of _____, 2014.

My Commission expires _____
Notary Public

NOTE: FAILURE TO PROPERLY SIGN AND NOTARIZE THIS AFFIDAVIT WILL DISQUALIFY THE BID.

END OF SECTION

SECTION 00500

AGREEMENT

TOWN OF FLORA:

THIS AGREEMENT, made on the _____ day of _____ 2014, by and between the **TOWN OF FLORA,** party of the first part, hereinafter called the Owner, and _____, party of the second part, hereinafter called the CONTRACTOR.

It is understood the ENGINEER representing the OWNER shall be Guest Consultants, Inc., or its authorized agent.

ARTICLE 1. SCOPE OF WORK

The Contractor hereby agrees to furnish all materials, equipment, and labor necessary, and to perform all of the work described in the Specifications for the project titled **"WATER & SEWER RELOCATION FOR CANE CREEK BRIDGE REPLACEMENT PROJECT"**, all in accordance with the requirements that are hereby made a part of this Agreement.

Specifications consisting of:

1. General Conditions
2. Special Conditions
3. Technical Specifications

Drawings prepared by Guest Consultants, Inc. dated January, 2014.

ARTICLE 2. TIME OF COMPLETION

The work to be completed under this Contract shall be commenced within ten (10) calendar days after receipt of Notice to Proceed.

The work shall be completed within 28 calendar days after receipt of the Notice to Proceed.

Failure to complete the work within the number of calendar days stated in this Article, including extensions granted thereto as determined by Section 20 of the General Conditions, shall entitle the Owner to deduct from the moneys due to the Contractor as "Liquidated Damages" an amount equal to $500.00 for each calendar day of the delay in completion of the work.

ARTICLE 3. CONTRACT SUM

Except for adjustments as provided for herein, the Owner shall pay the Contractor, for the performance of the work, which is estimated as being the sum of $_____which amount shall be known as the Contract Sum. The Contract Sum shall be equitably adjusted to cover changes ordered by the Engineer, but not shown on the drawings or required by the Specifications. Such increases or decreases in the Contract Sum

shall be determined by agreement between the Owner, or the Engineer or his representative, and the Contractor.

ARTICLE 4. PROGRESS PAYMENTS

The Owner shall make payments on account of the Contract as follows:

On or not later than the last day of every month, the Contractor shall present to the Engineer an invoice covering the total amount of the Contract which has been completed from the start of the month, together with such supporting evidence as may be required by the Engineer.

On or not later than the last day of the next month, the Owner shall pay to the Contractor 95% of the amount of the invoice – less previous payments made.

Five percent (5%) shall be retained until the work is at least fifty percent (50%) complete, on schedule and satisfactory in the Engineer's opinion, at which time fifty percent (50%) of the retainage held to date shall be returned to the prime Contractor for distribution to the appropriate Subcontractors and suppliers. Provided, however, that future retainage shall be withheld at the rate of two and one-half percent (2.5%). Payment for work under Subcontractors of the general contract shall be subject to the above conditions applying to the general Contractor.

Final payment of all moneys due on the Contract shall be made within 30 days of completion and acceptance of the work.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year first above written.

WITNESS:	OWNER:
_____	_____
Debra Ross, City Clerk	Leslie Childress, Mayor
WITNESS:	CONTRACTOR:
_____	_____

END OF SECTION

SECTION 00610

CONSTRUCTION PERFORMANCE BOND

KNOWN ALL MEN BY THESE PRESENTS:

That

_____

(Name of Contractor)

_____

(Address of Contractor)

_____

(Corporation, Partnership, or Individual)

called "Principal", and

_____

(Name of Surety)

hereinafter called "Surety", are held and firmly bound unto

TOWN OF FLORA

Hereinafter called OWNER in the penal sum of

_____Dollars $_____)

in lawful money of the United States, for the payment of which sum well and truly be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents. **THE CONDITION OF THIS OBLIGATION** is such that whereas, the Principal enter into a certain Contract with the Owner, dated the _____day of _____, 2014, a copy of which is hereto attached and made a part for the construction of: **WATER & SEWER RELOCATION FOR CANE CREEK BRIDGE REPLACMENT PROJECT.**

NOW THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term, thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the

Surety and during the one year warranty period and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so and shall reimburse and repay the OWNER of all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDE, FURTHER, that said Surety for value received hereby stipulates and sees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed hereunder of the Specifications accompanying the same shall in effect its obligation on their Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the loans of this Contract or to the work or to the Specifications.

PROVIDE, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may not yet be satisfied.

WITNESS WHEREOF, this instrument is executed in four counterparts, each of which shall be deemed an original, this the _____ day of _____, 2014.

ATTEST:

_____ _____
(Principal) Secretary (Principal)

(SEAL) By:_____
(Address)

_____

_____
Witness as to Principal

_____

_____

_____
(Surety)

ATTEST: By:_____
Attorney-in-Fact

_____ _____
to Surety Witness as to Surety

_____ _____
(Address) (Address)

_____

NOTE: Date of Bond **must not be** prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

IMPORTANT: Surety Companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Mississippi.

END OF SECTION

SECTION 00615

PAYMENT BOND

KNOWN ALL MEN BY THESE PRESENTS:

That

_____

(Name of Contractor)

_____

(Address of Contractor)

_____

(Corporation, Partnership, or Individual)

called "Principal", and

_____

(Name of Surety)

hereinafter called "Surety", are held and firmly bound unto

TOWN OF FLORA

Hereinafter called OWNER in the penal sum of

_____ Dollars($_____)

in lawful money of the United States, for the payment of which sum well and truly be made, we bind ourselves,

successors, and assigns, jointly and severally, firmly by these presents. **THE CONDITION OF THIS OBLIGATION** is such that whereas, the Principal enter into a certain Contract with the Owner, dated the _____ day of _____, 2014, a copy of which is hereto attached and made a part for the construction of: **WATER & SEWER RELOCATION FOR CANE CREEK BRIDGE REPLACMENT PROJECT.**

NOW THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided in such Contract, and any authorized extension or modification thereof, including amounts due for materials,

lubricants, gasoline, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor performed in such work whether by subcontractor or otherwise to remain in full force and effect.

PROVIDE, FURTHER, that the Surety for value received hereby stipulated and sees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed hereunder or the Specifications accompanying the same shall in effect its obligation on their Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the loans of this Contract or to the work or to the Specifications.

PROVIDE, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may not yet be satisfied.

WITNESS WHEREOF, this instrument is executed in four counterparts, each of which shall be deemed an original, this the _____ day of _____, 2014.

ATTEST:

_____ _____
(Principal) Secretary (Principal)

(SEAL) By: _____
(Address)

_____

_____
Witness as to Principal

_____

_____

_____
(Surety)

ATTEST: By:_____
Attorney-in-Fact

_____ _____
to Surety Witness as to Surety

_____ _____
(Address) (Address)

_____ _____

NOTE: Date of Bond **must not be** prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

IMPORTANT: Surety Companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Mississippi.

END OF SECTION

SECTION 00700

GENERAL CONDITIONS

ARTICLE 1 DEFINITIONS

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

Defined Terms:

1 Addenda: Written or graphic instruments issued prior to the opening of Bids that clarify, correct, or change, the Bidding Documents or the Contract Documents.

2 Agreement: The written agreement or written contract between Owner and Contractor covering the Work to be performed, including the Contractor's Bid and the Bonds. Other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

3 Application for Payment: The form accepted by Engineer which is to be used by Contractor in requesting progress or final payment and which is to include an affidavit of the Contractor that progress payments theretofore received from the Owner on account of the Work covered by all prior Applications for Payment.

4 Bid: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5 Bidder: Any person, firm or corporation submitting a Bid for the Work.

6 Bidding Documents: Notice to bidders or advertisement, if any; instructions to bidders; other bidding information and requirements; bidding forms and attachments; contract and bond forms, and the proposed Contract Documents, including any addenda issued prior to receipt of bids.

7 Bonds: Bid, performance and payment bonds and other instruments of security, furnished by the Contractor and his Surety in accordance with the Contract Documents.

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

9 Contract Documents: The Bid Agreement, Specifications, Drawings, Addenda (whether issued prior to opening of Bids or execution of the Agreement) and Modifications. The Contract Documents for the Contract.

10 Contract Price or Contract Sum: The total moneys payable by Owner to the Contractor under the Contract Documents as stated in the Agreement.

11 Contract Time: The number of calendar days or working days stated in the in the Agreement for the completion of the work.

12 Contractor: The person, firm or corporation with whom Owner has executed the Agreement. Whenever the Project is to be constructed under multiple direct contracts, the term "Contractor" shall mean the appropriate prime Contractor. Whenever a specific prime Contractor is referred to, terms such as "General Contractor", "Electrical Contractor", etc. will be used.

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

14 Engineer: The person, firm or corporation named as such in the Agreement.

15 Field Order: A written order issued by the Engineer which clarifies or interprets the Contract Documents or orders minor changes in the work.

16 Modifications: (a) A written amendment of the Contract Documents signed by both parties, (b) a Change Order, or (c) a Field Order or (d) a written order for a minor change or alteration in the work issued by the Engineer. A modification may only be issued after the effective date of the Agreement.

17 Owner: A public body or authority, corporation, association, partnership, or individual for whom the Work is being performed.

18 Project: The total construction of which the Work to be provided under the Contract Documents may be the whole or a part as indicated elsewhere in the Contract Documents.

19 Project Representative: The authorized representative of Engineer whom is assigned to the site or any part thereof.

20 Samples: Physical examples furnished by the Contractor to illustrate materials, equipment or ownership, and to establish standards by which some portions of the Work will be judged.

21 Shop Drawings: All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a manufacturer, fabricator, supplier or distributor and submitted by Contractor to illustrate material or equipment for some portion of the Work.

22 Specifications: The instructions to Bidders, these General Conditions, the Special Conditions, and the Technical Specifications.

23 Subcontractor: An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

24 Substantial Completion: The date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due.

25 Supplementary Conditions: Modifications and additions to the General Conditions.

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

27 Written Notice: Written Notice shall be deemed to have been dully served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to last business address known to him who gives the notice.

ARTICLE 2 EXECUTION AND CORRELATION OF CONTRACT DOCUMENTS

2.1 The Contract Documents shall be signed by the Owner and the Contractor.

2.2 The Contract Documents are complementary and what is called for by any one shall be binding as if called for by all. In case of conflict between the Drawings and Specifications, the Specifications shall govern. Materials or work described in words which so supplied have a well-known technical or trade meaning shall be held to refer to such recognized standards.

ARTICLE 3 DESIGN, DRAWINGS AND INSTRUCTIONS

3.1 It is agreed that the Owner will be responsible for the adequacy of design and sufficiency of the Drawings and Specifications. The Owner, through the Engineer, or the Engineer as the Owner's representative, shall furnish Drawings and Specifications which adequately represent the requirements of the work to be preformed under the Contract. All such Drawings and instructions shall be consistent with the Contract Documents and shall be true developments thereof. In the case of lump sum Contracts, Drawings and Specifications which adequately represent the work to be done shall be furnished prior to the time of entering into the Contract. The Engineer may, during the life of the Contract, and in accordance with Article 19, issue additional instructions by means of Drawings or other media necessary to illustrate changes in the work.

ARTICLE 4 ORAL AGREEMENT

4.1 Except as otherwise provided herein, oral agreements or conversations with any officer, agent or employee of the Owner either before or after execution of this Contract, shall not affect or modify any of the terms or obligations contained in any of the documents comprising said Contract. .

ARTICLE 5 COPIES OF DRAWINGS FURNISHED

5.1 Unless otherwise provided in the Contract Documents, the Engineer will furnish to the Contractor all copies of Drawings and Specifications reasonably necessary for the execution of the work. Reproduction cost will be paid by the Owner.

ARTICLE 6 ORDER OF COMPLETION

6.1 The Contractor shall submit, at the time as may be reasonably requested by the Engineer, schedules which shall show the order in which the Contractor proposes to carry on the work with dates at which the Contractor will start the several parts of work, and estimated dates of completion of the several parts.

ARTICLE 7 OWNERSHIP OF DRAWINGS

7.1 Drawings, Specifications and copies thereof furnished by the Engineer shall not be reused on other work, and with the exception of the signed Contract, sets are to be returned to him on request, at the completion of the work.

ARTICLE 8 FAMILIARITY WITH WORK

8.1 The Owner shall make known to all prospective bidders, prior to the receipt of bids, all information that he may have as to subsurface conditions in the vicinity of the work, topographical maps, or other information that might assist the bidder in properly evaluating the amount and character of the work that might be required. Such information shall be the best factual information available to the Owner. The Contractor by careful examination shall satisfy himself as to the nature and location of the work, the character of equipment and facilities need preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract; provided however that the requirements of this article shall in no way affect the rights and duties of the Owner and Contractor as set forth in Article 9 hereof.

ARTICLE 9 CHANGED CONDITION

9.1 The Contractor shall promptly, and before such conditions are disturbed, notify the Owner in writing of: (1) Subsurface or latent Physical conditions at the site differing materially from those indicated on this Contract; or (2) previously unknown physical or other conditions at the site , or an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Engineer shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or the time required for, performance of this Contract, an equitable adjustment shall be made and the Contract modified in writing accordingly. Any claims of the Contractor for adjustment hereunder shall not be allowed unless he has given notice as above required; provided that the Engineer may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final settlement of the Contract. If the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in Article 41 hereof.

ARTICLE 10 MATERIALS AND APPLIANCES

10.1 Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, lights, power, transportation and other facilities necessary for specified, all materials incorporated in the permanent work shall be new and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to kind and quality of materials. The Contractor shall be responsible for all material tests as required by the MDOT Standard Specifications for Road and Bridge Construction, latest edition.

ARTICLE 11 EMPLOYEES

11.1 The Contractor shall at all times enforce strict discipline and good order among his employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned to him. Adequately sanitary facilities for his employees shall be provided by the Contractor.

ARTICLE 12 ROYALTIES AND PATENTS

12.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof except that the Owner shall be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the Owner has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or believed to be patented.

ARTICLE 13 SURVEYS

13.1 The Owner shall furnish control points for locating the principal component parts of the work, together with a suitable number of bench marks adjacent to the work. From the information provided by the Owner, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, other working points, lines and elevations.

13.2 The Contractor shall carefully preserve bench marks, reference points and stakes and, in case of his willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance due to such willful or careless destruction.

ARTICLE 14 PERMITS, LICENSE AND REGULATIONS

14.1 Permits and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the Drawings and Specifications are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

ARTICLE 15 PROTECTION OF THE PUBLIC AND OF WORK AND PROPERTY

15.1.1 The Contractor shall provide and maintain all reasonable watchmen, barricades, warning lights and signs and take all reasonable precautions for the protection and safety of the public. He shall continuously maintain reasonable protection of all work from damage, and shall take all reasonable precautions to protect the Owner's property from injury or loss arising in connection with this Contract. He shall make good any damage, injury or loss to his work and to the property of the Owner resulting from the lack of reasonable protective precautions, except such as may be due to errors in the Contract Documents. He shall reasonably protect adjacent private and public property, as required by Law and Contract Documents.

15.2 The Contractor will designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Owner and Engineer.

ARTICLE 16 INSPECTION OF WORK

16.1 The Owner shall provide sufficient competent personnel, working under the supervision of a qualified Engineer, for the inspection of the work while such work is in progress to ascertain that the completed work will comply in all respects with the standards and requirements set forth in the Specifications. Notwithstanding such inspections, the Contractor will be held responsible for the acceptability of the finished work.

16.2 The Engineer and his representatives shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access, and for inspection.

16.2 If the Specifications, the Engineer's instructions, Laws, ordinances or any public authority require any such work to be specifically tested or approved, the Contractor shall give the engineer timely notice of its readiness for inspection, and it the inspection is by an authority other than the Engineer, of the fixed for such inspection. Inspections by the Engineer shall be made promptly, and where practicable at the source of the supply. If any work shall be covered up without approval or consent of the Engineer, if must, if required by the Engineer, be uncovered for examination and properly restored at the Contractors expense, unless the Engineer has reasonably delayed inspection.

16.3 Re-examination of any work may be ordered by the Engineer, and if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner shall pay the cost for re-examination and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

ARTICLE 17 SUPERINTENDANCE

17.1 The Contractor shall keep on his work, during its progress, a competent superintendent and any necessary assistant. The superintendent shall represent the Contractor, and all direction given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other direction shall be so confirmed on written request in each case. The Contractor shall give efficient superintendence to the work, using the best skill and attention.

ARTICLE 18 DISCREPANCIES

18.1 If the Contractor, in the course of the work, finds any discrepancy between the Drawings and the physical conditions of the locality, or any errors or omissions in Drawings or in the layout as given by survey points and instructions, he shall immediately inform the Engineer, in writing, and the Engineer shall promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk.

ARTICLE 19 CHANGES IN THE WORK

19.1 The Owner may make changes in the Drawings and Specifications or scheduling of the Contract within its general scope at any time by a written order. If such changes add or deduct from the Contractor's cost of the work, the Contract shall be adjusted accordingly. All such work shall be executed under the conditions of the original Contract except that any claim or extension of time caused thereby shall be adjusted at the time of ordering such change.

19.2 In giving instructions, the Engineer shall have authority to make minor changes in the work not involving extra cost, and not inconsistent with the purpose of the work, but otherwise, except in emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Owner and no claim for an addition to the Contract price shall be valid unless the additional work was so ordered.

19.3 The Contractor shall proceed with the work as changed and the value of any such extra work or change shall be determined as provided in the Contract Documents.

ARTICLE 20 EXTENSION OF TIME

20.1 Extension of time stipulated in the Contract for completion of the work will be made when changes in the work occur, as provided in Article 19; when the work is suspended as provided for in Article 24; and when the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, his Subcontractors or suppliers, and which were not the result of their fault or negligence. Extension of time for completion shall also be allowed for any delays in the progress caused by any act (except as provided elsewhere in these General Conditions) or neglect of the Owner or of his employees or by other contractors employed by the Owner, or by any delay in the furnishing of Drawings and necessary information by the Engineer, or by any other cause which in the opinion of the Engineer entitles the Contractor to an extension of time, including but not restricted to, acts of the public enemy, acts of any government in either sovereign or any applicable contractual capacity, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, freight embargoes, unusually severe weather or labor disputes. Extension of time due to rainfall will be granted for days exceeding the average number of rainfall days for a given month as determined by the National Weather Service (NWS). The extension of time due to rainfall will be determined by use of the following rainfall impact chart:

Daily Rainfall Amount (Inches)	**Days of Adverse Impact**
Less than 0.50	**None**
0.51 to 1.00	**Event Day = 1 day**
1.01 to 2.00	**Event Day + 1day = 2 days**
2.01 to 3.00	**Event Day + 2 days = 3 days**
More than 3.00	**Event Day + 3 days = 4 days**

20.2 The Contractor shall notify the Engineer promptly of any occurrence of conditions which in the Contractor's opinion entitle him to an extension of time. Such notice shall be in writing and shall be submitted within ten (10) days to permit full investigation and evaluation of the Contractor's claim. The Engineer shall acknowledge receipt of the Contractor's notice within five (5) days of its receipt. Failure to provide such notice shall constitute a waiver by the Contractor of any claim.

ARTICLE 21 CLAIMS

21.1 If the Contractor claims that any instructions by Drawings or other media issued after the date of the Contract involve extra cost under this Contract, he shall give the Engineer written notice thereof within ten (10) days after receipt of such instruction, and in any event before proceedings to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for in Article 19. No such claim shall be valid unless so made.

ARTICLE 22 DEDUCTIONS FOR UNCORRECTED WORK

22.1 If the Engineer deems it expedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore, unless the Contractor elects to correct the work.

ARTICLE 23 CORRECTION OF WORK BEFORE FINAL PAYMENT

23.1 The Contractor shall promptly remove from the premises all materials and work condemned by the Engineer as failing to meet the Contract requirements, whether incorporated in the work or not. The Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

23.2.1 If the Contractor does not take action to remove such condemned materials and work within ten (10) days after written notice, the Owner may remove them and may store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within ten (10) days time thereafter, the Owner may, upon ten (10) days written notice, sell such material at auction or at private sale and shall pay the Contractor any net proceeds thereof, after deducting all the costs and expense that should have been borne by the Contractor.

ARTICLE 24 SUSPENSION OF WORK

24.1 The Owner may at any time suspend the work, or any part thereof, by giving five (5) days notice to the Contractor in writing. This work shall be resumed by the Contractor within ten (10) days after the date fixed in the written notice from the Owner to the Contractor so to do. The Owner shall reimburse the Contractor in connection with the work under this Contract as a result of such suspension.

24.2.1 If the work, or any part thereof, shall be stopped by notice in writing aforesaid, and if the Owner does not give notice in writing to the Contractor to resume work at a date within ninety (90) days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work so suspended and he will be entitled to the estimates and payment for all work done on the portions so abandoned. The Contractor may make claims for and recover from the Owner payment for any expense incurred plus a reasonable profit on work so abandoned.

ARTICLE 25 OWNER'S RIGHT TO TERMINATE CONTRACT

25.1.1 If the Contractor should be adjudged as bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed as a result of insolvency, or if he

should be guilty of a substantial violation of the Contract, then the Owner, upon the certificate of the Engineer that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor and his Surety seven (7) days written notice, terminate the employment of the Contractor and take possession of the premises and all materials, tools, equipment and other facilities installed on the work and paid for by the Owner and such finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance if the Contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid by the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default shall be certified by the Engineer.

ARTICLE 26 CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If the work should be stopped under an order of any court, or other public authority, for a period of more than ninety (90) days, through no act or fault of the Contractor or of anyone employed by him, or if the Engineer should fail to issue any estimate for payment within fifteen (15) days after its due, or if the Owner should fail to pay the Contractor within fifteen (15) days of its maturity and presentation any sum certified by the Engineer or awarded by arbitrators, then the Contractor may, upon seven (7) days written notice to the Owner and the Engineer, stop work or terminate this Contract and recover from the Owner payment for all work executed, plus any loss sustained upon any plant or materials plus reasonable profit and damages.

ARTICLE 27 REMOVAL OF EQUIPMENT

27.1 In the case of termination of this Contract before completion for any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies from the property of the Owner, failing which the Owner shall have right to remove such equipment and supplies at the expense of the Contractor.

ARTICLE 28 - RESPONSIBILITY FOR WORK

28.1 Except as herein provided, the Contractor assumes full responsibility for the work. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the work (except for any part covered by partial acceptance as set forth is Article 29). The Contractor agrees to make no claims against the Owner for damages to unaccepted work for any cause except negligence or willful acts of the Owner, acts of an enemy, acts of war, acts of God, or as provided in Article 33.

ARTICLE 29 PARTIAL COMPLETION AND ACCEPTANCE

29.1 If at any time prior to the issuance of the final certificate referred to in Article 44 hereinafter, any portion of the permanent construction has been satisfactorily completed, and if the Engineer determines that such portion of the permanent construction is not required for the operations of the Contractor but is needed by the Owner, the Engineer shall issue to the Contractor a certificate of partial completion, and thereupon or at any time thereafter the Owner may take over and use the portion of the permanent construction described in such certificate, and may exclude the Contractor therefrom.

29.2 The issuance of a certificate of partial completion shall not be construed to constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if he has failed to complete it in accordance with the terms of this Contract. The issuance of such a certificate shall not operate to release the Contractor or his sureties from any obligations under this Contract or Performance Bond.

29.3 If such prior use increases the cost of or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Engineer may determine, unless otherwise provided.

ARTICLE 30 PAYMENTS WITHHELD PRIOR TO FINAL ACCEPTANCE OF WORK

30.1 The Owner, as a result of subsequently discovered evidence, may withhold or nullify the whole or part of any payment certificate to such extent as may be necessary to protect himself from loss caused by:

(A.) Defective work not remedied.

(B.) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor.

(C.) Failure of the Contractor to make payments properly to Subcontractors or for material or labor.

(D.) Damage to another contractor.

30.2 When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the Owner which will protect the Owner in the amount withheld, payment shall be made for amounts withheld, because of them.

ARTICLE 31 CONTRACTOR'S INSURANCE

31.1 The Contractor shall secure and maintain such insurance policies as will protect himself, his subcontractors, and unless otherwise specified, the Owner, from claims for bodily injuries, death or property damage, which may arise from operations under this Contract whether such operations be by himself or by any Subcontractors or anyone employed by them directly or indirectly.

31.2 All policies shall be for not less than the amounts set forth in the Special Conditions.

31.3 Certificates and/or copies of policy of such insurance shall be filed with the Engineer, and shall be subject to his approval as the adequacy of protection, within the requirements of the Specifications. Said certificates of insurance shall contain a provision that the coverage afforded under the policies will not be cancelled or materially changed until at least fifteen (15) days prior written notice has been given to the Owner and Engineer.

ARTICLE 32 SURETY BONDS

32.1 The Owner shall have the right, prior to the signing of the Contract, to require the Contractor to furnish bond covering the faithful performance of the Contract and payment of all obligations

arising thereunder, in such form as the Owner may prescribe in the bidding document and executed by one or more financially responsible sureties. If such bond is required prior to receipt of bids, the premium shall be paid by the Contractor, if subsequent thereto, it shall be paid by the Owner. The Owner may require additional bond if the Contract is increased appreciably.

ARTICLE 33 INDEMNIFICATION

33.1 The Contractor covenants, promises and agrees to indemnify, defend, save and hold harmless the Owner and the Engineer from any and all loss, costs, liability, and expense including attorney's fees, arising out of or resulting from every claim and cause of action made or assessed against the Owner or the Engineer by any person and/or entity for or on account of injury or death or damage or loss of property arising out of or resulting from any act or omission on the part of the Contractor, its officers, agents, servants, employees and any subcontractor engaged or employed by the Contractor, in any manner related to the Work performed hereunder.

33.2 In any and all claims against the Owner or the Engineer or any of their agents or employees by any employee of the Contractor, any Subcontractor of the Contractor, anyone directly or indirectly employed by any of them, or anyone else for whose acts any of them by be liable, the indemnification obligation under this Article 33 shall not be limited in any way by any benefits payable by or for the Contractor or any Subcontractor of the Contractor under workmen's compensation acts, disability benefit acts, or other employee benefit acts.

33.3 The obligations of the Contractor under this Article 33 shall not extend to the liability of the Engineer, his agents or employees arising out of (a) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or Specifications of (b) the giving of or the failure to give directions or instructions by the Engineer, his agents or employees provided such giving or failure to give is primary cause of injury or damage.

ARTICLE 34 ASSIGNMENT

34.1 Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due to him or to become due to him hereunder, except to a bank or financial institution acceptable to the Owner.

ARTICLE 35 SEPARATE CONTRACTS

35.1 The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

35.2 If the proper execution or results or any part of the Contractor's work depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

ARTICLE 36 SUBCONTRACTS

36.1 The Contractor shall, as soon as practicable after signing the Contract, notify the Engineer in writing of the names of Subcontractors proposed for the work. The Contractor agrees that he is fully responsible to the Owner for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

36.2 Nothing contained in the Contract Documents shall create a contractual relation between any Subcontractor and the Owner.

ARTICLE 37 ENGINEER'S STATUS

37.1 The Engineer shall perform technical inspection of the work. He has the authority to stop work whenever such stoppage may be necessary to insure proper execution of the Contract, however, the Contractor shall be responsible for the method, means and safety aspects of the work. He shall also have authority to reject all work and materials that do not conform to the Contract and to decide questions that arise in the execution of the work.

ARTICLE 38 ENGINEER'S DECISIONS

38.1 The Engineer shall, within a reasonable time after their presentation to him, make decisions in writing on all claims of the Owner, of the Contractor and on all other matters, relating to the execution and progress of the work or the interpretation of the Contract Documents.

ARTICLE 39 ARBITRATION

39.1 Demand for Arbitration – Any dispute or any decision of the Engineer may be submitted to arbitration upon the demand of either party to the dispute when not prohibited by law and provided that the opposing party shall consent thereto. Once the opposing party shall have consented to arbitrate, a decision of the arbitrators shall be a condition precedent to any legal action provided said decision is rendered with seven (7) secular days after all parties have concluded their testimony, arguments, and rested, then the arbitrators shall be deemed to be deadlocked and the entire proceeding shall be void. Either party shall have the right to submit his cause of action to the courts without prejudice after arbitrators shall have no binding affect upon the courts. The sole purpose for allowing arbitration is to clear up disputes between the parties rapidly. It is not mean to prejudice any parties right to have his position litigated by the courts should he deem such litigation necessary to protect his rights.

39.1.1 The demand for arbitration shall be delivered in writing to the Engineer and the adverse party by the demanding party, either personally or by registered mail to the last known business address of each. The demand shall be made within thirty (30) days of the receipt of the Engineer's decision, and in no case after final payment has been accepted except as otherwise expressly stipulated in the Contract Document. If the Engineer has failed to make a decision within a reasonable time, the demand for arbitration may be made as if his decision had been rendered against the demanding party.

39.2 Arbitrators – No one shall be nominated or act as an arbitrator who is any way financially interested in this Contract or in the business affairs of the Owner, or the Contractor, or the Engineer, or otherwise connected with any of them. Each arbitrator shall be a person who is generally familiar with the work or the problem involved in the dispute submitted to arbitration.

39.2.1 Unless otherwise provided by controlling statutes, the parties may agree upon one arbitrator, otherwise there shall be three, one named in writing, by each party of this Contract, to the other party and the third chosen by the two arbitrators, or if they should fail to select a third within fifteen (15) days, then he shall be appointed by the presiding officer, if a disinterested party, of the County Bar Association nearest the location of the work. Should the party demanding arbitration fail to name an arbitrator within ten (10) days of his demand, his right to arbitration shall lapse. Should the other party fail to name an arbitrator within thirty (30) days, and upon his failure to do so then such arbitrator shall be appointed on the petition of the party demanding arbitration by of a judge of the Federal Court in the District where such arbitration is to be held.

39.2.2 The said presiding officer of the County Bar Association nearest the location of the work, if a disinterested party, shall have the power to declare the position of arbitrator vacant by reason of refusal or inability to act, sickness, death, resignation, absence or neglect. Any vacancy shall be filled by the party making the original appointment, and unless so filled within five (5) days after the same has been declared, it shall be filled by the said presiding officer. If the testimony has been taken before a vacancy has been filled, the matter must be re-heard unless re-hearing is waived in submission (the statement of the matters in dispute between the parties to be passed upon by the arbitrator) or by the written consent of the parties.

39.2.3 If there be one arbitrator, his decision shall prevail; if three, the decision of any two shall prevail in respect to both the matter submitted and to the procedure followed during arbitration.

39.3 Arbitration Procedure – The arbitrators shall deliver a written notice to each of the parties and to the Engineer, either personally or by registered mail to the last know business address of each of the time and place for the beginning of the hearing of the matters submitted to them. Each party may submit to the arbitrators such evidence and argument as he may desire and the arbitrators shall, however, be the judges on all matters of law and fact relating to both the subject matter of the procedure during arbitration and shall not be bound by technical rules of law or procedure. They may hear evidence in whatever from they desire. The parties may be represented before them by such person as each selects, subject to the disciplinary power of the arbitrators if such representation shall interfere with the orderly or speedy conduct of the proceedings.

39.3.1 Each party and the Engineer shall supply the arbitrators with such papers and information as they may demand, or with any witness whose movements are subject to their respective control, and upon refusal or neglect with such demands the arbitrators may render their decision without the evidence which might have been elicited therefrom, and the absence of such evidence shall afford no ground for challenge of the award by the party refusing to comply with such demand.

39.3.2 The Submission to arbitration (the statement of the matters in dispute between the parties to be passed upon by the arbitrators) shall be in writing, the arbitrators, before hearing testimony, shall be sworn by an officer authorized by law to administer an oath, faithfully and fairly to hear and examine the matters in controversy and to make a just reward according to the best of their understanding.

39.3.3 The arbitrators, if they deem the case demands it, are authorized to award to the party whose contention is sustained such sums as they shall consider proper for the time, expense and trouble incident to the arbitration and if the arbitration was demanded without reasonable cause, damages for delay and other losses. The arbitrators shall fix their own compensation, unless otherwise provided for by agreement, and shall assess the cost and charges of the arbitration upon either or both parties.

39.3.4 The award of arbitrators shall be in writing and a duplicate shall be delivered personally or by registered mail forthwith upon its rendition, to each of the parties to the controversy and to the Engineer. In any event, the arbitration proceedings must be concluded within one hundred eighty (180) days after selection of arbitrators is completed or they shall be void.

39.3.5 The award of the arbitrators shall not be open to objection on account of the form of the proceedings or the award, unless otherwise provided by the controlling statutes. In the event of such statutes providing on any matter covered by this section otherwise than as hereinbefore specified, the method of procedure throughout the legal effect of the award shall be wholly in accord with said statutes, it being intention hereby to lay down a principal of action to be followed, leaving its local application to be adapted to the legal requirement of the jurisdiction having authority over the arbitration.

39.3.6 The Engineer shall not be deemed a party to the dispute. He is given the right to appear before the arbitrators to explain the basis of his decision and give such evidence as they may require.

ARTICLE 40 LAND FOR WORK

40.1 The Owner shall provide as indicated on the Drawings and not later than the date when needed by the Contractor the lands upon which the work under this Contract is to be done, right-of-way for access to same, and such other lands which are designated on the Drawings for the use of the Contractor. Such lands and right-of-way shall be adequate for the performance of the Contract. Any delay in the furnishing of these lands by the Owner shall be deemed proper cause for an equitable adjustment in both Contract price and time of completion.

40.2 The Contractor shall provide at his own expense and without liability to the Owner any additional land and access thereto that may be required for temporary construction facilities, or for storage of materials.

ARTICLE 41 CLEANING UP

41.1 The Contractor shall remove at his own expense from the Owners property and from all public and private property all temporary structures, rubbish and waste materials resulting from his operations. This requirement shall not apply to property used for permanent disposal of rubbish or waste materials in accordance with permission of such disposal granted to the Contractor by the Owner thereof.

ARTICLE 42 ACCEPTANCE OF FINAL PAYMENT

42.1 Upon receipt of written notice that the work is substantially completed or ready for final inspection and acceptance, the Engineer will promptly make such inspections, and when he finds the work acceptable under the Contract and the Contract fully performed or substantially completed, he shall promptly issue a certificate, over his own signatures, stating that the work required by this

Contract has been completed or substantially completed and is accepted by him under the terms and conditions thereof, and the entire balance found to be due the Contractor, including the retained percentage, less retention based on the Engineer's estimate of the fair value of the claims against the Contractor and the cost of completing the incomplete or unsatisfactory items of work with specified amounts for each incomplete or defective item or work, is due and payable. The date of substantial completion of the project or specified area of a project is the date when the construction is sufficiently completed in accordance with the Contract Documents as modified by any change orders agreed to by the parties so that the Owner can occupy the project or specified area of the project for the use for which it was intended.

42.2 Before issuance of final payment, the Contractor, if required in the Special Conditions, shall furnish a release from his Surety and shall certify in writing to the Engineer that all payrolls, material bills, and other indebtedness connected with the work have been paid, or otherwise satisfied, except that in case of disputed indebtedness or liens, if the Contract does not include a payment bond, the Contractor may submit in lieu of certification of payment a surety bond in the amount of the disputed indebtedness or liens, guaranteeing payment of all such disputed amount, including all related costs and interest in connection with said disputed indebtedness or liens which the Owner may be compelled to pay upon adjudication.

42.3 The making and acceptance of the final payment shall constitute a waiver of all claims by the Owner, other than those arising from unsettled liens, from faulty work appearing within the guarantee period provided in the Special Conditions, from the requirements of the Drawings and Specifications, or from manufacturer's guarantees. It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

42.4 If after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and Engineer so certifies, the Owner shall, upon certificate of the Engineer, and without terminating the Contract, make payment for the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

42.5 If the Owner fails to make payment as herein provided, there shall be added to each such payment where legal daily interest at the rate of 6% per annum commencing on the first day after said payment is due and continuing until payment is delivered or mailed to the Contractor.

ARTICLE 43 LIQUIDATED DAMAGES

43.1 For each calendar day that any work shall remain incomplete after the time specified for the completion of the work provided for by the Contract in accordance with these Specifications, the sum specified in the Information for Bidders per calendar day shall be deducted by the Owner from monies due the Contractor, not as penalty, but as liquidated damages, except that upon completion of the work, adjustments in time charges may be made. Provided, however, that allowance may be made by the Owner at its discretion, over the period hereinbefore specified for the completion of said work, for causes for which the said Contractor is not responsible and which have delayed the completion of said work, and in such case the Contractor shall become liable for said liquidated damages for delays commencing from the date on which said extended period shall expire.

END OF SECTION

SECTION 00800

SPECIAL CONDITIONS AND PROVISIONS

SPECIAL CONDITION NO. 1

INSURANCE

1.01 The Contractor shall furnish the Owner with Certificates of Insurance prior to commencing work covering the following categories and minimum limits:

A. Standard Workmen's Compensation and Employee' Liability Insurance

B. Contractor's Public Liability and Property Damage Liability Insurance ($1,000,000, $2,000,000, $1,000,000)

C. Comprehensive Automobile Liability Insurance ($1,000,000, $2,000,000, $1,000,000)

TAXES, PERMITS, BONDS

2.01 All fees for all taxes, permits, performance and bid bonds and all fees of like nature are to be paid by the Contractor. A 100% Performance and Payment Bond will be required.

SPECIAL CONDITION NO. 2

RELEASE AND INDEMNIFICATION OF THE TOWN OF FLORA

1.01 The Contractor hereby releases the TOWN OF FLORA and agrees that the TOWN OF FLORA and their respective officers, directors, members, employees, attorney and agents shall not be liable for and agrees to indemnify and hold the TOWN OF FLORA and their respective officers, directors, members, employees, attorney and agents harmless against:

(A) Any or all liability or loss, cost or expense, including reasonable attorney's fees, resulting from, arising out of any loss or damage to property or injury to or death of any person occurring on or about the Project or resulting from any defect in the fixtures, machinery, equipment or other property located on the Project or arising out of, pertaining to, or having any connection with the Project or the financing thereof (whether or not arising out of acts, omissions or negligence of the Local Entity); and

(B) Any and all claims, damages, judgments, penalties, cost and expenses (including attorney's fees and court cost now or hereafter arising from the aforesaid enforcement of this paragraph) arising directly or indirectly from the activities of the Local Entity, its predecessors in interest, third parties with whom it has a contractual relationship or arising directly or indirectly from the violation of any environmental protection, health or safety law, whether such claims are asserted by any governmental authority or any other person which indemnity shall survive termination of this Agreement.

COMPLIANCE WITH ENVIRONMENTAL LAWS

2.01 The Contractor shall cause all business, operations, and activities at or upon the Project at all times during the term of this Agreement to be conducted in compliance with all applicable federal, state, or local laws, ordinances, rules or regulations concerning public health, safety or the environment. These include, but are not limited to, the following:

(a) The Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C., §§9601 et seq.;

(b) The Resource Conservation and Recovery Act, as amended, 42 U.S.C., §§9601 et seq.;

(c) The Clean Water Act, as amended, 33 U.S.C., §§1251 et seq.;

(d) The Safe Drinking Water Act, as amended, 42 U.S.C., §§300(f) et seq.;

(e) The Toxic Substances Control Act, as amended, 15 U.S.C., §§2601 et seq.;

(f) The Clean Air Act, as amended, 42 U.S.C., §§7401 et seq.;

(g) The Emergency Planning and Community Right-to-Know Act of 1986, as amended, 42 U.S.C., §§11001 et seq.;

(h) The Occupational Health and Safety Act, as amended, 29 U.S.C., §§651 et seq.;

(i) The Mississippi Air and Pollution Control Law, as amended, Miss. Code Ann. §§49-17-1 et seq.;

(j) The Mississippi Solid Waste Disposal Law of 1974, as amended, Miss. Code Ann. §§17-17-1 et seq.;

(k) The Mississippi Underground Storage Tank Act of 1988, as amended, Miss. Code Ann. §§49-17-401 et seq.;

(l) The Mississippi Conservation of Groundwater Law, as amended, Miss. Code Ann. §§51-4-1 et seq.;

(m) Antiquities Law of Mississippi, as amended, Miss. Code Ann. §§39-7-1 et seq.;

SPECIAL PROVISION NO. 1

COORDINATION AND WORKMANSHIP WARRANTY

1.01 GENERAL

All work herein described shall be performed by the Contractor, or his approved Subcontractors, who shall bear all responsibility for it and who shall willingly submit to inspection of and review of the work at all times by representatives of the Engineer, the Owner, and/or the Owner's designated representative.

1.02 WORKMANSHIP

1.02.01 All work herein described shall be done in a workmanship like manner.

1.02.02 The Contractor shall maintain the job site in a neat, orderly and organized manner. Daily cleanup of work areas and prompt disposal of trash, used materials and other disposables shall be required.

1.03 GENERAL WARRANTY

1.03.01 The Contractor shall warrant all equipment, materials, products, and workmanship provided by the Contractor under these Contract Documents for a period of twelve months, unless longer periods are specified elsewhere, after date of substantial completion of the work.

1.03.02 Substantial completion shall be that date as certified by the Engineer in writing and accepted by the Owner in writing when the construction of the Project or a specified part thereof is sufficiently completed, beneficial occupancy or such requirements that may be imposed by applicable laws.

1.03.03 If, during the warranty period (a) any equipment, materials, or products furnished and/or installed by the Contractor are found to be defective in service by reason of the Contractor's faulty process, structural and/or mechanical design or specifications, or (b) any equipment, materials, or products furnished and/or installed by the Contractor are found to be defective by reason of defects in material or workmanship, the Contractor shall, as soon as possible after receipt of written notice from the Owner, repair or cause to be repaired such defective equipment, materials or products at no additional cost to the Owner.

1.03.04 The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.

SPECIAL PROVISION NO. 2

REVIEW OF ENGINEERING DATA

1.01 Engineering Data covering all equipment and fabricated products to be furnished under these Contract Documents shall be submitted to the Engineer for review. This data shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials and devices; the external connections; and dimensions needed for installation and correlation with other materials and equipment. Data submitted shall include drawings showing details of any changes proposed by the Contractor and all required wiring and layouts.

1.02 At the time of each submission, the Contractor shall in writing call the Engineer's attention to any deviations that the engineering data may have from the requirements of these Contract Documents.

1.03 The Engineer will review the engineering data submitted in a timely and expeditious manner, provided the data is submitted in accordance with these Contract Documents, is complete and is suitable for his review.

1.04 Three (3) copies of each drawing and necessary data shall be submitted to the Engineer. Each drawing or data sheet shall be clearly marked with the name of the project, the Contractor's name and reference to applicable specifications paragraphs. When catalog pages are submitted, the applicable items shall be identified. Each drawing or data sheet shall bear the stamp of the Contractor's Engineer which shall be construed as certification that he has reviewed, checked, and approved the engineering data and that the data is in conformance with the requirements of these Contract Documents and that he has determined and verified all quantities, numbers, and similar data required for preparation, accuracy, and sufficiency of the engineering data.

1.05 Unless otherwise directed by the Engineer, when drawings and data are returned marked "APPROVED AS NOTED" the changes shall be made as noted thereon and not less than three copies shall be furnished.

1.06 All corrections and changes made on the drawings or data sheets other than those noted by the Engineer shall be clearly identified with a revision symbol and shall be suitably documented on the drawing with a brief description and data.

1.07 The Engineers review of drawings and data submitted by the Contractor will cover only general conformity to the drawings and specifications, external connections, and dimensions that affect the layout. The Engineer's review of drawings returned marked "APPROVED" or "APPROVED AS NOTED" does not indicate a through review of all dimensions, quantities and details of the material, equipment device, or item shown and shall not in any way be deemed to relieve the Contractor from any responsibility for errors or deviations from the requirements of these Contract Documents, or from any liability placed upon him by any provisions of these Contract Documents.

1.08 All drawings and data, after final processing by the Engineer, shall become a part of these

Contract Documents and the work shown or described thereby shall be performed in conformity therewith unless otherwise authorized by the Owner or the Engineer.

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 LOCATION OF WORK

All of the work of this Contract is located in rights-of-way, easements, or on property owned by Madison County.

1.02 WORK TO BE DONE

A. The Contractor shall furnish all labor, materials, equipment, tools, services and incidentals to complete all work required by these Specifications.

B. The Contractor shall perform the work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, cleanup, replacements and restoration, including restoration of vegetative cover required as a result of damages caused during this construction.

C. All materials, equipment, skills, tools and labor which are reasonably and properly inferable and necessary for the proper completion of the work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.

D. The Contractor shall comply with all county, city, state, federal, and other codes which are applicable to the proposed constructions work.

1.03 GENERAL DESCRIPTION OF WORK TO BE PERFORMED

The work to be done under this Contract consists of relocating a water main and sewer main that is attached to the existing bridge that crosses over burnt corn creek on Cane Creek Road. New water and sewer mains will be bored under the creek and tied to the existing service lines in order for a bridge replacement project to be completed in the future. Said water and sewer mains are owned by the Town of Flora.

1.04 WORK SEQUENCE

A. Construction shall be coordinated to accommodate the owners' use of the premises during construction. The Contractor shall coordinate the work schedule with the Engineer.

1.05 CONSTRUCTION AREAS

A. Contractor shall limit his use of the construction areas for Work and for storage, to allow for Owner use.

B. Coordinate use of work site under direction of Engineer.

C. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

D. Move any stored products, under Contractor's control that interfere with operations of the Owner or person living in this area.

E. Obtain and pay for the use of additional storage or work areas needed for operations.

1.06 OWNER OCCUPANCY

A. Owner will have full access to their property during the entire period of construction for the conduct of his normal operations. Cooperate with Engineer in all construction operations to minimize conflict and to facilitate Owner usage.

B. Contractor shall at all times conduct his operations as to insure the least inconvenience to the general public. In this regard, the Contractor's attention.

1.07 PARTIAL OWNER OCCUPANCY (NOT USED)

1.08 SPECIFICATIONS AND DRAWINGS

A. Specifications

The Technical Specifications consist of three parts: General, Products and Execution. The General section contains general requirements that govern the work. The Products and Execution sections modify and supplement these by detailed requirements of the work and shall always govern whenever there appears to be a conflict.

B. Intent

All work called for in the Specifications applicable to the contract but not shown on the Drawings in their present form or vice versa shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications but involved in carrying out their intent or in the complete and proper execution of the work is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

C. Conflict between Drawings and Specifications.

Where an obvious conflict exists between the Drawings and Specifications, the Engineer shall decide which governs and the Contractor shall comply with the decision. Such decision shall not be grounds for additional payment to the Contractor, i.e., the Contractor shall include the price of the most expensive alternative in his bid.

PART 2 MATERIALS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01041

PROJECT COORDINATION

PART 1 - GENERAL

1.01 WORK PROGRESS

The Contractor shall furnish personnel and equipment that will be efficient, appropriate and large enough to secure a satisfactory quality or work and a rate of progress that will insure the completion of the work within the time stipulated in the Contract. If at any time such personnel appear to the Engineer to be inefficient, inappropriate or insufficient for performing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to perform the work at the specified quality and rate of progress.

1.02 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of the Owner's land, rights-of-way, or easements except by written permission of both the Owner and the Owner of the private land. Such permission shall be obtained by and at the expense of the Contractor and at no additional cost to the Owner.

B. Owners of adjacent private land shall be inconvenienced as little as possible by the construction work. Where possible, the Contractor shall maintain access across or over the work to adjacent property. At locations where an adjacent property has more than one access point for vehicular traffic, such as paved or aggregated surfaced driveways, grassed ramps, gaps, etc., the

Contractor shall schedule his work so that at least one access point is usable by the property owner, his associates, or his clientele in the case where the adjacent property is a business establishment.

1.03 WORK LOCATIONS

Work shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.04 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by the public, Owner's and Engineer's personnel, and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as

limiting the length of open trench, prohibiting stacking excavated materials in the street, and requiring that the excavations shall not remain open overnight.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated materials equipment, or other obstacles that could be dangerous to the public shall be barricaded as well lighted at all times when construction is not in progress.

1.05 MAINTENANCE OF TRAFFIC

A. Open pits, trenches, unpaved streets, debris, or other obstructions due to construction that will prevent the normal flow of traffic during an extended construction stoppage, for any reason, shall be minimized. In the event and extended construction stoppage is found to be necessary, Contractor shall provide for normal traffic flow during extended construction stoppage, regardless of the cause.

B. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic safety hazards, he shall repair the road surface, provide temporary roadways, erect wheel guards of fences, or take other measures for safety satisfactory to the Engineer. All excavations shall be covered, backfilled or protected as directed by the Engineer and fully delineated at night when the Work is not in progress.

C. Detours around construction areas will be subject to the approval of the Owner and the Engineer. Where detours are permitted the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations. The periods when traffic may be detoured will be strictly controlled by the Owner. Traffic control devices shall conform to the requirements of the Manual of Uniform Traffic Control Devices.

1.06 WATER FOR CONSTRUCTION PURPOSES

A. In locations where public or private water supply is available, the Contractor may purchase water for all construction purposes.

B. The Contractor shall make his own arrangements and pay all costs for connections to public or private water systems and for water used.

1.07 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at this expenses, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the Engineer.

B. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the best

modern practice.

C. Along the location of this Work, all fences, walks, brushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the Contractor shall be replaced in the locations indicated by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and sodded with the same type that was damaged

D. Trees close to the Work shall be boxed or otherwise protected against injury. The contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.

E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the lump sum price established in the Proposal.

F. Where fences must be removed for construction purposes or access, they shall immediately be reconstructed or replaced. The Contractor shall provide adequate temporary fence and gates as necessary to contain or restrict domestic and farm animals within their proper areas during the life of this contract and shall provide reasonable safe and convenient means of access where and when required.

1.08 MAINTENANCE OF FLOW

The Contractor shall maintain the flow of drains and water courses interrupted during the progress of the Work. The Contractor shall immediately remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow. All temporary works installed for flow maintenance shall be removed when the permanent work is finished and the areas cleaned and restored to good condition. Pavement removal and replacement which, in the opinion of the Contractor, is necessitated by placement of temporary flow control facilities, shall be considered as an item for convenience to the Contractor. Such costs for pavement removal and replacement shall, therefore, be born by the Contractor at his own cost required for other flow control measures. The intent of the Specification is that pavement removal be limited to the least amount possible and the Contractor shall investigate alternative methods for flow control which require the least amount of pavement removal.

1.09 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed. All portions injured shall be reconstructed by the Contractor at his own expense.

B. All structures shall be protected in a manner approved by the Engineer. Should any of the floors or other parts of the structures become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at no additional cost to the Owner and to the satisfaction of the Engineer. Special attention is directed to substructure bracing requirements, described in Section 02200. If, in the final

inspection of the work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein for at least the guarantee period described in the Contract.

C. The Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

1.10 CLEANUP

During the course of the Work, the Contractor shall keep the site of his operations in as clean and near a condition as possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining form the construction operations, and shall leave the entire site of the Work in a near and orderly condition.

1.11 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with the General Contractor and his or her subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling, and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

PART 2 MATERIALS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor shall comply with the requirements stated in the General Conditions and in the specifications for administrative procedures in closing out the Work.

1.02 SUBSTANTIAL COMPLETION

A. When the Contractor considers the Work is substantially complete, he shall submit to the Owner:

1. A written notice that the Work or designated portion thereof is substantially complete.

2. A list of items to be completed or corrected.

B. Within five (5) working days after receipt of such notice, the Owner will make an inspection to determine the status of completion. The Owner's opinion as to the status of completion shall be based on completion of the following as applicable:

C. Should the Owner determine that the Work is not substantially complete:

1. The Owner will promptly notify the Contractor in writing, giving the reasons therefore in accordance with the General and Supplemental Conditions.

2. Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Owner.

3. The Owner will re-inspect the Work.

D. When the Owner finds that the Work is substantially complete, he will:

1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final payment in accordance with the General and Supplemental Conditions.

2. After consideration of any objections made by the Owner as provided in the General and Supplemental Conditions of the Contract, and when the Owner considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.03 FINAL INSPECTION

A. When Contractor considers the Work is complete, he shall submit written certification that:

1. Contract Documents have been reviewed.

2. Work has been inspected for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in the presence of the Engineer and Owner's representative and are operational.

5. Work is completed and ready for final inspection.

B. The Owner will make an inspection to verify the status of completion within five working days after receipt of such certification.

C. Should the Owner consider that the Work is incomplete or defective:

1. The Owner will promptly notify the Contractor in writing, listing the incomplete or defective work.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Owner that the Work is complete.

3. The Owner will re-inspect the Work.

D. When the Owner finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittal.

1.04 RE-INSPECTION FEES

Should the Owner perform re-inspection due to failure of the Work to comply with the claims of status of completion made by the Contractor:

A. Owner will be compensated for such additional services.

B. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTAL TO OWNER

A. Owner will be compensated for such additional services.

B. Owner will deduct the amount of such compensation from the final payment of the Contractor.

C. Two sets of "AS-BUILT" drawings showing dimensions, valve locations lengths, etc.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Owner.

B. Statement shall reflect all adjustments to the contract Sum:

1. The original Contract Sum.

2. Additions and deductions resulting from:

a. Previous Change Orders.

b. Deductions for uncorrected Work.

c. Penalties and Bonuses.

d. Deductions for liquidated damages.

e. Deductions for re-inspection payments.

f. Other adjustments.

3. Total Contract Sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

C. Owner will prepare a final Change Order reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.07 APPLICATION FOR PAYMENT

Upon receipt of approval of the final Change Order, the Contractor shall submit an Application for Payment in Accordance with procedures and requirements stated in the General Conditions.

1.08 CONTRACT CLEAR LIEN CERTIFICATE AND PAYMENT OF RETAINAGE

A. Upon receipt of the Owner's acceptance of the work, the Contractor shall submit an affidavit that the project is clear of all materials and labor liens.

B. Upon receipt of the affidavit of clean liens, the Contractor shall submit an Application for Payment to the Owner requesting the release of the Project retainage with the certificate attached for the Owner to pay the retainage.

C. The Owner shall review the Application for Payment of the Project retainage and if in order shall submit an Application for Payment requesting the release of the project retainage with the certificate attached for the Owner to pay the retainage.

D. In accordance with the General Conditions, the Owner shall release the Project retainage and make payment to the Contractor the legal sum of the retainage for which the Contractor is entitled.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Cleaning shall include daily "policing" of the work and surrounding areas to clear general debris waste paper, wood scraps, broken concrete, loose riprap, and other objectionable material along with the final cleanup of site(s) required for project acceptance.

1.02 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

A. Execute daily cleaning to keep the Work, the site and adjacent properties, free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

D. Prior to final completion or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire Work is clean.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Maintain at the site for the Owner one record copy of:

A. Conformed Drawings.

B. Conformed Specifications.

C. Change Orders and other Modifications to the Contract.

D. Engineer's Field Orders or written instructions.

E. Approved Shop Drawings, Working Drawings and Samples.

F. Field Test records.

G. Latest, Approved Progress Schedule.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in a manner and location to prevent damage.

1. Provide files and racks for storage of documents.

2. Provide secure storage space for storage of samples.

B. File documents and samples in accordance with CSI section numbers.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by the Owner.

E. As a prerequisite for monthly progress payments, the Contractor is to exhibit the currently updated "record documents" for review by the Owner.

1.03 MARKING DEVICES

Provide felt tip marking pens for recording information in the color code designated by the Owner.

1.04 RECORDING

A. Label each document "PROJECT RECORD" with rubber stamp.

B. Record information concurrently with construction progress and do not conceal any work until required information is recorded.

C. Legibly mark drawings to record actual construction:

1. The Contractor shall use the following color code in marking Contract Drawings:

a. Yellow for no change.

b. Red to indicate additions, deletions and changes.

2. Elevations of various structure elements in relation to elevation datum.

a. Elevations referenced to control points established by the Owner's agent.

b. Specifically, elevations of drainage culvert inverts, ditch grades, top of roadway and driveway curbs, bridges, etc.

3. Location of internal utilities and appurtenances concealed in the construction by referencing to visible and accessible features of the structure.

4. Field changes of dimension and detail.

5. Changes made by Field Order or by Change Order.

6. Details not on original contract drawings.

D. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number, and Supplier of each Product and item of equipment actually installed.

2. Changes made by Field Order of by Change Order.

E. Shop Drawings (after final review):

F. Certified site survey and line elevations and stationing at 100 foot increments and all points of change of direction of installed underground utilities by a registered land surveyor.

1.05 SUBMITTAL

A. At Contract close-out, deliver Record Documents to the Owner.

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date.

2. Project title and number.

3. Contractor's name and address.

4. Title and number of each Record Document.

5. Signature of Contractor or his authorized representative.

PART 2 - MATERIALS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds, as in Article 32 of the General Conditions.

B. Co-execute submittals when so specified.

C. Review submittals to verify compliance with Contract Documents.

D. Submit to the Owner for review.

1.02 SUBMITTAL REQUIREMENTS

A. Assemble and include warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, couplers, and subcontractors including effective dates.

B. Number of original signed copies required. Five (5) each.

C. Table of Contents. Neatly typed in orderly sequence. Provide complete information for each item.

1. Product or work item.

2. Firm, with name of principal, address and telephone number.

3. Scope.

4. Date of beginning warranty, and bond.

5. Duration of warranty.

6. Provide information for Owner's personnel:

   a. Proper procedure in case of failure.

   b. Instances which might affect the validity of warranty or bond.

7. Contractor, name of responsible principal, address and telephone number.

1.04 FORM OF SUBMITTALS

A. Prepare in packets of five.

B. Format:

1. Size 8-1/2-inches x 11-inches, punch sheets for standard 3-post binder.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS." List:

a. Title of Project.

b. Name of Contractor.

C. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of 2-inches, "D" ring.

1.05 WARRANTY SUBMITTAL REQUIREMENTS

A. For all components of the work, unless stated otherwise in the specifications for each individual item of equipment, submit a written warranty from the manufacturer to replace promptly any component thereof which, in the sole opinion of the Engineer, has defects in design, workmanship, materials, or performance within a one (1) year period following the date of final acceptance by the Owner. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year, unless otherwise specified, commencing at the time of acceptance for operation (beneficial use) by the Owner and shall be read in conjunction with the Contractor's warranty which shall operate together to provide for replacement of defective components and restoration of proper operation. The Contractor shall be solely responsible for both warranties.

PART 2 MATERIALS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02120

SOIL EROSION AND SEDIMENT CONTROL

PART 1 PROJECT

1.01 SECTION INCLUDES

A. Installation of temporary erosion and sediment control items prior to clearing and commencing earthwork.

B. Stabilization of denuded areas.

C. Protection and stabilization of soil stockpiles.

D. Installation of sediment basin and traps, silt barrier fences, and sediment basin risers.

E. Temporary seeding, mulching, and sodding.

F. Excavation and embankment construction activities.

G. Stabilization of construction entrances.

H. Maintenance and removal of all sediment and erosion control measures.

1.02 REGULATORY REQUIREMENTS

A. Comply with all applicable codes and with the requirements of agencies having jurisdiction over the work in this Section.

B. If the owner does not already have, Contractor shall bear the responsibility of obtaining the applicable stormwater permits from the Mississippi Department of Environmental Quality.

1.03 EXAMINATION

Visually determine that the project is ready for the work of this section; beginning work shall indicate acceptance of the conditions.

PART 2 PRODUCTS

Erosion and sediment control materials suitable for site conditions shall be in accordance with requirements imposed by the Mississippi Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, Sections 215, 234, 235 and 236.

PART 3 EXECUTION

3.01 INSTALLATION

Installation shall be in accordance with the requirements of MDOT Standard Specifications for Road and Bridge Construction, latest edition, Sections 215, 234, 235 and 236.

3.02 MAINTENANCE AND REMOVAL

Maintenance and removal shall be in accordance with the requirements of MDOT Standard Specifications for Road and Bridge Construction, latest edition, Sections 215, 234, 235 and 236.

PART 4 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.01 METHOD OF MEASUREMENT

A. When Soil Erosion and Sediment Control items are listed on the Bid Form as a separate bid item, unit measurements of them shall be as noted on the Bid Form for material constructed in place and installed in accordance with these Specifications. When not listed as a separate bid item, no measurement of quantity will be made but quantity shall be considered as an absorbed cost.

4.02 BASIS OF PAYMENT

A. When listed on the Bid Form as a separate bid items, payment for any part of the Soil Erosion and Sediment Control shall be as noted on the Bid Form for material constructed and accepted in place and shall constitute full compensation for furnishing all material, labor, tools, equipment and incidentals and for performing all hauling, placing, construction and other operations necessary to complete the work in accordance with the Contract Specifications. When not so listed as a separate bid item, Soil Erosion and Sediment Control shall be considered as an absorbed cost item and no separate payment shall be made.

END OF SECTION

SECTION 02485

SEEDING, MULCHING, FERTILIZER, SODDING AND LINING

PART 1 GENERAL

1.01 SUMMARY

A. Work to be performed under this Section shall be either restoration or establishment of vegetative cover for aesthetic and permanent erosion control purposes. The Contractor shall make investigations of the project to determine types of existing vegetative cover that will require restoration and shall take all measures necessary to restore the vegetative cover in like kind to that which existed prior to the beginning of the Work.

B. Furnish all labor, materials, and equipment necessary to satisfactorily return all construction areas to their original conditions or better and to provide erosion control within the drainage area.

C. Work includes standard ground preparation and furnishing and placing topsoil, seed or sod, fertilizer, lime, lining, mulching, watering, and maintenance until acceptance by the Owner.

D. Reestablish vegetative cover in all areas where such cover existed prior to beginning of the Work and within the constructed drainage ways as instructed in the plans and specifications.

1.02 QUALITY ASSURANCE

A. Requirements: It is the intent of this specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work including grading, fertilizing, lining, watering, and seeding or sodding until a satisfactory stand is obtained.

B. Satisfactory Stand: For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover of the predominant vegetative species existing prior to the beginning of the Work or as specified in new areas over areas to be seeded or sodded, with grass free of weeds, alive and growing, leaving no bare spots larger than 1/2 square yard within a radius of 10 feet.

C. For purposes of lining, no liner material shall be displaced during the warranty period and no area underneath the liner shall lose more than 0.5 inches of top soil during the warranty period prior to the establishment of a satisfactory stand of grass.

D. 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 as determined by the Engineer, including installation of sodding on areas previously treated with seed applications, shall be undertaken by the Contractor to establish the required satisfactory stand of grass.

PART 2 MATERIALS

2.01 FERTILIZER

A. Fertilizer shall be in accordance with the MDOT Mississippi Standard Specifications for Road and Bridge Construction, latest edition, Section 213.

2.02 SEEDING

A. Seeding shall be completed in conformance with the MDOT Standard Specifications for Road and Bridge Construction, latest edition, Section 214.

2.03 SODDING

A. Sod shall be provided as required in accordance with the MDOT Standard Specifications for Road and Bridge Construction, latest edition, Section 216. The Contractor shall furnish sod equal to and similar in type as was disturbed. Placement and watering requirements shall be in accordance with MDOT requirements.

2.04 TOPSOIL

A. Topsoil shall be in accordance with the MDOT Standard Specifications for Road and Bridge Construction, latest edition, Section 211.

2.05 MULCH

A. Mulch shall be in accordance with the MDOT Standard Specifications for Road and Bridge Construction, latest edition, Section 215.

2.06 WATER

A. Water shall be supplied in accordance with the MDOT Standard Specifications for Road and Bridge Construction, latest edition, Section 219.

2.07 DITCH LINER

A. The liner shall consist of a temporary erosion control blanket machine produced material of wood fiber sewn on single or double netting as applicable.

B. Material for 40' wide ditch bottom: Erosion Control Systems Everhold XL2 or Contech EFB2.

C. Material for 3:1 side slopes: Erosion Control Systems Everhold XL2 or Contech EFB2.

D. All ditch liners shall be installed according to the manufacturer's recommendations.

2.08 HYDROSEEDING

A. Hydroseed shall be applied with hydraulic equipment at the rate of 1,000 pounds to 1,500 pounds of hydromulch per acre with the exception of any slopes in excess of 4:1 or any swales. Hydomulch shall be added to the water slurry in the hydraulic seeder after the proportionate quantities of seed, fertilizer and other accepted materials have been added. The slurry shall be sprayed uniformly on the surface of the soil.

B. Hydromulch shall be composed of wood cellulose fiber and contain no germination- or growth-inhibiting factors. It shall be colored green to allow visual metering in its application and have the property of being evenly dispersed and suspended when agitated in water.

C. Hydroseed equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend and homogeneously mix slurry. The distribution lines shall be large enough to prevent stoppage and to provide even distribution of the slurry over the ground. The pump shall have a capacity of 150 psi at the nozzle.

D. The slurry-tank shall have a minimum capacity of 1,000 gallons and shall be mounted on a traveling unit which will place the slurry tank and spray nozzles within sufficient proximity to the areas to be seeded.

E. The hydroseed mix shall contain 30 pounds of mulch, 7 pounds of seeds and 10 pounds of fertilizer per 1,000 square feet.

F. The areas that are to be hydroseeded shall be prepared by the following steps:

1. Preparation: Do all slurry preparation at the job site

    a. Water: Add water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, establish good re-circulation and add seed.

    b. Seed: Do not allow seed to remain more than 30 minutes in slurry.

    c. Fertilizer: Add fertilizer, followed by the mulch. The mulch shall only be added to the mixture after the seed, and when the tank is at least 1/3 filled with water.

    d. Mixing: Open the engine throttle to full speed when the tank is half-filled with water. Add all the mulch by the time the tank is 2/3 to 3/4 full. Commence spraying immediately when the tank is full.

2. Seed Bed Preparation

a. Rolling: Roll amended soil with 200-pound water ballast roller and bring to finish grade

b. Raking: Lightly rake seed bed surface to 1/4-inch depth. Seed immediately thereafter, provided the seed bed has remained in friable condition.

3. Application

a. General: Apply specified slurry mix in a sweeping motion to form a uniform mat at the specified rate. Keep hydroseeding within designated areas and keep from contact with other plant materials.

b. Unused Mix: Do not use a slurry mixture which has not been applied within 4 hours of mixing. Promptly remove from the site.

c. Protection: After application, do not operate any equipment over the hydroseeded areas.

d. Reseeding: Reseed all areas and parts of areas which fail to show a uniform stand

2.09 GROUND PREPARATION

A. Ground preparation shall be in accordance with the MDOT Mississippi Standard Specification for Road and Bridge Construction, latest edition, Section 212.

PART 3 EXECUTION

3.01 INSTALLATION

A. See Vegetation Schedule in plans for details of rate schedules and time-of-year requirements. Install all liner materials according to the manufacturer's recommendations and as shown in the plans for the material specified. An installation plan shall be submitted to the Engineer for approval.

3.02 CLEANUP

A. Soil, mulch, seed, or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of seeding and sodding operations, all excess soil, stones and debris remaining shall be removed from the construction areas.

3.03 LANDSCAPE MAINTENANCE

A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the Engineer.

3.04 REPAIR TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS

A. Drainage areas planted under this Contract and all lawn areas damaged by the Contractor's operation shall be repaired at once by proper topsoil backfill, soil preparation, fertilizing, and reseeding or sodding, in accordance with the following:

1. Areas damaged by placement of excavated material where existing grass is still living and more than fifty percent (50%) of the existing grass is left in place shall be repaired by filling depressions and scars created by equipment tires, tracks, or scarification teeth with topsoil, application of fertilizer over the entire area at the rates prescribed for other vegetative cover, hand raking soil to a uniform grade, and assure application of water at rates required for sodding until adequate regrowth of grass and coverage has been obtained.

2. Areas damaged by placement of excavated material where existing grass has died or where fifty percent (50%) or more of the existing grass has been removed shall be repaired by excavating the dead and/or remaining material to a uniform grade, placing topsoil to regrade the area to its original topography upon placement where sod is required, preparing the ground surface as required including fertilizing, placing seed or sod as applicable under the above specifications, placing mulch as required, and watering as required for other vegetative cover.

3. Areas damaged by other material or equipment storage or movement shall be repaired as applicable for areas described above for excavation storage.

3.05 REPAIR TO DRAINAGE WAYS DURING THE WARRANTY PERIOD

A. Drainage areas planted and lined under this contract and any area damaged by the Contractor's operations shall be repaired at once by proper soil and topsoil backfill, soil preparation, fertilizing, reseeding or sodding, and lining in accordance with the following:

1. Areas damaged by stormwater or other disturbances where existing liner and/or soil and topsoil have been uplifted and/or displaced exposing the soil and subsoil to additional erosion shall be repaired immediately to pre-existing condition. This includes all liner materials and additional stapling and pinning required to prevent a reoccurrence.

2. Because complete turf grass establishment is essential for the success of this drainage liner project, the Contractor shall be responsible for establishing at least 85% coverage of grass prior to receiving full payment. The Contractor shall maintain the grass and liner(s) and repair any eroded areas at no additional cost to the Owner until 95% grass coverage is achieved.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. When listed on the Bid Form as a separate bid item, measurement of seeding, mulching, fertilizer, sodding and lining shall be as noted on the Bid Form for material in place and installed in accordance with these Specifications. When not listed as a separate bid item no measurement of quantity will be made but quantity shall be considered as an absorbed cost to be included in the unit bid price for the item involved.

4.02 PAYMENT

A. When listed on the Bid Form as a separate bid item, payment for seeding, mulching, fertilizer, sodding and lining shall be as noted on the Bid Form for material accepted in place and shall constitute full compensation for furnishing all material, labor, tools, equipment and incidentals and for performing all hauling, placing and other operations necessary to complete the work in accordance with the Contract Specifications. When not so listed as a separate bid item, seeding, mulching, fertilizer, sodding and lining shall be considered as an absorbed cost item and no separate payment shall be made.

END OF SECTION

SECTION 02600

WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.01 DESCRIPTION

A. The work to be performed under these specifications consists of furnishing all materials and performing all work necessary for or incidental to completing and making ready for the operation of water distribution system as indicated on the Contract Drawings.

B. The work shall also include the furnishing, transporting and stringing of pipe; furnishing, transporting, storage and protection of valves, meters, fittings and all other materials that may be required for construction of the facility; ditching, shoring, backfill, installation of pipe, valves, fire hydrants, fittings, other appurtenances, and operations necessary to complete the work in accordance with the requirements of these specifications.

1.02 COORDINATION WITH INTERESTED PARTIES

A. The Contractor shall duly notify and coordinate any work with interested parties such as the Mississippi Department of Transportation, the Mississippi State Department of Health, or other utility companies. No work that affects these interested parties will commence until satisfactory coordination has been achieved.

1.03 CLEARANCE BETWEEN WATER AND SEWER LINES

A. Water mains shall be laid at least 10 feet horizontally and 18 inches vertically (water over sewer) from any sanitary sewer line or manhole.

B. Where this 10 feet horizontal separation cannot be maintained, the water line shall be ductile iron with water tight joints located at least 10 feet from the sewer line.

C. Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer (water over sewer). The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints.

1.04 CONFLICTS WITH OTHERS UTILITIES

A. Where construction conflicts with underground utilities which are to remain in place, or indicated to be removed and/or relocated by the Contractor, the Contractor shall at his own expense, protect these facilities, restore the portions

of those lines which are damaged or served as a result of his operations, and remove and/or relocate existing facilities as indicated on the Contract Drawings.

B. Where existing lines in conflict are indicated to be removed by others, the Contractor shall cooperate with the Owner of these utilities to the end that these conflicts are removed prior to excavation for the waterlines.

1.05 MAINTENANCE

A. The Contractor shall be responsible for, without extra compensation, the maintenance of all water lines and structures, for the stability of all backfills and the finished grades above the water line and around the structures and for the repair, replacement, and restoration of all items which were damaged or removed during construction.

B. The Contractor shall be responsible for, without extra compensation, the restoration of all permanent surfaces and landscaped areas such as pavements, sidewalks, driveways, curbs, gutters, shrubbery, decorative plantings, fences, poles, and other property and surface structures removed, disturbed and/or damaged during or as a result of construction operations to a condition which is equal in appearance and quality to the condition that existed before the work began.

C. The Contractor shall take such measures necessary to prevent, control and correct any dust nuisance or muddy conditions developing on roadways as a result of his operation. Direct payment for maintenance of the site shall not be provided as such but shall be considered a subsidiary obligation of the Contractor.

1.06 TRAFFIC CONTROL

A. Traffic control shall be the responsibility of the Contractor and should be implemented in accordance with the Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.

1.07 TEMPORARY SURFACE OVER TRENCHES

A. Whenever the water lines are constructed under traveled roadways, driveways, sidewalks or other traveled surfaces, a temporary surface shall be placed over the top of the trench as soon as possible after the placement and compaction of the back fill has been satisfactorily completed. The temporary surface shall consist of a minimum of six inches (6”) of clay gravel. The top of the temporary surface shall be smooth and meet the grade of the adjacent undisturbed surface. The temporary surface shall be maintained at the Contractor’s expense until final restoration of the street surface is completed as specified.

1.08 STORAGE OF MATERIALS

A. The Contractor shall store materials in a safe, well-protected area. Care should be taken to prevent contamination of stored materials prior to installation. The areas should be well drained and protected against storm water runoff that could come into contact with the stored materials. Covers or tarps should be used to prevent wind blown contamination from pesticides, herbicides, or other windblown particles that could contaminate stored materials. Should it be determined that the stored materials have become contaminated, the Contractor shall dispose of the contaminated materials in an acceptable manner and secure new materials for the construction of the project at no additional cost to the owner.

PART 2 MATERIALS

2.01 GENERAL

A. The Contractor shall furnish all materials necessary for or incidental to constructing the water distribution system. All materials shall be new and of first quality with certified tests for all pipe and pipe fittings made at the manufacturer's plant to assure conformance with these technical specifications. Two (2) certified copies of each test result shall be furnished to the Engineer.

B. The kinds and classes of materials incorporated into the work shall be as indicated on the Contract drawings or the Bid Form. The Contractor shall not construe or interpret the several kinds of materials described herein as being equal in their application.

2.02 WATER FOR CONSTRUCTION AND TESTING

A. The Contractor shall be responsible for all water needed in constructing the work, flushing the completed system, testing and other incidental needs. All water used shall be from an approved source free of pollution and shall be of a satisfactory bacteriological quality.

B. Water used in mixing concrete and mortar shall be fresh, clean and free from injurious amounts of sewage, oil, acid, alkalis, salts or organic matter.

2.03 PIPE, COUPLINGS AND ACCESSORIES

A. Polyvinyl Chloride (PVC) Pipe:

1. All PVC pipe and fittings four (4”) inches and larger in diameter shall conform to the latest edition of AWWA C-900 and shall be made from Class 12454-A or B materials per the latest edition of ASTM D-1784. Pipe shall be a minimum of SDR 18 unless otherwise specified, for a working pressure rating of 150 PSI. All pipe shall conform with the outside diameter (OD) dimensions of ductile iron pipe to facilitate use of DIP fittings, standard cast iron valves and specials. All joints shall be elastomeric seals conforming to the latest edition of ASTM F-477. All pipe shall bear the seal of the National Sanitation Foundation

(NSF). All jointing shall be made in accordance with the manufacturer's recommendations.

2. All PVC pipe three (3") inches to (1-1/2") inches in diameter shall conform to the latest edition of ASTM D-2241 and shall be made from Type 1120 material. Pipe shall be a minimum of SDR 26 unless otherwise specified, for a working pressure of 150 PSI. All joints shall be integral bell gasket in accordance with the latest edition of ASTM D-3139. Pipe shall bear the seal of the NSF. All jointing shall be made in accordance with the manufacturer's recommendations.

3. All PVC pipe (1") inch and smaller in diameter shall conform to the latest editionof ASTM D-2241 and shall be made from Type 1120 material. Pipe shall be a minimum af SDR 26 unless otherwise specified, for a working pressure of 150 PSI. All joints shall be solvent weld in accordance with latest edition of ASTM D-2855 with the solvent cement conforming to the latest edition of ASTM D-2564. All pipe shall bear the seal of the NSF. All jointing shall be made in accordance with the manufacturers recommendations.

B. Ductile Iron Pipe:

1. All pipe shall be centrifugally cast in metal or sand lined molds manufactured in accordance with the later edition of ANSI A21.51 (AWWA C-151). Pipe shall be class 350 Ductile Iron unless otherwise specified. All pipe and fittings shall be tested for minimum 150 PSI water working pressure laying conditions Type 2 flat bottom trench without blocking, tamped, backfilled and under five (5) feet of cover. All pipes and fittings shall be factory coated on the outside with coal tar enamel conforming to the latest edition of A 21.5 and lined inside with a minimum of 1/16 inch cement lining in accordance with the latest edition of ANSI A 21.4 (AWWA C-104).

2. Ductile iron pipe installed pursuant to these specifications shall be encased with an 8 mils thick loose polyethylene encasement in accordance with the latest edition of A 21.5 (AWWA C-105).

3. Joints for ductile iron pipe shall be slip on type unless otherwise specified. All joints for fittings, valves and specials shall be mechanical joints. Slip on pipe joint for ductile cast iron pipe shall conform to the latest edition of ANSI A 21.11 (AWWA C 111) except that the joints shall be made with a special gasket seal Super-Bel Tite as manufactured by Clow Corporation or approved equal. Lubricants shall be non toxic, odorless, tasteless and shall not support bacteria and shall be specifically manufactured for the pipe utilized. Mechanical joint pipes shall conform to the latest edition of ANSI A-21.11 (AWWA C-111).

4. All fittings shall be cast from ductile iron in accordance with ANSI/AWWA C153/A21.53. Fittings shall be listed by an approved certifying agency as conforming to the requirements of ANSI/NSF 61. The working pressure rating shall be 350 psi.

5. All fittings shall be tar coated outside and cement lined inside in accordance with the latest edition of AWWA C-104 (ANSI 21-4), except cement lining may be half of thickness (enameline type) with bituminous seal coating, per Federal Specification WW-PO42A where approved by the Engineer.

C. Valves:

1. Gate Valves: All gate valves shall comply with the latest edition of AWWA C-500 as manufactured by Mueller, American Darling or approved equal. Gate valves shall be iron body, fully bronze mounted, double disc, parallel seat, non-rising stem, and shall open counterclockwise. All gate valves shall have a maximum working pressure of 200 PSI and be tested at 400 PSI. The thrust collar and other bearing surfaces shall be permanently lubricated with oil. The disc mechanism shall be designed so that the seating pressure is applied equally at multiple separate contact points near the outer edge of each disc by a bronze or alloy wedging mechanism. Gate valves shall be equipped with mechanical joint connections unless otherwise specified.

2. Check Valves: All check valves shall be iron body, spring loaded, swing type with straight away passage of full pipe area and renewable bronze seat ring with resilient faced disc. Valves shall be as manufactured by Mueller, American Darling or approved equal.

3. Butterfly Valves: All butterfly valves shall be designed for buried service and in accordance with AWWA C504. The valve shall be rubber seated and operate under a 100 psi working pressure and a test pressure of 250 psi. All valves shall be as manufactured by the Henry Pratt Company or an approved equal.

4. Pressure Relief Valves: Pressure relief valves shall be installed as shown on the plans or as directed by the Engineer, and shall be a Model 66-D, as manufactured by GA Industries or an approved equal.

5. Air Release Valves: Air release valves, shall be installed at high points on the lines as shown on the plans or as directed by the Engineer and shall be 1" Crispin Universal, with Protectop, or an approved equal.

6. Blow-Off Valves: Blow-off valves shall be placed on all dead end lines or as directed by the Engineer and shall employ an American made 1-1/2" AWWA approved bronze gate valve, pressure rated at 125 psi, a meter box, marker, and all fittings and piping as shown on the typical detail sheets.

7. Valve Boxes: Valve boxes shall be installed on valves 2" and larger. Boxes shall be cast iron with a 5-1/4" shaft adjustable to appropriate height to be flush with ground, and with the correct base for each size valve. The boxes shall be as manufactured by Harper, M&H, or approved equal with a cast iron drop-in lid marked "water" or the letter “W”.

8. Valve Operating Wrench: Contractor shall supply two operating wrenches in lengths to be approved by the Engineer. Wrenches shall be No. 24610 as manufactured by Mueller Company, or approved equal.

9. Pressure Reducing Valves: Pressure reducing valves shall be installed as shown on the Contract Drawings or as directed by the Engineer and shall be:

    a. Clayton Model 90, G.A. Industries Model No. 4500 D, adjustable within the range shown on the Contract Drawings or approved equal.

    b. Individual service size valves shall be Model No. 43-D, complete with strainer, as manufactured by G.A. Industries or approved equal. The entire individual pressure reducing assembly will be installed in a separate meter box as shown on the typical detail sheet. In addition to the pressure reducer and strainer, the assembly shall also include a 3/4" union and a 3/4" AWWA approved gate valve as manufactured by Crane Valve Company (No. 410), or approved equal. The entire reducer assembly shall be installed as a unit in front of the meter assembly and set to discharge at 60 psi.

D. Fire Hydrants:

1. Fire hydrants shall be Mueller Model Centurion, American-Darling Model B-84-B or approved equal. Hydrants shall be of the compression type with a 5 1/4 inch valve opening. All hydrants shall be nominal 6" size, 3-way construction with one 4-1/2" pumper nozzle and two 2-1/2" hose connections. Nozzle threads shall be National Standard unless otherwise specified. The depth of bury shall be 4 feet unless otherwise specified.

2. Hydrants shall be furnished with a sealed oil reservoir located in the bonnet so that all threaded and bearing surfaces are lubricated when the hydrant is operated. Hydrant shall be furnished with a breakable feature that will break cleanly on impact and shall consist of two part breakable flange with a breakable stem coupling.

3. Hydrants shall be wire brushed as needed and painted one coat of red lead paint and two coats of epoxy paint of the color specified by the Engineer.

E. Service Piping:

1. Service piping shall be as specified on the Bid Form and shall be conform to the applicable AWWA/ASTM/ANSI Standards and designed for working pressure compatible with the water mains specified above:

    a. Copper Service Line: Copper service line shall be seamless copper tubing suitable for underground water services. This material shall

be supplied in conformance with ASTM Specification B-88-62 "Type K".

b. PVC Service Line: PVC service pipe shall be solvent weld in accordance with the National Sanitary Foundation (NSF), Class 200 pipe, or use with potable water.

c. Polybutylene Service Line: Polybutylene service pipe shall be PB 2110 and approved by the National Sanitary Foundation (NSF) for use with potable water.

F. Water Meters and Meter Boxes:

1. Water meters shall be magnetic-drive with hermetically sealed registers indicating gallons, 5/8" X 3/4" for residential service and 1" X 1-1/2" for commercial and heavy farm use. They shall be positive displacement meters as manufactured by Rockwell Manufacturing, Neptune Meter Company, Hershey Products, Inc., or an approved equal.

2. Meter boxes shall be cast iron, concrete, or plastic and be approximately 12" x 18" x 12" deep. Prior approval by the Engineer will be required.

G. Copper Meter Yokes: Copper meter yokes shall be as manufactured by the Mueller Company or approved equal, with lock-wing stop.

H. Corporation Stops and Curb Stops: Corporation stops and curb stops shall be as manufactured by Mueller Company or approved equal.

I. Service Clamps: Service clamps shall be double strap design as manufactured by Mueller Corporation or approved equal. All service connection on PVC mains shall be equipped with service clamps unless otherwise noted.

J. Branch Connections: Branch connections shall be as manufactured by Meuller Company or equal.

K. Specials: Specials shall be of the same material as the pipe material being used or as approved by the Engineer. The term specials shall include plugs, caps, and other items as needed. Specials shall conform to the applicable AWWA/ASTM/ANSI Standards and shall be designed for the working pressure of the water mains on which they are being installed.

2.04 OTHER MATERIAL

A. Concrete: Concrete shall be in accordance with Section 03300, Concrete, and shall develop a compressive strength of 3,000 pounds per square inch at twenty-eight (28) days.

B. Steel Casing: The steel casing pipe shall conform to ASTM designation A-53 and have an A.S.A. Standard thickness.

C. Tracer Wire: The Contractor shall install a 12 gauge solid coated copper wire parallel to all water mains. The wire shall be run up all valve boxes and terminated for future use while locating water mains.

D. Select Backfill Material: Select backfill material shall be as specified in Section 02200, Excavation and Backfill.

1. Select Bedding Material: Select bedding material for bedding all pipe shall be sand or selected sandy soil, all of which passes a 3/8 inch sieve and not more than 10 percent of which passes a No. 200 Sieve. Bedding material shall meet all requirements of Section 603.03.2 Class B Bedding in the Mississippi Standard Specifications for Road and Bridge Construction, 2004 Edition.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. The Contractor shall duly notify and coordinate all work local applicable governing authorities, the local Health Department, Mississippi Department of Transportation, utility companies and other interest parties. No work which affects these interested parties will commence until satisfactory coordination has been achieved.

B. Any time that the interruption of water service in the existing system is necessary because of operations under this Contract, the Contractor shall notify the Owner at least 48 hours in advance. Interruptions of water service shall not extend over night or through the weekend unless approved by the Owner and the Engineer.

3.02 EXCAVATION

A. The Contractor shall perform all excavation of every description and of whatever substances encountered to the depth specified in the Contract drawings or as directed by the Engineer. All trenches shall be excavated to a depth to maintain the following minimum cover over the installed pipe:

1. 36” for ordinary conditions
2. 42” for farm areas and under existing creeks or ditches
3. Trenching within highway or railway right-of-way will be in strict accordance with the permit on file with the Engineer.

B. The bottom of all trenches shall be carefully shaped, graded and aligned. Care shall be taken not to excavate below the depth specified; however, in the event this should occur, the bottom of the trench shall be filled back to grade with

approved material and thoroughly compacted in a manner satisfactory to the Engineer.

C. When conditions dictate bell holes of ample size shall be cut under and around all joints to provide adequate room for making joints and to assure that the barrel of the pipe rests uniformly and in continuous contact with the supporting ground for its entire length.

D. When rock is encountered, the Contractor shall excavate to a depth at least four inches (4") below the required grade and backfill to grade with four inches (4") of sand cushion.

E. Water will not be permitted in the trenches while the pipe is being laid. The Contractor shall not open up more trench than the available pumping facilities are able to dewater to the satisfaction of the Engineer.

F. A tolerance of six inches (6") from the established grade may be permitted, if approved by the Engineer, in order to prevent excessive breaks in alignment at the joints to such an extent that the joints cannot be properly made.

G. Should conflicts in grade occur with other utilities, the water line grade shall be changed to avoid the conflict in a manner acceptable to the Engineer.

H. Excavated material from trench and structure excavation suitable for backfill shall be placed compactly on the sides of the excavation and kept up so as not to endanger the work and be of as little inconvenience as possible to the public travel and abutting property, and so that free access is provided at all times to fire hydrants and water valves in the vicinity of the work. Any material encountered in the excavation which, in the opinion of the Engineer, is of such unsuitable nature as to be incapable of proper consolidation or is otherwise unsuitable for use in the work, shall be removed and wasted as directed and not stockpiled along the side of the excavation.

I. The disposal of all surplus and unsuitable excavation shall be the responsibility of the contractor at his own expense. The surplus and unsuitable material not to be used in the construction of the project shall not be left on the right-of-way or easement of the project, nor adjacent thereto.

3.03 SHEETING AND BRACING

A. The Contractor shall furnish and place, to the satisfaction of the Engineer, such sheeting and bracing as may be required to support the sides of the trench and to protect the workmen and pipe or adjacent structures from injury by the sloughing off or caving in of the trenches.

B. Approval of protective sheeting and bracing by the Engineer will not extend to the Engineer any liability for such protective measures that later proves defective.

C. The sheeting and bracing may be removed as the trench is backfilled, or may be left in place where necessary to prevent damage. In the event the sheeting or bracing is left in place, it shall not extend nearer than one foot (1') to the surface of the ground.

D. In no case will extra compensation be allowed for furnishing, placing or removing any sheeting and bracing; but the cost of this work shall be included in the unit price bid for installing the pipe.

3.04 PIPE LAYING

A. Pipe, specials and fittings shall be carefully laid to the line and grade established on the Contract drawings or as directed by the Engineer. All pipe shall be laid at such depth that a minimum cover is maintained as specified previously. Extra depth will not be measured unless noted on the Bid Form.

B. Pipe laying will not be permitted when trench contains water.

C. The bed for each piece of pipe is to be shaped either by trimming the bottom of the trench or by placing excavated earth therein and tamping so that each piece of pipe will have uniform bearing. The trench shall be further excavated around each bell or hub, if necessary, so that it will entirely be clear of the ground and leave ample room for making up joints.

D. The inside of the bells and the outside of the spigots shall be thoroughly cleaned before they are placed; the inside of the pipes shall be thoroughly swabbed to insure that all pipe is clean and free of obstructions and foreign matter until the work is completed.

E. Where pipe laying is stopped at the end of the day or for any other cause, the open end of the pipe shall be securely closed in order to prevent the entrance of water, mud or any other objectionable matter.

F. Thrust blocks shall be installed at all bends, and at all tees, caps, plugs and as otherwise directed by the Engineer. Thrust blocks will be of concrete.

G. At the end of all lines (dead ends) the line shall be equipped with a reducer and 1-1/2" Blow-Off valve.

3.05 MAKING JOINTS

A. All joints shall be constructed in accordance with the manufacturer's recommendations using the jointing materials, specials and lubricants specified by the manufacturer and approved by the Engineer.

3.06 SETTING FITTINGS, VALVES, HYDRANTS ANS SPECIALS

A. All fittings, valves, valve boxes, hydrants and other appurtenances shall be set at the location indicated on the Plans or as directed by the Engineer. Omission of any of these items shall be corrected by the Contractor without extra cost to the Owner. The addition of any of these items not shown on the plans and not requested by the Owner or Engineer which are installed without the expressed consent and agreement of the Engineer shall not be allowed for payment but shall be considered as absorbed costs to the Contractor. In addition, any fittings or specials installed by the Contractor purely for his convenience shall not be allowed for payment unless specifically approved by the Engineer. Valves and fittings shall be jointed to pipe as recommended by manufacturers.

B. All valves, including bypass valves, shall be provided with a valve box. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut with the cover flush with the pavement surface or such other level as directed. Valve box slabs or marker posts shall be provided where specified on the Drawings or as directed by the Engineer as an absorbed cost to the Contractor.

C. Hydrants shall be located as shown on the plans and in a manner that will provide complete accessibility and will prevent damage from vehicles. All hydrants shall stand plumb and shall have their pumper connections at right angles to the curb line. The Center of streamer nozzle shall be 18" above top of finished ground or top of curb where applicable. Where necessary, hydrant extensions shall be furnished at no additional cost to the Owner, to meet this requirement.

1. Each fire hydrant shall set truly vertical and securely braced with concrete or stone blocks until it is self standing. It shall be set on a stone or concrete slab not less than four (4) inches thick and not less than one square foot of surface area placed on well compacted soil surrounded by a minimum of seven (7) cubic feet of sound broken stone or clean gravel to permit free draining of the hydrant. The gravel or stone shall reach from the bottom of the trench to at least six (6) inches above the waste opening of the hydrant.

2. All hydrants, valves and fittings shall be anchored with steel all-thread rods (3/4" minimum) as indicated on the Plans or with anchor couplings approved by the Engineer.

3.07 SERVICE ASSEMBLIES AND SERVICE LINE INSTALLATION

A. Assemblies shall consist of a corporation stop, service clamp, curb stop and other appurtenances needed to complete the assembly in accordance with the Contract Drawings. They shall be installed in a good and workmanlike manner in the places designated on the Plans or as directed by the Engineer. The ends of the service shall be plugged, permanently marked with a metal "T" post, painted "Blue" and extending a minimum of 24" above finished grade. Ends of services shall be located from two property corners and shown on Contractor's record drawings also during the construction of the curb a "**W**" shall be inscribed into the curb at the service crossing locations.

B. Meter boxes, meters and service line shall be as specified herein and will be measured and paid for separately as detailed herein.

3.08 CONNECTION TO EXISTING MAINS

A. Where indicated on the Contract drawings, cut-ins must be made by the Contractor in order to make connection to existing water mains. The Contractor shall furnish all labor and materials and service required for the excavating, cuffing the existing mains, removal and relocation of sections of old pipe, de-watering the trench, connection main with the existing main and the setting of necessary fittings, specials and valves as shown on the Contract Drawings.

B. The Contractor shall provide temporary blocking and bracing properly placed to prevent movement or blowing off of any pipe, valves or fittings due to water pressure on the main. All connections shall be made in a most expeditious and workmanlike manner to cause the least inconvenience to water customers and to traffic, and shall be made at night unless otherwise approved by the Engineer.

3.09 BACKFILLING TRENCHES

A. Backfilling shall be carefully performed and the original surface restored, to the full satisfaction of the Engineer. The trenches shall be backfilled with fine, loose earth, free from large clods or stones, carefully rammed until enough has been placed to provide a cover of not less than 1 foot above pipe. The remainder of the backfill material in unpaved areas shall be placed in the trenches, and any excess materials shall be windowed over the trench. As settlement occurs, trenches shall be refilled, smoothed off, and made to conform to the surface of the ground until settlement ceases.

B. Backfill in roadways, drives or in areas to be paved shall be made as specified above except that fill above the pipe shall be deposited in layers not to exceed 6 inches. Such fill shall be compacted with mechanical tampers so that the compacted soil shall have a density of at least that of the undisturbed adjacent ground or 98% maximum optimum moisture density within 3% points of optimum moisture content.

3.10 TESTING

A. General:

1. Prior to final acceptance by the Owner and Engineer, the distribution lines must be tested for pressure and leakage in accordance with the requirements outlined herein.

2. All testing shall be performed in the presence of the Engineer or his Authorized Representative, and the Engineer shall be notified 24 hours in advance of the beginning of the test.

3. The Engineer or his Authorized Representative shall maintain a written record showing the results of testing for each section of line. The following information will be included as a minimum:

    a. Name of Owner, Engineer, and Contractor performing the work
    b. Identification of section being tested
    c. Date of test
    d. Length of section being tested and nominal diameter of pipe
    e. Test pressure in pounds per square inch gauge (p.s.i.g.)
    f. Duration of the test in hours
    g. Amount of water added during the leakage test in gallons
    h. Total number of leaks on the section being tested
    i. Date leaks were repaired
    j. Brand name of pipe used
    k. Pressure rating (SDR and p.s.i.)
    l. A similar set of data for any section of line that is re-tested

4. Tests shall be completed in accordance with the latest edition of AWWA C 600 except as modified herein.
5. The Contractor shall furnish the pump, pipe connections, fittings, gates, meters, and all necessary apparatus and shall furnish all labor and work required to make the tests. All costs of testing and re-testing(s) shall be borne by the Contractor and testing operations shall remain in operation until approved by the Engineer.

B. Pressure Test

1. Pressure Test Restrictions:

    a. A hydrostatic pressure of 150 p.s.i. shall be applied, and shall be based upon the elevation of the lowest point in the section.

    b. The duration of the test shall be not less than four (4) hours.

    c. Test pressures shall not vary by more than + or - 5 psi.

    d. Test pressures shall not exceed pipe or thrust restraint designs.

    e. Test pressures shall not exceed twice the rated pressure of valves or hydrants when these are used to isolate the test section.

    f. Test pressures shall not exceed the rated pressure of the valves if resilient-seated butterfly valves are used in the section being tested.

2. Pressurization: Each valved section of line shall be filled with water slowly and the specified test pressure as outlined in 1 above shall be applied by means of a pump connected to the pipe in a manner satisfactory to the

Engineer or his Authorized Representative. Where possible, the connection should be made at the lowest point in the section under test.

3. Air Removal: Before applying the specified test pressure, air shall be completely expelled from the pipe, valves, and hydrants. If permanent air relief valves are not located at the high points, the contractor shall install corporation stops at such points, so that the air can be expelled as the line fills with water. After the air has been expelled the corporation stops shall be closed, and the pressure applied. At the conclusion of the pressure test the corporation stops shall be removed and the holes plugged, or, at the discretion of the Owner they may be left in place.

4. Examination: All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valve, or hydrants that are discovered following the pressure test shall be repaired or replaced with like material and the test repeated until it is satisfactory to the Engineer or his Authorized representative.

C. Leakage Test

1. General: A leakage test should and normally will be conducted concurrently with the pressure test. Leakage is defined as the quantity of "make-up" water that must be injected into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after air in the pipeline has been expelled, and the pipe filled with water.

2. Allowable Leakage: No pipe installation should be accepted if the leakage is greater than that determined by the following equation:

   $L = NDP/7400$

   Where L= Allowable leakage in gallons per hour
   N= Number of joints in the length tested
   D= Nominal diameter of the pipe in inches
   P = Test pressure in pounds per square inch gauge (psig). This normally is 150 p.s.i.g. since most systems are designed for 80 p.s.i.g. working pressure. However, the test pressure may be more or less depending upon the design pressure for the section being tested.

3. Measurement of Water Used: Water which is introduced into the line to determine leakage may be measured by pumping water from a vessel of known volume, or, by use of a calibrated water meter. If a meter is used it must have the capability of accurately measuring the low flows which may be required to maintain the test pressure on the line. A displacement type meter with sweep hand dial is recommended. One complete revolution of the sweep hand should represent not more than ten gallons.

4. Acceptance: Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that shown in 2 above, the contractor shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.

3.11 STERILIZATION OF PIPELINES

A. General: Thoroughly disinfect all water pipe on potable water lines prior to being placed in service. Follow the applicable provisions of the procedure established for the disinfection of cast iron pipe as set forth in the latest edition of AWWA C651 entitled "Disinfecting Water Mains."

B. During the Construction: Workmen shall be required to use utmost care to see that the surface of parts of the structures, the inside of pipes, fittings, jointing materials, valves, and specials which come in contact with the Owner's water, are maintained in a sanitary condition. Every effort shall be made to keep the inside of the pipe, fittings and valves free of all foreign matter, sticks, dirt, rocks. As each joint of pipe is being laid, it shall be swabbed so that all foreign matter is removed. All fittings and exposed open ends of pipe shall be blocked or capped until the line is completed.

C. When the entire pipe line or certain selected sections thereof have been completed, tested and made ready for turning over to the Owner ready for use, the line or section of line shall be thoroughly sterilized according to the following procedure: The new pipe shall be disinfected by introducing HTH, Percloron, or a similar hypochlorite solution, through taps made by the Contractor. The water shall be turned into the mains slowly to allow a thorough mixing of the solution which shall be brought to a strength of 50 parts per million of available chlorine. All valves shall then be closed and the sterilizing solution permitted to remain in the pipe line section for not less than 24 hours, after which the mains shall be flushed thoroughly until a chlorine residual not exceeding two tenths (0.2) part per million is obtained.

D. Samples shall be collected under supervision of the ENGINEER or his Authorized Representative, using only approved bottles furnished by the State and will be tested by the State Health Department. **All samples shall be taken by a Registered Engineer, Certified Operator, or a representative of the Mississippi State Department of Health.** The Contractor shall arrange for the collection of samples from the end of each dead end line or from each major loop for bacteriological examination. The samples shall not have a chlorine residual higher than is normally maintained in the other parts of the distribution system. A copy of test results shall be furnished to the Owner and the results obtained shall be deemed conclusive. If the test shows satisfactory quality of water, the line so sterilized may then be placed in service. If the sample shows unsatisfactory quality of water the process of sterilization shall be repeated until a satisfactory water sample is obtained. All materials, testing and labor required for complete sterilization of the system shall be furnished by the CONTRACTOR at no expense to the OWNER.

3.12 DISPOSAL OF CHLORINATED DISINFECTING WATER

A. The Contractor shall be responsible for the disposal of the chlorinated water used for disinfecting mains under this contract. Chlorinated waters shall be dechlorinated to a residual concentration of no greater than 0.5 mg/l total residual chlorine prior to disposal to water courses, on land or through storm or sanitary sewers. The method of disposal shall be in conformance with requirements of the Mississippi Office of Pollution Control, the Mississippi Department of Health, and other state, federal or local agencies holding jurisdiction. The Contractor will provide written confirmation from these agencies that the method of disposal is acceptable and will provide licenses or permits required for the discharge of the dechlorinated water. The Contractor will comply with requirements of agencies having jurisdiction whether additional to or different from those included herein, at no additional cost to the Owner. Cost associated with disposal of chlorinated disinfecting water shall be considered incidental to the cost of the pipeline and shall be absorbed in the cost of the pipeline.

3.13 CLEAN-UP

A. In areas where the water mains have been backfilled, the Contractor shall clear the right-of-way and surrounding ground, and shall dispose of all waste materials and debris resulting from his operations. He shall fill and smooth holes and ruts and shall repair all miscellaneous and unclassified ground damage done by him and shall restore the ground to such a stable and suitable condition as may be reasonably required, consistent with the condition of the ground prior to construction.

B. Clean-up, including grading, disposal, dress work and other incidentals shall be completed by the Contractor at no additional cost to the Owner to the extent directed by the Engineer.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. When listed on the Bid Form as a separate bid item, measurement of the Water Distribution system shall be as noted on the Bid Form for material constructed in place and installed in accordance with these Specifications. When not listed as a separate bid item, no measurement of quantity will be made but quantity shall be considered as an absorbed cost to be included in the unit bid price for the item involved. **No separate measurement shall be made for testing.** Such testing shall be considered incidental to the completion of the work.

4.02 PAYMENT

A. When listed on the Bid Form as a separate bid item, payment for any part of the Water Distribution System shall be as noted on the Bid Form for material constructed and accepted in place and shall constitute full compensation for furnishing all material, labor, tools, equipment and incidentals and for performing all hauling, placing, construction and other operations necessary to complete the work in accordance with the Contract Specifications. When not so listed as a separate bid item, Water Distribution System shall be considered as an absorbed cost item and no separate payment shall be made.

Testing shall be an absorbed cost.

END OF SECTION

SECTION 02750

SANITARY SEWER SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.02 SUMMARY

A. In accordance with the requirements of these Specifications, the Contractor shall furnish and install materials and perform work necessary for or incidental to constructing a gravity flow sanitary sewer system complete and ready for use by the Owner.

B. The work shall include excavation, trenching and backfilling; furnishing and installing trench sheeting, shoring and bracing; furnishing and installing pipe, specials, services, manholes and related appurtenances; storage and protection of materials; testing, cleanup and other operations necessary to complete the work in accordance with the Specifications and Drawings.

C. Inspection, when used in this specification, means visual observation of materials, equipment, or construction work, on an intermittent basis, to determine that the work is in conformance with the contract documents and the design intent. **Such inspection does not constitute acceptance of the work, nor shall it be construed to relieve the Contractor in any way from his responsibility for the means and methods of construction or for SAFETY on the construction site.**

1.03 CONTRACTOR'S EQUIPMENT

A. The Contractor shall provide and maintain the equipment necessary to prosecute the work in an orderly and safe manner. The equipment shall consist of suitable units designed or selected to perform and expedite the work and incidental items of construction.

1.04 CONFLICT WITH OTHER UTILITIES

A. Where the location of the sewer is not clearly defined by dimensions on the Drawings or unless otherwise directed by the Engineer, the sewer shall not be laid closer horizontally than ten feet (10') to a water supply main except that where the bottom of the water pipe will be at least eighteen inches (18") above the top of the sewer pipe, horizontal spacing may be a minimum of six feet (6'). **Water and sewer pipe shall NOT be laid in the same trench.** Where gravity flow sewers cross above water lines, the sewer pipe, for a distance of ten feet (10') each side of the crossing,

shall be either ductile iron pressure pipe without any joint closer horizontally than eight feet (8') to the crossing or shall be fully encased in concrete.

B. Where sewer construction conflicts with underground utilities which are indicated to remain in place, the Contractor shall be fully responsible for protecting these facilities and for restoring the portions of those lines which are damaged or severed as a result of his operations. Where existing lines in conflict are indicated to be removed by others, the Contractor shall cooperate with the Owner of these utilities to the end that these conflicts may be removed prior to excavation for the sewers.

1.05 MAINTENANCE

A. The Contractor shall be responsible for, and without extra compensation, the maintenance of all sewers ad structures to the lines and grades established for the construction, for the stabilities of all backfill and finished grades above the sewers and around the structure, and for the repair and replacement of all items which were damage or removed during the construction.

1.06 WARRANTY

A. The contractor shall warrant all materials of construction and repair and all workmanship for a period of one (1) year from the date of final acceptance of the work.

B. Should defects or failures occur during the period of warranty, the Contractor shall promptly take whatever steps are necessary to return the work to first class condition.

1.07 PROTECTION OF PROPERTY

A. General: Existing power lines, telephone lines, trees, property corners or monuments, shrubbery, fences, water mains, gas mains, sewers, cables, conduits, ditches, embankments and other structures in the vicinity of the work not authorized to be removed shall be supported and protected from injury by the Contractor during the construction and until completion of the work affecting them. The Contractor shall be liable for damages done to such existing facilities and structures, as herein provided, and he shall save the Owner harmless from liability or expense for injuries, damages or repairs to such facilities. No additional compensation will be allowed for any operations of the Contractor in completing the work near, over, under or around existing utilities unless otherwise specified.

B. Underground Utilities: The type, size, location and number of known underground utilities have been shown on the Drawings; however, no guarantee is made as to the true type, size, location or number of such utilities. It shall be the responsibility of the Contractor to verify the existence and location of underground utilities along the route of the work. The omission from, or the inclusion of utility locations on the Drawings is not to be considered **as the nonexistence of** or **a definite location of** existing underground utilities. The Contract unit prices bid

shall provide full and complete compensation for operations necessary to complete the work in accordance with the Drawings and Specifications in working near, over, under or around existing utilities unless specified otherwise.

C. Relocation of Existing Utilities:

1. The Contractor shall notify the Owner or Owners of the existing utilities, whether above the ground or underground; prior to proceeding with trench excavation whenever such trenching operations are within ten feet (10') of any existing utility.

2. In the event that during construction it is determined that underground utilities, including sanitary sewers, water mains, gas mains, telephone cables, storm sewers, etc., and above ground utility facilities require relocation, the Contractor shall notify the utility Owner well in advance of his approach to such utility so that arrangements for such relocation by the Owner or the Owners of the affected utility can be completed without delay to the Contractor's work.

3. Should a utility be damaged in the trenching operations, the Contractor shall immediately notify the Owner of the utility, the project Owner and Engineer. If the damaged utility transports hazardous material, electricity, or type material carried is not known, the Contractor shall also notify appropriate Emergency Operations Agency and Law Enforcement Agency. **The Contractor shall not attempt to make repairs unless so authorized, in writing, by the affected utility owner. Duplicate copies of written authorization given to the Contractor to make repairs shall be filed with the Engineer and shall be so worded as to save harmless the Owner and Engineer of responsibility relative to the sufficiency of the repairs.**

D. Landscape Vegetation: Reasonable care shall be taken during construction to avoid damage to landscape vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

1.08 RAILROAD AND HIGHWAY CROSSING

A. Work incidental to the construction of sewer lines under streets, railroads, highways, driveways or parking areas shall be done in strict compliance with the regulations prescribed by the Owners of these properties and shall be done with extreme care to safeguard life and property. After the necessary permits and agreements for these crossings have been approved and executed, the Contractor shall confer with the representatives of the Railroad Company, the Mississippi Department of Transportation, the City or County, or the Owner of these properties and arrange schedules and the manner for constructing the work in accordance therewith. In general, the sewer pipe will be installed in steel casing or

steel lined tunnels at all railroad, street and highway crossings unless otherwise specified.

1.09 APPLICABLE DOCUMENTS

A. The following publications form a part of this Specification and where referred to by basic designation only, are applicable to the extent indicated. Reference is to the latest edition of each unless specified otherwise.

1. **American Society of Testing and Materials (ASTM)**

a. C-76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
b. C-443 Joints for Circular Concrete Sewer and Culvert Pipe.
c. C-478 Precast Reinforced Concrete Manhole Sections.
d. D-3034 Type PSM - PVC Sewer Pipe and Fittings.
e. D-3212 Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
f. D-2321 Underground Installation of Flexible Thermoplastic Sewer Pipe.
g. F-477 Elastomeric Seals for Joining Plastic Pipe.

2. **American Water Works Association (AWWA)**

a. C-151 Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds.
b. C-111 Joints for Ductile Iron Pipe, Rubber Gasket.
c. C-110 Gray Iron and Ductile Iron Fittings.
d. C-301 Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids.
e. C-304 Design of Prestressed Concrete Cylinder Pipe.

B. Local Building Codes: City, County, States or Federal Codes applying to the work.

C. Mississippi Department of Transportation Standard Specifications for Road and Bridge Construction, 2004 edition: Sections as referenced herein.

1.10 SUBMITTALS: The Contractor shall submit testing reports, manufacturer's certifications, shop drawings, manufacturer's catalogs, specification sheets and other incidentals, to the Engineer, prior to ordering material.

PART 2 MATERIALS

2.01 GENERAL

A. The Contractor shall furnish all materials necessary for or incidental to constructing a wastewater collection system. All materials shall be new and of first quality with certified tests for all pipe and fittings made at the

manufacturer's plant to assure conformance with these Technical Specifications. Two certified copies of each test result shall be furnished to the Engineer.

B. The kinds and classes of materials incorporated into the work shall be designated by the Engineer. The Contractor shall not construe or interpret the several kinds of materials described herein as being equal in their application for the project.

2.02 WATER FOR CONSTRUCTION AND TESTING

A. The Contractor shall be responsible for water needed in constructing the work, flushing the completed system, testing and other incidental needs. Water used shall be from an approved source relatively free of pollution and shall be of a satisfactory bacteriological quality.

B. Water used in mixing concrete and mortar shall be fresh, clean and potable, suitable for drinking.

2.03 SANITARY SEWER PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings - PVC sewer pipe and fittings shall be unplasticized polyvinyl chloride meeting the minimum of SDR 26 of the requirements of ASTM Specification D-3034 and with a minimum "pipe stiffness" (F/Y = 115 psi at 5% deflection - maximum allowable for installed pipe for SDR 26) when tested in accordance with ASTM D-2412. All pipe and fittings shall be joined by means of an integral wall bell and spigot joint and sealed with a rubber ring conforming to ASTM D-3212. The pipe and fittings shall be shipped to the job with a solid cross section rubber sealing ring securely locked in place in the bell.

The pipe shall be made from white PVC compound having physical properties and chemical resistance of cell classification 12454-B and fittings shall be made from white PVC compound having physical properties and chemical resistance of cell classifications 12454-B, 12454-C or 13343-C as defined in ASTM D-1784

Maximum trench width shall be the outside pipe diameter plus 24 inches. Minimum trench width shall be computed as the outside diameter of the pipe plus sixteen (16) inches.

PVC pipe shall be limited to the maximum trench depths shown in the following Table:

MAXIMUM TRENCH DEPTHS FOR PVC PIPE

Pipe Type	Pipe Diameter	Maximum Depth to Invert of Pipe	
		Bedding Designation	
		Class "B"	Class "C"
SDR 26	6"	20.0'	14.0'
SDR 26	8"	20.0'	14.0'
SDR 26	10"	20.0'	14.0'
SDR 26	12"	20.0'	14.0'
SDR 26	15"	20.0'	14.0'
SDR 26	18"	20.0'	14.0'

B. Ductile Iron Pipe - Ductile iron pipe shall be water pipe manufactured in accordance with the American national Standards Institute, Incorporated's ANSI Standard Specification A 21.51. The metal thickness for the various classes of ductile iron pipe shall not exceed the depth set forth in the following Table:

MAXIMUM COVER FOR DUCTILE IRON PIPE

Pipe Size	Pressure class	Thick. Inches	Work Press.	Maximum Cover to Top of Pipe, in Feet				
				Class 1	Class 2	Class 3	Class 4	Class 5
8	350	0.25	350	16.0	20.0	25.0	34.0	50.0
10	350	0.26	350	11.0	15.0	25.0	34.0	50.0
12	350	0.28	350	10.0	15.0	19.0	28.0	45.0
14	250	0.28	250	----	11.0	15.0	23.0	36.0
16	250	0.30	250	----	11.0	15.0	23.0	34.0
18	250	0.31	250	----	10.0	14.0	22.0	31.0
20	250	0.33	250	----	10.0	14.0	22.0	30.0
24	200	0.33	200	----	8.0	12.0	17.0	25.0
30	150	0.34	150	----	----	9.0	14.0	22.0
36	150	0.38	150	----	----	9.0	14.0	21.0

C. All ductile iron pipe shall be coated outside with a standard bituminous coating and cement lined inside in accordance with ANSI Standard Specification A-21.4.

D. Rubber gasket joints for ductile iron pipe shall be either the push-on type or mechanical joint type as specified, conforming to the requirements of ANSI A-21.11.

2.04 PIPE MARKING

A. General:

1. Each piece of pipe or fitting shall be clearly marked with a designation which shall conform with designations shown on the shop drawings.

2. Class designation shall be cast or painted on each piece of pipe or fitting four inches in diameter and larger.

3. Piping, smaller than four inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

B. Magnetic Underground Warning Tape:

1. Contractor shall place magnetic warning tape approximately 12 to 18 inches below grade in all pressure pipe trenches.

2. Buried sewer force main warning tape shall bare the message, “CAUTION – BURIED SEWER LINE”. The warning tape shall be three inches wide and have a green background with black lettering in color.

2.05 EPOXY LINING FOR CONCRETE PIPE AND MANHOLES

A. General - All interior and joint surfaces of each precast concrete manhole section, concrete pipe section, fitting and special shall be prepared, coated and cured as necessary to complete the installation of a coal tar epoxy lining system or a 100% solids epoxy lining system (or as called for in the plans) in each cured concrete unit at the concrete casting facilities. No exterior surface coatings will be required. Before coating work is commenced, the Contractor shall submit to the Engineer the proposed coating suppliers complete materials, data sheets and application specifications specifically prepared for the particular application.

All surface preparation, coating applications, curing and all other coating materials and procedures shall be in full compliance with the coating suppliers specifications and specified herein and as consistent with good coating practices. All safety precautions shall be carefully observed. All coating work including plant and field corrective work shall be done under the full-time supervision and inspection of a representative of the coating supplier. The Contractor shall furnish an affidavit from the coating supplier that each pipe length, fitting or special has been coated in accordance with the Specification prior to installation.

B. Materials - All material used in the application of the coating shall comply with the requirements specified herein and are subject to the approval of the Engineer of complete materials data sheets and application specifications. Protective coatings shall be either Porter Coatings Tarset C-200, Amercoat Number 78, Koppers Bitumastic Number 300-M, or an approved equal used with approved epoxy structural paste adhesive, primers and thinners.

C. Surface Preparation - All precast concrete units shall be thoroughly cured. Under no circumstances shall the specified lining system be installed on "green" concrete. Surfaces to receive the specified coating system shall not be treated with any curing compounds, surface hardeners, release agents or other chemical compounds. All precast concrete section surfaces to be prepared and coated shall be essentially free of voids, cracks, inclusions or other structural defects.

Any such defects shall be corrected by bagging or brushing the wet formed concrete or cement grouting the cured section. All grouting must be allowed to thoroughly cured before any coating is applied. The surfaces to be prepared and coated shall be smooth or lightly profiled. The surfaces shall not be extremely rough or deeply textured nor shall they bear exposed aggregate. All mortar fins, concrete splatter and other protrusions shall be removed by appropriate means. Prior to applying specified coatings, concrete surface shall be clean and properly prepared as specified herein and shall be dry to the extent that the surfaces to be coated are visibly dry and the concrete contains no greater than 10 percent (10%) moisture as determined by measurement with a suitable moisture meter.

Surfaces to be coated shall be clean and dry. All grease, oil, dirt, salts and other foreign matter shall be removed by steam or detergent cleaning. Any such areas shall be allowed to thoroughly dry before any further surface preparation is performed. All surfaces to be coated shall be uniformly brushed sandblasted to the extent that all loose or unsound concrete and latents are removed. All necessary precautions shall be employed to avoid excessive sandblasting equipment, air pressures and abrasive to produce a uniformly blasted concrete surface that is clean and lightly etched. All blasted surfaces shall be patched with an epoxy structural paste adhesive, if required, and have the prime coat applied within eight (8) hours and before surface contamination or moisture absorption can occur. In order to avoid damaging previously applied coatings, work shall be scheduled such that complete units are sandblasted and coated.

D. Application - The surface temperature and moisture content of the precast concrete unit, air temperature and humidity and all other working conditions shall be in accordance with the coating suppliers specifications and recommendations, and thoroughly compatible with his coating materials.

The coating shall be applied by airless spray method, in three (3) coats, consisting of a prime, four (4) mils minimum dry film thickness, followed by two (2) coats each with a minimum dry film thickness of eight (8) mils, for a total minimum dry film thickness of twenty (20) mils.

The completed coating system shall be free of excessive runs, sags and rips, cracks, crazing, alligatoring, blisters, inclusions, excessive or deficient film thickness, voids, pinholes or other holidays, damaged areas or any other defects. Any such deficiencies shall be corrected by removal and recoating. Depending upon air circulation and relative humidity conditions, the coating system should be cured sufficiently hard to handle the minimal damage based on the surface temperature versus time schedule and shall be allowed to cure based on the surface temperature versus time schedule, all in accordance with the coating suppliers recommendations.

E. Surface Testing - Film Testing and Inspection-Surface temperature shall be determined with an appropriate dial thermometer. Pipe moisture content shall be determined by an appropriate moisture meter to assure proper condition of the surface before applying coatings. The primer and finish coats shall be

inspected for continuity, pinholes, bore areas and holidays, with a nondestructive field-calibrated sparking holiday detector. Dry film thickness shall be determined with a nondestructive dry film gauge. All instruments shall be recommended by the coating supplier.

F. Touch-up and Repair - Excessive runs, sags and drips, cracks, crazing, alligatoring, blisters and inclusions shall be completely removed by suitable scraping, chipping or grinding. Loose or poorly bonded coating and improperly cured coating shall be completely removed to a sound substrate by grinding or sandblasting. Excessive film thickness shall be reduced to below 20.0 mils by grinding or sandblasting. All deficient areas shall be stripped free of all surface contamination using clean rags soaked in specified thinner and cleaned areas shall be allowed to dry. The deficient area shall then be thoroughly abraded and the abrasion shall be "feathered" out slightly beyond the perimeter of the affected area. Small areas may be abraded by hand or power tool sanding using medium grit garnet or sandpaper. Extensive areas may be abraded by uniform brush sandblasting. All necessary precautions shall be employed, including temporary shielding where required to protect adjacent coatings from damage during sandblasting operations. All abraded areas shall be thoroughly swept clean and the specified coatings applied the same day and before contamination can occur. The prepared areas shall then be primed and finish coated as specified, except that all coatings shall be "feathered" out to the edge of the abraded area. The pipe shall be visually inspected at the job site, before installation. Field touch-up and repair, as specified above, shall be made by qualified workmen under the supervision and inspection of a representative of the coating supplier.

2.06 MANHOLE FRAMES AND COVER

A. Frames and cover for manholes shall conform to ASTM Standard Specifications A-48 for "Gray Iron Castings, Class 25".

B. Castings shall be manufactured to the sizes and shapes as illustrated on the Construction Drawings or as specified by the manufacturer's model number.

2.07 MANHOLE STEPS

A. Steps for manholes shall be coated corrosion resistant PS2-PF Step as manufactured by M. A. Industries Incorporated of Peachtree City, Georgia, or Oliver tire and Rubber Company of Oakland, California, rubber encased "Surefoot" Manholes Step; or approved equal.

2.08 MANHOLES

A. Concrete Masonry Manholes - Concrete masonry segmental units for construction of manholes shall be precast, solid segmental blocks of the sizes and dimensions as shown on the Plans and shall be made of Portland Cement, sand and gravel conforming to the requirements of material specified herein.

All units shall be sound and free from cracks, broken corner or other defects that would interfere with proper workmanship. Each segmental unit or varying size and shape shall be cast with an indented number to indicate its proper position in the manhole neck corresponding to the key plan or schedule furnished by the manufacturer.

The physical requirements of the units shall comply with the following:

COMPRESSIVE STRENGTH

MINIMUM PSI (AVERAGE GROSS AREA)		WATER ABSORPTION MAXIMUM PERCENT	
Average of 5 Units	Individual Units	Average of 5 Units	Individual Unit
2,500	2,000	8	10

Sampling and testing of concrete masonry units and all other requirements shall be as specified in ASTM Designation C-139 or latest revisions thereof. When required by the Engineer, reports or laboratory tests of the units shall be furnished by the supplier upon delivery.

B. Precast Concrete Manholes - Precast concrete manholes shall consist of precast reinforced riser sections, and eccentric cone or flat slab top section and a base section conforming to the typical manhole details as shown on the Plans.

Precast reinforced concrete manhole section shall conform to ASTM Serial Designation C-478 and shall have not more than two (2) holes for the purpose of handling.

Joints shall be concrete pipe joints formed with rubber gaskets or preformed plastic joint compound as shown on the Plans or as directed by the Engineer. Rubber gaskets and preformed plastic joint compound shall conform to the requirements set forth below.

Rubber gaskets shall be the "0" ring type conforming to the requirements of the latest edition of ASTM Standard Specification A-443. The gaskets shall be as manufactured by the Blue Ridge Company of Flecher, North Carolina, or the Tylox "0" Ring Gasket produced by Hamilton-Kent Manufacturing Company of Kent, Ohio, or approved equal. Lubricants used with the selected gaskets shall be as furnished or recommended by the gasket manufacturer.

Preformed joint compound shall be Preformed Asphalt and Butyl Gasket Material, a product of the Blue Ridge Rubber Company or "Ram-Nek" as manufactured by K. T. Snyder Company, Inc. of Houston, Texas, or "Kent-Seal" as manufactured by Hamilton-Kent Manufacturing Company, or equal.

All manholes shall be produced with crystalline concrete waterproofing admixture of the concrete.

2.09 CLEAN-OUTS

A. Clean-outs shall be as specified on the plan detail sheets.

2.10 CONCRETE

A. Concrete shall be composed of Portland Cement, water, fine and coarse aggregate, and an air-entraining admixture. The design of concrete mixtures will be based on securing (a) a plastic, workable mixture suitable for the specific conditions at placement, and (b) when properly cured, a product having durability, impermeability, and strength in accordance with all of the requirements of the design. The water content of all concrete mixtures shall be the minimum necessary to produce a workable mixture.

Fine aggregate shall consist of natural sand, manufactured sand, or a combination of natural and manufactured sands, and shall conform to ASTM C-33, "Specifications for concrete Aggregates."

Water used in mixing concrete shall be fresh, clean and free from injurious amounts of sewage, oil, acid, alkalis, salts, or organic matter.

Where transit or agitator-mix concrete is used, the concrete shall comply in every respect with these specifications. The use of such equipment for mixing and transporting concrete shall be in accordance with the applicable portions of ASTM C-94, "Specifications for Ready-Mix Concrete".

2.11 CRYSTALLINE CONCRETE WATERPROOFING

A. The concrete waterproofing admixture shall be of the cementitious crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete.

B. The design shall include the use of the crystalline waterproofing repair materials that generate a non-soluble crystalline formation in the concrete.

C. The manufacturers shall be the following:

1. . Xypex Chemical Corporation, Richmond, B.C., Canada.

2.. Equivalent materials as approved by the engineer 10 days prior to acceptance of bids.

D. The material shall be the following:

1. Xypex Admix C-1000-T containing red dye to ensure detection in the concrete.
2. Xypex Concrete

2.12 BEDDING AND BACKFILL MATERIAL

E. The pipe shall be installed in accordance with the requirements specified in Part 3, hereafter. Native material excavated from the trench may be used for backfill, where allowed by the Engineer from one foot above the top of pipe to the top of the trench. Such native material shall be non-organic, debris-free soil. Material required for select bedding and backfill is specified in paragraphs B and C hereafter.

F. Select Bedding and Backfill: Select bedding and backfill material shall be considered as material hauled in from off site. Material used in meeting this specification shall not be measured or paid for separately but shall be considered an absorbed cost item relative to the cost of pipe installation. Testing costs incurred for tests required to verify that material meets this Specification shall be borne by the Contractor.

1. Select Bedding: Select bedding material for bedding all pipe shall be sand or selected sandy soil, all of which passes a 3/8 inch sieve and not more than 10 percent of which passes a No. 200 Sieve. Bedding material shall meet all requirements of Section 603.03.2 Class B Bedding in the Mississippi Standard Specifications for Road and Bridge Construction, 2004 Edition.

2. Select Backfill: Select material for backfilling pipe trenches shall be select sand-clay material meeting the requirements of Section 02220.

PART 3 EXECUTION

3.01 GENERAL

A. The requirements set forth in this Section shall govern the installation and construction of the gravity main wastewater system.

B. The work required shall consist of excavation and trenching for open cut construction; installation of pipe, manholes, and appurtenances; backfilling; testing; repair and restoration of property; and final cleanup.

3.02 SITE PREPARATION

A. The Contractor shall prepare, on a timely basis, rights-of-way, easements and sites indicated on the Drawings for construction of the wastewater improvements. The work shall include clearing and grubbing, removal of structures and obstructions, and the removal of permanent surfaces and landscaping items designated to be restored upon completion of the installation.

B. Clearing and grubbing shall conform to the requirements specified elsewhere herein and shall include the removal of trees, roots, vegetation, structures and

obstructions unless separate pay items are specifically provided for on the Bid Form. The completion of clearing and grubbing shall leave the site clear and free from undesirable obstructions, ready for trench excavation.

C. The removal of permanent surfaces and the subsequent restoration of the surfaces shall be as set forth below and in other sections herein where applicable.

3.03 REMOVAL OF PAVEMENT, SIDEWALKS, DRIVEWAYS AND CURBS

A. Whenever the wastewater improvements are to be located along or across an improved surface, the width of the trench shall be held as nearly as possible to the maximum width specified below unless specified otherwise on the plans. Where brick or concrete pavement, sidewalk, driveway or curbing is cut, the width of the cut shall exceed the actual width of the top of the trench by twelve inches (12") on each side or a total of two feet (2'). Exposed surfaces of Portland cement or asphaltic concrete shall be cut with a pavement saw before breaking. Care shall be taken in cutting to insure that a straight joint is sawed.

NOMINAL SEWER PIPE DIAMETER (INCHES)	MAXIMUM TRENCH WIDTH (FEET)	MAXIMUM WIDTH OF PERMANENT SURFACE AND CURB & GUTTER REMOVAL (FEET)
12 or less	5.00	7.00
15	5.00	7.00
18	5.00	7.00
21	6.00	8.00
24	6.00	8.00
27	7.00	9.00
30	7.00	9.00
36	7.50	9.50

3.04 EXCAVATION AND TRENCHING

A. Excavation of every description and of whatever substances encountered shall be performed to the depths indicated on the Drawings or as otherwise specified. Excavation shall be done by open cut from the surface except when tunneling or boring is specified or directed in writing by the Engineer. Trench width shall be kept as narrow as practical to provide a safe working area and to minimize excavation, and shall be maintained in strict compliance with OSHA regulations.

B. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave ins. Excavated materials not required or not suitable for backfill shall be removed and wasted as directed by the Engineer. Grading shall be done, as necessary, to prevent surface water from flowing into trenches or other excavations. Water accumulating therein shall be removed by pumping or by other

approved methods. Temporary sheeting and shoring shall be used where necessary for the protection of the work and for the **safety of the personnel.**

C. During excavation, materials meeting select bedding and/or backfill requirements shall be either separately or selectively stockpiled for use as pipe bedding and pipe backfill material. Sand material shall be handled and stockpiled in such a matter to prevent mixing with clay material when rehandled for backfilling.

D. Excavation for manholes shall be sufficient to permit the carrying out of the construction as required. Care shall be taken not to excavate the manholes below the depth specified.

E. Trenches for sewer pipe and other appurtenances shall be of only such width as necessary for proper laying of the pipe. The net width of the trench at and below the top of the pipe shall be at least the pipe O.D. plus twelve inches but not more than the pipe O.D. plus twenty four inches. The width of the trench above this level may be as wide as necessary for sheeting, bracing, shoring or **for proper safe performance of the work.**

F. **The sides of the trench shall be maintained in strict compliance with OSHA regulations**.

G. The bottom of the trench shall be carefully graded, formed and aligned according to these Specifications and reviewed by the Engineer's observer before sewers are laid thereon. The bottom of the trench shall be hollowed under each pipe joint to conform to the shape of the pipe, and holes shall be cut for the bells, allowing the body of the pipe a uniform contact and support throughout its entire length.

H. The Contractor shall leave a minimum 2 foot berm width on each side of the trench between the trench and the excavated earth, to allow the free passage of workmen, the Engineer's representative and to permit work in a safe, expeditious and satisfactory manner.

I. No more than two hundred (200) feet of trench shall be opened in advance of the completed sewer, nor shall more than one hundred (100) feet be left unfilled except by permission from the Engineer. In special cases, the Engineer, when so requested by the Contractor, may waive the distance restriction to which the trench may be opened by notifying the Contractor in writing.

3.05 TUNNELING

A. Tunneling will be permitted only in short sections bys special permission of the Engineer. Wherever tunneling is permitted, the space between the pipe and the undisturbed earth shall be completely filled with sand and/or gravel or other suitable material thoroughly compacted.

3.06 SHEETING, SHORING AND BRACING

A. Sheeting, shoring, and bracing shall be furnished, placed and maintained by the Contractor as may be required to support the sides of the excavation. The Contractor shall be fully responsible for the sufficiency of such supports to prevent movement which can injure or delay the work or endanger or cause damage to adjacent pavements, buildings or other structures, channels and drainage structures, **or create undue hazards to workmen.** Where in the opinion of the Engineer, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place. **The material and installation requirements for sheeting, shoring and bracing shall be in accordance with applicable sections of the Mississippi Department of Transportation, Mississippi Standard Specifications for Road and Bridge Construction, 2004 Edition**.

B. Sheeting, shoring and bracing which are not ordered by the Engineer to be left in place shall be removed in such manner as not to endanger the constructed sewer or other structures, utilities or property. Voids left or caused by the withdrawal of sheeting shall be immediately refilled with sand by tamping with tools specifically adapted to the purpose, by watering, or otherwise as may be directed.

3.07 EXCAVATED MATERIAL

A. Excavated material from trench and structure excavation suitable for backfill shall be placed compactly on the sides of the excavation and kept up so as not to endanger the work and be of as little inconvenience as possible to the public travel and abutting property, and so that free access is maintained to fire hydrants and water valves in the vicinity of the work. Material encountered in the excavation which, in the opinion of the Engineer, is not suitable for use in the work, shall be removed and wasted as directed and shall not be stockpiled along the side of the excavation.

B. The disposal of surplus and unsuitable excavation shall be the responsibility of the Contractor at his own expense. Surplus and unsuitable material not to be used in the construction of the project shall not be left on the right-of-way or easement of the project, nor adjacent thereto, except by written permission of the affected property owner.

3.08 DEWATERING

A. The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of surface and ground water entering excavations, trenches or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built or the pipe to be installed therein is complete to the extent that no damage from hydrostatic pressure, flotation or other cause will result. The normal water table shall be restored to its natural level in such a manner as not to disturb the pipe and its foundation.

B. Excavations for concrete structures or trenches which extend down to or below static ground water shall be dewatered by lowering and keeping the ground water

level beneath such excavations eighteen inches (18") or more below the bottom of the excavation; except where the pipe is laid in an impervious strata, the lower trench section shall be maintained in a dry condition for bedding. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench.

C. Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent practicable without causing damage to adjacent property.

D. The Contractor will be held responsible for the carrying capacity of pipe or conduit which he may use for drainage purposes. Pipes or conduits shall be kept clean and free of sediment or other restrictions.

E. **No separate payment will be made for this item.**

3.09 PIPE PLACEMENT

A. General: Unless otherwise noted on the Drawings or directed by the Engineer, the bed for the pipe shall be so shaped that at least the lower quarter of the pipe shall be in continuous contact with the bottom of the trench.

1. When bell and spigot pipes or pipe couplings are used, spaces shall be cut to accommodate the bells or couplings. These spaces shall be deep enough to ensure that the bells or couplings do not bear the load of the pipes. When the pipes are laid, the barrel of each section of pipe shall be in contact with the quadrant shaped bedding throughout its full length, exclusive of the bell or coupling, to support the entire load of the pipe. Adjustments to line and grade shall be made by scraping away or filling in and compacting the earth under the body of the pipe and not by wedging or blocking up the pipe. Pipe shall not be laid on frozen ground.

2. Before pipe is laid in the trench, the section in which pipe is to be placed must be dry and must be kept dry while joints are completed. Pipes, prior to being lowered into the trench, shall be thoroughly inspected by the Contractor's forces so that when jointed in the trench, there shall not be shoulders or unevenness along the lower half of the pipe. The faces of spigot ends and shoulders in the hubs or sockets shall be true. Abnormal enlargements on these faces shall be cut away before the pipe is lowered into the trench.

3. The pipe shall be laid upstream, without breaks and with the bell end upgrade. Whenever the work ceases for any reason, the unfinished end of the pipe line shall be securely closed with a tight-fitted plug or cover. Pipe shall be so placed and maintained, that at the time of final acceptance of the project, the completed lines will be true to the established alignment and flow line grades.

4. Construction shall begin at the lowest point, or elevation, and the pipe shall be laid continuously upstream without omitting sections or reaches.

B. The installation and joining of pipe shall be in strict accordance with the applicable ASTM or AWWA Standards and the pipe manufacturer's recommendations.

C. The trench subgrade shall consist of firm, stable, non-organic, debris-free soil. In locations where trench excavation exposes unsuitable material, as classified by these specifications, or in the judgement of the Engineer, the subgrade shall be undercut as directed by Engineer for the full design width of the trench and backfilled with select bedding material meeting the requirements of Part 2.11, herein, and installed in accordance with the requirements of Part 3.10 hereafter. Such undercutting and select bedding material will be compensated in accordance with the requirement of Part 4, hereafter. **Select bedding material in the pipe envelope will not be considered for payment.**

3.10 PIPE BEDDING

A. The pipe shall be placed on compacted select bedding material shaped and placed on the trench bottom. The bedding material shall meet the requirements of Part 2.11 herein. Bedding shall be applied in loose lifts and compacted to a minimum of 98% standard Proctor maximum dry density, in accordance with ASTM D 698, to the level indicated on the detail shown in the construction drawings. The bedding materials shall also be installed within 3% of optimum moisture content.

3.11 PVC PIPE JOINT CONSTRUCTION

A. The bell and spigot ends of PVC sewer pipe shall be cleaned of all foreign material that could interfere with proper assembly of the joints. the spigot ends shall be cleaned one inch (1") beyond the joint assembly reference mark.

B. The spigot end of the pipe shall be thoroughly lubricated in accordance with the manufacturer's recommendation. the coating should be the equivalent of a brush coat of enamel paint and may be applied by hand, cloth, pad sponge or glove.

C. The lubricated spigot end shall be inserted into the bell keeping the pipe length in proper alignment. The bell shall be braced while the spigot end is pushed in under the rubber ring, so that previously completed joints in the line will not be closed up. The spigot end shall be pushed into the bell until the reference mark is flush with the end of the bell.

D. Generally, the installation and jointing of PVC pipe shall conform to the requirements of the latest edition of ASTM D-2321, "Underground Installation of Flexible Thermoplastic Sewer Pipe".

3.12 DUCTILE IRON PIPE JOINT CONSTRUCTION

A. The installation and joint of ductile iron pipe shall generally conform to the applicable provisions of AWWA Standard Specification C-600 for pipe laying.

B. Where mechanical joint pipe is used, the surfaces which come in contact with the gasket shall be thoroughly brushed with a wire brush just prior to assembly. The gasket should be brushed with soapy water prior to installation to remove loosed dirt and to lubricate gasket as it is forced into its retaining space.

C. When tightening bolts, it is essential that the gland be brought up toward the pipe flange evenly. The bolts should be partially tightened; the bottom bolt first, then the top; next the bolts on either side; and last, the remaining bolts. Overstressing of bolts to compensate for poor installation will not be permitted. Bolt torque shall be in accordance with manufacturer's recommendations.

D. When push-on joint pipe is used, the pipe must be cleaned with a wire brush and the spigot end of the pipe lubricated with a thin film of lubricant. The gasket shall be inserted into bell socket recess and the spigot end pushed home. The joint shall be installed in accordance with the manufacturer's specifications.

E. All joints of whatever type shall be completely watertight after being subjected to the required tests.

3.13 JOINTING DISSIMILAR PIPES

A. Suitable water-tight adaptor couplings, acceptable to the Engineer, shall be used for connecting dissimilar pipes, and the completed jointing covered with a concrete encasement. Straps shall be stainless steel. No separate payment for adaptor couplings or concrete encasement will be made.

3.14 ALIGNMENT

A. The Contractor shall utilize a commercial grade laser beam specifically manufactured to aid in maintaining grade and alignment of pipelines during installation. The primary unit shall be mounted on a heavy duty base and firmly anchored in the downstream manhole of the reach under construction. The maximum distance shall not exceed four hundred feet (400') per set-up unless otherwise approved by the Engineer.

B. Each joint of pipe will be installed using an approved target to align the pipe with the projected laser beam. The methods and procedures shall be in strict accord with the manufacture's recommendations and instructions. Proper ventilation shall be maintained at all times. Care shall be exercised in order to prevent bumping or misalignment of the projected beam.

3.15 BACKFILLING

A. Backfill shall consist of the material placed as indicated on the detail shown in the construction drawings. As pipe is laid and suitably bedded in accordance with Part 3.10 herein, trenches and excavation shall be promptly backfilled to a level one-foot above the top of the pipe in relatively thin lifts with select backfill material defined

in Part 2.11 and compacted to a minimum 98% standard Proctor maximum dry density (ASTM D 698). Backfill shall be placed and tamped equally and thoroughly along each side of the pipe in a manner to avoid displacement of or damage to the pipe.

B. Tamping: The backfill shall be placed in equal thickness lifts, each lift being thoroughly compacted to the density specified. Each lift of the backfill material shall have proper moisture content to permit compaction to this density.

1. In areas where street paving, sidewalks, driveways and other restoration work is requiredor will be required/performed with the future roadway construction project, the backfill above the one (1) foot cover level shall be compacted to the subgrade level or as directed and maintained to eliminate voids and future settlement. Special compaction procedures involving 98% density on 6" lifts are required at such locations and at other locations shown on the Drawings.

2. In open fields or undeveloped areas, the backfill above the one (1) foot cover level may be placed in twelve inch (12") layers and compacted to a density of not less than that of the surrounding earth. The top of the filled trench shall be mounded slightly above the natural ground to allow for settlement. As settlement occurs, trenches shall be refilled, smoothed off and made to conform to the surface of the ground until settlement ceases.

3. Landscape and cultivatable areas shall be restored by the replacement of the stockpiled topsoil stripping to a depth of at least twelve inches (12").

3.16 MANHOLE CONSTRUCTION

A. General: Manholes shall be constructed of precast concrete sections, unless otherwise specified.

B. The construction shall also include the necessary frames, covers, castings fittings, steps and connections; all installed or constructed in accordance with these Specifications and conforming to all requirements, details, lines, grades and dimensions shown on the Plans or established by the Engineer.

C. The bottoms of masonry manholes shall be constructed of reinforced concrete and the inverts of channels through the manhole shall be semicircular to the diameter of the pipe leading from the manhole.

D. Where shown on the Plans or as directed, pipe connections to future mains shall be built into the manholes. The pipe stub-out shall be sealed with a plug or stopper at the outer end and an invert shall be built into the manhole at these connections.

E. Manholes shall have crystalline concrete waterproofing admixture applied in the following manner:

1. The dosage rate for Xypex Admix C-1000-T is 3.5% by weight of cement.
2. Xypex Admix C-1000-T must be added to the concrete at the time of batching. It is recommended that the Admix powder be added first to the rock and sand and blended thoroughly for 2 - 3 minutes before adding cement and water.
3. Blend total concrete mix using normal practices to ensure formation of homogeneous mixture.
4. For precast concrete manufacturers this usually means adding the Xypex C-1000-T into their pan type mixers.
5. For ready-mix batch plants the Xypex Admix C-1000-T can be evenly distributed on a plant conveyor belt carrying the rock and sand, or the dry powder Admix can be added to the truck first and then 30 - 50% of the required water for the concrete batch is dispensed along with 300 - 500 pounds of aggregate and mixed thoroughly for 2 - 3 minutes. The rest of the materials are then added to the truck and mixed for at least 5 minutes.
6. Retardation of set may occur when using Xypex Admix C-1000-T. The amount of retardation will depend upon the concrete mix design and the dosage rate of the admix. Consult with the manufacturer regarding proper dosage rate.
7. Concrete that contains Xypex Admix C-1000-T must be cured as per "Standard for Curing Concrete"(ACI 308)
8. Normal backfilling procedures may be used after concrete has cured for at least 7 days.
9. After the base and joints of the precast manhole have been grouted, apply two coats of Xypex Concentrate to all grouted surfaces at a rate of 1.5 lbs. per square yard to a properly prepared surface in accordance with manufacturer's written instructions.

3.17 DROP MANHOLES

A. In Manholes where the free fall inside the manhole exceeds two feet (2') (measured from the invert of the inlet pipe to the top of the floor of the manhole outside the channels), drop manholes shall be constructed in the same manner as specified for standard manholes except that the bottom shall be extended to support the ductile iron drop line. One joint (18' to 20' in length) of ductile iron pipe shall be extended upstream from the drop manhole and secured on the undisturbed bedding of the adjacent pipe trench.

3.18 PIPE CONNECTIONS TO MANHOLES

A. When the Plans indicate connections to existing manholes, these connections shall be watertight and all work performed in an acceptable manner.

B. The size of the opening cut in the manhole wall shall be restricted to a nominal diameter sufficient only to insert the sewer pipe. **The pipe shall be inserted into the manhole with a sealed watertight flexible rubber-boot type of connection to prevent water or waste leakage.** Straps and connectors shall be stainless steel.

3.19 SERVICES

A. Simultaneously with the installation of the sewer main, the Contractor shall install all required sewer services. The installation shall be coordinated in order to complete all surface restoration and repair work for installation of scheduled services.

3.20 SERVICE MARKERS

A. The Contractor shall place a four foot metal "T" fence post in a vertical position at the end of each sewer stub-out opening. The post shall be placed to extend a minimum of 2 foot above the ground level.

3.21 SANITARY SEWER STUB-OUTS

A. Sanitary Sewer Stub-outs shall be plugged with a plug or stopper manufactured for the purpose of effecting a watertight seal in the particular pipe in which it is installed. the plug shall be removable without damaging the pipe.

3.22 MANHOLE REHABLITATION

A. Rehabilitation of damaged manholes shall include grouting or sealing manhole walls and replacing faulty, damaged, unsafe or missing steps. Resetting, raising or lowering manhole ring and cover is to be absorbed in pavement repair. Reconstruction of invert is to be absorbed in sanitary sewer mains. Plugging, relocating or repairing pipe penetrations is to be absorbed in sanitary sewer mains or service connections, as appropriate. Manhole rehabilitation will be accomplished only when directed by the Engineer.

3.23 CONTRACTOR SUPPORT FOR INSPECTION

A. The Contractor shall maintain continuously on the job site, in the immediate vicinity of the current work area, a self-leveling, Lietz Model B-4, or equal, and 25' level rod graduated in feet, tenths and hundred for the convenience of the inspector. The Contractor shall assist the inspector in checking invert elevations.

3.24 AERIAL PIERS

A. Where indicated on the Plans or directed by the Engineer, the Contractor shall install the sewer main on aerial support piers at the grade indicated. The carrier pipe shall be securely mounted on the pier structure in accordance with the details and instructions set forth on the Plans.

B. The aerial piers shall be of the type specified in the proposal or identified on the drawings.

3.25 TEMPORARY SURFACES OVER TRENCHES

A. Whenever the wastewater improvements are constructed under traveled roadways, driveways, sidewalks or other traveled surfaces, a temporary surface shall be placed over the top of the trench as soon as possible after placement and compaction of the backfill has been satisfactorily completed. The temporary surface shall consist of a minimum of twelve inches (12") crushed stone conforming to the requirements of Section 02410 "Crushed Limestone Base Course".

B. The top of the temporary surface shall be smooth and meet the grade of the adjacent undisturbed surface. The temporary surface shall be maintained at the Contractor's expense until final restoration of the street surface is completed as specified. No permanent restoration of street surface shall be initiated until authorized by the Engineer. The temporary surfacing shall be required over the entire width of the trench. Any width in excess of the specified width shall not be used in computing payment quantities.

3.26 REPLACEMENT OF PERMANENT SURFACES, STRUCTURES AND PROPERTY

A. General: The Contractor shall restore all permanent type pavements, sidewalks, driveways, curbs, gutters, shrubbery, fences, poles and other property and surface structures removed or disturbed during or as a result of construction operations to a condition which is equal in appearance and quality to the condition that existed before the work began. The surface of improvements shall be constructed of the same material and match in appearance the surface of the improvement which was removed. Where select granular trench backfill is used, the restoration shall be made as soon as possible after compaction of the backfill has been completed.

B. Concrete Pavement Surface: Where the existing pavement surface is Portland Cement concrete, the pavement replacement shall consist of a minimum of six (6) inches of reinforced concrete placed over six (6) inches of compacted clay gravel or sub-base. Concrete shall conform to Section 03300 "Concrete". The concrete surface shall be finished equal to the existing finish (ie., trowel, broom, exposed aggregate, etc.). Pavement joints in the replacement surface shall conform to and match the joints in the adjacent pavement area.

C. Asphalt Pavement Surface: Where the existing pavement surface is bituminous concrete and 12" of clay gravel has been placed in the trench the, top 6" of gravel shall be removed and replaced with 4" of black base and 2" of surface course.

3.27 CONCRETE SIDEWALKS, DRIVEWAYS, CURB, AND CURB AND GUTTER

A. General: Where necessary to remove and replace concrete sidewalks, driveways, curbs and curb and gutters, replacements shall be made as follows:

B. Concrete sidewalks, driveways, curbs and curb and gutters shall be replaced with concrete meeting the applicable provisions of Section 03300 "Concrete" of these Specifications. Minimum thickness shall be four inches (4") for sidewalks and six inches (6") for driveways. Materials and construction requirements shall conform to the various Sections of these Specifications. Curb and gutter shall be formed as detailed on the Drawings or as directed by the Engineer. Sidewalks and driveways shall be finished to match existing adjacent surfaces, unless otherwise specified or directed by the Engineer.

3.28 RESTORATION OF LANDSCAPED AREAS

A. Sod, shrubbery, decorative planting and other landscape items shall be replanted, replaced or restored in the manner removed.

B. Should new construction be required to replace damaged or unsalvageable items, then the Contractor shall furnish all labor, materials, equipment, tools, and incidentals set forth in the applicable Sections of these Specifications.

3.29 MAINTENANCE OF SITE

A. The Contractor shall prevent, control and correct dust nuisance or muddy conditions developing on roadways as a result of his operation. No payment for maintenance of the site shall be made but shall be considered as a subsidiary obligation of the Contractor.

3.30 TEST

A. General: Before any backfill is placed, the sewer line shall be checked by the Engineer for line, grade and workmanship. Before acceptance, each section of the line between manholes or such other length as determined by the Engineer to be suitable, shall be thoroughly inspected and any defects in workmanship identified shall be immediately corrected.

B. The Contractor shall, at his own expense, furnish all labor, materials and equipment to perform air test and the "GO-NO-G0" mandrel for determining infiltration and deflection as described below:

1. Infiltration Testing - Infiltration testing of the completed gravity sewer system (after backfilling) shall be conducted. The testing shall be conducted by the Contractor in the presence of the engineer. The Engineer shall be given 24 hours notice before tests are to be conducted.

   If the ground water table is at least one foot above the top of the pipe at all points, the infiltration test shall be used. Otherwise, the air test shall be used. Only those sections under the ground water table shall be tested by the infiltration test.

a. Infiltration test (absorbed item) - The infiltration test shall be conducted between adjacent manholes. The outlet pipe on the downstream manhole shall be plugged and tested for water tightness to the satisfaction of the Engineer. The accumulated depth of water in the downstream manhole shall be read at 12 hour intervals for two days and the infiltration rate calculated from the data obtained. Any section exceeding an infiltration rate of 50 gallons/day/inch diameter/mile shall be relaid at the Contractors expense. This means that the contractor shall locate and repair leaks as necessary to pass the infiltration test.

b. Air Test Specification (Absorbed Item) - Procedure: the sewer line to be tested shall be tested between manholes. The line shall be sealed at both ends. The seal at one end shall have an orifice through which to pass air into the pipe. An air supply shall be connected to the orifice at one end of the line. the air supply line will contain an on-off gas valve and a pressure gauge having a range of 0 to 15 psi. The gauge shall have minimum divisions of .10 psi and shall have an accuracy of +/- .04 psi. Pressuring equipment should include a regulator or relief valve to avoid overpressuring and damaging an otherwise acceptable line.

The pipe line under test shall be pressurized to 4 PSIG for a period of no less than 5 minutes. If necessary, air should be added to the line to maintain the pressure above 3.5 PSIG. After stabilization period, the gas valve shall be closed. When the line pressure drops to 3.5 PSIG, commence timing with a stop watch. The stop watch should be allowed to run until such time as line pressure drops to 2.5 PSIG. Then the watch should be stopped and the time lapse compared with the allowable time lapse in Table I in this Section and for pipe size and leakage allowance specified by the Engineer. If the time lapse is greater than that specified, the section undergoing testing shall have passed, and the test may be discontinued at that time. If the time is less than that specified, the line has not passed the test and the Contractor will be required to find the leak(s), repair them and retest until the section passes at his own expense.

Table I

Line Pressure Air Test Using Low-Pressure Air
Specification Time Required for a 1.0 PSIG Pressure Drop for Size and Length of Pipe Indicated

Pipe Diameter (in)	Minimum Time (min)	Length for Min. Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown, Min.'s							
				100'	150'	200'	250'	300'	350'	400'	450'
4	3:46	597	.380L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48

12	11:20	199	3.418L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
24	22:40	99	13.674L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33

C. Vertical Alignment - Sewer pipe shall be laid such that the installed variation of invert elevations when compared with the construction plans does not exceed 0.10 feet. Sewer pipe in which said variation exceeds 0.10 feet shall be rejected. Sewer pipe shall be visually inspected for alignment by lamping, televising or by other appropriate means to determine alignment.

D. Deflection Testing - 100% of the PVC gravity sewer shall be tested in the following method:

Use a "go, no go" mandrel which is sized to such dimensions that it will not "go" when encountering a deflection greater than 5%. The instruction for its use are as follows:

1. Test shall be conducted after final backfill has been placed at least 30 days.

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

3. Mandrel shall have a diameter equal to 95% of the inside diameter of the pipe being tested.

4. Test shall be performed without mechanical pulling devices.

5. Completely flush the line making sure the pipe is clean of any mud and debris that would hinder the passage of the mandrel.

6. During the final flushing of the line, attach a floating block or ball to the end of the mandrel, pull rope and float the rope through the line. (A nylon ski rope is recommended.)

7. After the rope is threaded through the line, connect the pull rope to the mandrel and place the mandrel in the entrance of the pipe.

8. Connect a retrieval rope to the back of the mandrel to pull it back if necessary.

9. By hand, remove all the slack in the pull rope and place a tape marker on the top at the end of the pipe where the mandrel will exit, determining the location of the mandrel in the line.

10. By hand, draw mandrel through the sewer line. If any irregularities or obstructions are encountered in the line, they shall be corrected by the Contractor.

11. If a section with excessive deflection is found, locate it; dig down and uncover the pipe; inspect the pipe; if any damage is found, replace it; if pipe is not damaged, replace the thoroughly tramp haunching and initial backfill; replace remainder of backfill.

12. Re-test this section for deflection and air tightness.

E. Testing of Manholes

1. Vacuum testing of all completed manholes shall be conducted by methods and equipment which have been reviewed by the Project Engineer.

2. Vacuum tests shall be performed with a circular vacuum manhole tester and the acceptability of the manhole will be determined by the amount of vacuum loss over a specified period of time.

3. The vacuum pump shall have the following CFM capacity:

Inches of Mercury	CFM
0” Hg.	28 CFM
10” Hg.	18 CFM
15” Hg.	12 CFM
20” Hg.	8 CFM

4. Plug all manhole inverts with pipeline plugs placed at least 6 inches beyond the wall to prevent temporary sealing of inverts.

5. Follow all local, state, and federal regulations and safety precautions concerning entry of confined spaces. Follow all manufacturers’ recommendations and warnings for proper and safe installation of plugs and operation of a vacuum testing equipment.

6. Evacuate the manhole to 10 inches mercury vacuum (0.3 bar). Monitor vacuum for the specified time period in accordance with ASTM C924. If the vacuum does not drop in excess of 1 inch of mercury, the manhole is considered to pass the test.

7. If a manhole does not pass, Contractor shall identify leak, repair leak, and repeat test until manholes passes.

F. Flushing:

1. The completed gravity flow system shall be free of all muck, siltation and other foreign matter deposited or collected during construction. Flushing shall continue downstream manhole to manhole. Only water from an approved source will be permitted.

2. Water used in flushing will NOT be permitted to enter into the existing system but shall be disposed of in a manner acceptable to the Engineer.

G. Clean Up:

1. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. Surplus dirt shall be removed from the site or deposited at the locations and in the manner directed by the Engineer.

2. After all work is completed, the Contractor shall remove all tools and other equipment used by him, leaving the entire site free, clear and in good condition.

PART 4 MEASUREMENT AND PAYMENT

4.01 GENERAL

A. The compensation as herein provided shall constitute full payment for performance of the work. The compensation shall further constitute full payment for all materials, labor equipment, and incidental items of construction furnished by the Contractor.

B. Measurement and payment of the items specified shall be for the purpose of establishing a unit price contract.

C. No measurement will be made of subsidiary items of work and accessories, excavation, trenching, backfill, and disposal of surplus excavation and other incidentals included in the related pay items or called for in the contract.

4.02 MEASUREMENT

A. Manholes - Manholes shall be measured per each per depth bracket as installed and accepted. Depth bracket shall be determined by measuring the distance from finished manhole lid to finished invert elevation. Depth brackets are as indicated in the proposal and shall be defined as commencing with a depth greater than the first indicated depth and terminating with a depth equal to the second indicated depth, all inclusive.

B. Drop Connection - Drop connection to manhole shall be measured per vertical foot as installed and accepted.

C. Sanitary Sewer Mains - Sanitary sewer mains shall be measured per linear foot per depth bracket as installed and accepted. Depth bracket shall be determined by measuring the distance from the prevailing ground surface or from the top of the sub-base of any overlying road or street, whichever is the lesser, to the invert of the sanitary sewer main. Depth brackets are as indicated in the proposal and shall be defined as commencing with a depth greater than the first indicated depth and terminating with a depth equal to the second indicated depth, all inclusive. Length shall be determined by the measured distance between manhole centers with no deduction for manhole diameter.

D. Sanitary Sewer Service Stub-outs - Stub-outs shall be measured per linear foot installed and accepted from the center of the sanitary sewer main to the end of the sanitary sewer service stub-out or to the City right-of-way or easement, whichever is the shorter. Measurement shall be for all depths of cut. Measurement shall be for each size and type of pipe.

E. Pipe Specials - Pipe specials shall be measured per each installed and accepted. Measurement shall be for each size and type of special.

F. Pump Station - Pump Stations shall be enumerated separately in the proposal and measured as each, complete, installed and accepted, and shall include all items prescribed under the pump stations section of these specifications for each described pump station.

G. Force Mains - Force mains shall be measured per linear foot installed and accepted. This item includes bedding and backfill, whether select or random; thrust blocks and connection to existing or new manholes, and clean-outs. Measurement shall be for each size and type of force main.

H. Air Release Valves, Vacuum Valves and Combination Valves - Valves shall be measured per each installed and accepted. This item includes cast iron or concrete valve box with manhole ring and cover for each valve installed and accepted.

I. Undercut Excavation and Stabilization - When so ordered by the Engineer shall be measured per cubic yard of select bedding material placed and accepted.

J. Select Bedding Material - Select bedding material shall not be measured separately, but shall be considered an absorbed cost item relative to the cost of pipe installation.

K. Select Backfill - Select backfill shall not be measured separately, but shall be considered an absorbed cost item relative to the cost of pipe installation.

L. Bored Crossing - Bored crossing shall be measured per linear foot for each size of ductile iron pipe sewer main or stub when indicated on the plans and in the bid proposal.

M. Connection to Existing Sanitary Sewer - Connection to existing sanitary sewer shall be considered an absorbed cost item relative to the cost of pipe installation.

N. Casing Bored and Jacked - Casing bored and jacked shall be measured per linear foot installed and accepted.

O. Connection to Existing Manhole - Connection to existing manhole shall be considered an absorbed cost item relative to the cost of pipe installation.

P. Clean-outs - Clean-outs shall be measured as the number of completed and accepted units in place. Depth of cut will not be considered.

Q. Service Markers - Metal posts installed at the end of a service line as a reference for future tie in shall not be measured for payment.

R. Aerial Piers - Aerial support piers shall not be measured for payment separately but shall be considered as a subsidiary item of work for ductile iron pipe (on piers). The type and number of piers shall be as designated on the Construction Drawings or as directed by the Engineer.

S. Supplementary Items - If provided for in the proposal, work performed in support of the gravity main construction shall be measured for payment in the manner prescribed in the respective sections of the Specifications covering new construction of these items.

4.03 PAYMENT

A. Manholes - Manholes shall be paid for by depth bracket at the price indicated in the proposal per each manhole installed and accepted.

B. Drop Connections to Manholes - Drop connections to manholes shall be paid for at the unit price indicated in the proposal per each drop connection installed and accepted.

C. Sanitary Sewer Mains - Sanitary sewer mains shall be paid for by depth bracket at the unit price indicated for each size and type pipe in the proposal per linear foot of sanitary sewer main installed and accepted.

D. Sanitary Sewer Stub-outs - Sanitary sewer service stub-outs shall be paid for at the unit price indicated in the proposal per linear foot installed and accepted.

E. Pipe Specials - Pipe specials shall be paid for at the unit price indicated for each size and type special in the proposal per each special installed and accepted.

F. Pump Stations - Pump stations shall be paid for at the lump sum price for the pump station installed and accepted as indicated in the proposal which shall be

full compensation for all appurtenances specified under this Section (if included).

G. Force Mains -Force mains shall be paid for at the unit price indicated for each size and type of pipe in the proposal per linear foot of force main installed and accepted.

H. Air Release Valves, Vacuum Valves and Combination Valves - Valves shall be paid for at the unit price for each size and type of valve indicated in the proposal per each valve installed and accepted.

I. Undercut excavation and Stabilization - Undercut excavation and stabilization shall be paid for at the unit price indicated in the proposal per cubic yard ordered by the Engineer and excavated.

J. Select Bedding - Select bedding shall not be paid for separately, but shall be considered an absorbed cost item relative to the cost of pipe installation.

K. Select Backfill - Select backfill shall not be paid for separately, but shall be considered an absorbed cost item relative to the cost of pipe installation.

L. Bored Crossing - Bored crossing shall be paid for by the unit price indicated in the proposal per linear foot installed and accepted.

M. Connection to Existing Sanitary Sewer - Connection to existing sewer shall be considered an absorbed cost item relative to the cost of pipe installation.

N. Casing Bored and Jacked - Casing bored and jacked shall be paid for at the unit price indicated in the proposal per linear foot installed and accepted.

O. Connection to Existing Manhole - Connection to existing manhole shall be considered an absorbed cost item relative to the cost of pipe installation.

P. Clean-outs - Clean-outs shall be paid for at the contract unit price per unit for all depths, complete in place and accepted. This price shall include all excavation and backfilling necessary for the satisfactory completion of work.

Q. Service Markers - Service markers placed at the end of each service line shall be included in the cost of other items.

R. Aerial Piers - Payment for contract unit price bid per linear foot (L.F.) for ductile iron pipe (on piers) shall constitute full compensation for the placement of the piers, pipe and all hardware items required to secure the sewer line in place.

END OF SECTION

SECTION 02751

HIGH DENSITY POLYETHYLENE PIPE (HDPE), PRESSURE PIPE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

PART 2 MATERIALS

2.01 MATERIALS

A. HDPE pipe shall conform to ASTM D1248, D3350 and D3035. Unless otherwise specified, pipe shall be of high molecular weight distribution designed as PE 3408 with an ASTM D3350 cell classification number of 345434C. Pipe shall be designated to accommodate all expected loads with a safety factor of 2.0. All HDPE piping shall be designed with an adequate wall thickness to withstand loading, and under no conditions shall the SDR measurement of the pipe be greater than 17. Pipe ends shall be connected using butt fusion per ASTM D2657, or using stainless steel couplings of a design approved by the Engineer. End sections shall be flared and shall meet the concrete material, steel area, and workmanship requirements for Class III or A-III pipe. Fittings shall be SDR 17 maximum unless otherwise specified. Molded fittings shall be manufactured per ASTM D2513 and installed per ASTM D3261 if fused or otherwise per manufacturer's instructions. The pipe shall be provided with a lightly pigmented interior coating to aid in pipeline inspection (video inspection).

PART 3 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This item shall be measured for payment by the linear foot for the completion of the work indicated on the Contract Drawings and in the Specifications and other Contract Documents for this Project.

4.02 PAYMENT

A. This Item shall be paid for at the contract unit price per linear foot, completed in place, as provided by the proposal and contract. The contract price per linear foot shall be the total compensation for the furnishing of all labor, materials, tools, equipment, and incidentals necessary to complete the work including excavation,

backfill, and disposal of surplus materials in accordance with the plans and specifications.

END OF SECTION

SECTION 02755

BORED AND JACKED RAILROAD AND STREET CROSSINGS

PART 1 GENERAL

Pipe in steel or PVC casing, whichever is required, shall be used where bored and jacked encased water line street or railroad crossings are called for in the plans. All work incidental to the construction of railroad and street crossings shall be done in strict compliance with the requirements prescribed by the OWNERS of the properties upon which the work is to be performed and shall be done with extreme care to safeguard life and property. After the necessary permits and agreements have been approved and executed, the CONTRACTOR shall confer with the representatives of the OWNERS of the railroad and/or roadway properties and arrange schedules for constructing the work in accordance therewith.

PART 2 DRY BORING

The casing or carrier pipe is to be installed by drilling a hole of a size not larger than one inch (1") around the outside circumference of the casing or carrier pipe.

Water bearing sands and mucky soils will be well pointed as necessary prior to commencing the bore.

All bores will be accomplished with the auger inside the casing or carrier pipe with the cutting edges positioned just ahead of the pipe.

Care should be exercised at all times to keep the auger properly positioned within the encasement or carrier pipe and to maintain sufficient forward pressure upon the encasement or carrier pipe to quickly run through any pockets of loose soil.

All boring will be carefully observed for comparison between the amount of cutting removed from the hole and the diameter of the bore together with the distance the auger has traveled in the bore, An excessive amount of cuttings removed from the bore indicates caving or spalling of the bore wall and the bore will be stopped until a method for completing the bore is found acceptable to the OWNERS of the railroad and/or roadway properties has been agreed upon.

An acceptable fluid may be introduced by gravity flow approximately 3' back of the forward end of the casing or carrier pipe to lubricate the cuttings in order to facilitate the removal thereof; however, the intemperate use of such fluid causing undue flow back and erosion of the bore shall not be allowed.

PART 3 BORING WITH DRILLING FLUID

The use of either a gel-forming colloidal drilling fluid or the use of a polymer-surfactant mixture is permitted only if acceptable by the OWNER of the property and with prior

approval from the ENGINEER. The drilling fluid shall be used to lubricate the cutters or reamers, as a binder to bind the cuttings into plugs of appropriate length and to form a filter cake around the circumference of the bore in order to prevent cave-ins or spalling, to maintain the arch and also to lubricate the bore for easy removal of masses or plugs of cuttings from the bore by using compressed air. Liquids other than the drilling fluids described in Methods A and B shall not be permitted. All bores accomplished with the use of a drilling fluid will be made as follows:

1. Method A: The casing or carrier pipe shall be installed by drilling a hole of a size not larger than one inch (1") around the outside circumference of the casing or carrier pipe with an open type bit that leaves the cuttings in place. A gel-forming colloidal drilling fluid consisting of al least 10% by weight of an accepted type of gel-forming substance, when boring in sandy subsoils, fine sand, water bearing sand or any soils which easily spall or cave, consisting of at least 5% by weight of an accepted type of gel-forming substance, when boring in dense consolidated soils, will be used to consolidate the cuttings, seal the wall of the bore and furnish lubrication for subsequent removal of the cuttings and installation of the casing immediately thereafter. The percentage of the gel-forming agent will be increased as required by soil conditions. When boring sandy subsoils, fine sands, water bearing sands or any soil which easily spalls or caves, the bore entrance will be plugged or dammed in order to retain the drilling fluid and the cuttings within the bore until immediately before the casing or carrier pipe is installed. Water bearing sands and mucky soils will be well pointed as necessary prior to commencing the bore. When drilling through dense consolidated soils the cuttings may be partially removed from the hole in approximately three foot plugs by use of compressed air or by retraction of the cutter or reamer. No cutter or reamer shall have holes therein larger that 5/16" in diameter through which drilling fluid is forced during boring.

2. Method B: The casing or carrier pipe shall be installed by drilling a hole a size not larger than one inch (1") around the outside circumference of the casing or carrier pipe with an open type bit that leaves the cuttings in place. Drilling fluid composed of water and a poly-surfactant of approximately 61% Diesel fuel, 15% sodium carboxyl methyl cellulose of same quality as Drispace, 21.5% water and 2.5% anionic surfactant will be used to consolidate the cuttings, seal the wall of the bore and furnish lubrication for subsequent removal of the cuttings and installation of the casing or carrier pipe immediately thereafter. When boring sandy subsoils, fine sands, water bearing sands or any soil which easily spalls or caves, the bore entrance will be plugged or dammed in order to retain the drilling fluid and the cuttings within the bore until immediately before the casing or carrier pipe is installed. Water bearing sands and mucky soils will be well pointed as necessary to commencing the bore. When drilling through dense consolidated soils the cuttings may be partially removed from the hole in approximately three foot plugs by use of compressed air. The polymer-surfactant mixture or drilling fluid when used in dense consolidated soils will consist of not less that 2% of polymer-surfactant by volume. The percentage of polymer-surfactant will be increased as required by soil conditions.

PART 4 DIRECTIONAL BORING

Directional boring will be accomplished by the following method:

1. A pilot hole is drilled beginning at a prescribed angle from horizontal and continues across the obstruction along a design profile made of straight tangents and long radius arcs.

2. Once the pilot hole is made, the casing or carrier pipe can be pulled through. The casing or carrier line is prefabricated on the bank opposite the drilling rig. A reamer is attached to the drill string and then connected to the casing or carrier pipe pull head via a swivel. The swivel prevents any translation of the reamer's rotation into the casing or carrier pipe string allowing for a smooth pull in to the drilled hole. The drilling rig then begins the pullback operation, rotating and pulling on the drill string and once again circulating high volumes of drill slurry. The pullback continues until the reamer and casing or carrier pipe returns to the drilling rig. The design and type of drilling slurry and method used for the drilling operation shall be of industry standard.

PART 5 PVC AND STEEL CASING

Physical properties of steel casing shall meet the requirements of ASTM A-252, Grade 2 or better. Minimum wall thickness for steel casing shall be as follows (casing size (outside diameter), minimum wall thickness): 12" or less, no minimum wall thickness, 12" to 18", 0.188"; 18" or greater, 0.250". Minimum wall thickness of casing used in railroad crossings shall be 0.25". The minimum yield point shall be 35,000 PSI.

PIPE	CASING SIZE (INSIDE DIAMETER)	MAXIMUM SKID SUPPORT SPACING
14”	20” – 20”	11.0’
12”	18” – 20”	13.7’
10”	16” – 18”	12.2’
8”	14” – 16”	10.5’
6”	10” – 12”	8.8’
4”	8” – 10”	6.8’
3”	6” – 8”	4.0’
2”	4” – 6”	3.0’
¾”	2” – 4”	2.0’

PART 6 MEASUREMENT AND PAYMENT

6.01 MEASUREMENT

A. When Bored, Bored and Jacked, Cased or other items associated with work for these items are listed on the Bid Form as a separate bid item, unit measurements of them shall be as noted on the Bid Form for material constructed in place and

installed in accordance with these Specifications. When not listed as a separate bid item, no measurement of quantity will be made but quantity shall be considered as an absorbed cost.

6.02 PAYMENT

A. When Bored, Bored and Jacked, Cased or other items associated with work for these items are listed on the Bid Form as a separate bid item, payment of them shall be as noted on the Bid Form for material constructed and accepted in place and shall constitute full compensation for furnishing all material, labor, tools equipment and incidentals and for performing all hauling, placing, construction and other operations necessary to complete the work in accordance with the Contract Specifications. When not so listed as a separate bid item, Bored, Bored and Jacked, Cased or other items associated with work for these items shall be considered as an absorbed cost item and no separate payment shall be made.

END OF SECTION

APPENDIX A

CONSTRUCTION DRAWINGS

JANUARY 2014

General Notes:

1. Contractor to verify locations and inverts of all existing utilities prior to doing any improvements. If any discrepancies are found the contractor shall notify the Engineer in writing.

2. Underground improvements shown in these plans were determined from survey data and maps that were provided to Guest Consultants by Neel-Schaffer. No excavation was performed. Users of these plans should satisfy themselves as to whether the information shown hereon is accurate and complete.

3. Contractor to contact Mississippi One Call by dialing 811 as required by law at least 48 hours before doing any improvements.

4. Contractor to coordinate with the Town of Flora regarding swapping of service from the existing water and sewer lines to the proposed new lines. Contractor shall notify the Town and Engineer 48 hours in advance of any planned water and sewer service interruption.

5. Contractor shall take care to protect existing utilities to remain from damage and new utilities from damage. Damage to utilities as a result of the contractor's work shall be repaired at the contractor's expense before acceptance.

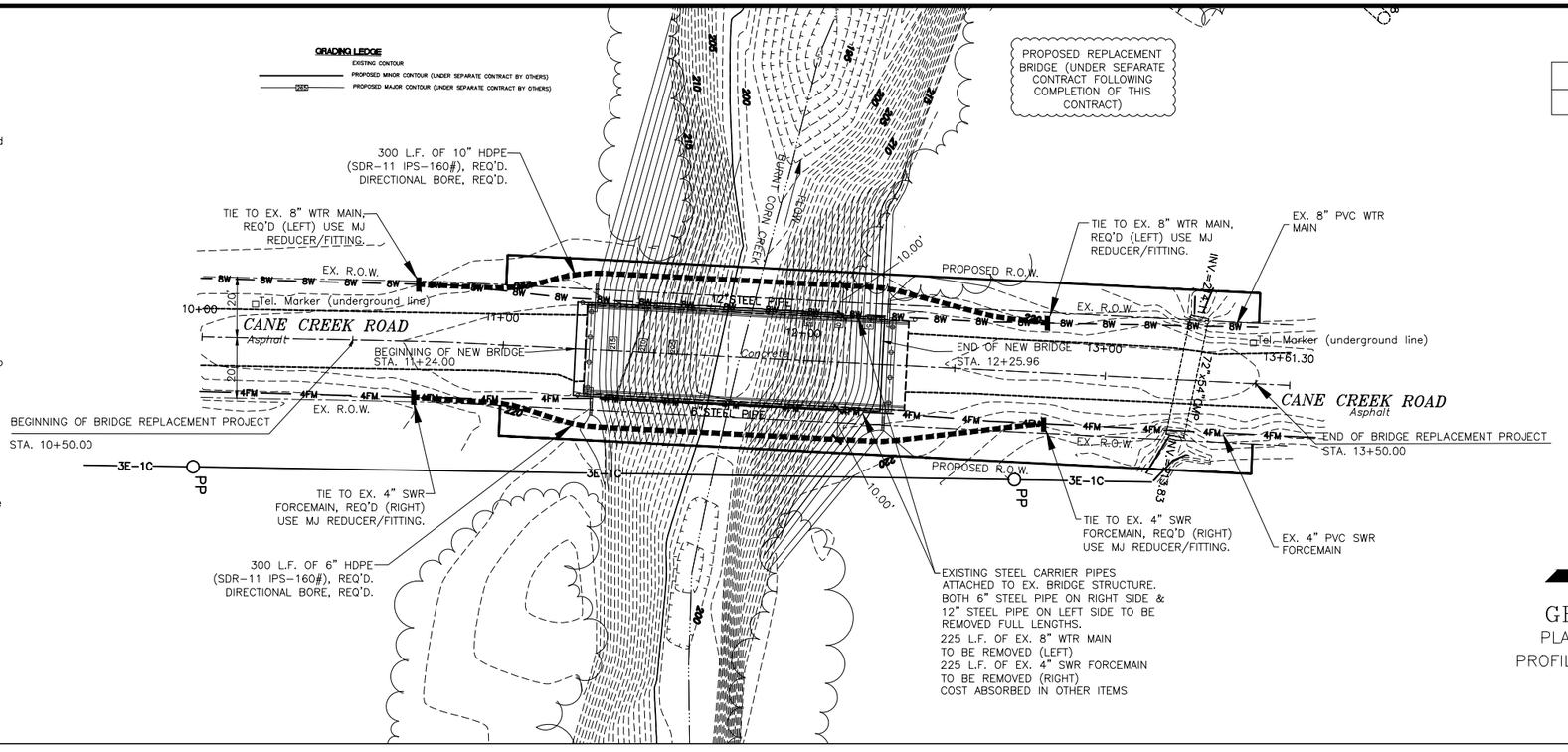
6. Guest Consultants was not retained to perform boundary or deed research for this project.

7. Contractor shall comply with the requirements of the local governing agency Erosion Control Ordinance and have and implement storm water plan using BMP's for the site.

8. Contractor shall seed, mulch and fertilize all soil disturbed by this the utility relocation under this contract.

9. The Contractor shall be responsible for disposal of any item specified to be removed. Disposal shall be made in an approved off-site facility.

10. The Contractor shall be responsible for traffic control measures for the duration of his project and shall follow the current MUTCD manual for direction and implementation of said measures.

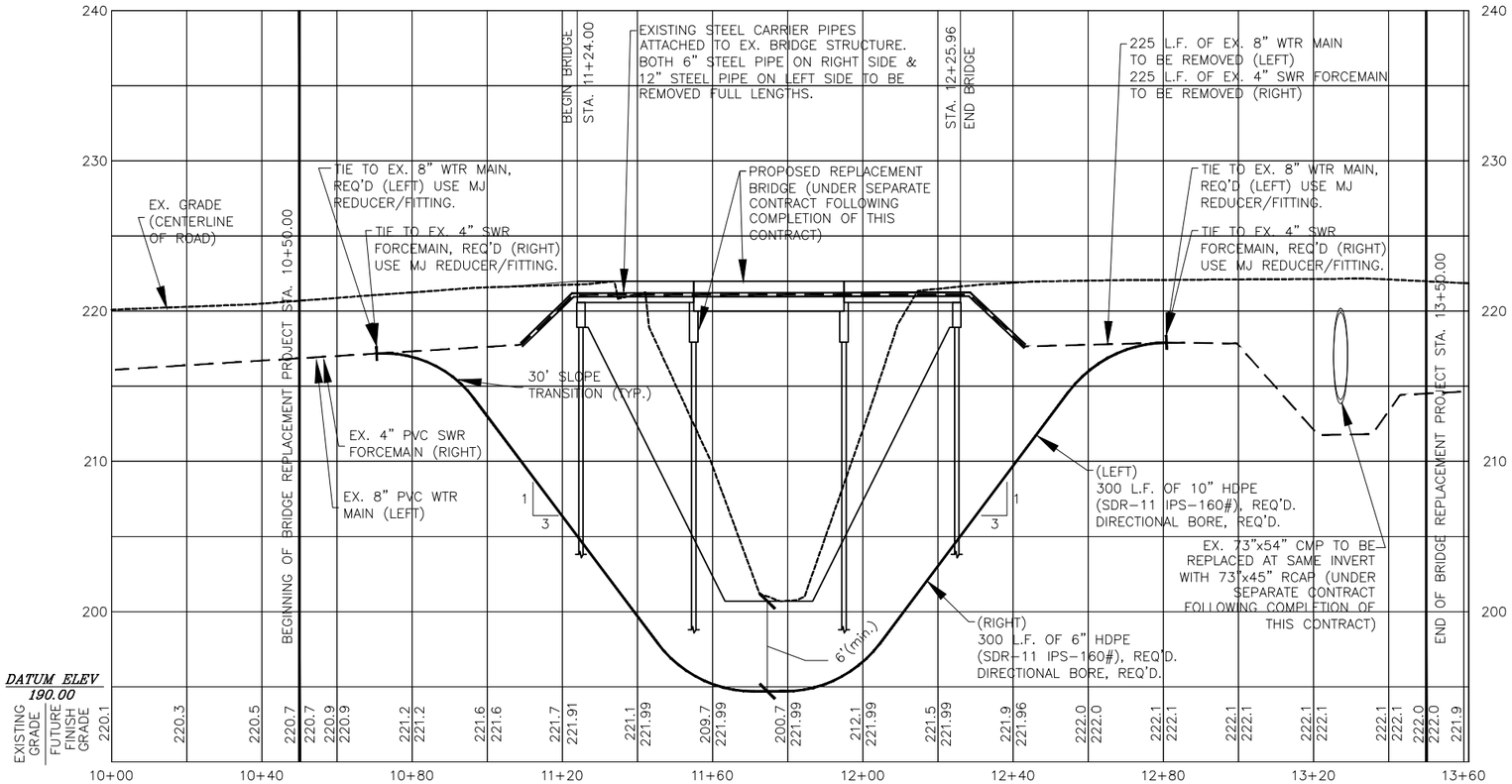


PROJECT LOCATION

LATTITUDE	32°33'18" N
LONGITUDE	90°16'42" W

GRAPHIC SCALE

PLAN VIEW : 1" = 50'
PROFILE VIEW : 1" = 40' HORZ.
1" = 10' VERT.



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CHECKED BY: PG
APPROVED BY: DD
CAD FILE: 13-218base.dwg

REV	DATE	DESCRIPTION

CLIENT: TOWN OF FLORA

PROJECT TITLE: WATER & SEWER RELOCATION FOR CANE CREEK BRIDGE REPLACEMENT PROJECT

DRAWING TITLE: PLAN - PROFILE

PROJ. NO: 13-218

DATE: 1-8-2014

SHEET NO. 1