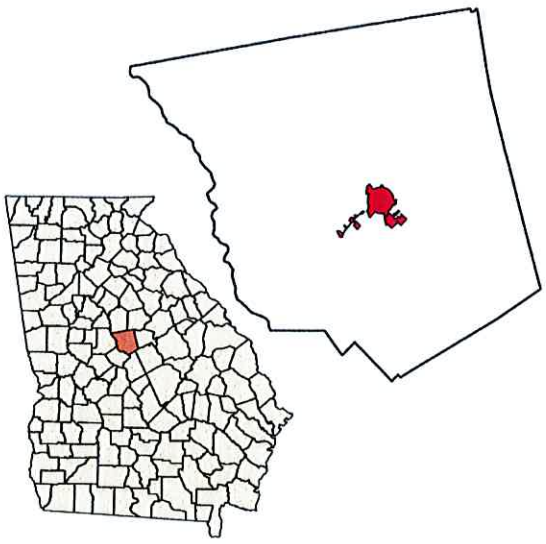
Contract Documents & Specifications

Bus Parking Improvements

for the

Jones County Board of Education



GEORGIA REGISTERED No. 20644 PROFESSIONAL ENGINEER TIMOTHY D. INGRAM

9/21/21

September, 2021

I&A Project No.: 1162-004-01

CONTRACT DOCUMENTS
and
SPECIFICATIONS

BUS PARKING IMPROVEMENTS

FOR THE

Jones County Board of Education

SEPTEMBER, 2021

I & A PROJECT NO.: 1162-004-01

INGRAM & ASSOCIATES, L.L.C.
332 New Street
Macon, Georgia 31201

Division 0 – Bidding and Contract Requirements

Division 1 – General Requirements

Division 2 – Sitework

Division 3 – Concrete

DRAWINGS

Division 0

Bidding
and
Contract Requirements

1. Sealed Bids: Sealed bids for the construction of **Bus Parking Improvements** will be received until **_____ 2021, at ____ p.m.,** local prevailing time at the **Jones County Board of Education, 125 Stewart Avenue, Gray, GA 31032** at which time and place all Bids will be publicly opened and read. No bid may be withdrawn after the closing time for receipt of bids for a period of sixty (60) days.

2. Contractor License: Any Contractor submitting a bid must be licensed by the State of Georgia. License numbers must be written on the face of the bid envelope. No bid will be opened unless it contains the Contractor's license number. See Instructions to Bidders for additional bidding requirements.

3. Work To Be Done: The work to be done shall consist of furnishing all labor, materials and equipment necessary to construct the project titled **Bus Parking Improvements** as shown on the construction drawings. In general, construction consists of cleaning and grubbing of the site; stripping of topsoil; hauling of fill material; compaction of existing soil on site; testing; graded aggregate base course; hot asphalt mix paving (12.5 mm); striping, grassing; NPDES Monitoring; soil and erosion measures and any miscellaneous appurtenances for a complete project. All work shall be done in accordance with the plans and specifications. This work will be awarded per division.

4. Plans and Contract Documents: Plans and Contract Documents are on file for review at the **Jones County Board of Education**. Copies for bidding purposes can be obtained from **Ingram & Associates, L.L.C., 332 New Street, Macon, GA 31201**, Phone: **(478) 745-3996**, Fax: **(478) 742-4690**, Email: stephanie@ingrameng.com upon payment of **$75.00** for each set (non-refundable).

5. Bonds: All bid forms must be accompanied by a Bid Bond in an amount not less than ten percent (10%) of the base bid. All bonds shall be by a surety company licensed in Georgia with an "A" minimum rating of performance and a financial strength of at least five (5) times the contract price as listed in the most current publication of "Best's Key Rating Guide Property Liability". The successful bidder, if awarded the Contract, will be required to furnish a Performance Bond and Payment Bond, each in the amount of one hundred percent (100%) of the Contract amount. Each bond shall be accompanied by a "Power of Attorney" authorizing the attorney-in-fact to bind the surety and certified to include the date of the bond. All bonds must appear on the Treasury Department's most current Circular 570 Listing.

6. Reservation of Rights: The Owner, reserves the right to reject any or all bids, including without limitation, the rights to reject any or all non conforming, non responsive, unbalanced or conditional Bids and to reject the Bid of any Bidder of Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability

or fails to meet any other pertinent standard or criteria established by the Owner.

7. Funding Sources: Funding is to be provided by the **Special Purpose Local Option Sales Tax (SPLOST).**

Jones County Board of Education

Ad Dates:

INTENTION: It is intended that the Instructions to Bidders, General Conditions, Supplementary Conditions, Technical Specifications and Construction Drawings shall cover the complete work to which they relate.

ARTICLE 1 DEFINED TERMS

Terms used in these Instructions to Bidders which are defined in the standard General Conditions of the construction contract have the meanings assigned to them in the General Conditions (EJCDC 1910-8)(1996). In addition to these terms, the terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

1.1 **Bidder** – One who submits a Bid directly to Owner as distinct from a sub-bidder, who submits a bid to a Bidder.

1.2 **Successful Bidder** – The lowest, responsible and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

1.3 **Bid** – A complete and properly signed offer to execute work for the prices stipulated in Bid Form and submitted in accordance with the Bidding Documents.

1.4 **Addenda** – Graphic or written documents issued by Engineer prior to the opening of Bids issued to clarify, revise, add to, or delete information in the original bidding documents or in previous addenda.

ARTICLE 2 BID FORM

All bids must be made upon the Bid Forms hereto annexed, and shall state the amount bid for each item shown, and all bids must be for materials and work called for in the specifications. **Deposits for plans and specifications are non-refundable.**

2.1 The Bid Form is included with the Bidding Documents; additional copies may be obtained from Engineer.

2.2 All blanks on the Bid Form must be completed by printing in black or blue ink or by typewriter.

2.3 Bids by corporations or partnerships must be executed in the corporate or partnership name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

2.4 The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

2.5 The address and telephone number for communications regarding the Bid must be shown.

2.6 The Bidder shall complete, execute and submit the following documents, which are attached to these Contract Documents:

a. Section 00410 - Bid Form
b. Section 00420 - Bid Bond
c. Section 00450 - Statements of Bidders Qualifications
d. Section 00455 - Contractor's License Certification
e. Section 00480 - Non-Collusion Affidavit of Prime Bidder

ARTICLE 3 QUALIFICATIONS OF BIDDERS:

3.1 To demonstrate qualifications to perform the Work, each Bidder must submit Section 00450 – Statement of Bidders Qualifications at the Bid Opening showing detailed written evidence such as financial data, previous experience, present commitments, and other such data as may be necessary to assist Owner in determining Contractor's qualifications.

3.2 Each Bid must contain evidence of Contractor's authority to conduct business in the state where the Work is to be performed. State Contractor license number, if applicable, must also be shown on the Bid Form.

ARTICLE 4 COPIES OF BIDDING DOCUMENTS:

4.1 Complete sets of Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Engineer. The deposit is non-refundable.

4.2 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

4.3 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

ARTICLE 5 EXAMINATION OF BIDDING DOCUMENTS, OTHER DATA, AND SITE:

5.1 It is the responsibility of each Bidder before submitting a bid:

5.1.1 To examine and study thoroughly the Contract Documents and other related data identified in the Contract Documents;

5.1.2 To visit the work site to ascertain by inspection pertinent location conditions such as location, character and accessibility of the site including existing subsurface conditions in the work area; availability of facilities, location and character of existing work within or adjacent thereto, labor conditions, etc. that may affect cost, progress, performance, and/or furnishing of the Required Work.

5.1.3 To become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the Work;

5.1.4 To obtain and carefully study (or assume responsibility for doing so) all addition or supplementary examination investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate any aspect of the means, methods, techniques, sequences, and procedures of construction expressly required of the bidding documents, and safety precautions and programs incident thereto;

5.1.5 To promptly notify Engineer of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between the Biding Documents and such other related documents;

5.1.6 To agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies or data are necessary for the determination of its Bid for performance of the work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

5.1.7 To become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

5.1.8 To determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

5.2 The Owner shall make available to all prospective bidders, previous to receipt of bids, information that it may have as to sub-soil conditions and surface topography at the work site. Such information shall be given as the best factual information available without being considered as a representation of the Owner.

5.3 Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.

5.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.2 and 4.3 of the General conditions.

5.5 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Document.

5.6 On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up and restore the site to its former condition upon completion of such explorations.

5.7 The lands upon which the work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

5.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 5, that without exception, the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques,

sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 6 INTERPRETATIONS AND ADDENDA:

6.1 All questions about the meaning or intent of the Bidding Documents are to be directed to Engineer. The person submitting the request shall do so in writing and be responsible for its prompt delivery. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6.2 Owner or Engineer may also issue addenda to modify the Bidding Documents as deemed advisable.

ARTICLE 7 BID SECURITY:

7.1 Each Bid must be accompanied by Bid security made payable to Owner in an amount of ten percent of Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a surety company licensed in [Georgia] with an "A" minimum rating of performance and a financial strength of at least five (5) times the contract price as listed in the most current publication of "Best's Key Rating Guide Property Liability".

7.2 The Bid security of Successful Bidder will be retained until such Bidder has executed the Agreement, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the sixty-first day after the Bid opening,

whereupon Bid security furnished by such bidders will be returned. Bid security with Bids, which are not competitive, will be returned within seven days after the Bid opening.

ARTICLE 8 CONTRACT TIME

The number of days within which, or by which the Work is to be (a) Substantially Completed and (b) also completed and ready for final payment are set forth in the Agreement. Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 9 LIQUIDATED DAMAGES

Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 10 SUBSTITUTE AND "OR EQUAL" TERMS

Whenever a material, article or piece of equipment is identified on the plans or in the specifications by reference to manufacturer's r vendor's names, trade names, catalogue numbers, etc., it is intended to establish a standard; and if an equal can perform adequately the duties imposed by the general design, it will be considered equally acceptable provided the material, article, or equipment so proposed, is, in the opinion of the Engineer, of equal substance and function. "Or Equal" equipment, as offered by the Bidder, may be written into the Bid Data as a Substitute. Submittals on proposed "Or Equal" equipment by the Bidder shall be required for review by the Engineer and Owner as provided in paragraph 4 of the supplementary Conditions.

ARTICLE 11 SUBCONTRACTORS, SUPPLIERS, AND OTHERS:

11.1 If the Supplementary Conditions require the identify of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of

Award is given, request apparent Successful Bidder to submit a substitute,

11.2 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions would not constitute grounds for forfeiture of the bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

11.3 No contractor shall be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 12 SUBMISSION OF BIDS:

12.1 Bids shall be submitted at the time and place indicated in the Invitation to Bid and shall be enclosed in a sealed opaque envelope, marked with the project title, and name and address of Bidder, and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it. Contractor license number(s) shall be written on the face of the bid envelope, if required.

12.2 Each Bidder is responsible for seeing that his Bid is received by the Owner not later than the advertised time set for the opening of Bids.

ARTICLE 13 MODIFICATION AND WITHDRAWAL OF BIDS:

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of bids.

13.2 If, within twenty-four hours after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided.

ARTICLE 14 OPENING OF BIDS:

Bids will be opened and (unless obviously non-responsive) read aloud publicly at the place where Bids are to be submitted. An abstract of the amount of the base Bids and major alternates (if any) will be made available to Bidders after the opening of Bids.

ARTICLE 15 BIDS TO REMAIN SUBJECT TO ACCEPTANCE:

Bids can not be withdrawn (except as noted in Paragraph 13) after the time set for the opening of Bids. Bids will remain subject to acceptance for sixty (60) days after the day of the Bid opening, but the Owner may, in its sole discretion, release any Bid and return the Bid security prior to expiration of the acceptance period.

ARTICLE 16 AWARD OF CONTRACT:

16.1 Owner reserves the right to reject any or all Bids, including without limitation, the rights to reject any or all nonconforming, non-responsive, unbalanced or conditional Bids and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive, or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the Owner.

16.2 Owner also reserves the right to waive all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

16.3 In evaluating Bids, Owner will consider the qualification of Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

16.4 The Owner will also consider whether the Bidder involved:

(a) Maintains a permanent place of business;
(b) Has adequate plant and equipment to do the work properly and expeditiously;

(c) Has suitable financial status to meet obligations incidental to the work;

(d) Has appropriate technical experience.

16.5 Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

16.6 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

16.7 If the contract is to be awarded, it will be awarded to the Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.

16.8 If the contract is to be awarded, Owner will give Successful Bidder a Notice of Award within sixty (60) days after the day of the Bid opening.

ARTICLE 17 MODIFICATIONS OF QUANTITIES:

If the lowest bona fide Bid exceeds the money available for the Work, the Owner reserves the right to delete enough of the Work to bring the cost within the available funds. The Owner also reserves the right to delete whichever items or portions of items he considers to be in the best interest of the Owner.

ARTICLE 18 CONTRACT SECURITY:

The General Conditions and Supplementary Conditions set forth Owner's requirements as to performance and payment bonds. When the Successful Bidder delivers the executed Agreement to the Owner, it must be accompanied by the required performance and payment bonds.

ARTICLE 19 SIGNING THE AGREEMENT:

When the Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen (15) days thereafter, Contractor shall sign and deliver the required counterparts of the Agreement and attached documents to Owner with the required Bonds. Within ten (10) days thereafter, Owner shall deliver one fully signed counterpart to the Contractor.

ARTICLE 20 FOUR HOUR BID PLAN JOB:

This project has been designated as a "Four-Hour Bid Plan Job" in accordance with the "Code of Ethical Practice and Procedure for Receiving Sub-bids on Utilities Construction Work, and Agreement Establishing the Utilities Construction Board of Georgia".

ARTICLE 21 NON-SEGREGATED FACILITIES:

Bidders must certify that they do not and will not, maintain or provide for their employees any facilities that are segregated on a basis of race, color, creed, or national origin.

ARTICLE 22 LAWS AND REGULATIONS:

The Contractor shall comply with local, District, County, State, and Federal laws applicable to the work.

22.1 The Contractor shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work and Safety Standards Act (PL 91-54). The regulations are administered by the Department of Labor and the Contractor shall allow access to the project to personnel from that Department.

ARTICLE 23 CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE:

Contractor shall not commence work under this contract until he has obtained all the insurance required by the Supplementary Conditions.

ARTICLE 24 TERMINATION OF CONTRACT:

If the Owner is made to stop construction of the work because of an order from a Court or State Department, the contract shall be terminated. Payment will be made for work completed and a prorated share of the work underway, materials stored, and for the overhead and profit of the completed work and work underway. Payment will not be made

for anticipated profit and overhead on work not completed or underway.

ARTICLE 25 CONTRACT SCHEDULE

In order to complete this project, the Contractor shall start at the north end and complete all grassing, grading, and compaction. Once the most northern area is graded, the contractor can move on to the remaining sites. This is of the utmost essence for this project.

END OF SECTION

PROJECT IDENTIFICATION:

Bus Parking Improvements

CONTRACT IDENTIFICATION AND NUMBER:

I & A Project No.: 1162-004-01

THIS BID IS SUBMITTED TO:

Jones County Board of Commissioners
125 Stewart Avenue
Gray, GA 31032

THIS BID IS SUBMITTED FROM:

_____

_____

_____

_____

_____

The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen days after the date of Owner's Notice of Award.

In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date	Number
_____	
_____	

BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in paragraph 4.2 of the General Conditions, and accepts the determination set forth in paragraph 5 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which BIDDER is entitled to rely.

BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in (c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.2 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by BIDDER for such purposes.

BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required by BIDDER in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the General Conditions.

BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

BIDDER has given ENGINEER written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.

This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with an agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other BIDDER or over OWNER.

BIDDER agrees to commence work under this Agreement on or before a date to be specified in a written "Notice to Proceed" of the OWNER and to fully complete the work within **150** consecutive calendar days from the "Notice to Proceed" date. This time frame has 60 consecutive calendar days built in for rain. The Contractor is encouraged to complete the project in 90 days.

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

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Jones County Board of Education
Bus Parking Improvements

Base Bid

ITEM NO.	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1	1	LS	Site Preparation, Stakeout, Bonds, Insurance, Mobilization/Demobilization, Cleanup, & Disposal of Debris		
2	1	LS	Quality Control Testing (Allowance for Grading & Paving) Owner selected Geotechnical Consultant		
3	1	LS	Grading Complete -23224 CY Haul-in Structural Fill Material (w/ assumed 20% shrinkage included) - 847 CY Unclassified Excavation		
4	13	EA	Tree Removal		
5	1	LS	Triple Drop Inlet (DI)		
6	1	LS	Junction Box w/ MH Frame & Cover(JB)		
7	1	EA	Outlet Control Structure (OCS)		
8	75	LF	18" HDPE Storm Pipe		
9	27	LF	30" HDPE Storm Pipe		
10	1	EA	18" Flared End Section(FES)		
11	1	EA	30" Flared End Section(FES)		
12	677	LF	36" Concrete Curb & Gutter (GDOT Type 3)(C&G)		
13	42	SF	Concrete (6" Thick)		
14	1382	TN	Hot Mix Asphaltic Conc. Surface – 12.5 mm Superpave		
15	2073	TN	Hot Mix Asphaltic Conc. Base Layer – 19 mm Superpave		
16	907	TN	Graded Aggregate Base Construction(GABC)		
17	754	Gal	Bituminous Tack Coat (0.06 gal/sy)		

18	1	LS	Erosion, Sedimentation & Pollution Control including; all BMPs not specifically itemized below, inspections, maintenance/removals, and temporary grassing/mulching measures		
19	1	EA	Inlet Sediment Trap (Sd2-F)		
20	1	EA	Inlet Sediment Trap (Sd2-P)		
21	1751	SY	Erosion Matting for Slope Stabilization(Ss)		
22	1044	LF	Silt Fence Type "A" (Sd1-A)		
23	1	EA	Temporary Gravel Construction Entrance/Exit (Co)		
24	46	SY	Rock Rip Rap Outlet Protection (18"Thickness) (St)		
25	1	LS	Floating Surface Skimmer (Sk) Including Connection to OCS		
26	1	EA	Retrofit on Outlect Control Structure (Rt-P)		
27	1	EA	Rock Outlet for Temporar Sediment Trap(Sd4-C)		
28	1.25	AC	Turf Establishment Permanent Targeted Species-common Burmuda (Ds3)		
29	1	LS	NPDES Permit GAR100001 Monitoring & Reporting		
30	1335	LF	6' High Chain Link Fence w/ 3-Strand Barbwire		
31	1	EA	26' Wide Automatic Slide Gate w/ Electric Operator		
32	1	EA	16' Wide Automatic Slide Gate w/ Electric Operator		
33	1	EA	4' Wide Swing Gate		
34	4477	LF	4" White Striping Hatch		
35	863	SY	4" White Striping Hatch		
				TOTAL BASE BID	$

Bidder agrees to furnish all materials, equipment and to perform all labor necessary for the construction of the project titled **Bus Parking Improvements** for the Jones County Board of Education for the sum of:

_____Dollars ($_____).

The above lump sum and unit prices shown shall include all labor, materials, bailing, shoring removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for. BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informality in the bidding. Alternate bids may be used to determine the low responsive and responsible bidder.

BIDDER furthermore agrees that, in the case of a failure on his part to execute the Contract Agreement and Bonds within fifteen days after receipt of conformed contract documents for execution, the Bid Bond accompanying his bid and the monies payable thereon shall be paid into the funds of the OWNER as liquidated damages for such failures.
The following documents are attached to and made a condition of this Bid:

a. Required Bid Bond for the sum of _____
_____Dollars ($_____)
according to the conditions of "Instructions to Bidders".

b. Bid Data submitted by BIDDER that indicates standard specifications, details or drawings with any deviation from the specifications indicated.

SUBMITTED on _____, 20 ____.

BIDDER: _____

By: _____

Title: _____

Address: _____

_____

_____

Phone: _____

Fax: _____

Seal: (if bid by a Corporation)

END OF SECTION

STATE OF GEORGIA

Jones County

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal,

and _____, as Surety, are held and firmly bound

unto the **Jones County Board of Education:**

_____Dollars ($_____)

lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted to the Owner a Proposal for construction of **Bus Parking Improvements** for the **Jones County Board of Education.**

NOW THEREFORE, the conditions of this obligation are such that if the Bid be accepted, the Principal shall within ten days after receipt of conformed contract documents execute a contract in accordance with the Bid upon the terms, conditions and prices set forth therein, and in the form and manner required by the Owner and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to the Owner, each in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to the Owner, or in the event of the failure of the Contractor to execute and deliver the Contract Agreement and give said Performance and Payment Bonds, the Contractor shall pay the Owner the difference not to exceed the penalty hereof between the amount specified in said Proposal and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said Proposal, and execute the Special Assurances form, then this obligation shall be void; otherwise, it shall be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid Owner, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-1 et seq and all the provisions of the law referring to this character of bond as set forth in said sections or as may be hereinafter enacted and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said Principal has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 20____.

PRINCIPAL: _____

By: _____

Title: _____

Signed and sealed in
the presence of

1. _____

2. _____

SURETY: _____

By: _____

Title: _____

Signed and sealed in
the presence of:

1. _____

2. _____

END OF SECTION

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information desired. Attach all additional sheets to this statement.

1. Name of Bidder:

_____

2. Permanent main office address:

_____

3. When organized:

_____

4. If a Corporation, where incorporated:

_____

5. How many years have you been engaged in the contracting business under your present firm or trade name?

_____

6. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion):

_____

_____

7. General description of work performed by your company:

_____

_____

8. Have you ever failed to complete any work awarded to you? If so, where and why?

_____

_____

9. Have you ever defaulted on a contract? If so, where and why?

_____

_____

10. List the most important projects recently completed by your company, stating the

approximate cost for each, and the month and year completed:

_____

_____

_____

_____

11. Experience in construction work similar in importance to this project:

_____

_____

_____

12. Background and experience of the principal members of your organization, including officers:

_____

_____

13. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the local public agency in verification of the recitals comprising his Statement of Bidder's Qualifications.

Dated this _____ day of _____, 20___.

Bidder: _____

By: _____
(Signature)

Title: _____

State of _____

County of _____

_____ being duly sworn deposes and says that he

_____ of _____

and that the answers to the foregoing questions and all statements therein contained are true and correct. Subscribed and sworn to before me this _____day of _____, 20___.

Notary Public: _____
(Signature)

My Commission Expires: _____
(Date)

(Seal)

END OF SECTION

Contractor's Name: _____

Contractor's License Number: _____

Expiration Date of License: _____

I certify that the above information is true and correct and that the classification noted is applicable to the Bid for this Project.

Signed_____

Printed:_____

Date: _____

END OF SECTION

State of _____ County of _____

_____, being first duly sworn, deposed and says that:

(1) He is _____ of _____,
(owner, partner, officer, representative, or agent) (company or corporation)
the Bidder that has submitted the attached Bid;

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid:

(3) Such Bid is genuine and is not a collusive or sham Bid:

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner directly or indirectly sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the _____(Local Public Agency) or any person interested in the proposed Contract and:

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

By: _____

Title: _____

Subscribed and sworn to before me this
_____ day of _____, 2021.

_____
(Notary Public)

My commission expires _____, 20___.

END OF SECTION

THIS AGREEMENT is dated as of the ____ day of _____ in the year **2021** by and between the **Jones County Board of Education** (hereinafter called OWNER) and _____ _____ (hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Bus Parking Improvements

The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Bus Parking Improvements

Article 2. ENGINEER.

The Project has been designed by **Ingram & Associates Consulting Engineers, L.L.C.**, who is hereinafter called ENGINEER and who is to act as Owner's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 3. CONTRACT TIME.

3.1. CONTRACTOR agrees to commence Work under this Agreement on or before a date to be specified on a written "Notice to Proceed" of the OWNER and to fully complete the Work with **150** consecutive calendar days from the "Notice to Proceed" date. This time frame has 60 consecutive calendar days built in for rain. The Contractor is encouraged to complete the project in 90 days.

3.2. Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring

any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER Two Hundred Dollars ($200.00) for each day that expires after the time specified in paragraph 3.1.

Article 4. CONTRACT PRICE.

4.1. OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current as follows:

_____ **Dollars ($_____)**

Article 5. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. ENGINEER will process applications for Payment as provided in the General Conditions.

Article 6. CONTRACTOR'S REPRESENTATIONS.

In order in induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

6.1. CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

6.2. CONTRACTOR has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in paragraph 4.2 of the General Conditions, and accepts the determination set forth in paragraph 5 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which CONTRACTOR is entitled to reply.

6.3. CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in paragraph 6.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the Work as CONTRACTOR considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance of paragraph 4.2 of the General Conditions; and no

additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by CONTRACTOR for such purposes.

6.4. CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the General Conditions.

6.5. CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

6.6. CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

Article 7. CONTRACT DOCUMENTS.

7.1. This Agreement

7.2. Exhibits to this Agreement

7.3. Performance and other Bonds

7.4. Notice of Award

7.5. General Conditions

7.6. Supplementary Conditions

7.7. Drawings, consisting of sheets numbered 1 through 9, inclusive with each sheet bearing the following general title: **Bus Parking Improvements**

7.8. Addenda numbers, - to -, inclusive.

7.9. Contractor's Bid

7.10. Documentation submitted by CONTRACTOR prior to Notice of Award.

7.11. The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to paragraphs 3.4 and 3.5 of the General Conditions.

7.12. The documents listed in paragraphs 7.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be amended, modified or supplemented as provided in paragraphs 3.4 and 3.5 of the General Conditions.

Article 8. MISCELLANEOUS

8.1. Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

8.2. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.3. OWNER and CONTRACTOR each binds itself, its partners, successors, assign and legal representatives to the other party hereto, its partners, successors, assign and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

Article 9. OTHER PROVISIONS.

9.1. RETAINAGE OF CONTRACTOR'S PAYMENT.

The retainage shall be an amount equal to 10% of Contractor's partial pay estimate until 50% of the work has been completed. At 50% completion, further partial payments shall be made in full to the Contractor and no additional amounts may be retained unless the Engineer certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the Contractor. At 50% completion or any time thereafter when the progress of the Work is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 20% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the Contractor. When the Work has been

substantially completed except for Work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgement of the Owner are valid reasons for noncompletion, the Owner may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed.

Partial pay estimates may include stored materials. Contractor must submit invoices and all materials must be located at the site of the work. Retainage will not be held on stored materials.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in **five (5) counterparts**. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 2021.

OWNER: **Jones County Board of Education**

By: _____

[CORPORATE SEAL]

Attest: _____

Address for giving notices:

Jones County Board of Education
125 Stewart Avenue
Gray, GA 31032

(If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Agreement.)

CONTRACTOR: _____

By: _____

[CORPORATE SEAL]

Attest: _____

Address for giving notices:

License No. _____

Agent for service of process: _____

_____

(If CONTRACTOR is a corporation, attach evidence of authority to sign.)

END OF SECTION

STATE OF GEORGIA

Jones County Board of Education

KNOW ALL MEN BY THESE PRESENTS, that we,_____ _____, as Principal (hereinafter know as "CONTRACTOR"), and we _____ _____, as Surety, do hereby acknowledge ourselves indebted and firmly bound and held unto the **Jones County Board of Education** for the use and benefit of those entitled thereto, in the sum of :

_____**Dollars ($_____)**

for the payment of which well and truly to be made, in lawful money of the United States, we do hereby bind ourselves, successors, assigns, heirs, and personal representatives.

BUT THE CONDITION OF THE FOREGOING OBLIGATION OR BOND IS THIS:

WHEREAS, the OWNER has engaged the said CONTRACTOR for the sum of:

_____**Dollars ($_____)**

for the **Bus Parking Improvements** as more fully appears in a written Agreement bearing the date of _____**,2021**, a copy of which Agreement is by reference hereby made a part hereof.

NOW, THEREFORE, if said Contractor shall fully and faithfully perform all the undertakings and obligations under the said agreement or contract herein before referred to and shall fully indemnify and save harmless the said OWNER from all costs and damage whatsoever which it may suffer by reason of any failure on the part of said CONTRACTOR to do so, and shall fully reimburse and repay the said default, and shall guarantee all products and workmanship against defects for a period of one year, then this obligation or bond shall be null and void, otherwise, it shall remain in full force and effect.

And for value received it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the terms of the said Agreement or Contract or in the work to be performed hereunder, or the Specifications accompanying the same shall in any way affect the obligations under the obligation or bond, and notice is hereby waived of any such damage, extension of time, alteration or addition to the terms of the Agreement or Contract or to the work or to the Specifications.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-1 et seq. and 36-82-100 et seq. and all the provisions of the law referring to this character of bond as set forth in said sections or as may be hereinafter enacted and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 2021. Executed in **5** counterparts.

CONTRACTOR: _____

By: _____

Title: _____

Signed and sealed in
the presence of:

1. _____

2. _____

SURETY: _____

By: _____

Title: _____

Signed and sealed in
the presence of:

1. _____

2. _____

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 Treasure Department's most current list (circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

END OF SECTION

STATE OF GEORGIA

Jones County Board of Education

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal (hereinafter know as "CONTRACTOR"), and we, _____, as Surety, do hereby acknowledge ourselves indebted and firmly bound and held unto the **Jones County Board of Education** for the use and benefit of those entitled thereto, in the sum of :

_____ **Dollars ($_____)**

for the payment of which well and truly to be made, in lawful money of the United States, we do hereby bind ourselves, successors, assigns, heirs, and personal representatives.

BUT THE CONDITION OF THE FOREGOING OBLIGATION OR BOND IS THIS:

WHEREAS, the OWNER has engaged the said CONTRACTOR for the sum of:

_____ **Dollars ($_____)**

for the **Bus Parking Improvements** as more fully appears in a written Agreement bearing the date of _____**, 2021**, a copy of which Agreement is by reference hereby made a part hereof.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if said CONTRACTOR and all subcontractors to whom any portion of the work provided for in said Contract is sublet and all assignees of said Contractor and of such subcontractors shall promptly make payments to all persons supplying him or them with labor, products, services, or supplies for or in the prosecution of the work provided for in such Contract, or in any amendment or extension of or addition to said Contract, and for the payment of reasonable attorney's fees, incurred by the claimants in suits on this bond, then the above obligation shall be void; otherwise, it shall remain if full force and effect.

HOWEVER, this bond is subject to the following conditions and limitations:

(a) Any person, firm or corporation that has furnished labor, products, or supplies for or in the prosecution of the work provided for in said Contract shall have a direct right of action against the CONTRACTOR and Surety on this bond, which right of action shall be asserted in a proceeding, instituted in the County in which the work provided for in said Contract is to be performed or in any county in which Contractor or Surety does business. Such right of action shall be asserted in proceedings instituted in the name of the claimant or claimants for his or their use and benefit against said CONTRACTOR or Surety or either of them (but not later than one year after the final settlement or said Contract) in which action such claim or claims shall be adjudicated and judgment rendered thereon.

(b) The Principal and Surety hereby designate and appoint _____

as the agent of each of them to receive and accept service of process or other pleading issued or filed in any proceeding instituted on this bond and hereby consent that such service shall be the same as personal service on the CONTRACTOR and/or Surety.

(c) In no event shall the Surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or preceding thereon that is instituted later than one year after the final settlement of said Contract.

(d) This bond is given pursuant to and in accordance with provisions of O.C.G.A. Section 13-10-1 et seq and 36-82-100 et seq and all the provisions of law referring to this character of bond as set forth in said sections or as may be hereinafter enacted, and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this ____ day of _____, 20___. Executed in **5** counterparts.

CONTRACTOR: _____

By: _____

Title: _____

Signed and sealed in
the presence of

1. _____

2. _____

SURETY: _____

By: _____

Title: _____

Signed and sealed in
the presence of:

1. _____

2. _____

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 Treasure Department's most current list (circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

END OF SECTION

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of the **Jones County Board of Education**, do hereby certify as follows:

I have examined the attached contract, performance and payment bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

By: _____

Date: _____

END OF SECTION

PROJECT DESCRIPTION:

Bus Parking Improvements

The OWNER has considered the BID submitted by you for the above-described WORK in response to its Advertisement for Bids dated _____, and all associated Addenda's and Instruction to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of:

_____ **Dollars ($_____)**

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Contractor's Performance BOND, Payment BOND and Certificates of Insurance with fifteen (15) calendar days from the date of the Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within five (5) days from the date of this notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE of AWARD to the OWNER and ENGINEER

Dated this _____ day of _____, 20 __.

Jones County Board of Education
Owner

By: _____

Title: _____

ACCEPTANCE OF NOTICE (CONTRACTOR)

Receipt of the above NOTICE OF AWARD is hereby acknowledged by_____
This _____ day of _____, 20___.

By: _____

Title: _____

END OF SECTION

To: _____ Date: _____

_____ Project: Bus Parking Improvements

_____

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 20____, on or before _____, 20____, and you are to complete the WORK within **90** consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 20___.

Jones County Board of Education
Owner

By: _____

Title: _____

ACCEPTANCE OF NOTICE
(CONTRACTOR)

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

_____

This, the _____day of _____, 20___.

By: _____

Title: _____

END OF SECTION

TABLE OF CONTENTS

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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:

Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

Agreement - The written agreement between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment - The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress for final payments and which is to include such supporting documentation as is required by the Contract Documents.

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

Bonds - Bid, performance and payment bonds and other instruments of security.

Change Order - A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR'S Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.

Contract Price - The moneys payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

Contract Time - The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

CONTRACTOR - The person, firm or corporation with whom OWNER has entered into the Agreement.

Defective - An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial

Completion in accordance with paragraph 14.8 or 14.10).

Drawings - The drawings 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.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

ENGINEER - The person, firm or corporation named as such in the Agreement.

Field Order - A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Time.

General Requirements - Sections of Division 1 of the Specifications.

Laws and Regulations; Laws or Regulations - Laws, rules, regulations, ordinances, codes and/or orders.

Notice of Award - The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

Notice to Proceed - A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

OWNER - The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

Partial Utilization - Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

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.

Resident Project Representative - The authorized representative of ENGINEER who is assigned to the site or any part thereof.

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 Supplier and submitted by CONTRACTOR to illustrate material or equipment for some portion of the Work.

Specifications - Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

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

Substantial Completion - The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if there be no such certificate issued, when final payment is due in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.

Supplementary Conditions - The part of the Contract Documents which amends or supplements these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, material man or vendor.

Underground Facilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials; electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

Unit Price Work - Work to be paid for on the basis of unit prices.

Work - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

Work Directive Change - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering and addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

Written Amendment - A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the none engineering or non-technical rather than strictly Work-related aspects of the Contract Documents.

ARTICLE 2 - PRELIMINARY MATTERS

Delivery of Bonds:

2.1. When CONTRACTOR delivers the executed Agreements to OWNER,

CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2. OWNER shall furnish to CONTRACTOR up to ten copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional Copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Time; Notice to Proceed:

2.3. The Contract Time will commence to run on the thirtieth day after the Effective Date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within thirty days after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the seventy-fifth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

Starting the Project:

2.4. CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

Before Starting Construction:

2.5. Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

2.6. Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1. an estimated progress schedule indicating the starting and completion dates of the various stages of the Work;

2.6.2. A preliminary schedule of Shop Drawing submissions; and

2.6.3. A preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of

Work which will be confirmed in writing by CONTRACTOR at the time of submission.

2.7. Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to ENGINEER, certificates (and other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4, and OWNER shall deliver to CONTRACTOR certificates (and other evidence of insurance requested by CONTRACTOR) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7.

Pre-construction Conference:

2.8. Within twenty days after the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the site, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6., to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Finalizing Schedules:

2.9. At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility therefor. The finalized schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents, as being required to produce the intended result will be supplied whether or not specifically called for. When words, which have a well-known technical or trade meaning are used to describe Work, materials or equipment such words shall be interpreted in accordance with

that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from ENGINEER; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonable have known thereof.

Amending and Supplementing Contract Documents:

3.4. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.4.1. A formal Written Amendment,

3.4.2. A Change Order (pursuant to paragraph 10.4), or

3.4.3. A Work Directive Change (pursuant to paragraph 10.1).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contact Time may only be changed by a Change Order or a Written Amendment.

3.5. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the followings ways:

3.5.1. A Field Order (pursuant to paragraph 9.5),

3.5.2. ENGINEER's approval of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27), or

3.5.3. ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.6. Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4 - AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands:

4.1. OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR justifies that any delay in OWNER's furnishing these lands, rights-of-way or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefor as provided in Article 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

Physical Conditions:

4.2.1. *Explorations and Reports:* Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site.

4.2.2. *Existing Structures:* Reference is made to the Supplementary Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities referred to in paragraph 4.3) which are at our contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, but not for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.2.3. *Report of Differing Conditions:* If CONTRACTOR believes that:

4.2.3.1. Any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2. Any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify OWNER and ENGINEER in writing about the inaccuracy or difference.

4.2.4. *ENGINEER's Review:* ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise OWNER in Writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5. *Possible Document Change:* IF ENGINEER concludes that there is a material error in the Contract Documents or that because of newly discovered conditions a change in the Contract Documents is required, a Work Directive Change or a change Order will be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6. *Possible Price and Time Adjustments:* In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy of difference. If OWNER and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

Physical Conditions - Underground Facilities:

4.3.1. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness or any such information or data; and,

4.3.1.2. CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2. *Not Shown or Indicated.* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after

becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the extent to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of. If the parties are unable to agree as to the amount or length thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Reference Points:

4.4. OWNER shall provide engineering surveys to establish reference points for construction, which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified in the General Requirements), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever a reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

ARTICLE 5 - BONDS AND INSURANCE

Performance and Other Bonds:

5.1. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

5.2. If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1,

CONTRACTOR shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to OWNER.

Contractor's Liability Insurance:

5.3. CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable.

5.3.1. Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts;

5.3.2. Claims for damages because of bodily injury occupational sickness or disease, or death on CONTRACTOR's employees;

5.3.3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.3.4. Claims for damages insured by personal injury liability coverage, which are sustained (a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (b) by any other person for any other reason;

5.3.5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

5.3.6. Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

5.3.7. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

The insurance required by this paragraph 5.3 shall include the specific coverage's and be written for not less than the limits of liability and coverage's provided in the Supplementary Conditions, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and ENGINEER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing *defective* Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish OWNER and with evidence of continuation of

such insurance at final payment and one year thereafter.

Contractual Liability Insurance:

5.4. The comprehensive general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's obligations under paragraphs 6.30 and 6.31.

Owner's Liability Insurance:

5.5. OWNER shall be responsible for purchasing and maintaining OWNER's own liability insurance and, at OWNER's option, may purchase and maintain such insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

Property Insurance:

5.6. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment.

5.7. CONTRACTOR shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties.

5.8 All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER by certified mail and will contain waiver provisions in accordance with paragraph 5.11.2.

5.9 OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible

amounts that are provided in the Supplementary Conditions. The risk of loss within the deductible amount, will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10. If OWNER requests in writing that other special insurance be included in the property insurance policy, CONTRACTOR shall, if possible, include such insurance, and the cost thereof will be charged to OWNER by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, CONTRACTOR shall in writing advise OWNER whether or not such other insurance has been procured by CONTRACTOR.

Waiver of Rights:

5.11.1. OWNER and CONTRACTOR waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraphs 5.6 and 5.7 and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractors, and all other parties names as insured in such policies for losses and damages so caused. As required by paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of OWNER, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insured. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by CONTRACTOR as trustee or otherwise payable under any policy so issued.

5.11.2 OWNER and CONTRACTOR intend that any policies provided in response to paragraphs 5.6 and 5.7 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any of the parties named as insureds or additional insureds, and if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER's consultant, OWNER will obtain the same, and if such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

Receipt and Application of Proceeds:

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13. OWNER as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object

in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as trustee shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, OWNER as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of such duties.

Acceptance of Insurance:

5.14. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.3 and 5.4 on the basis of its not complying with the Contract Documents, OWNER shall notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.7. If CONTRACTOR has any objection to the coverage afforded by or other provisions of the policies of insurance required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 on the basis of their not complying with the Contract Documents, CONTRACTOR shall notify OWNER in writing thereof within ten days of the date of delivery of such certificates to CONTRACTOR in accordance with paragraph 2.7 OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided by each as the other may reasonably request. Failure by OWNER or CONTRACTOR to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased by the other as complying with the Contract Documents.

Partial Utilization - Property Insurance:

5.15. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledge notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

ARTICLE 6-CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be responsible to see

that the finished Work complies accurately with the Contract Documents.

6.2. CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instruction of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

Adjusting Progress Schedule:

6.6 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Items:

6.7.1. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the

type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by ENGINEER if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named. The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs or redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

6.7.2. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER and as may be supplemented in the General Requirements.

6.7.3. ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute. ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's

consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject *defective* Work.

6.9 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organization performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may other wise be required by Laws and Regulations.

6.10. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.11. All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER and contains waiver provisions as required by paragraph 5.11. CONTRACTOR shall pay each

Subcontractor a just share of any insurance moneys received by CONTRACTOR on account of losses under policies issued pursuant to paragraphs 5.6 and 5.7.

Patent Fees and Royalties:

6.12. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorneys' fees and court and arbitration costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits:

6.13. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening the Bids, or if there are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2. If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

6.15. CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

Use of Premises:

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises which construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER or ENGINEER by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER and ENGINEER harmless from and against all claims damages, losses and expenses (including, but not limited to fees or engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against OWNER or ENGINEER to the extent based on a claim arising out of CONTRACTOR's performance of the Work.

6.17. During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings

will be available to ENGINEER for reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection:

6.20. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1 all employees on the Work and other persons and organizations who may be affected thereby:

6.20.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body (Including OSHA) having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.21. CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

Emergencies:

6.22. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or

OWNER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

Shop Drawings and Samples:

6.23. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, five copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review submission. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to review the information as required.

6.24. CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.25.1 Before submission of each Shop Drawing or sample CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.25.2. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to ENGINEER for review and approval of each such variation.

6.26. ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident

thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.27. ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1.

6.28. Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER's review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

6.29. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

Indemnification:

6.30. To the fullest extent permitted by Laws and Regulations CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and their consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by an negligent act or omission of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31. In any and all claims against OWNER or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose

acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6.32. The obligations of CONTRACTOR under paragraph 6.30 shall not extend to the liability of ENGINEER, ENGINEER's consultants, agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

ARTICLE 7 - OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work; and, if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

7.2. CONTRACTOR shall afford each utility owner and other contractor who is a party to such a direct contract (or OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3. If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility owner (or OWNER), CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR's failure so to report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided in the Supplementary Conditions. Unless otherwise provided in the Supplementary Conditions, neither OWNER nor ENGINEER shall have any authority or responsibility in respect of such coordination.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.1. OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER. Any dispute in connection with such appointment shall be subject to arbitration.

8.3 OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.5. OWNER's responsibilities in respect of purchasing and maintaining liability insurance are set forth in paragraphs 5.5 through 5.8.

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1 Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2. ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

Project Representation:

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in observing the performance of the Work. The duties, responsibilities and limitations of authority of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions. If OWNER designates another agent to represent OWNER at the site who is not ENGINEER's agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in the Supplementary Conditions.

Clarifications and Interpretation:

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve as adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall perform the Work involved promptly. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

Rejecting Defective Work:

9.6. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be *defective*, and will also have authority to require special inspection or testing of the Work as provided in paragraph

13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7. In connection with ENGINEER's responsibility for Shop Drawings and samples, see paragraphs 6.23 through 6.29 inclusive.

9.8. In connection with ENGINEER's responsibilities as to Change Orders, see Articles 10, 11, and 12.

9.9. In connection with ENGINEER's responsibilities in respect of Applications for Payment, etc., see Article 14.

Determinations for Unit Prices:

9.10. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decisions thereon will be final and binding upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other party to the Agreement and to ENGINEER written notice of intention to appeal from such a decision.

Decisions on Disputes:

9.11. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

9.13. Neither ENGINEER's authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14. Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgement of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

9.15. ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10 - CHANGES IN THE WORK

10.1. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefor as provided in Article 11 or Article 12.

10.3. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.22

and except in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments)

10.4.1. changes in the Work which are ordered by OWNER pursuant to paragraph 10.1, are required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14, or are agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Time which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11 - CHANGE OF CONTRACT PRICE

11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3. The value of any Work covered by a Change Order or of any claim for an increase

or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1. through 11.9.3, inclusive).

11.3.2. By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2.1.).

11.3.3. On the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.6 and 11.7).

Cost of the Work:

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall

obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5. Supplemental costs including the following:

11.4.5.1. The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used by not consumed which remain the property of CONTRACTOR.

11.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof - all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is not longer necessary for the Work.

11.4.5.4. Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.4.5.6. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than the negligence of CONTRACTOR, any

Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses will be included in the Cost of Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7. The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by OWNER in accordance with paragraph 5.9.

11.5. The term Cost of the Work shall not include any of the following:

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4 - all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9. above).

11.5.5. Cost due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of *defective* Work, disposal

of materials or equipment wrongly supplied and making good any damage to property.

11.5.6. Other overhead or general expenses costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

CONTRACTOR's Fee:

11.6. The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee; or if none can be agreed upon,

11.6.2. a fee based on the following percentages of the various portions of the Cost of the Work:

11.6.2.1. for costs incurred under paragraphs 11.4.1 and 11.4.2., the CONTRACTOR's Fee shall be fifteen percent;

11.6.2.2. for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five percent; and if a subcontract is on the basis of Cost of the Work Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen percent;

11.6.2.3. no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.4 the amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decreases plus a deduction in CONTRACTOR's Fee by an amount equal to ten percent of the net decrease; and

11.6.2.5 when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1. through 11.6.2.4, inclusive.

11.7. Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to ENGINEER. CONTRACTOR agrees that:

11.8.1. The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.8.2. CONTRACTOR's costs for unloading and handling on the site,

labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

Unit Price Work:

11.9.1. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10.

11.9.2. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

11.9.3. Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expenses as a result thereof, CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the amount of any such increase.

ARTICLE 12 - CHANGE OF CONTRACT TIME

12.1 The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time

will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR is a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing additional work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

12.3. All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) for delay by either party.

ARTICLE 13 - WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS: CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee:

13.1 CONTRACTOR warrants and guarantees to OWNER and ENGINEER that all Work will be in accordance with the Contract Documents and will not be *defective*. Prompt notice of all defects shall be given to CONTRACTOR. All *defective* Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2 ENGINEER and ENGINEER's representatives, other representative of OWNER, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.

Tests and Inspection:

13.3. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspection, tests or approvals.

13.4. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by OWNER (unless otherwise specified).

13.5. All inspections, tests or approvals other than those required by Laws or

Regulations of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and CONTRACTOR (or by ENGINEER if so specified).

13.6. If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.7. Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR with CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

Uncovering Work:

13.8 If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observations and replaced at CONTRACTOR's expense.

13.9. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and OWNER shall be entitled to an appropriate decrease in the CONTRACT Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such Work is not found to be *defective*, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Owner May Stop the Work:

13.10. If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any other party.

Correction or Removal of Defective Work:

13.11. If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with *non-defective* Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

One Year Correction Period:

13.12. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be *defective*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instruction, either correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with *non-defective* Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges or engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall bear all direct, indirect and consequential costs attributable to OWNER's evaluation of and determination to accept such *defective* Work (such costs to be approved by ENGINEER as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct *defective* Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work

in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees such access to the site as many be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's *defective* Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1 The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment:

14.2. At least twenty days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location

agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Supplementary Conditions.

CONTRACTOR's Warranty of Title:

14.3. CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

14.4. ENGINEER will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application. Ten days after presentation of the Application for Payment with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

14.5. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the Work in progress as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or OWNER to withhold payment to CONTRACTOR.

14.6. ENGINEER's recommendation of final payment will constitute an additional representation by ENGINEER to OWNER

that the conditions precedent to CONTRACTOR's being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

14.7. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGI- NEER's opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extents as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1. the Work is *defective*, or completed Work has been damaged requiring correction or replacement.

14.7.2. the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3. OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4. of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling OWNER to a set-off against the amount recommended, but OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action.

Substantial Completion:

14.8. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said

fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9 OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10. Use by OWNER of any finished part of the Work, which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER and CONTRACTOR agree constitutes a separately functioning and useable part of the Work that can be used by OWNER without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division or responsibility in respect thereof and access thereto.

14.10.2. OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance warranties and guarantees for that part of the Work which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.10.3. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

Final Inspection:

14.11. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or *defective*. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instruction, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents - all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases of waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish

receipts or leases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor of Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

Final Payment and Acceptance:

14.13. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.16. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

14.14. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Contractor's Continuing Obligation:

14.15. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by OWNER, nor any act of

acceptance by OWNER nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13, nor any correction of *defective* Work by OWNER will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.16).

Waiver of Claims:

14.16. The making and acceptance of final payment will constitute:

14.16.1. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from *defective* Work appearing after final inspection pursuant to paragraph 14.11 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights in respect of CONTRACTOR's continuing obligations under the Contract Documents; and

14.16.2. A waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1. OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 and 12.

Owner May Terminate:

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2. if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3. if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4. if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge or property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors:

15.2.5. if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6. if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.9 as revised from time to time);

15.2.7. if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8. if CONTRACTOR disregards the authority of ENGINEER; or

15.2.9. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if there be one) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass of conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contact Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) such excess will be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such costs incurred by OWNER will be approved as to reasonableness by ENGINEER and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR when existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4. Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, CONTRACTOR shall be paid for all Work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs).

Contractor May Stop Work or Terminate:

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or OWNER has failed to make any payment as aforesaid, CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the Work until payment of all amounts then due. The provisions of this under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

ARTICLE 16 - ARBITRATION

16.1. All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of, or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.16) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining subject to the limitations of this Article 16. This agreement so to arbitrate and any other agreement or consent to arbitrate entered into accordance herewith as provided in this Article 16 will be specifically enforceable under the prevailing law of any court having jurisdiction.

16.2. No demand for arbitration of any claim, dispute or other matter that is required to be referred to ENGINEER initially for decision in accordance with paragraph 9.11 will be made until the earlier of (a) the date of which ENGINEER has rendered a decision or (b) the tenth day after the parties have presented their evidence to ENGINEER if a written decision has not been rendered by ENGINEER before that date. No demand for arbitration of any such claim, dispute or other matter will be made later than thirty days after the date on which ENGINEER has rendered a written decision in respect thereof in accordance with paragraph 9.11; and the failure to demand arbitration within said thirty days' period shall result in ENGINEER's decision being final and binding upon OWNER and CONTRACTOR. If ENGINEER renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not

supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned. No demand for arbitration of any written decision of ENGINEER rendered in accordance with paragraph 9.10 will be made later than ten days after party making such demand has delivered written notice of intention to appeal as provided in paragraph 9.10.

16.3. Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the American Arbitration Association, and a copy will be sent to ENGINEER for information. The demand for arbitration will be made within the thirty-day or ten-day period specified in paragraph 16.2 as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other mater in question would be barred by the applicable statute of limitations.

16.4. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joiner or in any other manner any other person or entity (including ENGINEER, ENGINEER's agents, employees or consultants) who is not a part to this contract unless:

16.4.1. the inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration.

16.4.2. such other person or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and

16.4.3. the written consent of the other person or entity sought to be included and of OWNER and CONTRACTOR has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

16.5. The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and will not be subject to modification or appeal except to the extent permitted by Sections 10 and 11 of the Federal Arbitration Act (9 U.S.C. 10,11).

ARTICLE 17 - MISCELLANEOUS

Giving Notice:

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given 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 or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Time:

17.2.1. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

General:

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.30, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.

END OF SECTION

INDEX

1. SUPPLEMENTARY CONDITIONS.

These Supplementary Conditions amend or supplement the General Conditions and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

2. SCOPE OF THE WORK.

The Work includes the furnishing of all necessary machinery, equipment, tools, labor and other construction means, and all materials and equipment required to perform the Work including the placing of the Work into satisfactory operation.

3. CONSTRUCTION DRAWINGS.

The Work shall conform to the following construction drawings:

Bus Parking Improvements

Sheet No.	Title
-	Title Sheet
1	General Notes and Legend
2	Grading & Drainage Layout
3	Initial Erosion & Sediment Control Plan
4	Intermediate Erosion & Sediment Control Plan
5	Final Erosion & Sediment Control Plan
6	Miscellaneous Details
7-9	Erosion Control Notes & Details

4. SUBSTITUTIONS OR "OR EQUAL".

Substitutes may be offered in lieu of the major equipment manufacturers listed in the Technical Specifications. Submittals on "Or Equal" substitutes must be received by the Engineer within 48 hours after the Bid Opening.

a. Submittals for each type of equipment proposed shall include illustrative drawings; specifications, descriptive brochures, installation lists, weights, metal thickness of principal components; drive arrangements; torques; power requirements; performance curves; installation requirements; availability of spare parts; local

service capability and other items necessary for the Engineers to determine that the intent of these Specifications is to be met.

b. The price bid for substitute equipment shall not be used in the base bid but shall be bid as a deductible or additive alternate and listed on the forms provided in the Proposal.

c. Unless otherwise waived by the Owner, a five (5) year warranty shall be required on all substitute equipment/materials/systems in the form of a bond or other equivalent surety. Such warranty/surety shall be in the amount of the Contractor's purchase order, including installation and service for the substitute. Should the substitute fail to perform satisfactorily, either in mechanical integrity or in performance, the Owner can require modification or replacement or if the supplier/manufacturer fails to remedy the defects/performance the Owner may use any or all of the bond/surety to modify or replace the system or portions thereof including modifications to another process.

d. The Contractor shall be responsible for the substitute supplier/manufacturer's action and performance until satisfactory performance is obtained and thereafter during the one (1) year warranty period as specified in the Contract Documents. After this to cover the remaining period of the two (2) years, the Owner can take action on the system supplier's bond/surety. The bond/surety must be tended prior to approval of the substitute.

e. The Owner reserves the right to accept or reject any and all substitutes that may be offered.

f. The contract will be awarded on the basis of the lowest qualified base bid including any substitute selected by the Owner.

g. The adjustment in price bid for the substitute equipment shall include the cost of all re-design, the cost of structural, mechanical, and electrical changes when the considered item will not fit the design, as determined by the Engineer.

5. REPORTS AND DRAWINGS USED BY THE ENGINEER.

In the preparation of Drawings and Specifications, ENGINEER has relied upon:

a. The following reports of explorations and tests of sub-surface conditions at the site of the Work:

(1) NONE

b. The following drawings of physical conditions in or relating to existing surface and sub-surface structures (except Underground Facilities) which are contiguous to the site of the Work.

(1) NONE

6. SANITARY CONVENIENCES.

The CONTRACTOR shall provide adequate sanitary conveniences for use of those employed on the work and their use shall be strictly enforced. Such conveniences shall be made available when the first employees arrive on the site and shall be removed after the departure of the last employees from the job.

7. UTILITY SERVICE.

The CONTRACTOR will arrange for water service and temporary electrical service through the local agencies at his own expense.

8. ENVIRONMENTAL IMPACT.

The CONTRACTOR shall conduct all operations so as to minimize, to the greatest extent possible, adverse environmental impact.

a. Noise: All equipment and machinery shall be provided with exhaust mufflers maintained in good working order so as to reduce operating noise to minimum levels.

b. Dust/Smoke: All equipment movements shall be accompanied by a minimum of dust. Traveled surfaces and earthwork shall be maintained in a moist condition to avoid the generation of dust or the airborne movement of particulate matter under all prevailing atmospheric conditions.
Burning operations will be conducted only with written permission of the OWNER and/or appropriate regulatory agency. The CONTRACTOR shall be responsible for obtaining all permits and comply with all codes, ordinances, and regulations pertaining to the burning.

c. Traffic: Trucks shall be routed over roads which will result in the least effect on traffic and nuisance to the public. All material shall be loaded in a manner which will preclude the loss of any portion of the load in transit, including covering, if necessary.

d. Sedimentation: All points of concentrated runoff from rainfall shall be visually monitored to determine that no eroded material from the construction site is being deposited offsite. Measures shall be taken to promptly eliminate such a deposition if occurring, including the installation of detention basins.

9. CONSTRUCTION STAKEOUT.

The CONTRACTOR shall be responsible for all construction staking required to complete the work.

10. UTILITIES.

Utilities such as sewer, water, and electric lines encountered in the work shall be protected from injury and maintained in service until moved or replaced as required under this Contract or by others as the case may be, or abandoned as may be necessary for the proper construction and use of the new work.

11. ADJUSTMENT OF DISCREPANCIES.

In all cases of discrepancies between the various dimensions and details shown on drawings, or between the drawings and these specifications, the more expensive construction shall be estimated before construction is started, the matter shall be submitted to the ENGINEER for clarification. Without such a decision, discrepancies shall be adjusted by the CONTRACTOR at his own risk and in settlement of any complications arising from such adjustment, the CONTRACTOR shall bear all of the extra expense involved.

12. RESTORATION.

The CONTRACTOR shall conduct his operations so that restoration of roadways, driveways, curb and gutter, ditches and easement progresses along with the pipe laying.

Reasonable care shall be taken during construction to avoid damage to 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 to those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

13. MAINTENANCE DURING CONSTRUCTION.

The CONTRACTOR shall maintain the Work from the beginning of construction operations until final acceptance. This maintenance shall constitute continuous and effective work prosecuted day by day with adequate equipment and forces to the end that the site and structures thereon are kept in satisfactory condition at all times, including satisfactory signing or marking as appropriate and control of traffic where required by use of traffic control devices as required by the State in which his project is located.

Upon completion of the Work, the CONTRACTOR shall remove all construction signs and barriers before final acceptance.

While undergoing improvements, the roads shall be kept open to all traffic by the CONTRACTOR. The CONTRACTOR shall keep the portion of the site being used by public traffic, whether it be through or local traffic, in such condition that traffic will be adequately accommodated. The CONTRACTOR shall bear all cost of signs and markings as required and other maintenance work during construction and before the Work is accepted and of constructing and maintaining such approaches, crossing, intersections, and other features as may be necessary without direct compensation.

14. BARRICADES, DANGER, WARNING & DETOUR SIGNS.

The CONTRACTOR shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public. Highways and streets closed to traffic shall be protected by effective barricades, and obstructions shall be lighted during hours of darkness. Suitable warning signs shall be provided to properly control and direct traffic.

The CONTRACTOR shall furnish, install, and maintain all necessary barricades, warning signs, and other protection devices in accordance with the State requirements in which the project is located. Temporary signs may be reused, provided they are in good condition and legible. All protective devices shall be kept in a good, legible condition while in use.
As soon as construction advances to the extent that temporary barricades, and signs are no longer needed to inform the traveling public, such signs shall be promptly removed.

The cost of furnishing, erecting, maintaining, and removing protective devices will not be paid for as a separate Bid Item. Where the CONTRACTOR is required to perform any of these functions, the cost thereof shall be included in the overall Bid submitted. Ownership of the temporary warning devices shall remain with the CONTRACTOR.

15. HIGH VOLTAGE ACT.

The CONTRACTOR acknowledges the requirement of the High Voltage Act of the General Assembly of Georgia by execution of this Contract.

16. ACCESS FOR INSPECTION.

Access for inspection shall be provided for representatives of the Georgia Department of Natural Resources, Environmental Protection Division and the Georgia Department of Transportation.

17. INSURANCE.

The limits of liability for the insurance required by paragraph 5.3 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

a. Workers' Compensation, etc. under paragraphs 5.3.1 and 5.3.2 of the General Conditions:

(1)	State:	Statutory
(2)	Applicable Federal (e.g. Longshoreman's):	Statutory
(3)	Employer's Liability:	$200,000
(4)	Contractor shall show Owner as additional insured.	

b. Comprehensive General Liability (under paragraphs 5.3.3 through 5.3.6 of the General Conditions):

(1) Combined single limit for Bodily Injury and Property Damage:

$1,000,000	Each Occurrence
or combined single limit	$2,000,000

(2) Property Damage liability insurance will provide Explosion, Collapse and Underground coverages where applicable.

(3) Personal Injury, with employment exclusion deleted

$1,000,000	Annual Aggregate

c. Comprehensive Automobile Liability:

Bodily Injury:

$200,000	Each Person
$500,000	Each Occurrence

Property Damage:

$300,000	Each Occurrence
or combined single limit of	$200,000

d. Builders Risk Insurance (Fire and Extended Coverage):

100% completed value based on the insurable portion of the project.

e. Contractual Endorsement:

The Contractual Liability required by paragraph 5.4 of the General Conditions shall provide coverage for not less than the following amounts:

(1) Bodily Injury:

$500,000	Each Occurrence

(2) Property Damage:

$300,000	Each Occurrence
$N/A	Annual Aggregate

During the installation of any work on railroad right-of-way the contractor, at his sole cost and expense, shall procure and keep in force a Comprehensive General Liability insurance policy, which will include contractual liability coverage and have no exclusive for the "Railroad Operations Exposure" providing a combined single limit of $6,000,000 for work within the right-of-way of CSX Transportation Railroad.

The Contractor shall furnish certificates of insurance evidencing the above coverage shall be subject to the prior approval of the Railroad. Such insurance shall contain a contractual liability endorsement which will cover the obligations assumed under this agreement and such other endorsement or endorsements as, in the opinion of counsel for the railroad, may be necessary or advisable to fully protect and indemnify the railroad. In addition, such insurance shall contain notification provisions whereby the insurance company agrees to give 30 days notice to the railroad of any change or cancellation of the policies. All of these endorsements and

notice provisions shall be stated on the certificate of insurance which is to be provided to the railroad. Provided, however, that notwithstanding any of the provisions of this agreement with respect to insurance, it is understood and agreed that the liability assumed by the Contractor shall not be limited to the insurance coverage stipulated herein.

18. AS-BUILT INFORMATION.

The CONTRACTOR shall provide the OWNER with one set of red-lined prints indicating as-built information.

19. CERTIFICATES OF INSURANCE.

Certificates acceptable to the Owner shall be attached to the signed Contract Documents when they are transmitted to the Owner for execution. These certificates shall contain the statement that "Coverages afforded under the policies will not be canceled unless at least thirty (30) days prior to cancellation written notice has been given to the Owner, as evidenced by receipts of registered or certified mail".

20. WORK AREA.

The Contractor shall keep the work area secured at all times. Every precaution must be made to ensure the area is safe.

21. BUILDER'S RISK.

The Contractor shall procure and shall maintain during the life of the Contract Agreement, Builder's Risk Insurance to protect the interests of the Owner, Contractor, and Sub-Contractors against loss by fire, vandalism, malicious mischief, and all hazards included in a standard Extended Coverage Endorsement. The amount of the insurance shall be at all times equal or exceed the full amount of the Contract. The policies shall be in the name of the Owner and the Contractor.

22. BUY AMERICAN.

By submitting this bid, the Contractor agrees that the Contractor, sub-contractors, material, men and suppliers in the performance of this Contract will give preference to domestic construction material.

23. RETAINAGE OF CONTRACTOR'S PAYMENT.

The retainage shall be an amount equal to 10% of Contractor's partial pay estimate until 50% of the work has been completed. At 50% completion, further partial payments shall be made in full to the Contractor and no additional amounts may be retained unless the Engineer certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the Contractor. At 50% completion or any time thereafter when the progress of the Work is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 20% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the Contractor. When the Work has been substantially completed except for Work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgement of the Owner are valid reasons for noncompletion, the Owner may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed.

Partial pay estimates may include stored materials. Contractor must submit invoices and all materials must be located at the site of the work. Retainage will not be held on stored materials.

24. This site has been used to stockpile dirt from other projects. It is the Contractor's responsibility to spread the stockpiled dirt and compact that dirt to meet these specifications.

END OF SECTION

Division 1

General Requirements

PART 1 GENERAL

1.01 DESCRIPTION

The work to be done shall consist of furnishing all labor, materials and equipment necessary to construct the project titled **Bus Parking Improvements** as shown on the construction drawings. In general, construction consists of cleaning and grubbing of the site; stripping of topsoil; hauling of fill material; compaction of existing soil on site; testing; graded aggregate base course; hot asphalt mix paving (12.5 mm); striping; grassing; NPDES Monitoring; soil and erosion measures and any miscellaneous appurtenances for a complete project. All work shall be done in accordance with the plans and specifications. This work will be awarded per division.

All work shall be done in accordance with the plans and specifications for a complete project for the **Jones County Board of Education**.

A. All Work described above shall be performed as shown on the Drawings and as specified.

B. This site has been used to stockpile dirt from other projects. It is the Contractor's responsibility to spread the stockpiled dirt and compact that dirt to meet these specifications.

1.02 PROJECT LOCATION

The equipment and materials to be furnished will be installed at the locations shown on the drawings.

1.03 QUANTITIES

The Owner reserves the right to alter the quantities of work to be performed or to extend or shorten the improvements at any time when found necessary, and the Contractor shall perform the work as altered, increased, or decreased. Payment for such increased or decreased quantity will be made in accordance with the Instructions to Bidders. No allowance will be made for any change in anticipated profits nor shall such changes be considered as waiving or invalidating any condition or provisions of the Contract and Bond.

1.04 PARTIAL OWNER OCCUPANCY

The existing facilities to which these improvements are being made will continue operation during the period of construction.

END OF SECTION

PART 1 GENERAL

1.01 PARTIAL OCCUPANCY BY OWNER

Whenever, in the opinion of the Engineer, any section or portion of the Work or any structure is in suitable condition, it may be put into use upon the written order of the Engineer and such usage will not be held in any way as an acceptance of said Work or structure, or any part thereof, or as a waiver of any of the provisions of these Specifications and the Contract. Pending final completion and acceptance of the Work, all necessary repairs, and replacements, due to defective materials or workmanship or Operations of the Contractor, for any section of the Work so put into use shall be performed by the Contractor at Contractor's own expense.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

A. This Section describes the methods by which measurement will be made of the quantities for which payment will be made for the Project.

B. The Bid lists each item of the Project for which payment will be made. No payment will be made for any items other than those listed in the Bid.

C. Required items of work and incidentals necessary for the satisfactory completion of the work which are not specifically listed in the Bid, and which are not specified in this Section to be measured or to be included in one of the items listed in the Bid, shall be considered as incidental to the work. All costs thereof, including Contractor's overhead costs and profit, shall be considered as included in the lump sum or unit prices bid for the various Bid items. The Contractor shall prepare the Bid accordingly.

D. Work includes furnishing all plant, labor, equipment, tools and materials, which are not furnished by the Owner and performing all operations required to complete the work satisfactorily, in place, as specified and as indicated on the Drawings.

1.2 MEASUREMENT OF WORK

A. Measurement of an item of work will be by the unit indicated in the Bid Form.

B. Final payment quantities shall be determined from the record drawings. The record drawing lengths, dimensions, quantities, etc. shall be determined by a survey after the completion of all required work. The precision of final payment quantities shall match the precision shown for that item in the Bid Form.

C. Payment will include all necessary and incidental related work not specified to be included in any other item of work listed in the Bid Form.

D. Unless otherwise stated in individual sections of the Specifications or in the bid, no separate payment will be made for any item of work, materials, parts, equipment, supplies or related items required to perform and complete the work. The costs for all such items required shall be included in the price bid for item of which it is a part.

E. Payment will be made by extending unit prices multiplied by quantities provided and then summing the extended prices to reflect actual work. Such price and

payment shall constitute full compensation to the Contractor for furnishing all plant, labor, equipment, tools and materials not furnished by the Owner and for performing all operations required to provide to the Owner the entire Project, complete in place, as specified and as indicated on the Drawings.

F. "Products'' shall mean materials or equipment permanently incorporated into the work.

G. "Provide'' shall mean furnish and install.

H. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

I. Work shall be measured by the Engineer or his representative with assistance from the Contractor prior to preparation of a payment request by the Contractor.

J. Unit quantities that are measured in place shall be measured monthly. The Contractor shall give the Engineer a minimum of two days notice for making all required measurements.

K. Materials that must be measured as delivered shall be measured at the time of delivery by the Engineer or his representative; the Contractor shall provide sufficient advance notice so that such measurements can be made.

L. Work completed shall be measured for completion against the schedule of values provided by the Contractor in accordance with the General Conditions. Related work necessary for a complete and operational job, such as relocation of mail boxes removal of trees, relocation of utilities, field engineering, clearing and grubbing, traffic control, etc., not specifically identified as a pay item shall be included in the unit price bid. No additional payments will be made for such activities.

1.3 ESTIMATED QUANTITIES

A. All estimated quantities for unit price items, stipulated in the BID FORM, or other Contract Documents, are approximate and are to be used as a basis for comparing the bids submitted for the Project. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. The Contractor agrees to make no claim for damages, anticipated profits or otherwise on account of any difference between the amounts of work actually furnished and the estimated amounts included in the BID FORM. The Contractor will not be paid for any work which exceeds the quantity set forth in the BID FORM without a change order issued before the work is performed unless

specifically ordered in writing by the Engineer. The Contractor will provide assistance to the Engineer to check quantities and elevations when so requested.

1.4 MEASUREMENT OF QUANTITIES

A. **Measurement by Weight** – Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

B. **Measurement by Volume** – Measured by cubic dimension using mean length, width and height or thickness.

C. **Measurement by Area** – Measured by square dimension using mean length and width or radius.

D. **Linear Measurement** – Measured by linear dimension, at the item centerline or mean chord.

E. **Stipulated Sum/Price Measurement** – Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.5 PROGRESS PAYMENTS

A. Progress payments shall be based on the quantity of units installed.

B. All items of Work not specifically listed in the Bid Schedule shall be considered incidental to the construction, and the cost of all such work and material shall be included in the prices bid for various items listed.

C. All items listed for measurement and payment shall include all machinery, plant, materials and labor, etc., to successfully and satisfactorily complete Work specified.

D. Payment – The Contractor will receive payment only for the items listed in the Bid Schedule of his contract, and no separate payments will be made for the work under any section of the Contract Documents except as provided for in the Bid Form. Where measurements are required to be made by the Engineer, for the payment of a pay item, the failure of the Contractor to give the adequate notification or failure of the Contractor to give the engineer assistance for the measurement shall result in the forfeiture of payment for the work or item, which was not measured.

E. Work to be paid for as a "Lump Sum" shall be measured for completion against the "Schedule of Values" provided by the Contractor. The "Schedule of Values" shall be submitted at the Preconstruction conference and shall include quantities and prices of items aggregating the total "Lump Sum" and will subdivide the work into

component parts in sufficient detail to serve as the basis for progress payments during construction.

PART 2 – PRODUCTS

2.1 STORED MATERIALS

A. Partial payment shall be made for approved materials stored at the project site, provided invoices for said materials are furnished in accordance with payment request submittal and shop drawings for said materials have been approved.

PART 3 – EXECUTION

3.1 CLEARING AND GRUBBING

A. Measurements for clearing and grubbing shall be on the basis of acreage cleared for installation and construction as shown on the plans.

B. Payment for clearing and grubbing shall be based on the unit price bid in the Bid Form. Payment shall include all labor, material, and equipment necessary to remove trees, stumps, vegetation, topsoil, etc. as required in the plans and specifications.

3.2 TRENCH EXCAVATION AND BACKFILL

A. No separate or additional payment shall be made for any special or unique method, means, techniques, or equipment necessary for the Contractor's compliance with these Specifications, regulatory requirements, permits, laws or regulations which govern this Project.

B. Trench Excavation: No separate payment shall be made for trench excavation. All costs shall be included in the unit price bid for the item to which it pertains at the appropriate depth.

C. Sheeting, Bracing and Shoring

1. No separate payment will be made for providing sheeting, bracing and timbering which are specified, shown on the Drawings or necessary due to Contractor's means of construction.

2. No payment will be made for sheeting removed or for sheeting left in place for the Contractor's convenience.

D. **Rock Excavation**

1. Measurement of classified excavation shall be on the basis of the amount of cubic yards of rock excavated. Cubic yards of classified excavation shall be determined by multiplying the total length of rock excavated by a 30-inch trench width and by the total depth of rock excavated. Then dividing by 27 to convert to cubic yards

2. Payment for classified excavation shall be on the basis of the BID FORM. Payment shall include excavation, removal and replacement of fill as specified in Rock Excavation Section 02320.

E. **Dewatering Excavations:** All costs of equipment, labor and materials required for dewatering shall be included in the price bid for the item to which it pertains.

F. **Bedding and Haunching**

1. No additional payment will be made for improved bedding required to compensate for over excavation of the trench.

2. No payment will be made for additional trench depth.

G. **Initial Backfield**

1. No separate payment shall be made for initial backfill.

2. No separate payment shall be made for drying out the initial backfill material in order to meet the compaction requirements.

3. No separate payment shall be made for the adding of moisture to the initial backfill materials in order to meet the compaction requirements.

4. No separate payment shall be made for providing select material if the insitu material cannot meet the compaction requirements.

H. Final Backfilling

1. No additional payment will be made for additional material when excavated materials are used.

2. No separate payment shall be made for drying out the final backfill material in order to meet the compaction requirements.

3. No separate payment shall be made for the adding of moisture to the initial backfill materials in order to meet the compaction requirements.

4. No additional payment will be made for providing select material if the insitu material cannot meet the compaction requirements.

I. **Additional Material:** No separate payment will be made for additional earth or fill materials imported to the Project site. Fill shall be included as past of the base bid.

J. **Excavation and Bedding for Water Main Construction:** No additional payment will be made for additional trench depth.

3.3 EARTHWORK

A. Unclassified Excavation

1. Unclassified Excavation shall be on a cubic yard basis and shall include all labor, materials and equipment needed to remove, relocate and compact earth materials as indicated on the construction plans.

2. Payment for Unclassified Excavation for the Ground Storage Tank shall be included in the cost of the item to which it pertains. The unit quantity was based on the prizmortal method of volume calculation with a compaction factor included. In the event the contractor's calculations are drastically different from the Engineer's Calculations, attention to this matter shall occur prior to any material excavated or contractor risks no additional compensation.

B. Unsuitable Material

1. Costs for undercutting, foundation preparation, and removal and replacement of unsuitable material, where shown on the Drawings or specified, shall be included in the price bid for the ground storage tank.

2. Payment for removal and replacement of unsuitable material which is ordered by the Engineer which is not shown on the Drawings or specified, shall be included in the lump sum price bid for the pump station.

3. No separate payment will be made for concrete backfill of trenches beneath structures. The cost of this work and all costs incidental thereto shall be included in the price bid for the item to which the work pertains.

4. Additional costs of corrective work, made necessary by unauthorized

excavation of earth or rock, shall be borne by the Contractor.

C. **Dewatering:** No separate payment will be made for dewatering required to accomplish the work.

D. **Backfilling:** No separate payment will be made for backfilling or excavation, hauling and placement of borrow material. The cost of all such work and all coasts incidental thereto shall be included in the unit price bid for Unclassified Excavation.

3.4 ASPHALT/CONCRETE OR CLASS "A" PAVEMENT REPLACEMENT

A. Measurement: Measurement of the Pavement Replacement (Class "A", asphalt, concrete), and shall be on the basis of the linear foot replaced at the thickness as specified.

B. Payment Class "A" Pavement Replacement: Payment of Class "A" Pavement Replacement shall be on the basis of the unit price in the Bid Form. Payment shall include saw cutting of the existing pavement, removing existing pavement, installing proposed utility, compacting trench as detailed, placing 8" thick Portland Cement Concrete, and bituminous tack coat, and 2" asphaltic topping (match existing)

C. Payment – Concrete and Asphalt Replacement: Payment of concrete replacement shall be on the basis of the unit price in the Bid Form. Payment shall include saw cutting of the existing pavement, removing existing pavement, installing proposed utility, compacting trench as detailed, placing two (2) times the base material, where no base material use 4" crusher run, and pour four (4) inches concrete.

For asphalt replacement, use 2" asphalt (Type "E" or match existing over primed base.

3.5 GRADED AGGREAGATE BASE

B. Measurements for graded aggregate base shall be on the basis of the tonnage installed and construction as shown on the plans. Submit weight tickets with pay request. Tickets shall have job number, truck number, hauler, date, and weight at a minimum.

B. Payment for clearing and grubbing shall be based on the unit price bid in the Bid Form. Payment shall include all labor, material, and equipment necessary to haul, install and compact graded aggregate base as required in the plans and specifications.

3.6 EROSION AND SEDIMENTATION CONTROL

A. General

1. Payment shall be made for temporary and/or permanent erosion and sedimentation controls, except as noted below. All other temporary and/or permanent erosion and sedimentation control costs shall be included in the unit price bid for the item to which it pertains.

2. No payment will be made for any portion of the Project for which temporary erosion and sedimentation controls are not properly maintained.

3. Quantities for payment shall be based upon actual quantity constructed and authorized by the Engineer.

B. Temporary Construction Exits, Co: All costs for construction exits, including installation, maintenance, repair and removal shall be included in the unit price bid.

C. Temporary Sediment Barriers, Sd1: All costs for sediment barriers, whether specifically hay bales, specifically silt fences, or Contractor's choice of bales or silt fence, including installation, maintenance, repair, replacement, and removal shall be included in the unit price bid for Sediment Barriers.

D. Temporary Ditch Checks, Cd: All costs for Temporary Ditch Checks, including stone, necessary earthwork, periodic maintenance and repair, and removal of sediment and stone following establishment of permanent erosion control measures shall be included in the unit price bid for temporary pitch checks.

E. Temporary Mulch and Temporary Grassing

1. Measurement and Payment for Temporary Mulch and Temporary Grassing shall be on a per acre basis and shall include all labor, materials and equipment needed to Temporary Mulch and the Temporary Grass distributed area.

F. Grassing Complete, Permanent

1. The unit price bid for Grassing shall be for clean up, dressing, and grassing of the disturbed area. Any other costs for labor, materials, and equipment for clean-up and grassing of the disturbed area shall be included in the price bid for the item to which it pertains.

2. No additional payment will be made for grassing of the disturbed area

where the Contractor must reseed due to inadequate watering and maintenance; loss of seeds caused by site erosion, e.g., wind and rain; inadequate germination of the seeds; inadequate coverage/density; providing permanent species at the appropriate season after temporary grassing has been performed. Once grassing is completed, 70% of the money bid for grassing will be paid. The remaining 30% will be paid when 100% coverage, 70% density is achieved.

3. No additional payment will be made for providing a temporary species of grass where the seasonal limitations do not allow for the proper germination of a permanent species of grass. Any additional cost anticipated for sowing a temporary species shall be included in the price bid for the item to which it pertains.

4. Measurement for payment for Grassing shall be the acreage of area disturbed, excluding the paved area. The Contractor shall be responsible to seed, re-seed to achieve a cover of 100% coverage at a 70% density.

G. **Polyacrylamide Spray, Pam:** All cost for Polyacrylamide Spray including all labor, maintenance, repair and removal shall be included in the unit price bid for Polyacrylamide Spray.

H. **NPDES Monitoring**

All costs associated with meeting the requirements for coverage under NPDES General Permit to Discharge Storm Water associates with construction activity (GAR 100002 – Infrastructure) including all preparation, labor, materials, and equipment needed shall be included in the unit price bid for NPDES Monitoring.

I. **Temporary Ditch Checks, Cd-s and CD-Hb:** All costs for Temporary Ditch Checks, CD-s, and CD-Hb, including stone, hay bales, necessary earthwork, periodic maintenance and repair, and removal of sediment and stone following establishment of permanent erosion control measures shall be included in the unit price bid for temporary ditch checks.

3.7 WATER DISTRIBUTION

A. Measurement:

1. Water Mains: Each size of water mains and 6" fire hydrant leads will be measured along the pipe from center of fitting to center of fitting or end of pipe in place, without deduction for the length of intermediate fittings or valves.

2. Water Main Connections: Measurement for various water main connections shall be on the basis as shown in the Bid Form.

3. Water Main Termination: Water Main terminations shall be paid for on the basis of each installed.

4. Fittings: Measurement of fittings will be on the basis of each installed

4. Fire Hydrants: Measurement of fire hydrants will be on the basis of each installed.

5. Valves: Measurement of valves will be on the basis of each installed.

6. Concrete Valve Marker: Measurement for concrete valve markers shall be on the basis as shown in the Bid Form

7. Tapping Sleeve and valve with Box: Measurement for concrete valve markers shall be on the basis as shown ion the Bid Form.

8. Service Connections: The quantity of new service connections complete will be the actual number installed. Short side and long side will be paid separately.

9. Testing and Disinfecting: Testing and Disinfecting shall be paid for at the unit price per linear foot of water main in the Bid Form. The price shall include all materials, labor, and equipment required for obtaining a passing sample.

B. Payment:

1. Water Mains: Water mains measured as described above will be paid for at the unit price bid per linear foot for the various sizes shown in the Bid Form. Payment shall include all labor, equipment, and materials necessary to complete the work as specified, including thrust blocking.

2. Fittings: Fittings for iron and plastic pipe in the distribution system will be paid for on the basis of the unit price per each of ductile iron fittings installed. The price shall include fittings, accessories, concrete thrust blocking, installation and all materials necessary for a complete and operational fitting. WE have included several additional fittings to be used as needed.

3. Fire Hydrants: Fire hydrants shall be paid for at the unit price per each shown in the Bid Form. The price shall include all labor, equipment, materials and incidentals necessary for a complete installation. No separate payment will be made for gravel, retainer glands, strapping, blocking or other incidentals normally provided for a hydrant installation. Any additional fittings required to install a hydrant will be paid for at the unit price bid for each fitting.

4. Valves: Gate valves will be paid for at the unit price per each shown in the Bid Form for various sized valves. The price shall include all materials, labor, equipment, valve box, concrete blocking, concrete pad and all other incidentals required for a complete installation.

5. Cleaning and Disinfecting: No separate payment will be made for cleaning and disinfecting. Cleaning and disinfecting piping in the distribution system will be included in the lump sum and unit prices for the appropriate items.

6. Grassing: There will be no separate measurement or payment. Grassing shall be considered as a subsidiary obligation of the Contractor in the restoration of disturbed areas.

7. Metal Detector Tape and Tracer Wire: No separate payment will be made for tape. The cost of furnishing and placing Metal Detector Tape and tracer wire shall be included in the contract unit price for installing non-metallic pipe.

3.8 METERED SERVICES AND TRANSFER OF SERVICES

1. Measurement:

   a. Service Pipe: 1" service pipe will be measured along the pipe from center of the main to center of meter box, without deduction from the length of intermediate fittings or valves. Service pipe shall be Polyethylene Tubing 200 psi.

   b. Relocation of Meter and Box: Measurement of meter and box will be on the basis of each relocated.

   c. Transfer of Service: Measurement of transfer of service will be on the basis of each transferred to the new main.

   d. Long Side Service: Long Side service shall be on the basis of each installed.

e. Short Side Service: Short Side Service shall be on the basis of each installed.

2. Payment:

a. Service Pipe: Service pipe measured as described above will be paid for at the unit price bid per linear foot as shown on the BID FORM. Payment shall include all labor, equipment, and materials necessary to complete the work as specified.

b. Relocation of Meter and Box: Meter and box shall be paid for at the unit price per each as shown in the BID FORM. The price shall include all labor, materials, equipment, and other items as required to relocate meter and box inside City right-of-way.

c. Transfer of Service: Transfer of Service shall be paid for at the unit price per each as shown in the BID FORM.

d. Long Side Service: Long Side services shall be paid at the unit price per each as shown in the BID FORM. The price shall include all labor, material, and necessary items to install the service complete with meter, meter box, corporation stop, curb stop, tapping saddle and tunneling for service tubing, 1" service tubing to be paid separately.

e. Short Side Service: Short side service shall be paid at the unit price per each as shown in the BID FORM. The price shall include all labor, materials, and necessary items to install the service complete with meter, meter box, corporation stop, tapping saddle and curb stop as shown in the plans. 1" service tubing to be paid separately

3.9 JACK AND BORE/OPEN CUT

A. Measurement: Measurement of jack and bore or open cut shall be on the basis of linear footage steel casing jacked and bored or open cut.

B. Payment:

1. Payment for jack and bore or open cut of steel casing shall be on the basis of the unit price for linear foot of the casing size as provided in the Bid Form Payment shall include all materials, labor and necessary extras to jack and bore or open cut the required size steel casing. Payment for carrier pipe installed shall be made separately.

2. Unit price bid shall also include cost of any additional insurance required by Department of Transportation and Norfolk Southern Railroad for individual crossing(s).

3. Unit price bid shall include cost of any warning signs and/or flagmen that may be required by highway and railroad departments. Contractor is to determine need for such prior to submitting bid price.

1. Payment for pipeline construction in state highway or railroad rights-of-way shall be contingent upon approval and acceptance by highway department or railroad.

2. No payment shall be made for incomplete or unacceptable borings, for realignment, or for increased length for the convenience of the Contractor. Casing has been rounded to 10' lengths and will be paid for on basis of what is installed, not what Contractor can push.

3.10 MOBILIZATION, DEMOBILIZATION, BONDS, INSURANCE

1. Measurement and Payment for Mobilization, Demobilization, Bonds, and Insurance shall be on a lump sum basis and shall include all costs associated with the Contractor's actual amount paid for all bonds and insurance as well as costs associated with mobilization and demobilization.

3.11 GRAVEL REPLACEMENT

Measurement and Payment of gravel replacement will be on the basis of each linear foot covered with 4" of #57 stone. Width shall be same as trench line or driveway width.

3.12 SOD

Measurement and payment will be on the basis of sod installed on a linear foot basis. Standard with will be considered 20' wide.

3.13 SIDEWALK REPLACEMENT

A. Measurement: Measurement of the Sidewalk Replacement shall be on the basis of the linear foot of sidewalk replaced at the thickness as specified.

B. Payment: Payment of Sidewalk Replacement shall be on the basis of the unit price in the Bid Form. Payment shall include removal of existing sidewalk and replacing of concrete sidewalk.

3.14 EXPLORATORY DIGGING

C. Measurement: Measurement of exploratory digging shall be on the basis of an hourly rate of digging.

D. Payment: Payment of exploratory digging shall be on the basis of the unit price in the Bid Form. Payment shall include all labor and equipment necessary to locate underground utilities. As a minimum, Contractor shall budget backhoe, operator, and two laborers.

3.15 PLUG AND ABANDON WATER MAIN

E. Measurement: Measurement of plugged and abandoned water main shall be on the basis of each abandoned water main as specified in the plans as specified.

F. Payment: Payment of plugged and abandoned water main shall be on the basis of the unit price per each in the Bid Form. Payment shall include all labor, material, and equipment necessary to plug and abandon existing water mains in place,

3.16 REMOVE EXISTING FIRE HYDRANT

G. Measurement: Measurement of the removal of existing fire hydrants shall be on the basis of each removed.

H. Payment: Payment of the removal of existing fire hydrants shall be on the basis of the unit price per each in the Bid Form. Payment shall include all labor, material, and equipment necessary to remove existing fire hydrants and plug hydrant leads.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. Construction staking shall include all of the surveying work required to layout the Work and control the location of the finished Project. The contractor shall have the full responsibility for constructing the Project to the correct horizontal and vertical alignment, as shown on the Drawings, as specified, or as ordered by the Engineer. The Contractor shall assume all costs associated with rectifying work constructed in the wrong location.

B. From the information shown on the Drawings and the information to be provided as indicated under Project Conditions below, the Contractor shall:

1. Be responsible for setting reference points and/or offsets, establishment of baselines, and all other layout, staking, and all other surveying required for the construction of the Project.

2. Safeguard all reference points, stakes, grade marks, horizontal and vertical control points, and shall bear the cost of re-establishing same if disturbed.

3. Stake out the permanent and temporary easements or the limits of construction to ensure that the Work is not deviating from the indicated limits.

4. Be responsible for all damage done to reference points, baselines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, baselines, center lines and temporary bench marks as a result of the operations.

C. Baselines shall be defined as the line to which the location of the Work is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or survey line.

D. Record Drawing surveys shall be performed in accordance with Section 001720 of these Specifications.

1.02 PROJECT CONDITIONS

A. The Drawings provide the location and/or coordinates of principal components of the Project. The alignment of some components of the Project may be indicated in the Specifications. The Engineer may order changes to the location of some of the components of the Project or provide clarification to questions regarding the

correct alignment.

B. The survey points, control points, and baseline to be provided to the Contractor shall be limited to only that information which can be found on the Project site by the Contractor.

1.03 QUALITY ASSURANCE

A. The Contractor shall furnish documentation, prepared by a surveyor currently registered in the State in which the Project is located, confirming that staking is being done to the horizontal and vertical alignment shown in the Contract Documents. This requires that the Contractor hire, at the Contractor's own expense, a currently registered surveyor, acceptable to the Owner, to provide ongoing construction staking or confirmation of such.

B. Any deviations from the Drawings shall be confirmed by the Engineer prior to Construction of that portion of the Project.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. Permits and Responsibilities: The Contractor shall, without additional expense to the Owner, be responsible for obtaining all necessary licenses and permits and for complying with any applicable federal, state, county, and municipal laws, codes and regulations, in connection with the prosecution of the Work. Building permits will be required as a result of this Project, and the Contractor is responsible for inspection fees. Permits obtained by the Engineer are included on the following page for your use.

B. The Contractor shall take proper safety and health precautions to protect the Work, the workers, the public and the property of others.

C. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the Work, except for any completed unit of construction there of which may heretofore have been accepted.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. Whenever reference is made to conforming to the standards of any technical society, organization, body, code, or standard, it shall be construed to mean the latest standard code, specification, or tentative specification adopted and published at the time of Advertisement for Bids. This shall include the furnishing of materials, testing of materials, fabrication, and installation practices. In those cases where the Contractor's quality standards establish more stringent quality requirements, the more stringent requirement shall prevail. Such standards are made a part hereof to the extent, which is indicated or intended.

B. The inclusion of an organization under one category does not preclude those organizations' standards from applying to another category.

C. In addition, all work shall comply with the applicable requirements of local codes, utilities and other authorities having jurisdiction.

D. All material and equipment, for which a UL Standard, an AGA or NSF approval or an ASME requirement is established, shall be so approved and labeled or stamped. The label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.

E. The standards which apply to this Project are not necessarily restricted to those organizations which are listed in Article 1.02.

1.02 STANDARD ORGANIZATIONS

A. Piping and Valves

ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
DIPRA	Ductile Iron Pipe Research Association
FCI	Fluid Controls Institute
MSS	Manufacturers Standardization Society
NCPI	National Clay Pipe Institute

NSF	National Sanitation Foundation
PPI	Uni-Bell PVC Pipe Association

B. Materials

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials

C. Painting and Surface Preparation

NACE	National Association of Corrosion Engineers
SSPC	Steel Structures Painting Council

D. Electrical and Instrumentation

AEIC	Association of Edison Illuminating Companies
AIEE	American Institute of Electrical Engineers
EIA	Electronic Industries Association
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
TIA	Telecommunications Industries Association
UL	Underwriter's Laboratories
VRCI	Variable Resistive Components Institute

E. Aluminum

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association

F. Steel and Concrete

ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
CRSI	Concrete Reinforcing Steel Institute
NRMA	National Ready-Mix Association

PCA	Portland Cement Association
PCI	Prestressed Concrete Institute

G. Welding

ASME	American Society of Mechanical Engineers
AWS	American Welding Society

H. Government and Technical Organizations

AIA	American Institute of Architects
APHA	American Public Health Association
APWA	American Public Works Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASQC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
AWWA	American Water Works Association D-100-96
CFR	Code of Federal Regulations
CSI	Construction Specifications Institute
EDA	Economic Development Administration
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FmHA	Farmers Home Administration
FS	Federal Specifications
IAI	International Association of Identification
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
NBFU	National Board of Fire Underwriters
(NFPA)	National Fluid Power Association
NBS	National Bureau of Standards
NISO	National Information Standards Organization
OSHA	Occupational Safety and Health Administration
SI	Salt Institute
SPI	The Society of the Plastics Industry, Inc.
USDC	United States Department of Commerce
WEF	Water Environment Federation

I. General Building Construction

AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AITC	American Institute of Timber Construction
APA	American Plywood Association
BHMA	Builders Hardware Manufacturers Association
BIFMA	Builders and Institutional Furniture Manufacturers Association
DHI	Door and Hardware Institute
FM	Factory Mutual Fire Insurance Company
HPMA	Hardwood Plywood Manufacturers Association
HTI	Hand Tools Institute
IME	Institute of Makers of Explosives
ISANTA	International Staple, Nail, and Tool Association
ISDSI	Insulated Steel Door Systems Institute
IWS	Insect Screening Weavers Association
MBMA	Metal Building Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NAGDM	National Association of Garage Door Manufacturers
NCCLS	National Committee for Clinical Laboratory Standards
NFPA	National Fire Protection Association
NFSA	National Fertilizer Solutions Association
NKCA	National Kitchen Cabinet Association
NWMA	National Woodwork Manufacturers Association
NWWDA	National Wood Window and Door Association
RMA	Rubber Manufacturers Association
SBC	SBCC Standard Building Code
SDI	Steel Door Institute
SIA	Scaffold Industry Association
SMA	Screen Manufacturers Association
SPRI	Single-Ply Roofing Institute
TCA	Tile Council of America
UBC	Uniform Building Code

J. Roadways

AREA	American Railway Engineering Association
DOT	Department of Transportation
SSRBC	Standard Specifications for Road and Bridge Construction, Georgia Department of Transportation

K. Plumbing

AGA	American Gas Association
NSF	National Sanitation Foundation
PDI	Plumbing Drainage Institute
SPC	SBCC Standard Plumbing Code

L. Refrigeration, Heating, and Air Conditioning

AMCA	Air Movement and Control Association
ARI	American Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
CGA	Compressed Gas Association
CTI	Cooling Tower Institute
HEI	Heat Exchange Institute
IIAR	International Institute of Ammonia Refrigeration
NB	National Board of Boilers and Pressure Vessel Inspectors
PFMA	Power Fan Manufacturers Association
SAE	Society of Automotive Engineers
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SMC	SBCC Standard Mechanical Code
TEMA	Tubular Exchangers Manufacturers Association

M. Equipment

AFBMA	Anti-Friction Bearing Manufacturers Association, Inc.
AGMA	American Gear Manufacturers Association
ALI	Automotive Lift Institute
CEMA	Conveyor Equipment Manufacturers Association
CMAA	Crane Manufacturers Association of America
DEMA	Diesel Engine Manufacturers Association
MMA	Monorail Manufacturers Association
OPEI	Outdoor Power Equipment Institute, Inc.
PTI	Power Tool Institute, Inc.
RIA	Robotic Industries Association
SAMA	Scientific Apparatus Makers Association

1.03 SYMBOLS

Symbols and material legends shall be as scheduled on the Drawings.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. Work under this Section includes all scheduling and administering of any pre-construction and/or progress meetings as herein specified and necessary for the proper and complete performance of this Work.

B. Scheduling and Administration by Engineer:
1. Prepare agenda
2. Make physical arrangement for the meetings
3. Preside at meetings
4. Record minutes and include significant proceedings
5. Distribute copies of the minutes to participants

1.02 PROJECT COORDINATION MEETING

A. Hold called meetings as the progress of the Work dictates

B. The meetings shall be held at the location indicated by the Engineer

C. Representatives of the following parties are to be in attendance at the meetings:
1. Engineer
2. Contractor and superintendent
3. Major subcontractors as pertinent to the agenda
4. Representatives of governmental or other regulatory agencies as appropriate

E. The minimum agenda for progress meetings shall consist of the following:
1. Review and approve minutes of previous meetings
2. Review work progress since last meeting
3. Note field observations, problems, and decisions
4. Identify problems, which impede planned progress
5. Review Contractor's corrective measures and procedures to regain plan schedule
6. Review Contractor's revision to the construction schedule
7. Review submittal schedule; expedite as required to maintain schedule
8. Maintenance of quality and work standards
9. Review changes proposed by Owner for their effect on the construction schedule and completion date
10. Complete other current business

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The work under this Section includes preparing, furnishing, distributing, and periodic updating of the construction schedules as specified herein.

B. The purpose of the schedule is to demonstrate that the Contractor can complete the overall Project within the Contract time and meet all required interim milestones.

1.02 SUBMITTALS

A. Overall Project Schedule (OPS)

1. Submit the Schedule within 10 days after date of the Notice to Proceed.
2. The Engineer will review the schedule and return it within 10 days after receipt.
3. If required, resubmit within 10 days after receipt of a returned copy.

B. Near Term Schedule (NTS)

1. Submit the first Near Term Schedule within 10 days of the Notice to Proceed.
2. The Engineer will review the schedule and return it within 10 days after receipt.

C. Submit an update of the OPS and NTS with each progress payment request.

D. Submit the number of copies required by the Contractor, plus two copies to be retained by the Engineer.

1.03 APPROVAL

Approval of the Contractor's detailed construction program and revisions thereto shall in no way relieve the Contractor of any of Contractor's duties and obligations under the Contract. Approval is limited to the format of the schedule and does not in any way indicate approval of, or concurrence with, the Contractor's means, methods, and ability to carry out the Work.

1.04 OVERALL PROJECT SCHEDULE (OPS)

A. The Contractor shall submit to the Owner for approval a detailed Overall Project Schedule of the Contractor's proposed operations for the duration of the Project. The OPS shall be in the form of a Gantt/bar chart.

B. Gantt/Bar Chart Schedule

1. Each activity with duration of five or more days shall be identified by a separate bar. Activities with duration of more than 20 days shall be sub-divided into separate activities.

2. The schedule shall include activities for shop drawing preparation and review, fabrication, delivery, and installation of major or critical path materials and equipment items.

3. The schedule shall show the proposed start and completion date for each activity. A separate listing of activity start and stop dates and working day requirements shall be provided unless the information is shown in text form on the Gantt/bar chart.

4. The schedule shall identify the Notice to Proceed date, the Contract Completion date, major milestone dates, and a critical path.

5. The schedule shall be printed on a maximum 11 X 17- inch sized paper. If the OPS needs to be shown on multiple sheets, a simplified, one page, summary bar chart showing the entire Project shall be provided.

6. The schedule shall have a horizontal time scale based on calendar days and shall identify the Monday of each week.

7. The schedule shall show the precedence relationship for each activity.

1.05 NEAR TERM SCHEDULE (NTS)

A. The Contractor shall develop and refine a detailed Near Term schedule showing the day-to-day activities with committed completion dates which must be performed during the upcoming 30-day period. The detailed schedule shall represent the Contractor's best approach to the Work which must be accomplished to maintain progress consistent with the Overall Project Schedule.

B. The Near Term Schedule shall be in the form of Gantt/bar chart and shall include a written narrative description of all activities to be performed and describe corrective action to be taken for items that are behind schedule.

1.06 UPDATING

A. Show all changes occurring since previous submission of the updated schedule.

B. Indicate progress of each activity and show actual completion dates.

C. The Contractor shall be prepared to provide a narrative report at the Project Coordination Meetings. The report shall include the following:

1. A description of the overall Project status and comparison to the OPS.

2. Identify activities which are behind schedule and describe corrective action to be taken.

3. A description of changes or revisions to the Project and their effect on the OPS.

4. A description of the Near Term Schedule of the activities to be completed during the next 30 days. The report shall include a description of all activities requiring participation by the Engineer and/or Owner.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish all equipment and labor materials required to provide the Owner with construction photographs of the Project.

B. Negatives shall become the property of the Owner and none of the photographs herein shall be published without express permission of the Owner.

1.02 PRE AND POST CONSTRUCTION PHOTOGRAPHS

A. Prior to the beginning of any work, the Contractor shall take project photographs of the work area to record existing conditions.

B. Following completion of the work, another recording shall be made showing the same areas and features as in the pre-construction photographs.

C. All conditions, which might later be subject to disagreement, shall be shown in sufficient detail to provide a basis for decisions.

D. The pre-construction photographs shall be submitted to the engineer within 25 calendar days after the date of receipt by the Contractor of Notice to Proceed. Post-construction photographs shall be provided prior to final acceptance of the project.

1.03 PROGRESS PHOTOGRAPHS

A. Photographs shall be taken to record the general progress of the Project during each pay periods. Photographs shall be representative of the primary work being performed at that time.

B. The photographs shall include the date and time marking of the recording. All photographs shall be labeled on a tab connected to the bottom of the photo to indicate date and description of work shown.

C. A minimum of 10 photographs shall be submitted with each request for payment. The view selection will be as agreed to with the Engineer. Two prints of each photograph shall be submitted.

1.04 SUBMITTALS

A. Photographs shall be submitted in plastic sleeves pre-punched for a 3-ring binder. Negatives shall be submitted in polyethylene preservers, 8-1/2 X 11-inches in size, equal to Print File Archival Preservers, Style No. 35-7B.

B. Construction photographs shall be submitted with each payment request.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The work under this Section includes submittal to the Engineer of shop drawings, product data, and samples required by the various sections of these Specifications.

B. Submittal Contents: The submittal contents required are specified in each section.

C. Definitions: Submittals are categorized as follows:

1. Shop Drawings

a. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance surveys, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawings is prepared.

b. Provide newly prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated) or appropriate number of prints hereof, with name or preparer (firm name) indicated. The Contract Drawings shall not be traced or reproduced by any method for use as or in lieu of detail shop drawings. Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirement. Do not allow shop-drawing copies without appropriate final "Action" markings by the Engineer to be used in connection with the Work.

c. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, specification section, schedule or room numbers shown on the Contract Drawings.

d. Minimum assembly drawings sheet size shall be 24 x 36-inches

e. Minimum detail sheet size shall be 8-1/2 x 11-inches

f. Minimum Scale:
(1) Assembly Drawings Sheet, Scale: 1-inch = 30 feet
(2) Detail Sheet, Scale: 1/4-inch = 1 foot

2. Product Data

   a. Product data includes standard printed information on materials, products and systems, not specially prepared for this Project, other than the designation of selections from among available choices printed therein.

   b. Collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the Project. Included manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked and special coordination requirements.

3. Samples

   a. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work, both as complete units and as smaller portions of units of work, either for limited visual inspection or, where indicated, for more detailed testing and analysis.

   b. Provide units identical with final condition of proposed materials or products for the work. Include "range'' samples, not less than three units, where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where the Engineer's selection is required. Prepare samples to match the Engineer's sample where indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations and compliance with standards. Samples are submitted for review and confirmation or color, pattern, texture and "kind'' by the Engineer. Engineer will note "test" samples, except as otherwise indicated, for other requirements, which are the exclusive responsibility of the Contractor.

4. Miscellaneous submittals related directly to the Work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey date and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, records drawings, field measurement date, operating and maintenance materials, overrun stock, security/protection/safety keys and

similar information, devices and materials applicable to the Work but not processed as shop drawings, product data or samples.

1.02 SPECIFIC CATEGORY REQUIREMENTS

A. General: Except as otherwise indicated in the individual work sections, comply with general requirements specified herein for each indicated category of submittal.

1. Submittals shall contain:

a. The date of submittal and the dates of any previous submittals.
b. The Project title
c. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.
d. The Names of:
   (1) Contractor
   (2) Supplier
   (3) Manufacturer
e. Identification of the product, with the Specification section number, permanent equipment tag numbers and applicable Drawing No.
f. Field dimensions, clearly identified as such
g. Relation to adjacent or critical features of the Work or materials
h. Applicable standards, such as ASTM or Federal Specification numbers
I. Notification to the Engineer in writing, at time of submissions, of any deviations on the submittals from requirements of the Contract Documents.
j. Identification of revisions on re-submittals
k. An 8 x 3-inch blank space for Contractor and Engineer stamps
l. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the Work and of Contract Documents.
m. Submittal sheets or drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

1.03 ROUTING OF SUBMITTALS

A. Submittals and routine correspondence shall be routed as follows:

1. Supplier to Contractor (through representative if applicable)
2. Contractor to Engineer
3. Engineer to Contractor
4. Contractor to Supplier

1.04 ADDRESS FOR COMMUNICATIONS

Engineer: Ingram & Associates, L.L.C.
2286 Ingleside Avenue
Macon, Ga. 31204
Attn: Tim Ingram, P.E.
e-mail: tim@ingrameng.com
Phone: (478) 745-3996 Fax: (478) 742-4690

NO E-MAIL SUBMITTALS WILL BE ACCEPTED

PART 2 PRODUCTS

2.01 SHOP DRAWINGS

A. Unless otherwise specifically directed by the Engineer, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the Work.

B. Submit all shop assembly drawings, larger than 11 x 17-inches, in the form of one reproducible transparency with two opaque prints or blue lines.

C. Submit all shop drawings, 11 x 17-inches and smaller, in the form of six opaque prints or blue lines.

D. One reproducible for all submittals larger than 11 x 17-inches and no more than three prints of other submittals will be returned to the Contractor

2.02 MANUFACTURER'S LITERATURE

A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.

B. Submit the number of copies which are required to be returned (not to exceed three) plus three copies which will be retained by the Engineer.

2.03 SAMPLES

A. Samples shall illustrate materials, equipment, or workmanship and established standards by which completed work is judged.

B. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.

C. Submit all samples in the quantity which is required to be returned plus one sample which will be retained by the Engineer.

2.04 COLORS

A. Unless the precise color and pattern is specifically described in the Contract Documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.

B. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

PART 3 EXECUTION

3.01 CONTRACTOR'S COORDINATION OF SUBMITTALS

A. Prior to submittal for the Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:

1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.

2. Coordinate as required with all trades and all public agencies involved.

3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this Section.

4. Clearly indicate in a letter or memorandum on the manufacturer or fabricator's letterhead, all deviations from the Contract Documents.

B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the contractor for conformance with this requirement.

C. The Owner may back charge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a "No Exceptions Taken" mark.

D. Grouping of Submittals

1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items.

2. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to the Engineer along with Contractor's comments as to compliance, non-compliance or features requiring special attention.

E. Schedule of Submittals: Within 30 days of Contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the estimated date of submittal and the desired approval date for each shop drawing anticipated. A reasonable period shall be scheduled for review and comments. Time lost due to unacceptable submittals shall be the Contractor's responsibility and some time allowance for re-submittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.02 TIMING OF SUBMITTALS

A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for review, for securing necessary approvals, for possible revision and re-submittal, and for placing orders and securing delivery.

B. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal

3.03 REVIEWED SHOP DRAWINGS

A. Engineer Review

1. Allow a minimum of 30 days for the Engineer's initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Engineer on each submittal as to whether processing time is critical to progress of the Work, and therefore the Work would be expedited if processing time could be foreshortened.

2. Acceptable submittals will be marked "No Exceptions Taken". A minimum of three copies will be retained by the Engineer for Engineer's and the Owner's use and the remaining copies will be returned to the Contractor.

3. Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Contractor may order, fabricate and ship the items included in the submittals provided the indicated corrections are made. Drawings must be resubmitted for review and marked "No Exceptions Taken" prior to installation or use of products.

4. Submittals marked "Amend and Resubmit" must be revised to reflect required changes and the initial review procedure repeated.

5. The "Rejected - See Remarks" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.

6. Only two copies of items marked "Amend and Resubmit" and "Rejected - See Remarks" will be reviewed and marked. One copy will be retained by the Engineer and the other copy with all remaining unmarked copies will be returned to the Contractor for re-submittal.

B. No work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.

C. Substitutions: In the event the Contractor obtains the Engineer's approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor's own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.

D. Use of the "No exceptions Taken" notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials, and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer's review shall not relieve the Contractor of responsibility for error of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance

with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

3.04 RESUBMISSION REQUIREMENTS

A. Shop Drawings

1. Revise initial drawings as required and resubmit as specified for initial submittal, with the re-submittal number shown.

2. Indicate on drawings all changes which have been made other than those requested by the Engineer.

B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with the re-submittal number shown.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. This Section includes testing which the Owner may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.

B. This work also includes all testing required by the Owner to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength and slump testing, soil compaction, etc.

C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer, e.g., testing of pipe.

D. The testing laboratory or laboratories will be selected by the Owner. The testing laboratory or laboratories will work for the Owner.

1.02 PAYMENT FOR TESTING SERVICES

A. The cost of additional testing services not specifically required in the Specifications, but requested by the Owner or Engineer, shall be paid for by the Owner through the CASH ALLOWANCE upon submittal of actual invoice for testing services.

B. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid by the Owner.

C. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor. Retesting shall be performed by the testing laboratory working for the Owner.

1.03 LABORATORY DUTIES

A. Cooperate with the Owner, Engineer, and Contractor

B. Provide qualified personnel promptly on notice

C. Perform specified inspections, sampling, and testing of materials.

1. Comply with specified standards, ASTM, other recognized authorities, and as specified.

2. Ascertain compliance with requirements of the Contract Documents

D. Promptly notify the Engineer and Contractor of irregularity or deficiency of work which are observed during performance of service.

E. Promptly submit three copies (two copies to the Engineer and one copy to the Contractor of report of inspections and tests in addition to those additional copies required by the contractor with the following information included:

1. Date issued

2. Project title and number

3. Testing laboratory name and address

4. Name and signature of inspector

5. Date of inspection or sampling

6. Record of temperature and weather

7. Date of test

8. Identification of product and Specification section

9. Location of Project

10. Type of inspection or test

11. Results of test

12. Observations regarding compliance with the Contract Documents

F. Perform additional services as required.

G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the Work.

1.04 CONTRACTOR RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work and/or manufacturer's requirements.

B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.

C. Furnish copies of mill test reports.

D. Furnish required labor and facilities to:

1. Provide access to Work to be tested;
2. Obtain and handle samples at the site;
3. Facilitate inspections and tests;
4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.

E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.

G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

1.05 QUALITY ASSURANCE

Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.06 PRODUCT HANDLING

Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.

1.07 FURNISHING MATERIALS

The Contractor shall be responsible for furnishing all materials necessary for testing.

1.08 CODE COMPLIANCE TESTING

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor

1.09 CONTRACTOR'S CONVENIENCE TESTING

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.10 SCHEDULES FOR TESTING

A. Establishing Schedule

1. The Contractor shall, by advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.

2. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back-charged to the Contractor and shall not be borne by the Owner.

1.11 TAKING SPECIMENS

Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

1.12 TRANSPORTING SAMPLES

The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. Temporary facilities required for this work include, but are not necessarily limited to:

1. Temporary utilities such as electricity

2. First aid facilities

3. Sanitary facilities

4. Potable water

1.02 GENERAL

A. First aid facilities, sanitary facilities, and potable water shall be available on the Project site on the first day that any activities are conducted on site. The other facilities shall be provided as the schedule of the Project warrants.

B. Maintenance: Use all means necessary to maintain temporary facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, immediately make all repairs and replacements necessary, at no additional cost to the Owner.

C. Removal: Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

1.03 TEMPORARY UTILITIES

A. General

1. Provide and pay all costs for all water, electricity and other utilities required for the performance of the Work.

2. Pay all costs for temporary utilities until Project completion.

3. Costs for temporary utilities shall include all power, water and the like necessary for testing equipment as required by the Contract Documents.

B. Temporary Water: Provide all necessary temporary piping, and upon completion of the Work, remove all such temporary piping. Provide and remove water meters.

C. Temporary Electricity

1. Provide all necessary wiring for the Contractor's use.

2. Furnish, locate, and install area distribution boxes such that the individual trades may use, their own construction type extension cords to obtain adequate power, and artificial lighting at all points where required by inspectors and for safety.

1.04 FIRST AID FACILITIES

The Contractor shall provide a suitable first aid station, equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. All first aid facilities and emergency ambulance service shall be made available by the Contractor to the Owner and the Engineer's personnel.

1.05 SANITARY FACILITIES

Prior to starting the Work, the Contractor shall furnish, for use of Contractor's personnel on the job, all necessary toilet facilities which shall be secluded from public observation. These facilities shall be either chemical toilets or shall be connected to the Owner's sanitary sewer system. All facilities, regardless of type, shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the area in which the Work is performed. Adequacy of these facilities will be subject to the Engineer's review and maintenance of same must be satisfactory to the Engineer at all time.

1.06 POTABLE WATER

The Contractor shall be responsible for furnishing a supply of potable drinking water for employees, subcontractors, inspectors, engineers, and the Owner who are associated with the Work.

END OF SECTION

PART 1 GENERAL

1.01 BARRICADES, LIGHTS, AND SIGNALS

A. The Contractor shall furnish and erect such barricades, fences, lights, and danger signals and shall provide such other precautionary measures for the protection of persons or property and of the Work as necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one light at each barricade and sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any work under construction.

B. The Contractor will be held responsible for all damage to the work due to failure of barricades, signs, and lights and whenever evidence is found of such damage, the Contractor shall immediately remove the damaged portion and replace it at Contractor's cost and expense. The Contractor's responsibility for the maintenance of barricades, signs, and lights shall not cease until the Project has been accepted by the Owner.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall provide transportation of all equipment, materials, and products furnished under these Contract Documents to the Work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the Work.

B. All equipment, materials, and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the Work.

1.02 TRANSPORTATION

A. All equipment shall be suitably boxed, crated, or otherwise protected during transportation.

B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.

C. Small items and appurtenances such as gauges, valves, switches, instruments and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.03 HANDLING

A. All equipment, material, and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.

B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.

C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.

D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

The work under this Section includes, but is not necessarily limited to, the furnishing of all labor, tools and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the Work.

1.02 STORAGE AND PROTECTION

A. Storage

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the Engineer.

2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the Owner.

3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.

4. All materials shall meet the requirements of these Specifications at the time that they are used in the Work.

5. Store products in accordance with manufacturer's instructions.

B. Protection

1. Use all means necessary to protect the materials, equipment, and products of every section before, during and after installation and to protect the installed work and materials of all other trades.

2. All materials shall be delivered, stored, and handled to prevent the inclusion of foreign materials and damage by water, breakage, vandalism, or other causes.

3. Substantially constructed weather tight storage sheds with raised floors shall be provided and maintained as may be required to adequately protect those materials and products stored on the site which may require protection from damage by the elements.

C. Replacement: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Engineer and at no additional cost to the Owner.

D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel and sheet construction products shall be stored with one end elevated to facilitate drainage.

E. Unless otherwise permitted in writing by the Engineer, building products and materials such as cement, grout, plaster, gypsum board, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block, and structural tile may be stored outdoors under a properly secured waterproof covering.

F. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

1.03 EXTENDED STORAGE

In the event that certain items of major equipment such as air compressors, pumps, and mechanical aerators have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the Engineer. The Contractor shall provide all special packaging, protective coverings, protective coatings, power, nitrogen purge, desiccants, lubricants and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording, and submitting of project record documents as herein specified.

B. Record documents include, but are not limited to:

1. Drawings;
2. Specifications;
3. Change orders and other modifications to the Contract;
4. Engineer field orders or written instructions, including Requests for Information (RFI) and Clarification Memorandums;
5. Reviewed shop drawings, product data and samples;
6. Test records;

B. The Contractor shall maintain on the Project site throughout the Contract Time an up to date set of Record Drawings.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Storage

1. Store documents and samples in the Contractor's field office, apart from documents used for construction.
2. Provide files and racks for storage of documents.
3. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with format of these Specifications.

C. Maintenance

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

3. Maintain at the site for the Owner one copy of all record documents.

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

E. Failure to maintain the Record Documents in a satisfactory manner may be caused for withholding of a certificate for payment.

1.03 QUALITY ASSURANCE

Unless noted otherwise, Record Drawings shall provide dimensions, distances, and coordinates to the nearest 0.1 foot.

1.04 RECORDING

A. Label each document "PROJECT RECORD" in neat, large printed letters.

B. Recording

1. Record information concurrently with construction progress.

2. Do not conceal any work until required information is recorded.

1.05 RECORD DRAWINGS

A. Record Drawings shall be reproducible, shall have a title block indicating that the drawings are Record Drawings, the name of the company preparing the Record Drawings, and the date the Record Drawings were prepared. The Contractor will be provided paper sepias of the Drawings, or it may elect to provide reproducible drawings via another method. Reproducible shall be defined as being translucent so as to allow a blueline print to be produced.

B. Legibly mark drawings to record actual construction, including:

1. All Construction

a. Changes of dimension and detail.

b. Changes made by Requests for Information (RFI), field order, clarification memorandums or by change order.

c. Details not on original Drawings.

2. Site Improvements, Including Underground Utilities

   a. Horizontal and vertical locations of all exposed and underground utilities and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.

   b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.

   c. The locations shall be referenced to a least two easily identifiable, permanent landmarks, (e.g., power poles, valve markers, etc.) or benchmarks.

1.06 SPECIFICATIONS

A. 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 Requests for Information (RFI), field order, clarification memorandums, or by change order.

1.07 SUBMITTAL

A. At contract closeout, deliver Record Documents to the Engineer for 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 Contractor's authorized representative

END OF SECTION

PART 1 GENERAL

1.01 PROJECT MAINTENANCE AND WARRANTY

A. Maintain and keep in good repair the Work covered by these Drawings and Specifications until acceptance by the Owner.

B. The Contractor shall warrant for a period of one year from the date of Owner's written acceptance of certain segments of the Work and/or Owner's written final acceptance of the Project, as defined in the Contract Documents, that the completed Work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.

C. 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.

D. In the event of multiple failures of major consequences prior to the expiration of the One-year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new 12-month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over-or under-lubrication and using maintenance procedures not conforming with published maintenance instructions, shall be exempted from the scope of the one-year warranty. Should multiple failures occur in a given item, all products of the

same size and type shall be disassembled, inspected, modified or replaces as necessary and guarantee for one year.

E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.

F. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility (not designated for removal) resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.

G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.

H. In the event the Contractor fails to proceed to remedy the defects upon mortification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.

I. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.

J. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION

Division 2

Sitework

PART 1 GENERAL

1.01 SCOPE

A. Clearing and grubbing includes, but is not limited to, removing from the Project site, trees, stumps, roots, brush, structures, abandoned utilities, trash, debris and all other materials found on or near the surface of the ground in the construction area and understood by generally accepted engineering practice not to be suitable for construction of the type contemplated. Precautionary measures that prevent damage to existing features to remain is part of the Work.

B. Clearing and grubbing operations shall be coordinated with temporary and permanent erosion and sedimentation control procedures.

1.02 QUALITY ASSURANCE

A. The Contractor shall comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction over the Project. All required permits of a temporary nature shall be obtained for construction operations by the Contractor.

B. Open burning, if allowed, shall first be permitted by the local authority having jurisdiction. The Contractor shall notify the local fire department and abide by fire department restrictions.

1.03 JOB CONDITIONS

Location of the Work: The area to be cleared and grubbed is shown schematically on the Drawings or specified below. It includes all areas designated for construction.

PART 2 PRODUCTS

2.01 EQUIPMENT

The Contractor shall furnish equipment of the type normally used in clearing and grubbing operations including, but not limited to, tractors, trucks and loaders.

PART 3 EXECUTION

3.01 SCHEDULING OF CLEARING

A. The Contractor shall clear at each construction site only that length of the right-of-way, permanent or construction easement which would be the equivalent of one month's pipe laying. This length shall be determined from the Contractor's Progress Schedule.

B. The County may permit clearing for additional lengths of the pipe line provided that temporary erosion and sedimentation controls are in place and a satisfactory stand of temporary grass is established. Should a satisfactory stand of grass not be possible, no additional clearing shall be permitted beyond that specified above.

C. A satisfactory stand of grass shall have no bare spots larger than one square yard. Bare spots shall be scattered and the bare area shall not comprise more than one percent of any given area.

3.02 CLEARING AND GRUBBING

A. Clear and grub as required on each side of the pipeline before excavating. Remove all trees, growth, debris, stumps and other objectionable matter. Clear the construction easement or road right-of-way only if necessary.

B. Grubbing shall consist of completely removing roots, stumps, trash and other debris from all graded areas so that topsoil is free of roots and debris. Topsoil is to be left sufficiently clean so that further picking and raking will not be required.

C. All stumps, roots, foundations and planking embedded in the ground shall be removed and disposed of. Piling and butts of utility poles shall be removed to a minimum depth of two feet below the limits of excavation for structures, trenches and roadways or two feet below finish grade, whichever is lower.

D. Landscaping features shall include, but are not necessarily limited to, fences, cultivated trees, cultivated shrubbery, property corners, man-made improvements, subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.

E. Surface rocks and boulders shall be grubbed from the soil and removed from the site if not suitable as rip rap.

F. Where the tree limbs interfere with utility wires, or where the trees to be felled are in

close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the utility.

G. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.

H. All fences adjoining any excavation or embankment that, in the Contractor's opinion, may be damaged or buried, shall be carefully removed, stored and replaced. Any fencing that, in the County's opinion, is significantly damaged shall be replaced with new fence material.

I. The Contractor shall exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, etc. situated within the limits of the construction area but not directly within excavation and/or fill limits. The Contractor shall be held liable for any damage the Contractor's operations have inflicted on such property.

J. The Contractor shall be responsible for all damages to existing improvements resulting from Contractor's operations.

3.03 DISPOSAL OF DEBRIS

A. The debris resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the Contractor and shall be disposed of in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except with written consent of the property owner. A copy of written consent shall be provided to the County for permanent records. In no case shall any material or debris be left on the Project, shoved onto abutting private properties or buried on the Project.

B. When approved in writing by the County and when authorized by the proper authorities, the Contractor may dispose of such debris by burning on the Project site provided all requirements set forth by the governing authorities are met. The authorization to burn shall not relieve the Contractor in any way from damages which may result from Contractor's operations. On easements through private property, the Contractor shall not burn on the site unless written permission is also secured from the property owner, in addition to authorization from the proper authorities.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The work specified in this Section consists of providing, maintaining, and removing temporary erosion and sedimentation controls.

B. Temporary erosion controls, include, but are not limited to, grassing, mulching, watering and reseeding on-site surfaces and spoil and borrow area surfaces, and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the Georgia Erosion and Sedimentation Act of 1975, as amended, Section 402 of the Federal Clean Water Act, and applicable codes, ordinances, rules, regulations and laws of local and municipal authorities having jurisdiction.

C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, filter stone and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Federal Clean Water Act of 1987, as amended.

D. Land disturbance activity shall not commence until the Land Disturbance Permit has been issued.

E. Basic Principles

1. Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type, and condition.

2. Minimize the disturbed area and the duration of exposure to erosion elements.

3. Stabilize disturbed areas immediately.

4. Safely convey run-off from the site to an outlet such that erosion will not be increased off site.

5. Retain sediment on site that was generated on site.

6. Minimize encroachment upon watercourses.

F. Temporary Erosion and Sedimentation Control: In general, temporary erosion and sedimentation control procedures shall be directed toward:

1. Preventing soil erosion at the source.

2. Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented.

3. Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway.

G. Permanent Erosion Control: Permanent erosion control measures shall be implemented to prevent sedimentation of the waterways and to prevent erosion of the Project site.

1.02 QUALITY ASSURANCE

A. General: Perform all work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated above and these Specifications.

B. Conflicts: Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.

PART 2 PRODUCTS

2.01 SEDIMENT BARRIER

A. Silt Fence: Silt fence shall be as shown on the Standard Detail Drawings.

B. Stone Check Dams: Stone shall conform to the requirements of Section 805.01 of the Georgia Department of Transportation Standard Specification, latest edition, for Stone Dumped Rip Rap except the stone shall be 8-inches or less at the greatest dimension.

C. Hay Bales: Hay bales shall be clean, seed-free cereal hay.

D. Concrete Blocks: Concrete blocks shall be hollow, non-load-bearing type.

E. Plywood shall be 3/4-inch thick exterior type.

2.02 CONSTRUCTION EXIT STONE

Use sound, tough, durable stone resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Aggregate size shall be in accordance with the National Stone Association Size R-2 (1.5 to 3.5-inch stone) or Type 3 rip rap stone conforming to Section 805.01 of the Georgia Department of Transportation Standard

Specifications.

2.03 CONCRETE

Concrete shall have a compressive strength of not less than 3,000 psi and not more than 4,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

2.04 RIP RAP

A. Stone Rip Rap: Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Unless shown or specified otherwise, stone rip rap shall be Type III.

1. Type 1 Rip Rap: Rip rap size shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specification for Type 1 Stone Dumped Rip Rap.

2. Type 3 Rip Rap: Rip rap size shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specifications for Type 3 Stone Dumped Rip Rap.

3. 200 Pound Rip Rap: Minimum weight of individual stones shall be 200 pounds.

2.05 FILTER FABRIC

A. The filter fabric for use under rip rap shall be a monofilament, polypropylene woven fabric meeting the specifications as established by Task Force 25 for the Federal Highway Administration. The filter fabric shall have an equivalent opening size (EOS) of 70.

B. Filter fabric under rip rap shall be Mirafi, Amoco or Exxon.

2.06 GRASSING

A. Grassing materials shall meet the requirements of the following sections of the Georgia Department of Transportation Standard Specifications, latest edition:

Material	Section
Topsoil	893.01
Seed and Sod	890
Fertilizer	891.01
Agricultural Lime	882.02
Mulch	893.02
Inoculants	893.04

B. Seed species shall be provided as shown on the approved Erosion Control Plan.

C. Mulch Binder: Mulch on slopes exceeding 3 (horizontal) to 1 (vertical) shall be held in place by the use of a mulch binder, as approved by the Owner. The mulch binder shall be non-toxic to plant and animal life and shall be approved by the Owner.

D. Water: Water shall be free of excess and harmful chemicals, organisms and substances that may be harmful to plant growth or obnoxious to traffic. Salt or brackish water shall not be used. Water shall be furnished by the Contractor.

PART 3 EXECUTION

3.01 GENERAL

A. Standards: Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Federal Clean Water Act of 1987, as amended, local enforcing agency guidelines and these Specifications.

B. Implementation: The Contractor shall have the responsibility to actively take all steps necessary to control soil erosion and sedimentation.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Temporary erosion and sedimentation control procedures should be initially directed toward preventing silt and sediment from entering the waterways. The preferred method is to provide an undisturbed natural buffer, extending a minimal five feet from the water, to filter the run-off. Should this buffer prove infeasible due to construction activities being too close to the water, or if the amount of sediment overwhelms the buffer, the Contractor shall place silt fences to filter the run-off and, if necessary, place permanent rip rap to stabilize the bank.

B. Silt dams, silt fences, traps, barriers, check dams, appurtenances and other temporary measures and devices shall be installed as indicated on the approved plans and working drawings, shall be maintained until no longer needed, and shall then be removed. Deteriorated hay bales and dislodged filter stone shall be replaced with new materials.

C. Where permanent grassing is not appropriate, and where the Contractor's temporary erosion and sedimentation control practices are inadequate, the Owner may direct the Contractor to provide temporary vegetative cover with fast growing seedlings.

D. All erosion and sedimentation control devices, including check dams, shall be inspected by the Contractor at least weekly and after each rainfall occurrence and cleaned out and repaired by the Contractor as necessary.

E. Temporary erosion and sedimentation control devices shall be installed and maintained from the initial land disturbance activity until the satisfactory completion and establishment of permanent erosion control measures. At that time, temporary devices shall be removed.

3.03 PERMANENT EROSION CONTROL

A. Permanent erosion control shall include:

1. Restoring the work site to its original contours, unless shown otherwise on the Drawings or directed by the Owner.

2. Permanent vegetative cover shall be performed in accordance with "Grassing" of this Section.

B. Permanent erosion control measures shall be implemented as soon as practical after the completion of pipe installation or land disturbance for each segment of the Project. In no event shall implementation be postponed when no further activities related to pipe installation will impact that portion or segment of the Project. Partial payment requests may be withheld for those portions of the Project not complying with this requirement.

3.04 GRASSING

A. General

1. Grassing shall be performed as shown on the approved Erosion Control Plan.

2. All references to grassing, unless noted otherwise, shall relate to establishing permanent vegetative cover as specified herein for seeding, fertilizing, mulching, etc.

3. When final grade has been established, all bare soil, unless otherwise required by the Contract Documents, shall be seeded, fertilized and mulched in an effort to restore to a protected condition. Critical areas shall be sodded as approved or directed by the Owner.

4. Specified permanent grassing shall be performed at the first appropriate season listed below following establishment of final grading in each section of the site.

B. Materials

1. Topsoil: Natural, fertile, agricultural soil typical of the locality, capable of sustaining vigorous plant growth, from a well drained site free of flooding, not in frozen or muddy condition, not less than six percent organic matter, and pH value of 5.9 to 7.0. Free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, couch grass, noxious weeds, and foreign matter.

2. Peatmoss: Horticultural grade Class A decomposed plant material, elastic and homogeneous. Free of decomposed colloidal residue, wood, sulphur, and iron. Peatmoss shall have a pH value of 5.9 to 7.0, 60 percent organic matter by weight, moisture content not exceeding 15 percent and water absorption capacity of not less than 300 percent by weight on oven dry basis.

3. Sand: Hard, granular, natural, beach sand, washed, free of impurities, chemical, or organic matter.

4. Fertilizer: 6-12-12 grade Commercial type with six percent nitrogen, 12 percent P_2O_5, and 12 percent K_2O.

5. Lime: Standard agricultural type containing at least 85 percent total carbonates applied at a rate of 4,000 pounds per acre (92 pounds per 1,000 square feet), or as required by the test results and recommendations as specified above. Before seeding, apply lime and fertilizer and incorporate them into the soil at least 3-inches deep by discing and harrowing, at the rates recommended above or required by the above test results.

6. Seed: Seed shall be uniform mixtures of the kinds and applied at the rates shown in the approved Erosion Control Plan.

C. Replant grass removed or damaged in residential areas using the same variety of grass and at the first appropriate season. Where sod is removed or damaged, replant such areas using sod of the same species of grass at the first appropriate season. Outside of residential or landscaped areas, grass the entire area disturbed by the work on completion of work in any area. In all areas, promptly establish successful stands of

grass.

3.05 RIP RAP

A. Unless shown otherwise on the Drawings and/or approved Erosion Control Plan, rip rap shall be placed where ordered by the Owner. Carefully compact backfill and place rip rap to prevent subsequent settlement and erosion.

B. Preparation of Foundations: The ground surface upon which the rip rap is to be placed shall be brought in reasonably close conformity to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers.

C. Placement of Filter Fabric: The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions, and debris. The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3-inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three feet during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals or other contaminants. Any contaminated fabric or any fabric damaged during its installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no expense to the Owner.

D. Placement of Rip Rap: The rip rap shall be placed on a 6-inch layer of soil, crushed stone or sand overlaying the filter fabric. This 6-inch layer shall be placed to maximize the contact between the soil beneath the filter fabric and the filter fabric. Rip rap shall be placed with its top elevation conforming with the natural slope of the stream bank and stream bottom. Stone rip rap shall be dumped into place to form a uniform surface and to the thickness specified on the Drawings. The thickness tolerance for the course shall be -6-inches and +12-inches. If the Drawings or Bid do not specify a thickness, the course shall be placed to a thickness of not less than 18-inches.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grading.

B. Excavation.

C. Backfilling.

D. Compaction.

E. Remove and Replace Topsoil.

F. Dressing of Shoulders and Banks.

G. Stone Drainage Filter.

H. Water Control.

I. Testing.

1.02 RELATED SECTIONS

Section 02110 - Clearing and Grubbing

1.03 MEASUREMENT AND PAYMENT

A. Grading to subgrades, construction of ditches, dressing of disturbed areas, removing and replacing topsoil, excavating, backfilling and compacting to required elevations, testing, staking, and construction supervision shall be included in the contract lump sum price in the item to which it pertains

B. Unsuitable Material - Payment will be included in the item to which it pertains. Payment will include excavation and disposal of unsuitable material.

C. Borrow - Payment will be included in the item to which it pertains. Payment will include furnishing materials required in excess of suitable materials available on site.

D. Earthwork - All earthwork shall not be measured for direct payment. Payment for the earthwork shall be included in the item to which it pertains.

E. Dewatering - No direct payment shall be made for dewatering. Dewatering shall be included in the item to which it pertains.

F. Proof Rolling - Payment will be included in the item to which it pertains. Payment will include furnishing a loaded truck, truck driver, fuel and rolling the designated areas.

1.04 REFERENCES

A. ASTM D 448-86 (Reapproved 1993) - Sizes of Aggregate for Road and Bridge Construction.

B. ASTM D 1556-90 - Density and Unit Weight of Soil in Place by the Sand-Cone Method.

C. ASTM D 1557-91 - Laboratory Compaction Characteristics of Soil Using Modified Effort.

D. ASTM D 2167-94 - Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

E. ASTM D 2487-93 - Classification of Soils for Engineering Purposes.

F. ASTM D 2922-91 - Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

G. ASTM D 301 7-88 (Reapproved 1993) - Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

H. ASTM D 3740-94a - Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

I. ASTM E 329-93b - Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.05 SUBMITTALS

A. Section 01340 - Submittals: Procedures for submittals.

B. Materials Source: Submit names of materials source.

1.06 QUALITY ASSURANCE

Perform work in accordance with Federal, State of Georgia and Baldwin County standards.

1.07 TESTING

A. Laboratory tests for moisture density relationship for fill materials shall be in accordance with ASTM D 1557, (Modified Proctor).

B. In place density tests in accordance with ASTM D 1556 or ASTM D 2922.

C. Testing laboratory shall operate in accordance to ASTM D 3740 and E 329 and shall be accepted by the Engineer.

D. The testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any of the tests.

E. Testing shall be the responsibility of the Contractor and shall be performed at the Contractor's expense by a commercial testing laboratory that operates in accordance with subparagraph C above.

F. Test results shall be furnished to the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Borrow shall consist of sand or sand-clay soils capable of being readily shaped and compacted to the required densities, and shall be free of roots, trash and other deleterious material.

B. All soils used for structural fills shall have a PI (plastic index) of less than 10, and a LL (liquid limit) of less than 30. Fill soils shall be dried to appropriate moisture contents prior to compaction.

C. Additionally, fill soils used for the top 2 feet of fill beneath roads and parking lots shall have no more than 15% passing the # 200 sieve. Fill soils used for house lots shall have no more than 25% passing the # 200 sieve.

D. Contractor shall furnish all borrow material.

E. Contractor shall be responsible for and bear all expenses in developing borrow sources including securing necessary permits, drying the material, haul roads, clearing, grubbing, and excavating the pits, haul roads, placing, restoration of pits and haul roads to a condition satisfactory to property owners and in compliance with applicable state and local laws and regulations.

2.02 SOURCE QUALITY CONTROL

A. If tests indicate materials do not meet specified requirements, change material and retest.

B. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 TOPSOIL

A. Contractor shall strip all topsoil and stockpile on site at a location determined by the Owner at the Contractor's expense.

B. Topsoil shall be placed to a depth of 4" over all disturbed areas.

C. Any remaining topsoil determined by the Owner or Engineer to be useful will be stored on site at a location determined by the Owner at the Contractor's expense.

3.02 EXCAVATION

A. Shall be defined as unclassified excavation.

B. Suitable excavation material shall be transported to and placed in fill areas within the limits of the work.

C. Unsuitable material, encountered in areas to be paved and under building pads, shall be excavated 2 feet below final grade and replaced with suitable material from site or borrow excavations.

D. Unsuitable and surplus excavation material not required for fill shall be disposed of at locations shown on the plans. No material shall be removed from the Industrial Park.

E. Proper drainage, including sediment and erosion control, shall be maintained at all times. Methods shall be in accordance with the National Pollutant Discharge

Elimination System standards and other local, state and federal regulations.

F. Unsuitable materials as stated herein shall be highly plastic clay soils, of the CH and MH designation, borderline soils of the SC-OH description, and organic soils of the OL and OH description based on the Unified Soils Classification System. Further, any soils for the top two feet of pavement subgrade shall have no more than 15% passing the # 200 sieve.

3.03 GROUND SURFACE PREPARATION FOR FILL

A. All vegetation such as roots, brush, heavy sods, heavy growth of grass, decayed vegetable matter, rubbish, and other unsuitable material within the areas to be filled shall be stripped and removed prior to beginning the fill operation.

B. Sloped ground surfaces steeper than 1 vertical to 4 horizontal, on which fill is to be placed shall be plowed, stepped, or benched, or broken up as directed, in such a manner that the fill material will bond with the existing surface.

C. Surfaces on which fill is to be placed and compacted shall be wetted or dried as may be required to obtain the specified compaction.

3.04 FILL

A. Shall be reasonably free from roots, organic material, trash and stones having dimensions greater than 4 inches.

B. Shall be placed in successive horizontal layers 8 inches to 12 inches in loose depth for the full width of the cross-section and compacted as required.

3.05 TOLERANCES

A. Unpaved areas to within 0.1 feet of elevations shown on the drawings provided such deviation does not create low spots that do not drain.

B. Paved Areas - Subgrade to within 0.05 feet of the drawing elevations less the compacted thickness of the base and paving.

3.06 FINISHED GRADING

A. All areas covered by the project including excavated and filled sections and adjacent transition areas shall be smooth graded and free from irregular surface changes.

B. Degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, supplemented with hand raking and finishing, except as otherwise specified.

C. The finished surface of unpaved areas shall be not more that 0.10' above or below the established grade or approved cross-section.

D. Ditches and lagoon banks shall be finished graded, dressed and seeded within fourteen (14) calendar days of work to reduce erosion and permit adequate drainage.

3.07 DISPOSAL OF WASTE MATERIAL

All vegetation roots, brush, sod, broken pavements, curb and gutter, rubbish, and other unsuitable or surplus material stripped or removed from the limits of construction shall be disposed of by the Contractor.

3.08 PROTECTION

A. Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance.

B. The Contractor shall be responsible for protection of below grade utilities shown on the drawings or indicated to him by the Owner at all times during earthwork operations.

C. Repair or re-establishment of graded areas prior to final acceptance shall be at the Contractors expense.

D. Site drainage shall be provided and maintained by Contractor during construction until final acceptance of the project. Drainage may be by supplemental ditching, or pumping if necessary, prior to completion of permanent site drainage.

3.09 DRAINAGE

The Contractor shall be responsible for providing surface drainage away from all construction areas. This shall include maintenance of any ditches that exist or may be constructed by others in the immediate vicinity of the work. Contractor shall provide proper and effective measures to prevent siltation of wetlands, streams, and ditches both on the Owner's property, and those properties downstream.

3.10 FIELD QUALITY CONTROL

A. Compaction testing shall be performed in accordance with ASTM D 1556 or D 2922. Where tests indicate the backfill does not meet specified requirements, the backfill shall be removed, replaced, and retested at the Contractors expense.

B. Unpaved areas - at least 90% of maximum laboratory density at optimum moisture content unless otherwise approved by the Engineer.

C. Paved Areas and Under Structures - top 6 inch layer of subgrade to at least 98% of maximum laboratory density at optimum moisture content. Layers' below top 6 inches shall be compacted to 95% of maximum laboratory density at optimum moisture content.

D. Rolling and compaction equipment and methods shall be subject to approval by the Engineer. Approval in no way relieves Contractor of the responsibility to perform in correct and timely means.

E. Number of Tests - Under paved areas, no less than one density test per horizontal layer per 5,000 square feet of subgrade shall be made. In unpaved areas, no less than one density test per horizontal layer per 10,000 square feet of fill area shall be made.

Under curb and gutter, no less than one density test per every 300 linear feet.

3.11 PROOF ROLLING

Shall be required on the subgrade of all curb and gutter and paved areas and on the base of all paved areas where designated by the Engineer. Proof rolling shall take place after all underground utilities are installed and backfilled. The operation shall consist of rolling the subgrade or base with a fully loaded ten (10) wheeled dump truck. A full load shall consist of ten (10) to twelve (12) cubic yards of soil or rock. The dump truck shall be capable of traveling at a speed of two (2) to five (5) miles per hour and be in sound mechanical shape with no exhaust leaks or smoking from burning oil. The Engineer shall determine number of passes and areas rolled.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. The work under this Section consists of furnishing all labor, equipment and materials and performing all operations in connection with the trench excavation and backfill required to install the pipelines shown on the Drawings and as specified.

B. Excavation shall include the removal of any trees, stumps, brush, debris or other obstacles which remain after the clearing and grubbing operations, which may obstruct the work, and the excavation and removal of all earth, rock or other materials to the extent necessary to install the pipe and appurtenances in conformance with the lines and grades shown on the Drawings and as specified.

C. Backfill shall include the refilling and compaction of the fill in the trenches and excavations up to the surrounding ground surface or road grade at crossing.

D. The trench is divided into five specific areas:

1. Foundation: The area beneath the bedding, sometimes also referenced to as trench stabilization.

2. Bedding: The area above the trench bottom (or foundation) and below the bottom of the barrel of the pipe.

3. Haunching: The area above the bottom of the barrel of the pipe up to a specified height above the bottom of the barrel of the pipe.

4. Initial Backfill: The area above the haunching material and below a plane 18 inches above the top of the barrel of the pipe or the top of duct bank.

5. Final Backfill: The area above a plane 18 inches above the top of the barrel of the pipe.

E. The choice of method, means, techniques and equipment rests with the Contractor. The Contractor shall select the method and equipment for trench excavation and backfill depending upon the type of material to be excavated and backfilled, the depth of excavation, the amount of space available for operation of equipment, storage of excavated material proximity of man-made improvements to be protected, available easement or right-of-way and prevailing practice in the area.

1.02 QUALITY ASSURANCE

A. Density: All references to "maximum dry density" shall mean the maximum dry density defined by the "Maximum Density-Optimum Moisture Test", ASTM D 698, except that for non-cohesive materials "maximum dry density" shall mean the maximum index density as determined by the "Maximum Index Density of Soils Using a Vibratory Table", ASTM D 4253. Determination of the density of foundation, bedding, haunching, or backfill materials in place shall meet with the requirements of ASTM D 1556, "Density of Soil In Place by the Sand Cone Method", ASTM D 2937, "Density of Soil In Place by the Drive-Cylinder Method" or ASTM D 2922, "Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)".

B. Sources and Evaluation Testing: Testing of materials to certify conformance with the Specifications shall be performed by an independent testing laboratory. All imported fill materials shall meet the requirements of on-site fill materials.

C. All costs associated with compaction testing ordered by the Owner shall be paid for by the Contractor. The extent of testing required shall be reasonable, but shall also be dependent upon soil conditions, Contractor's means and methods of operation, and regulatory requirements. As a minimum, compaction tests shall be performed in two-foot lifts at a single location per each public right-of-way.

1.03 SAFETY

Perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P "Excavation, Trenching & Shoring" as described in OSHA publication 2226. Particular attention is drawn to the requirement that the Contractor must have on site and individual with current competent person training certification.

PART 2 PRODUCTS

2.01 TRENCH FOUNDATION MATERIALS

Crushed stone shall be utilized for trench foundation (trench stabilization) and shall meet the requirements of the Georgia Department of Transportation Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone sizes shall be between No. 57 and No. 4, inclusive.

2.02 BEDDING AND HAUNCHING MATERIALS

A. Unless shown on the Drawings or specified otherwise, bedding and haunching material shall be suitable earth materials.

B. Earth materials utilized for bedding and haunching shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2 inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, earth bedding and haunching materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as bedding or haunching material, as determined by the Owner, provide select material conforming to the requirements of this Section.

2.03 INITIAL BACKFILL

A. Unless shown on the Drawings or specified otherwise, initial backfill material shall be crushed stone or earth materials as specified for bedding and haunching materials.

B. Earth materials utilized for initial backfill shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2 inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, initial backfill materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as initial backfill material, as determined by the Owner, provide select material conforming to the requirements of this Section.

2.04 FINAL BACKFILL

Unless shown on the Drawings or specified otherwise, final backfill material shall be general excavated earth materials, shall not contain more than one/third broken rock, of which no stone or boulder shall weigh more than 50 pounds, cinders, stumps, limbs, man-made wastes and other unsuitable materials. If materials excavated from the trench are not suitable for use as final backfill material, as determined by the Owner, provide select material conforming to the requirements of this Section.

2.05 SELECT BACKFILL

Select backfill shall be materials which meet the requirements as specified for bedding, haunching, initial backfill or final backfill materials, including compaction requirements.

2.06 CONCRETE

Concrete for bedding, haunching, initial backfill or encasement shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION

A. Topsoil and grass shall be stripped a minimum of 6 inches over the trench excavation site and stockpiled separately for replacement over the non-paved, finished grading areas.

B. Trenches shall be excavated to the lines and grades shown on the Drawings with the centerlines of the trenches on the centerlines of the pipes and to the dimensions which provide the proper support and protection of the pipe and other structures and accessories.

C. Trench Width for Pipelines

1. The sides of all trenches shall be as vertical as is practical to a minimum of one foot above the top of the pipe. Unless otherwise indicated on the Drawings, the maximum trench width shall be equal to the sum of the outside diameter of the pipe plus two feet. The minimum trench width shall be that which allows the proper consolidation of the haunching and initial backfill material.

2. Excavate the top portion of the trench to any width within the construction easement or right-of-way which will not cause unnecessary damage to adjoining structures, roadways, pavement, utilities, trees or private property. Where necessary to accomplish this, provide sheeting and shoring.

3. Where rock is encountered in trenches, excavate to remove boulders and stones to provide a minimum of 6 inches clearance between the rock and any part of the pipe or appurtenance.

4. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the next higher Class or Type of bedding and haunching as shown on the Drawings for the full trench width as actually cut. The excessive trench width may be due to unstable trench walls, inadequate or improperly placed bracing and sheeting which caused sloughing, accidental over-excavation, intentional over-excavation necessitated by the size of the Contractor's tamping and compaction equipment, intentional over-excavation due to the size of the Contractor's excavation equipment, or other reasons beyond the control of the Owner.

D. Depth

1. The trenches shall be excavated to the required depth or elevation which allow for the placement of the pipe and bedding to the dimensions shown on the Drawings or specified.

2. Excavate trenches to provide a minimum cover of 48 inches. Within the right-of-way of highways, streets or roadways, also excavate to place the top of the pipe a minimum of 36 inches below the nearest pavement edge or drainage ditch.

3. Increase the depth of cover where specifically shown on the Drawings and where necessary to avoid interference with underground utilities and obstructions.

4. Where rock is encountered in trenches for pipelines, excavate to the minimum depth which will provide clearance below the pipe barrel of 8 inches for pipe 21 inches in diameter and smaller and 12 inches for larger pipe, valves and manholes. Remove boulders and stones to provide a minimum of 6-inches clearance between the rock and any part of the pipe, manhole or accessory.

E. Excavated Materials

1. Excavated materials shall be placed adjacent to the work to be used for backfilling as required. Top soil shall be carefully separated and lastly placed in its original location.

2. Excavated material shall be placed sufficiently back from the edge of the excavation to prevent caving of the trench wall, to permit safe access along the trench and not cause any drainage problems. Excavated material shall be placed so as not to damage existing landscape features or man-made improvements.

3.02 SHEETING, BRACING, AND SHORING

A. Sheeting, bracing and shoring shall be performed in the following instances:

1. Where sloping of the trench walls does not adequately protect persons within the trench from slides or cave-ins.

2. In caving ground.

3. In wet, saturated, flowing or otherwise unstable materials. The sides of all trenches and excavations shall be adequately sheeted, braced and shored.

4. Where necessary to prevent damage to adjoining buildings, structures, roadways, pavement, utilities, trees or private properties which are required to remain.

5. Where necessary to maintain the top of the trench within the available construction easement or right-of-way.

B. In all cases, excavation protection shall strictly conform to the requirements of the Occupational Safety and Health Act of 1970, as amended.

C. Timber: Timber for shoring, sheeting, or bracing shall be sound and free of large or loose knots and in good, serviceable condition. Size and spacing shall be in accordance with OSHA regulations.

D. Steel Sheeting and Sheet Piling: Steel sheet piling shall be the continuous interlock type. The weight, depth and section modulus of the sheet piling shall be sufficient to restrain the loads of earth pressure and surcharge from existing foundations and live loads. Procedure for installation and bracing shall be so scheduled and coordinated with the removal of the earth that the ground under existing structures shall be protected against lateral movement at all times. The Contractor shall provide closure and sealing between sheet piling and existing facilities.

E. Trench Shield: A trench shield or box may be used to support the trench walls. The use of a trench shield does not necessarily preclude the additional use of bracing and sheeting. When trench shields are used, care must be taken to avoid disturbing the

alignment and grade of the pipe or disrupting the haunching of the pipe as the shield is moved. When the bottom of the trench shield extends below the top of the pipe, the trench shield will be raised in 6-inch increments with specified backfilling occurring simultaneously. At no time shall the trench shield be "dragged" with the bottom of the shield extending below the top of the pipe or utility.

F. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the pipe and adjacent property. Leave sheeting in place when in the opinion of the Owner it cannot be safely removed or is within three feet of an existing structure, utility, or pipeline. Cut off any sheeting left in place at least two feet below the surface.

G. Sheet piling within three feet of an existing structure or pipeline shall remain in place, unless otherwise directed by the Owner.

3.03 ROCK EXCAVATION

A. Definition of Rock: Any material which cannot be excavated with conventional excavating equipment, and is removed by drilling and blasting, or mechanically fracturing by means other than a trench excavator, and occupies an original volume of at least one-half cubic yard.

B. Blasting: Provide licensed, experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all buildings and structures from the effects of the blast. Repair any resulting damage. If the Contractor repeatedly uses excessive blasting charges or blasts in an unsafe or improper manner, the Owner may direct the Contractor to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.

C. Removal of Rock: Dispose of rock off site that is surplus or not suitable for use as rip rap or backfill.

D. The Contractor shall notify the Owner prior to any blasting. Additionally, the Contractor shall notify the Owner and local fire department before any charge is set.

E. The Contractor shall conduct pre-blast and post-blast inspections of structures, including photographs or videos, and maintain a detailed written log.

3.04 DEWATERING EXCAVATIONS

A. Dewater excavation continuously to maintain a water level two feet below the bottom of the trench.

B. Control drainage in the vicinity of excavation so the ground surface is properly pitched to prevent water running into the excavation.

C. There shall be sufficient pumping equipment, in good working order, available at all times, to remove any water that accumulates in excavations. Where the utility crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Provision shall be made for the satisfactory disposal of surface water to prevent damage to public or private property.

D. In all cases, accumulated water in the trench shall be removed before placing bedding or haunching, laying pipe, placing concrete or backfilling.

E. Where dewatering is performed by pumping the water from a sump, crushed stone shall be used as the medium for conducting the water to the sump. Sump depth shall be at least two feet below the bottom of the trench, Pumping equipment shall be of sufficient quantity and/or capacity to maintain the water level in the sump two feet below the bottom of the trench. Pumps shall be a type such that intermittent flows can be discharged. A standby pump shall be required in the event the operating pump or pumps clog or otherwise stop operation.

F. Dewater by use of a well point system when pumping from sumps does not lower the water level two feet below the trench bottom. Where soil conditions dictate, the Contractor shall construct well points cased in sand wicks. The casing, 6 to 10-inches in diameter, shall be jetted into the ground, followed by the installation of the well point, filling casing with sand and withdrawing the casing.

3.05 TRENCH FOUNDATION AND STABILIZATION

A. The bottom of the trench shall provide a foundation to support the pipe and its specified bedding. The trench bottom shall be graded to support the pipe and bedding uniformly throughout its length and width.

B. If, after dewatering as specified above, the trench bottom is spongy, or if the trench bottom does not provide firm, stable footing and the material at the bottom of the trench will still not adequately support the pipe, the trench will be determined to be unsuitable and the Owner shall then authorize payment for trench stabilization.

C. Should the undisturbed material encountered at the trench bottom constitute, in the opinion of the Owner, an unstable foundation for the pipe, the Contractor shall be required to remove such unstable material and fill the trench to the proper subgrade with crushed stone or surge stone as directed by the Owner.

D. Where trench stabilization is provided, the trench stabilization material shall be compacted to at least 90 percent of the maximum dry density, unless shown or specified otherwise.

3.06 BEDDING AND HAUNCHING

A. Prior to placement of bedding material, the trench bottom shall be free of any water, loose rocks, boulders or large dirt clods.

B. Bedding material shall be placed to provide uniform support along the bottom of the pipe and to place and maintain the pipe at the proper elevation. The initial layer of bedding placed to receive the pipe shall be brought to the grade and dimensions indicated on the Drawings. All bedding shall extend the full width of the trench bottom. The pipe shall be placed and brought to grade by tamping the bedding material or by removal of the excess amount of the bedding material under the pipe. Adjustment to grade line shall be made by scraping away or filling with bedding material. Wedging or blocking up of pipe shall not be permitted. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted. Each pipe section shall have a uniform bearing on the bedding for the length of the pipe, except immediately at the joint.

C. At each joint, excavate bell holes of ample depth and width to permit the joint to be assembled properly and to relieve the pipe bell of any load.

D. After the pipe section is properly placed, add the haunching material to the specified depth. The haunching material shall be shovel sliced, tamped, vigorously chinked or otherwise consolidated to provide uniform support for the pipe barrel and to fill completely the voids under the pipe, including the bell hole. Prior to placement of the haunching material, the bedding shall be clean and free of any water, loose rocks, boulders or dirt clods.

E. Ductile Iron Pipe

1. Unless otherwise shown on the Drawings or specified, utilize earth materials for bedding and haunching. Type 2, 3, 4 and 5 bedding shall be as detailed on the Drawings.

2. Unless specified or shown otherwise, bedding shall meet the requirements

for Type 2 Pipe Bedding. Unless specified or shown otherwise for restrained joint pipe and fittings, bedding shall meet the requirements for Type 3 Pipe Bedding.

3. Where the depth of cover over the piping exceeds 15 feet, the pipe bedding shall meet the requirements of Type 4 Pipe Bedding. Where the depth of cover over the piping exceeds 28 feet, the pipe bedding shall meet the requirements of Type 5 Pipe Bedding.

4. Type 4 or Type 5 Pipe Bedding called for on the Drawings, specified or ordered by the Owner, shall meet requirements for Type 4 or Type 5 Pipe Bedding, utilizing sand, gravel, or crushed stone bedding and haunching material.

F. Polyvinyl Chloride Pipe

1. Unless shown otherwise on the Drawings, utilize earth materials for bedding and haunching.

2. Unless shown otherwise on the Drawings, bedding and haunching shall meet the requirements for Type 2 Pipe Bedding, as detailed on the Drawings.

G. Excessive Width and Depth

1. Water Mains: If the trench is excavated to excess width, provide the next higher type or class of pipe bedding, but a minimum of Type 4, as detailed on the Drawings.

2. If the trench is excavated to excessive depth, provide sand, gravel, or crushed stone to place the bedding at the proper elevation or grade.

H. Compaction: Bedding and haunching materials under pipe, manholes and accessories shall be compacted to a minimum of 90 percent of the maximum dry density, unless shown or specified otherwise.

3.07 INITIAL BACKFILL

A. Initial backfill shall be placed to anchor the pipe, protect the pipe from damage by subsequent backfill and ensure the uniform distribution of the loads over the top of the pipe.

B. Place initial backfill material carefully around the pipe in uniform layers to a depth of at least 18 inches above the pipe barrel. Layer depths shall be a maximum of 6 inches.

C. Backfill on both sides of the pipe simultaneously to prevent side pressures.

D. Compact each layer thoroughly with suitable hand tools or tamping equipment.

E. Initial backfill shall be compacted to a minimum 90 percent of the maximum dry density, unless shown or specified otherwise.

F. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.

3.08 CONCRETE ENCASEMENT FOR PIPELINES

Where concrete encasement is shown on the Drawings for pipelines, excavate the trench to provide a minimum of 6-inches clearance from the bell of the pipe. Lay the pipe to line and grade on concrete blocks. In lieu of bedding, haunching and initial backfill, place concrete to the full width of the trench and to a height of not less than 6 inches above the pipe bell. Do not backfill the trench for a period of at least 24 hours after concrete is placed.

3.09 FINAL BACKFILL

A. Backfill carefully to restore the ground surface to its original condition.

B. The top 6 inches shall be topsoil obtained as specified in "Trench Excavation" of this Section.

C. Excavated material which is unsuitable for backfilling, and excess material, shall be disposed of, at no additional cost to the Owner, in a manner approved by the Owner. Surplus soil may be neatly distributed and spread over the site, if approved by the Owner. If such spreading is allowed, the site shall be left in a clean and sightly condition and shall not affect pre-construction drainage patterns. Surplus rock from the trenching operations shall be removed from the site.

D. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.

E. After initial backfill material has been placed and compacted, backfill with final backfill material. Place backfill material in uniform layers, compacting each layer thoroughly as follows:

1. In 6 inch layers, if using light power tamping equipment, such as a "jumping jack"

2. In 12 inch layers, if using heavy tamping equipment, such as hammer with tamping feet

3. In 24 inch layers, if using a hydra-hammer

F. Settlement: If trench settles, re-fill and grade the surface to conform to the adjacent surfaces.

G. Final backfill shall be compacted to a minimum 90 percent of the maximum dry density, unless specified otherwise.

3.10 ADDITIONAL MATERIAL

Where final grades above the pre-construction grades are required to maintain minimum cover, additional fill material will be as shown on the Drawings. Utilize excess material excavated from the trench, if the material is suitable. If excess excavated materials are not suitable, or if the quantity available is not sufficient, provide additional suitable fill material.

3.11 BACKFILL UNDER ROADS

Compact backfill underlying pavement and sidewalks, and backfill under dirt and gravel roads to a minimum 98 percent of the maximum dry density. The top 12 inches shall be compacted to a minimum of 98 percent of the maximum dry density.

3.12 BACKFILL WITHIN GEORGIA DOT RIGHT-OF-WAY

Backfill within the Georgia DOT right-of-way shall meet the requirements stipulated in the "Utility Accommodation Policy and Standards", published by the Georgia Department of Transportation.

3.13 BACKFILL ALONG RESTRAINED JOINT PIPE

Backfill along restrained joint pipe shall be compacted to a minimum 90 percent of the maximum dry density.

3.14 TESTING AND INSPECTION

A. The soils testing laboratory is responsible for the following:

1. Compaction tests in accordance with Article 1.02 of this Section.

2. Field density tests as ordered by the Owner.

3. Inspecting and testing stripped site, subgrades and proposed fill materials.

B. The Contractor's duties relative to testing include:

1. Notifying laboratory of conditions requiring testing.

2. Coordinating with laboratory for field testing.

3. Paying costs for all testing performed at the request of the Owner beyond the scope of that required and for re-testing where initial tests reveal non-conformance with specified requirements.

4. Providing excavation as necessary for laboratory personnel to conduct tests.

C. Inspection

1. Earthwork operations, acceptability of excavated materials for bedding or backfill, and placing and compaction of bedding and backfill is subject to inspection by the Owner.

2. Where required by the Owner, foundations and shallow spread footing foundations are required to be inspected by a geotechnical engineer, who shall verify suitable bearing and construction.

D. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

E. Owner shall have the right to select the location of compaction tests, no more than one per 1,000 feet of pipeline, and shall be notified by Contractor 24-hours in advance for the Owner to be present.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

A. This section specifies clearing and grubbing which includes, but is not limited to, removing from the Project site the following: trees, stumps, roots, brush, and other plant life; structures; abandoned utilities; trash; debris; removal of paving, curbs and sidewalks; and all other materials found on or near the surface of the ground in the construction area and understood by generally accepted engineering practice not to be suitable for construction of the type contemplated. Precautionary measures that prevent damage to existing features to remain are part of the Work.

B. Clearing and grubbing operations shall be coordinated with temporary and permanent erosion and sedimentation control procedures.

C. This section also includes stripping and stockpiling of topsoil as needed.

1.2 QUALITY ASSURANCE

A. The Contractor shall comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state, or federal authorities having jurisdiction over the Project. All required permits of a temporary nature shall be obtained for construction operations by the Contractor.

B. Open burning, if allowed, shall first be permitted by the local authority having jurisdiction. The Contractor shall notify the local fire department and abide by fire department restrictions.

C. The Contractor shall coordinate all clearing operations with the appropriate utility company(s).

1.3 JOB CONDITIONS

A. The Contractor shall determine the actual condition of the site as it affects his portion of the work.

B. The Engineer may limit the clearing and grubbing of the site by showing limits on the drawings and/or on the job site.

1.4 RELATED SECTIONS

A. Section 02220 – Demolition & Removal
B. Section 02204 – Earthwork
C. Section 02125 – Erosion & Sedimentation Control

PART 2 PRODUCTS

2.1 EQUIPMENT

A. The Contractor shall furnish equipment of the type normally used in clearing and grubbing operations including, but not limited to, tractors, trucks, and loaders.

2.2 MATERIALS

A. Materials used for protection of trees and vegetation not to be removed during clearing operations shall be at Contractor's option. Materials chosen shall be approved by the Engineer prior to installation and upon installation shall be approved by the Engineer to ensure maximum protection to vegetation.

B. Materials used for the repair of trees and vegetation damaged outside clearing limits shown on Drawings shall be at Contractor's opinion but must be approved by the Engineer prior to use.

C. Wound paint shall be a standard bituminous product.

D. Herbicides shall not be used unless written approval is given by Owner.

E. Explosives shall not be used unless written approval is given by Owner.

F. Materials used for the replacement or relocation of existing fences shall be of equal or superior quality to those fence materials existing prior to construction unless specified otherwise on the plans.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that existing plant life designated to remain is tagged or identified.

B. Identify a waste area for placing removed materials.

3.2 PROTECTION

A. Streets, roads, adjacent property, and other works to remain shall be protected throughout the work in accordance with local laws and ordinances.

B. Contractor shall make every effort to protect existing benchmarks, R/W markers, monuments, iron pins, property corner markers, etc. If any are disturbed or destroyed, Contractor shall provide services of a registered land surveyor to replace the markers, as directed by Owner, at no expense to Owner.

C. No trees shall be cut outside of areas designated without specific approval of Engineer, and any trees designated shall be protected from damage by Contractor's construction operations. The Contractor shall not be held accountable for damages to trees resulting from placement of fill or removal of soils where such action is required by the contract documents. Any tree, the trunk of which is within 10 feet of any footing or trench shall be exempt from these penalties except that the Contractor shall exercise all reasonable precautions to preserve even these trees. The Contractor agrees to pay penalties as established below in the event that he or any of his subcontractors causes the loss or removal of grass designated to be saved under the provisions of the Agreement.

Tree Diameter at a Point 4 Feet Above Existing Grade	Penalty
6" – 7"	$ 500.00
7" – 8"	$ 600.00
8" – 11"	$ 800.00
12" – 20"	$ 1,000.00
21" and Larger	$ 2,000.00

D. Existing trees and other vegetation to remain shall be protected as directed by Owner.

1. Trees shall be protected by fencing, barricades, or wrapping.

2. Shrubs and bushes shall be protected by fencing, barricades, or wrapping. Wrapping of bushes and shrubs with plastic film will not be permitted.

3. Shallow-rooted plants shall be protected at ground surface under and in some cases outside the spread of branches by fencing, barricades, or ground cover protection.

E. In the event that archaeological resources are uncovered, Contractor shall notify Owner prior to proceeding with work.

F. It shall be the responsibility of the Contractor to inspect the site, determine the amount of work required, and include this work in his proposal.

G. Contractor is to erect temporary fences as necessary to preserve the privacy of all affected property owners whose existing fences are being removed or relocated. Temporary fences shall be of sufficient strength and quality to prevent escape of animals and livestock and to prevent the intrusion of animals and people.

H. It is Contractor's responsibility to coordinate the removal and erection of fences with each affected property owner and to maintain any temporary and relocated fences throughout the contract period.

I. The Contractor shall protect all utilities that remain.

J. Clearing operations shall be conducted so as to prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction, and so as to provide for the safety of employees and others.

3.3 CLEARING

A. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

B. Limits of clearing shall be contained within the areas within construction limits as shown on the drawing right-of-way and easement.

C. Existing fences that at the direction of Owner can be reused shall be carefully removed and stored at such a distance they shall not be damaged by construction activity.

D. Fences that cannot be reused shall be removed to such a distance to allow construction activity and shall be replaced with new materials similar to existing fences upon completion of construction.

3.4 GRUBBING

A. Materials to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and not less than 2 feet in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable materials and compacted to make the surface conform to the original adjacent surface of the ground.

3.5 REMOVAL AND DISPOSAL

A. Contractor shall remove and dispose of all excess material resulting from clearing or site preparation operations. Contractor shall dispose of such materials in a manner acceptable to Owner and the local governing authority and at an approved location where such materials can be lawfully disposed.

B. Contractor may, at no cost, retain any materials of value from clearing operations for his own use or disposal by sale unless otherwise stated in these Specifications. Such material shall be removed from construction area before date of completion of work under these Specifications. Owner assumes no responsibility for protection or safekeeping of any materials so retained by Contractor.

C. Materials will not be disposed of by burying unless approved by Owner. Buried materials will be covered with not less than 2 feet of earth material.

D. Burning will be permitted if the required permits have been acquired from the local Fire Department. Burning will be permitted only at times when conditions are considered favorable for burning and at locations approved by proper State or local authorities. Materials to be burned shall be piled neatly and, when in a suitable condition, shall be burned completely. Piling for burning shall be done in such a manner and in such locations as to cause the least fire risk. All burning shall be so thorough that the materials are reduced to ashes. No logs, branches, or charred pieces shall be permitted to remain. Contractor shall at all times take special precautions to prevent fire from spreading to areas beyond the limits of cleared areas and shall have available at all times, suitable equipment and supplies for use in preventing and suppressing fires. Unguarded fires will not be permitted.

E. Material to be removed from site shall be removed as it accumulates to prevent any unsightly spoil areas.

3.6 STRIPPING AND STOCKPILING OF TOPSOIL

A. Remove topsoil to its entire depth from within graded areas. Minimum depth shall be 6 inches.

B. Stockpile topsoil in onsite locations where it will not interfere with building or paving construction, site or utility operations or adjacent facilities and functions. Materials stockpiled shall be placed in a manner to afford drainage. Protect against erosion using bales of hay placed continuously around perimeter.

C. Areas to be stripped shall first be scraped clean of all brush, weeds, grass, roots, wood, glass, rocks, broken concrete, brick and concrete block. Topsoil shall be free from subsoil, debris, and stones larger than 2 inches in diameter.

D. Topsoil shall be re-spread outward from the buildings at the close of the job. Scope is limited to the supply of material on the site. No topsoil shall be removed from the premises.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

A. This section specifies requirements for sheeting, shoring, and bracing of trenches and excavations greater than 5 feet in depth. Where sheet piling, shoring, sheeting, bracing or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the Contractor.

1.2 DESIGN REQUIREMENTS

A. The design, planning, installation and removal, if required, of all sheeting, shoring, sheet piling, lagging, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.

B. The Contractor shall design sheeting, shoring, and bracing in accordance with the OSHA Safety and Health Standards as well as state and local requirements.

C. Horizontal strutting below the barrel of a pipe and the use of pipe as support are not acceptable.

D. When the construction sequence of structures requires the transfer of bracing to the completed portions of any new structure or to any existing structure, the Contractor shall provide the Engineer with a complete design analysis of the expected impact of that bracing on the structure. This action shall in no way absolve the Contractor of responsibility of damage resulting from said bracing.

1.3 REFERENCES

A. OSHA 2207 Revised 1987 – OSHA Safety and Health Standards

1.4 SUBMITTALS

A. Prior to starting any excavation work requiring sheeting, shoring, and bracing, the Contractor shall submit his plans for trench and excavation support systems to the Engineer for review and comment. No excavations shall be started until the Contractor has obtained written acceptance of the trench support system. Said acceptance will be to assure the Owner of the Contractor's general compliance with the required codes and shall not be construed as a detailed analysis for adequacy of the support system, nor shall any provisions of the above

requirements be construed as relieving the Contractor of his overall responsibility and liability for the work. Submittals shall include the following:

1. Design calculations and method of installation and removal of all sheeting, sheet piling, shoring and bracing. Calculations shall be made by a professional structural or civil engineer in the state of the project.

2. Detailed excavation support drawings.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTIONS

3.1 GENERAL

A. Contractor shall be responsible for supporting and maintaining all excavations required even to the extent of sheeting and shoring the sides and ends of excavations with timber or other supports. If the sheeting, braces, shores, and stringers or walling timbers or other supports are not properly placed or are insufficient, the Contractor shall provide additional or stronger supports. The requirement of sheeting or shoring or the addition of supports shall not relieve the Contractor of his responsibility for their sufficiency. All sheeting, shoring and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to conform to OSHA Safety & Health Standard (29 CFR 1926/1910) OSHA 2207, latest edition.

B. Excavations adjacent to existing or proposed buildings and structures or in paved streets or alleys shall be sheeted, shored and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. The Contractor shall be held liable for any damage resulting to such structures or pavements as a result of his operations.

C. Trench sheeting shall be left in place until the backfilling has been completed to elevation not less than twelve (12) inches above the top of the pipe. Unless otherwise ordered in writing, sheeting shall then be cut off at the top of the lowest set of bracing and the upper section shall be removed. All voids left by sheeting along trenches shall be carefully refilled and rammed with suitable tools.

D. In unstable ground, sheeting shall be driven to such depth below bottom of the trench or side of the excavation as required to ensure stability.

E. The need and adequacy of sheeting, shoring, bracing, or other provisions to protect men and equipment in a trench or other excavation shall be the sole and exclusive responsibility of Contractor.

F. Underpin adjacent structures, which may be damaged by excavation work, including service utilities and pipe chases.

G. Notify Engineer of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.

H. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

I. Grade top perimeter of excavation to prevent surface water run-off into excavation.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

A. Removal of identified and discovered rock materials during excavation for the purpose of construction. Removal shall include drilling and/or blasting incidental thereto and disposal of excavated materials.

B. When necessary for prosecution of the Work, the use of explosives to assist rock removal may be exercised by Contractor provided this use is in compliance with all local, State, Federal and other Governmental regulations applying to transportation, storage, use and control of explosives.

1.2 RELATED SECTIONS

A. Section 02204 – Earthwork

B. Section 02225 – Trench Excavation & Backfill

1.3 REFERENCES

A. NFPA 495 – Code for the manufacture, Transportation, Storage, and Use of Explosive Materials.

B. OSHA 2207 – Construction Industry Standards, Subpart T – Demolition.

1.4 SUBMITTALS

A. Section 01340 – Shop Drawings, Product data, and Samples: Procedures for submittals.

B. Explosives: Indicate proposed method of blasting, delay pattern, explosive types, type of blasting mat or cover, and intended rock recovery method.

C. Assurance/Control Submittals.

1. Qualification Documentation: Submit seismic survey firm and explosives firm documentation of experience indicating compliance with specified qualification requirements.

1.5 QUALITY ASSURANCE

A. Qualifications for Explosives:

1. Seismic Survey Firm: Company specializing in seismic surveys with five years documented experience.

2. Explosives Firm: Company specializing in explosives for destruction for removal of subsurface rock with five years documented experience.

B. Regulatory Requirements:

1. Perform rock removal in accordance with applicable requirements of governing authorities having jurisdiction.

2. Comply with all laws, rules, and regulations of Federal, State and local authorities which govern storage, use, manufacture, sale, handling, transportation, licensing, or other disposition of explosives. Take special precautions for proper use of explosives to prevent harm to human life and damage to surface structures, all utility lines, or other subsurface structures. Do not conduct blasting operations until persons in vicinity have had ample notice and have reached positions of safety.

3. Obtain permits from authorities having jurisdiction before explosives are brought to site or drilling for setting of explosives is started.

a. Notify Contracting Officer of schedule and producers prior to explosive use.

C. Pre-Installation Meeting:

1. Convene a pre-installation meeting one week prior to commencing Work of this Section.

2. Require attendance of parties directly affecting Work of this Section.

3. Review conditions for use of explosives in rock removal operations, explosive rock removal procedures and coordination with related Work.

4. Agenda:

a. Tour, inspect and discuss conditions of existing soils and rock encountered.

b. Review blast control measures and requirements.

c. Review safety precautions relating to use of explosives

d. Review types of explosives to be used.

e. Review required submittals, both completed and yet to be completed.

f. Review and finalize construction schedule relating to explosive rock removal, and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.

g. Review required inspections, certifying, and material usage accounting procedures.

h. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.

1.5 PROJECT CONDITIONS OR SITE CONDITIONS

A. Environmental Requirements: Determine all environmental effects associated with proposed rock removal Work and safeguard those concerns as regulated by law and authorities having jurisdiction by approved methods.

B. Explosives: Do not bring explosives onto site or use in Work without prior written permission from Contracting Officer and authorities having jurisdiction. Comply with requirements of NFPA 495. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

1. Hold harmless the Architect, Engineer and United States Postal Service from any claim resulting from use of explosives. Removal of materials of any nature by blasting shall be done in such a manner and such time as to avoid damage affecting the integrity of design and to avoid damage to any new or existing structure included in or adjacent to work. It shall be contractors responsibility to determine method of operation to ensure desired results and integrity of completed work.

C. Existing Conditions:

1. Geotechnical Data:

a. Reports of Subsurface Investigation and data are not a part of Contract Documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. Rock (Definition) – Solid mineral material with a volume in excess of ½ cubic yard that cannot be broken down and removed by use of heavy construction equipment, such as a Caterpillar 215 or equivalent, bulldozer such as a Caterpillar D8K equipped with single tooth hydraulic ripper, ¾ cubic yard capacity power shovel, rooters, etc., and without drilling or blasting. Materials which can be loosened with a pick, hard pan, boulders less than ½ cubic yard in volume, chert, clay, soft shale, soft and disintegrated rock and any similar material shall not be considered as rock. (All materials to be considered unclassified or common excavation).

B. Explosives – Shall be suitable for intended purposes at the Contractor's option subject to review by Owner and Engineer.

C. Delay Devices – Type recommended by explosives firm to be used as accessory to explosives. Subject to review by Engineer.

D. Blasting Mat – When the use of explosives is necessitated during prosecution of the Work, Contractor shall incorporate the use of blasting mats or type recommended by explosives form to lessen the danger of projectiles occasionally resultant from blasting of rock.

PART 3 EXECUTIONS

3.1 EXAMINATION

A. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to for rock excavation to begin.

B. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

3.2 ROCK EXCAVATION

A. Perform rock excavation in a manner that will produce material of such size as to permit it being placed in embankments in accordance with Section 02300. Remove rock to limits indicated. Remove loose or shattered rock, overhanging ledges and boulders, which might dislodge.

B. Rock Excavation - Mechanical Method:

1. Excavate for and remove rock by mechanical method. Drill holes and utilize expansive tools and wedges to fracture rock.

2. Cut away rock at excavation bottom to form level bearing. Remove shaled layers to provide sound and unshattered base for foundations.

3. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

4. Remove shaled layers to provide sound unshattered base for footings and foundations.

5. Re-use excavated rock materials on-site in accordance with Section 02320.

6. Remove excavated rock materials not re-used off-site.

C. Rock Excavation - Explosives Method:

1. Where igneous, metamorphic, or sedimentary rock is encountered that cannot be removed by rippers or other mechanical methods, remove rock by explosives method.

2. Comply with requirements of NFPA 495

E. Use lean concrete or suitable materials to replace rock over blast or over excavation in building area and in expansion area to facilitate placement of utilities and future footings.

3.3 FIELD QUALITY CONTROL

A. Inspection: Contracting Officer will inspect bearing surfaces and cavities formed by removed rock.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

A. This Section covers the work necessary to move in and move out necessary and equipment, set up and remove crane and temporary facilities, and clean up site, complete.

1.02 MATERIALS & EQUIPMENT

A. Provide all materials and equipment required to accomplish the work as specified.

1.03 WORKMANSHIP

A. Set up all equipment necessary to complete all work within the area designated by the Engineer. Accomplish all required work in accordance with applicable portions of these specifications.

B. Some obstructions may not be shown. Bidders are advised to carefully inspect the existing facilities before preparing their proposals. The removal and replacement of minor obstructions such as electrical conduits, water, waste piping, and similar items shall be anticipated and accomplished, even though not shown or specifically mentioned.

1.04 SECURITY FENCE

A. Contractors security fence may be constructed for the protection of materials, tools, and equipment or the Contractor and subcontractors. At completion of the work, remove fence from the site and restore the area.

1.05 CONTAMINATION PRECAUTIONS

A. Avoid contamination of the project area. Do not dump waste oil, rubbish, or other similar materials on the ground.

1.06 CLEANUP OF CONSTRUCTION AREAS

A. Upon completion and acceptance of the elevated water storage tank, remove from the site the crane and equipment, complete, and all debris, unused materials, temporary construction buildings, and other miscellaneous items resulting from or used in the operations. Replace or repair any facility, which has been damaged during the construction work. Restore the site as nearly as possible to its original condition.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Site storm sewer drainage piping, fittings and accessories, and bedding.

2. Connection of storm sewer system to municipal storm sewer system.

3. Catch basins, paved area drainage, site surface drainage, and storm water detention facilities.

B. Related Documents: The Contract Documents, as defined in the General Conditions, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

C. Related Sections:

1. Section 02225 - Trench Excavation and Backfill.

2. Section 03300 - Cast-In-Place Concrete: Concrete for catch basins, inlets, and junction boxes.

3. Section 02634 - Storm Drainage Manholes: Manholes, lids, frames and accessories.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 760 - Specification for Pipe, Corrugated Steel, Zinc Coated, (Galvanized).

2. ASTM C 76 - Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

3. ASTM D 1248 - Specification for Type III, Polyethylene Pipe Category 4 or 5, Grade P33 or P34, Class C per ASTM D-1248 pipe and fittings.

1.03 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to start of backfill operations.

1.04 SUBMITTALS

A. Section 01340 - Submittal Procedures: Procedures for submittals.

1. Product Data: Data indicating pipe, pipe accessories, and fittings.

2. Assurance/Control Submittals:

a. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.

b. Certificates: Manufacturer's certificate that products meet or exceed specified ASTM requirements.

B. Section 01720 – Record Drawings: Procedures for record drawings.

1. Project Record Documents: Accurately record the following.

a. Actual locations of pipe runs, connections, manholes, catch basins, cleanouts, and invert elevations.

b. Identify and describe unexpected variations to subsoil conditions and location of uncharted utilities.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Conform to state & local Public Works Standard Specifications for materials and installation of the work of this Section.

PART 2 PRODUCTS

2.01 PIPE MATERIALS

A. Reinforced Concrete Pipe:

1. Pipe: ASTM C 76, Class III, latest revision, unless indicated otherwise on Drawings. Pipe joints shall be either tongue and groove with mortar joint or "O" ring type joints. Pipe shall meet Georgia Department of Transportation

Specifications.

Cast-in-place concrete shall have minimum compressive strength of 3000 psi at 28 days. Slump shall be 3" ± 1".

All storm drainage pipes under public roadways shall be RCP.

2. Gaskets: ASTM C 443; rubber compression gaskets installed in accordance with manufacturer's published instructions.

B. Smooth Interior Corrugated Polyethylene Pipe:

1. Pipe: Polyethylene Pipe shall be high-density polyethylene corrugated pipe with an integrally formed smooth interior. This specification is applicable to nominal sizes 4 - 36 inch diameter. Requirements for test methods, dimensions, and markings are those found in AASHTO Designations M-252 and M-294.

2. Pipe and fittings shall be made of polyethylene compounds which meet or exceed the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM D-1248 with the applicable requirements defined in ASTM D-1248. Clean reworked material may be used.

3. Minimum parallel plate pipe stiffness values shall be as follows:

Diameter	Pipe Stiffness*
4"	50 psi
6"	50 psi
8"	50 psi
10"	50 psi
12"	45 psi
15"	42 psi
18"	40 psi
24"	34 psi
30"	28 psi
36"	22 psi

*Per ASTM Test Method D-2412

4. The pipe and fittings shall be free of foreign inclusions and visible defects. For pipe sizes 12" diameter and greater, designed drainage perforations shall be permitted in corrugation valleys only. All holes of any kind in the corrugation crests or sidewalls shall be considered unacceptable. The ends of the pipe shall be cut squarely and cleanly so as not to adversely effect joining.

5. The nominal size for the pipe and fittings is based on the nominal inside diameter of the pipe. Corrugated fittings may be either molded or fabricated by the manufacturer. Fittings supplied by manufacturers other than the supplier of the pipe shall not be permitted without the approval of the Project Engineer.

6. Joints shall be made with split couplings, corrugated to engage the pipe corrugations, and shall engage a minimum of 4 corrugations, 2 on each side of the pipe joint. A neoprene gasket shall be utilized with the coupling to provide a soil tight joint.

7. Installation shall be in accordance with ASTM Recommended Practice D-2321 or as specified by the Project Engineer or local approving agency.

8. A manufacturers' certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished to the Engineer upon request.

C. Brick: Brick for manholes and catch basins shall be first quality, sound, hard burned, perfect shaped brick, presenting a smooth regular shape. Brick shall not absorb more than 16 percent of water by weight when submerged in water for 24 hours, having been in a thoroughly dry state prior to placing in water.

D. Mortar: All cement used in mortar shall conform to ASTM Designation C-150, and the latest revision thereof. All mortar used shall be composed of one part Portland cement and two parts of fine sand.

E. Cast Iron: Cast iron for manhole frames and covers and catch basin frames and grates, and manhole steps shall conform to the shape and dimensions shown on the Plans, and shall be clean and perfect free from sand and blow holes or other defects. Cast iron shall conform to ASTM Designation A-48-74 for Class No. 20 gray cast iron.

F. Pre-cast Concrete Structures: Pre-cast concrete storm drainage structures shall conform to the requirements o ASTM C-478. Dimensions and reinforcement steel shall be as shown on the details. Also see Section 03400.

2.02 INLETS, CATCH BASINS, AND JUNCTION BOXES

A. Lid and Frame: Cast iron as indicated on Drawings.

B. Structure: As indicated on Drawings.

C. Concrete: Specified in Section 03300.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

1. Verify that survey benchmark and intended elevations for the Work are as indicated on Drawings.

2. Verify that trench cut and excavation is ready to receive Work and excavations, dimensions, and elevations are as indicated on Drawings.

B. Report in writing to Project Engineer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 TRENCHING

A. Excavate trenches to the line and grade shown on the plans. The minimum width of the trench shall be 12" plus the outside diameter of the pipe. The maximum width shall be 24" plus the outside diameter of the pipe. Machine trenching may be carried to within four inches of the flow line elevation and the remainder of the trench bottom removed by hand. Undercutting will not be permitted except to obtain a stable bottom. Do not open ore trench in advance o pipe laying than is possible to use in laying pipe for that day. Backfill all trenches at the end of each day.

B. Shape the bottom of the trench to the lower 1/3 of the pipe for a firm bed, or lay the pipe on a flat trench bottom and backfill immediately to 1/4 its diameter and tap in 4" layers against and under the pipe.

3.03 BEDDING

A. Excavate pipe trench as specified in Section 02225. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layers not exceeding 6 inches compacted depth, each layer. Place compacted bedding material to elevation of paving sub grade as indicated on Drawings.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

D. Remove excess backfill and excavated material from site.

3.04 PIPE LAYING

A. Lay pipe to line and grade by the use of batter boards or laser. Set batter boards at intervals of 25 feet or less. Begin pipe laying at the lowest flow line elevation and continue toward the highest flow line elevation.

3.05 BACKFILLING

A. As soon as practicable after the completion of laying and jointing of the pipe, the trench shall be backfilled, and at no time shall be the completed backfilling of the trench be more than 300 feet behind the pipe laying.

1. Suitable earth materials: Soil materials free of roots 1" in diameter and larger, deleterious matter, debris and rocks over 6" in greatest dimension, and with not more than 15% of the rocks or lumps greater than 2-3/8" in their greatest dimension.

   Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects.

   When the void is below the sub grade for the storm sewer bedding, use suitable earth materials and compact to at least 95% maximum dry density as determined in accordance with ASTM D 698.

   When the void is in the site of the storm sewer trench or open cut, use suitable earth materials and compact to at least 95% maximum dry density as determined in accordance with ASTM D-698.

2. Lower portion of trenches: Deposit backfill and bedding material as shown on the plans in layers of 4" maximum thickness, and compact with suitable tampers to the density of the adjacent soil, or grade as specified herein, until there is a cover of not less than 24" over sewers.

   Do not damage pipe and pipe coatings in backfilling and bedding operations.

   Backfill trenches to the ground surface with selected material approved by the soil engineer.

Reopen trenches that have been improperly backfilled, refill and compact as specified.

3.06 STRUCTURES

A. Construct area drains, manholes catch basins, junction boxes, and headwalls to conform to the details shown on the plans.

B. After the masonry work and/or concrete work has been completed to elevation, the cast iron frames shall be set in a full bed of mortar and adjusted to the elevation shown on the plans.

3.07 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM C 12, ASTM D 2321 or manufacturer's published instructions, and state or local requirements. Seal joints watertight.

B. Install pipe on minimum 4 inch bedding.

C. Lay pipe to slope gradients indicated on Drawings.

D. Install aggregate at sides and over top of pipe. Provide top cover to minimum compacted thickness equal to paving sub-grade indicated on Drawings.

E. Refer to Section 02225 for trenching requirements. Do not displace or damage pipe when compacting.

F. Refer to Section 02634 for manhole requirements.

G. Connect to municipal storm sewer systems, manholes, and inlets as indicated on Drawings.

3.08 INSTALLATION - CATCH BASINS, INLETS, AND JUNCTION BOXES

A. Form bottom of excavation clean and smooth to elevation indicated on Drawings.

B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe to be placed at required elevations.

C. Form and place cast-in-place concrete walls, sleeved at required elevation, to receive storm sewer pipe as indicated on Drawings.

D. Form and place cast-in-place top of structure as indicated on Drawings.

E. Mount grate and frame level, in grout, secured to top section at elevation indicated.

3.09 CONSTRUCTION

A. Interface with Other work: Coordinate the Work with termination of storm sewer connection outside building including connection to municipal storm sewer system.

3.10 FIELD QUALITY CONTROL

A. Site Tests:

1. Perform inspections prior to and immediately after placing bedding.

2. Compaction: As Specified in Section 02225.

a. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

b. Frequency of Tests: One test for each 50 lineal feet of trench.

B. Perform the following tests in accordance with applicable state & local Public Works Department Standard Specifications and requirements.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Monolithic concrete manhole section with the option of monolithic concrete or masonry transition to lid frame, covers, anchorage, and accessories.

2. Modular pre-cast concrete manhole section with tongue-and-groove joints and with the option of pre-cast concrete or masonry transition to lid frame, covers, anchorage, and accessories.

3. Masonry manhole section with masonry transition to lid frame, covers, anchorage, and accessories.

4. The terms Manholes and Junction Boxes are interchangeable.

B. Related Documents: The Contract Documents, as defined in the General Conditions, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

C. Related Sections:

1. Section 02225 – Trench Excavation and Backfill.

2. Section 02630 - Storm Drainage:

3. Section 03300 - Cast-In-Place Concrete:

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C55 - Specification for Concrete Building Brick.

2. ASTM A48 - Specification for Gray Iron Castings.

3. ASTM C478 - Specification for Pre-cast Reinforced Concrete Manhole.

4. ASTM C923 - Specification for Resilient Connectors between Reinforced Concrete Manhole Structures and Pipes.

B. International Masonry Industry All-Weather Council (IMIAC): Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.03 SUBMITTALS

A. Section 01340 - Submittal Procedures: Procedures for submittals.

1. Product Data: Data for manhole covers, manhole steps, component construction, features, configuration, and dimensions.

2. Shop Drawings: Drawings of manhole locations, elevations, piping with sizes, locations, and elevations of penetrations.

1.04 PROJECT CONDITIONS OR SITE CONDITIONS

A. Environmental Requirements:

1. Cold Weather Requirements: IMIAC - Recommended Practices and Specifications for Cold Weather Masonry Construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manhole Section: Reinforced pre-cast concrete. in accordance with ASTM C 478 with gaskets in accordance with ASTM C 923.

1. Construct manholes of pre-cast concrete sections as required by Drawings to size, shape, and depth indicated, but never less than 4 foot 0 inch inside diameter.

B. Manhole Section: Non-reinforced cast-in-place concrete as specified in Section 03300.

1. Cast-in place Manholes shall be constructed of 3500 psi concrete.

2. Forms shall be made of steel sheets accurately shaped and fabricated of sufficient strength to form dense watertight walls to true dimensions.

3. Concrete shall be deposited in evenly distributed layers of about 18 inches, with each layer vibrated to bond it to the preceding layer.

C. Concrete Brick Units: ASTM C 55, Grade N Type I- Moisture Controlled, normal weight, of same Grade, Type and weight as block units, nominal modular size of 3 5/8 x 7 5/8 x 2 1/4 inches.

D. Mortar and Grout: Mortar for finishing and sealing shall be Class "C". Honeycombing less than 2 inches deep shall be repaired using Class "D" mortar.

E. Brick Transition Reinforcement: Formed steel 8 gage wire with galvanized finish.

2.02 COMPONENTS

A. Lid and Frame: ASTM A 48, Class 30B Heavy Duty Cast iron construction, machined flat bearing surface, removable lid, closed or open as indicated on Drawings; sealing gasket; manufactured by Neenah Foundry Company.

B. Manhole Steps: Neenah Foundry Company catalog No. R- 1982-F for precast or catalog No. R-1980-0 for brick/cast-in-place manholes or M.A. Industries PS-1.

C. Base Pad: Cast-in-place concrete as specified in Section 03300.

2.03 CONFIGURATION

A. Manhole Section Construction: Concentric with eccentric cone top section.

B. Shape: Cylindrical.

C. Clear Inside Dimensions: 48-inch diameter or as indicated on Drawings.

D. Design Depth: As indicated on Drawings.

E. Clear Lid Opening: 24-inches minimum.

F. Pipe Entry: Provide openings as indicated on Drawings.

G. Main and Lateral Pipes: Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls, and point up irregularities and rough edges with non-shrinking grout.

H. Inverts: Shape inverts for smooth flow across structure floor as shown on Drawings. Use concrete and mortar to obtain proper grade and contour and finish surface with fine textured wood float.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

B. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves as indicated on Drawings for drainage system piping specified in Section 02630

3.03 PLACING PRE-CAST MANHOLE SECTIONS

A. Place base pad to proper elevation and location and trowel top surface level for placement of manhole section.

B. Place manhole section plumb and level to correct elevations and anchor to base pad.

1. After completion of slab foundation, the first joint of manhole section shall be lowered into position, grooved end first, and set level and plumb on concrete base. Align and adjust to proper grade prior to placing and forming invert which shall be poured immediately after setting of first section of manhole section.

2. Prior to setting subsequent manhole sections, apply primer to tongue and groove ends and allow to set in accordance with manufacturer recommendations. Place "Ram-nek", or equivalent, plastic rope on tongue end. Lower next section into position, and remove excess material from interior of structure. Add additional material on exterior of joint, if necessary, for completely watertight joint.

3.04 MASONRY MANHOLE SECTION CONSTRUCTION

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Lay masonry units in running bond. Course 3 brick units and 3 mortar joints to equal 8 inches.

C. Form flush mortar joints.

D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

E. Install joint reinforcement 16 inches on center

F. Place joint reinforcement in first and second horizontal joints above base pad and below lid frame opening.

G. As work progresses, build-in fabricated metal items.

H. Cut and fit masonry for pipes as specified herein.

I. Set cover frames and covers level without tipping, to correct elevations.

J. Grout base of shaft section to achieve slope to exit piping. Trowel smooth. Contour as required.

K. Coordinate with other sections of Work to provide correct size, shape and location.

3.05 BACKFILLING

A. Backfill around manholes as specified in Section 02225.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Bituminous concrete paving.

2. Surface course.

3. Binder course.

4. Paving base course.

B. Related Documents: The Contract Documents, as defined in the General Conditions, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

C. Bituminous Concrete Paving shall comply with all requirements of Georgia DOT Standard Specifications Current Edition, Section 400 (Hot-Mix, Asphalt Concrete Construction and Related Material Sections, GDOT Standard Specifications will govern should there be any discrepancy between this Section and GDOT Standards.

D. Related Sections:

1. Section 02765 - Pavement Markings: Painted pavement markings.

1.02 REFERENCES

A. Asphalt Institute (AI):

1. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.

2. AI MS-3 - Asphalt Plant Manual.

3. AI MS-8 - Asphalt Paving Manual.

4. AI MS-19 - Basic Asphalt Emulsion Manual.

B. American Society for Testing and Materials (ASTM):

1. ASTM D 242 - Specification for Mineral Fiber for Bituminous Paving Mixtures.

2. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 Pound Rammer and 12 inch Drop.

3. ASTM D 1188 - Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens.

4. ASTM D 1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 Pound Rammer and 18 inch Drop.

5. ASTM D 1559 - Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

6. ASTM D 2397 - Specification for Cationic Emulsified Asphalt.

7. ASTM D 2399 - Practice for Selection of Cutback Asphalt.

8. ASTM D 2726 - Test Method for Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens.

9. ASTM D 3381 - Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.

10. ASTM D 3549 - Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.

11. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

C. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO T 88 - Mechanical Analysis of Soils.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Provide asphalt-aggregate mixture as recommended by local or state paving authorities to suit project conditions. Use locally available materials and gradations that meet standard state highway specifications and exhibit satisfactory records of previous installations.

1.04 SUBMITTALS

A. Section 01340 - Submittal Procedures: Procedures for submittals.
   1. Assurance/Control Submittals:

      a. Design Data:

         1) Submit design mix following format indicated Asphalt Institute Manual MS-2, Marshall Stability Method; including type/name of mix, gradation analysis, grade of asphalt cement used, Marshall Stability (pounds), flow, effective asphalt content (percent), and direct references to applicable state highway department specification sections for each material.

         2) Provide design mixture listed in current edition of applicable state highway department specifications.

         3) Use mix designs prepared within 3 years maximum.

         4) Provide documentation of state highway limitations, if any, on use of recycled content materials.

      b. Certificates: Submit materials certificate to Testing Laboratory signed by material supplier and Contractor, certifying that materials comply with, or exceed, the requirements specified herein.

      c. Qualification Documentation: Paving installer documentation of experience indicating compliance with specified qualification requirements.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with AI MS-8

B. Installer Qualifications: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

C. Regulatory Requirements:

   1. Conform to applicable requirements for paving work on public property.

2. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Use temporary striping, flagmen, barricades, warning signs, and warning lights as required.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Jobsite Requirements:

1. Apply prime and tack coats when ambient temperature is above 40 degrees F, and when temperature has been above 35 degrees F for 12 hours immediately prior to application. Do not apply when base is wet, contains excess moisture, or during rain.

2. Construct bituminous concrete paving when atmospheric temperature is above 40 degrees F.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Resource Management:

1. Recycled Content: Provide aggregate fabricated from recycled rubble or concrete. Provide asphalt cement fabricated from recycled content asphalt.

PART 2 PRODUCTS

2.01 MATERIALS

A. Base Course: As indicated on Drawings, complying with applicable state highway specifications regarding source, quality, gradation, liquid limit, plasticity index and mix proportioning.

1. Unless otherwise specified in applicable state highway specifications, provide base course aggregate fabricated from minimum 30 percent recycled rubble or concrete.

B. Asphalt Cement: Refer to GDOT Standard Specification Section 400.

2.02 EQUIPMENT

A. Maintain equipment in satisfactory operating condition and correct breakdowns in a manner that will not delay or be detrimental to progress of paving operations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of existing conditions before starting work.

B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to for earthwork operations to begin.

1. Verify gradients and elevations of base are correct, and base is dry.

C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 BASE COURSE PLACEMENT

A. Perform base course construction in a manner that will drain surface properly at all times and at the same time prevent runoff from adjacent areas from draining onto base course construction.

B. Compact base material to not less than 98 percent of optimum density as determined by ASTM D 698 or 95 percent of optimum density, as determined by ASTM D 1557, unless otherwise indicated on the Drawings.

C. Granular Base: Construct to thickness indicated on Drawings. Apply in lifts or layers not exceeding 8 inches, measured loose.

D. Sand/Shell Base: Construct to thickness indicated on Drawings. Apply in lifts or layers not exceeding 4 inches, measures loose.

E. Asphalt Institute Type IV Mix for Full Depth Asphalt Base: Construct to thickness indicated on Drawings in lifts or layers not exceeding 3 inches, measured loose.

F. Asphalt Institute Type VI, VII, or VIII Mixes for Hot-Mix Sand Asphalt Bases: Construct to thickness indicated on Drawings. Apply in lifts or layers not exceeding 3 inches, measured loose.

G. Soil Cement Stabilized Base: Construct to thickness and strength as indicated on Drawings and in accordance with applicable state highway specifications. If not indicated on the Drawings, the minimum compressive strength shall be 500 pounds per square inch, tested at 28 days.

3.03 APPLICATIONS

A. Prime Coat:

1. Apply bituminous prime coat to all base material surfaces where bituminous concrete paving will be constructed.

2. Apply bituminous prime coat in accordance with applicable state highway specifications.

3. Apply at minimum rate of 0.25 gallon per square yard over compacted base material. Apply to penetrate and seal, but not flood surface.

4. Make necessary precautions to protect adjacent areas from overspray.

5. Cure and dry as long as necessary to attain penetration of compacted base and evaporation of volatile substances.

B. Tack Coat:

1. Apply to contact surfaces of previously constructed bituminous concrete base courses or portland cement concrete and surfaces abutting or projecting into bituminous concrete or into bituminous concrete pavement.

2. Apply tack coat to bituminous concrete base course or sand asphalt base course. Apply emulsified asphalt tack coat between each lift or layer of full depth bituminous concrete and sand asphalt bases and on surface of all such bases where bituminous concrete paving will be constructed.

3. Apply emulsified asphalt tack coat in accordance with applicable state highway specifications.

4. Apply at minimum rate of 0.05 gallon per square yard of surface.

5. Allow to dry until at proper condition to receive paving.

3.04 BITUMINOUS CONCRETE PLACEMENT

A. Place bituminous concrete mixture on completed compacted sub grade surface, spread, and strike off. Spread mixture at following minimum temperatures:

1. When ambient temperature is between 40 degrees F and 50 degrees F, mixture temperature equal to 285 degrees F.

2. When ambient temperature is between 50 degrees F and 60 degrees F, mixture temperature equal to 280 degrees F.

3. When ambient temperature is higher than 60 degrees F, mixture temperature equal to 275 degrees F.

B. Whenever possible, all pavement shall be spread by a finishing machine; however, inaccessible or irregular areas may be placed by hand methods. The hot mixture shall be spread uniformly to the required depth with hot shovels and rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for use on asphalt mixtures. Loads shall not be dumped faster that they can be properly spread. Workers shall not stand on the loose mixture while spreading.

C. Paving Machine Placement: Apply successive lifts of bituminous concrete in transverse directions with the surface course placed in the direction of surface-water flow. Place in typical strips not less than 10 feet wide.

D. Joints: Make joints between old and new pavements, or between successive days and work in a manner that will provide a continuous bond between adjoining work. Construction joints shall have same texture, density, and smoothness as other sections of bituminous concrete course. Clean contact surfaces of all joints and apply tack coat.

3.05 ROLLING AND COMPACTION

A. The mixture, after being spread, shall be thoroughly compacted by rolling as soon as it will bear the weight of the rollers without undue displacement. The number, weight, and types of rollers and sequences of rolling operations shall be such that the required density and surface are consistently attained while the mixture is in a workable condition.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling with hot material.

D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot bituminous concrete. Compact by rolling to maximum surface density and smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.06 CONSTRUCTION

A. Site Tolerances:

1. Paving Surface Smoothness: Maximum allowable 10 foot straightedge tolerance for smoothness.

a. Base Course Surface: 1/4 inch.

b. Wearing Surface Course: 3/16 inch.

3.07 FIELD QUALITY CONTROL

A. Site Tests:

1. Paving Base Course: Perform testing of in-place base courses for compliance with requirements for thickness, compaction, density, and tolerance.

a. Moisture/Density Test: ASTM D 698 or ASTM D 1557.

b. Mechanical Analysis Test: AASHTO T-88.

c. Plasticity Index Test: ASTM D 4318.

d. Base Material Thickness Test: Minimum one test for every 20,000 square feet.

e. Base Material Compaction Test: Minimum one test for every 20,000 square feet.

f. Field Density Tests: Perform testing of in-place base courses for compliance with requirements for density using one of the following methods:
   1) Sand-cone Method: ASTM D 1556.
   2) Balloon Method: ASTM D 2167.
   3) Nuclear Method: ASTM D 2922, Method B (Direct Transmission).

g. Test each source of base material for compliance with applicable state highway specifications.

2. Asphalt Concrete Paving: Perform testing of in-place asphalt concrete paving courses for compliance with requirements for thickness, compaction, and surface smoothness.

   a. Thickness: ASTM D 3549; Thickness shall not be less than thickness specified on Drawings.

   b. Surface Smoothness: Testing shall be performed on the finished surface of each asphalt paving course using 10 foot straightedge applied parallel with, and at right angles to centerline of paved areas. Smoothness shall not be less than tolerances specified herein.

3. Compaction: Field density test for in place materials shall be performed by examination of field cores in accordance with one of the following standards:

   a. Bulk Specific Gravity of Paraffin-Coated Specimens: ASTM D 1188, minimum one core per 20,000 square feet.
      1) Standard Duty Areas: Minimum 3 cores.
      2) Heavy Duty Areas: Minimum 3 cores.

b. Bulk Specific Gravity Using Saturated Surface-Dry Specimens: ASTM D 2726, minimum one core per 20,000 square feet.

1) Standard Duty Areas: Minimum 3 cores.

2) Heavy Duty Areas: Minimum 3 cores.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Painted pavement markings.

B. Related Documents: The Contract Documents, as defined in the General Conditions, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in Georgia DOT Standards Specification Section 652 and related specifications. Georgia DOT Standard Specifications will govern should there be any discrepancy between this section and GDOT Standards.

C. Related Sections:

1. Section 02743 - Bituminous Concrete Paving: Asphalt paving substrate for marking application.

1.02 SUBMITTALS

A. Section 01340 - Submittal Procedures: Procedures for submittals.

1. Product Data: Technical data sheets indicating manufacturer's catalog number, paint type description, and VOC content for each paint type specified.

2. Assurance/Control Submittals:

a. Certificates: Manufacturer certificate that Products meet or exceed specified requirements.

b. Test Reports: Manufacturer Material Safety Data Sheets (MSDS) for each paint type specified.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: Provide paint materials that conform to Federal, State, and local restrictions for Volatile Organic Compounds (VOC) and lead-free content.

1.04 DELIVERY, STORAGE AND HANDLING

A. Product Requirements: Transport, handle, store, and protect products.

B. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and/or reducing.

C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's published instructions.

1.05 PROJECT CONDITIONS OR SITE CONDITIONS

A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize flagmen, barricades, warning signs and warning lights as required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with project requirements, manufacturers offering specified Products that may be incorporated into the Work include the following:

1. Devoe and Raynolds Company, Louisville, KY (502) 897-9861.

2. Glidden Coatings and Resins, Cleveland, OH (216) 344-8000.

3. Sherwin-Williams Company, Cleveland, OH (800) 321-8194.

2.02 MATERIALS

A. Ready-mixed; pigments fully ground maintaining a soft paste consistency, capable of readily and uniformly dispersing to a complete homogeneous mixture providing good flowing and brushing properties capable of drying or curing free of streaks or sags. Dry to traffic and touch in 2 hours.

B. Traffic Paint: Flat, Water Base, Acrylic.

1. 1st Coat:

   a. Devoe: Traffic-Line Interior-Exterior Water Based Traffic Marking Paint, 416XX; MDF 7 mils.

   b. Glidden: Ultra Hide Waterbased Traffic Paint, MDF 7 mils.

   c. Sherwin-Williams: Setfast Vinyl Acrylic Waterborne Traffic Marking Paint, MDF 7 mils

2. 2nd Coat:

   a. Devoe: Traffic-Line Interior-Exterior Water Based Traffic Marking Paint, 416XX; MDF 7 mils.

   b. Glidden: Ultra Hide Waterbased Traffic Paint, MDF 7 mils.

   c. Sherwin-Williams: Setfast Vinyl Acrylic Waterborne Traffic Marking Paint, MDF 7 mils

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of existing conditions before starting work.

B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 PREPARATION

A. Sweep pavement and surfaces to receive paint markings clean of dust and dirt.

B. Clean surfaces free of glaze and grease, road film, and other foreign materials.

C. Where existing pavement markings are indicated on Drawings to be removed or would interfere with the adhesion of new paint, use a motorized abrasive device to remove existing markings.

1. Use equipment that will not damage existing paving or create surface hazardous to vehicle or pedestrian traffic.

2. Use marking removal methods approved by governing authority having jurisdiction in areas within public rights-of-way.

3.03 APPLICATION

A. Apply paint products in accordance with manufacturer's published instructions using application procedures approved for the particular application and substrate to the specified Minimum Dry Film Thickness (MDF). Apply each coat to uniform finish.

B. Do not apply paint markings on surfaces that are not dry and if rain is expected within 24 hours.

C. Do not apply paint markings when surface or air temperature is below 50° F.

D. Apply 2 coats at manufacturer recommended rate without addition of thinner, with maximum 100 square feet per gallon coverage. Apply with mechanical equipment to produce uniform straight edges. At sidewalk curbs and crosswalks, use straightedge to provide uniform, clean, and straight stripe.

3.04 PAINT MARKING SCHEDULE

A. Paint the following items with colors indicated below:

1. Pedestrian Crosswalks: White.

2. Lane Striping Where Separating Traffic in Opposite Directions: Yellow.

3. Lane Striping Where Separating Traffic in Same Direction: White.

4. Stop Bars: White

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

This section of the Specifications describes the products, materials and labor necessary to construct the concrete curb and gutter shown on the plans.

PART 2 PRODUCTS

A. Materials: The following describes materials to be used.

1. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

   Use flexible spring steel forms or laminated boards to form radius bends as required.

   Coat forms with a non-straining form release agent that will not discolor or deface surface of concrete.

2. Concrete Mix, Design and Testing: Design mix to product normal-weight concrete consisting of portland cement, aggregate, air-entraining mixtures and water to produce the following properties:

   Compressive Strength: 3000 psi

   Compressive Strength is required at a minimum 28 days, unless otherwise noted.

   Slump Range: 3" for all concrete

   Air Content: 5% to 8%

PART 3 EXECUTION

A. Surface Preparation

1. Remove loose material from compacted sub base surface immediately before placing concrete.

2. Proof-roll prepared sub base surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and area ready to receive paving.

B. Form Construction: Set forms to required grades and lines with gutter pitched to drain in locations indicated by the grades shown on the plans. Rigidly brace and secure all forms. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

Check completed formwork for grade and alignment to following tolerances:

Top of forms not more than 1/8" in 10'.

Vertical face on longitudinal axis, not more than 1/4" in 10'.

Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

C. Concrete Placement:

1. Do not place concrete until sub base and forms have been checked for line and grade. Moisten sub base if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

2. Place concrete using methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocation of joint devices.

   Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

   Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2-hour, place a construction joint.

3. Curbs and Gutters: Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed minimum specified. Machine placement must product curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed

concrete as specified.

4. Joints:

   a. General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

      When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

   b. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints at 15 feet on center. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

      1). **Tooled Joints:** Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.

      2). **Inserts:** Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.

   c. Construction Joints: Place construction joints at end of placements and at locations when placement operations are stopped for a period of more than 1/2-hour, and at every third contraction joint.

      Construct joints as shown or, if not shown, use standard metal keyway-section forms.

      Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.

   d. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.

5. Concrete Finishing: After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architects.

6. Repairs and Protections:

   a. Repair or replace broken or defective concrete, as directed by Engineer.

   b. Allow testing company to drill test cores where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

   c. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

      Sweep concrete curb and gutter and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

A. The Contractor shall furnish all labor, materials, equipment and miscellaneous items as necessary for the installation of a complete chain link fence system around the headworks and plant site. Fencing shall be installed in the location as shown on the Drawings in complete conformity with the manufacturer's written recommendations and as specified herein.

B. Security fencing for the Contractor is at Contractor's option and is not included as part of the work specified.

C. Gate Schedule:

Location/Description	Size/Type (width)	Units
Walk Gate at Building	4' single swing	1 each
Gate at Bill Conn Pkwy. (Spec Section 2822)_	26' slide gate with smart operator	1 each
Gate at Railroad St. (Spec Section 2822)	16' slide gate with smart operator	1 each

1.2 DELIVERY AND HANDLING

A. Deliver materials with the manufacturer's tags and labels intact.

B. Handle and store materials in such a manner that will avoid damage.

1.3 STORAGE AND PROTECTION

A. Provide storage and protection in accordance with the manufacturer's requirements.

1.4 QUALITY ASSURANCE

A. Standards of manufacturer shall comply with the standards of the Chain Link Manufacturers Institute and these Specifications.

B. Provide fencing as a complete unit produced by a single manufacturer including the required erection accessories, fittings and fasteners.

PART 2 PRODUCTS

2.1 GENERAL

A. Overall height for new fencing shall be seven feet including three strands of barbed wire on malleable iron post tops. Posts shall be set at no more than 10 foot centers, a full three feet deep in concrete footings, poured the full size of the holes as excavated. Corner posts shall have the necessary strut and tie bracing. Gates shall be provided of the size and at the locations indicated on the Drawings.

B. Where fencing crosses ditches, steep grades, and other unusual conditions, make special provisions to ensure that the security, appearance, maintainability and permanence of the standard fencing are equalled or exceeded.

2.2 MATERIALS AND CONSTRUCTION

A. Fence Mesh: 9-gauge wire, woven to 2-inch squares, galvanized after weaving, six-foot-wide roll. Continuous tension wire shall be provided at the lower edge of the mesh.

B. Line Post: 2-1/2-inch O.D. Galvanized Pipe (3.65 #/ft.).

C. Corner Post: 3-inch O.D. Galvanized Pipe (5.79 #/ft.).

D. Gate Post: 4-inch O.D. Galvanized Pipe (9.11 #/ft.).

E. Top Rail: 1-5/8-inch O.D. Galvanized Pipe (2.27 #/ft.) with extra long pressed steel sleeves.

F. Gates shall be supplied with heavy-duty latches, keepers and heavy duty hardened bronze padlocks with duplicate keys.

G. Gate Frames: 2-inch O.D. Galvanized Pipe Frame (2.72 #/ft.).

H. Barbed wire shall consist of three strands of 12-gauge wire, with 4-point pattern barbs, galvanized after weaving.

I. Concrete shall be furnished in accordance with the requirements shown in Section 03300 of these Specifications.

PART 3 EXECUTION

3.0 INSTALLATION

A. Fence installation shall not be started before the final grading is completed, with finish grade elevations established, unless otherwise permitted.

B. Excavation: Drill holes of diameters and spacings shown, for post footings in firm, undisturbed or compacted soil.

1. Excavate holes to the minimum diameters as recommended by fence manufacturer.

2. Excavate hole depths approximately 3-inches lower than the post bottom, with bottom of posts set not less than 36-inches below the surface when in firm, undisturbed soil.

3. If solid rock is encountered near the surface, drill into rock at least 12-inches for line posts and at least 18-inches for end, pull corner, and gate posts. Drill hole at least 1-inch greater diameter than the largest dimension for the post to be placed. If solid rock is below soil overburden, drill to full depth required. Penetration into rock need not exceed the minimum depths specified above.

C. Setting Posts: Remove loose and foreign materials from sides and bottoms of holes and moisten soil prior to placing concrete.

1. Center and align posts in holes 3-inches above bottom of excavation.

2. Place concrete around posts in a continuous pour and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.

3. Trowel finish tops of footings and slope of dome to direct water away from posts. Extend footings for gate posts to the underside of bottom hinge. Set keeps, stops, sleeves and other accessories into concrete as required.

4. Grout-in posts set into sleeved holes, concrete constructions or rock excavations with non-shrink Portland cement grout or other acceptable grouting material.

D. Concrete Strength: Allow concrete to attain at least 75 percent of its minimum 28-day compressive strength, but in no case sooner than seven days after placement, before rails, tension wires, barbed wire or fabric is installed. Do not stretch and tension fabric and wires and do not hang gates until the concrete has attained its full design strength.

E. Top Rails: Run rail continuously through post caps or extension arms, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.

F. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.

G. Tension Wire: Install tension wires by weaving through the fabric and tying to each post with not less than 6-gauge galvanized wire or by securing the wire to the fabric.

H. Fabric: Pull fabric taut and tie to posts, rails and tension wires. Install fabric on security side of fence and anchor to framework so that fabric remains in tension after pulling force is released.

I. Repair damaged coatings in the shop or during field erection by recoating with manufacturer's recommended repair compound, applied per manufacturer's directions.

J. Stretcher Bars: Thread through or clamp to fabric 4-inches on center and secure to posts with metal bands spaced 15-inches on center.

K. Barbed Wire: Install three parallel wires on each extension arm; on security side of fence, unless otherwise indicated. Pull wire taut and fasten securely to each extension arm.

L. Tie Wires: Use U-shaped wire appropriate for the diameter of pipe. Attach pipe and fabric firmly with tie wire ends twisted at least two full turns. Bend ends of wire to minimize hazard to persons or clothing.

M. Fasteners: Install nuts for tension band and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.2 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all debris and equipment. Repair all damage resulting from new chain link fence system installation or relocation.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

The Contractor shall provide all labor, materials, and appurtenances necessary for the installation of the chain link cantilever gate system and operator defined herein at the main access location.

1.2 Related Work

A. Spec Section 02204 – Earthwork

B. Spec Section 03300 - Concrete

1.3 SYSTEM DESCRIPTION

The manufactured shall supply a total high security cantilever gate system similar to the Ameristar TransPort Link with bard-wire extension. The system shall include all components (i.e., tracks, uprights, bracing, hardware fittings, and fasteners) required for a complete installation.

1.4 Acceptable Gate Manufacturers

A. Ameristar Fence Co.

B. Wallace Perimeter Security ALPHA CLF

C. An approved equal

Acceptable Operator Manufacturers

A. Lift Master

B. Slide Smart by HySecurity

C. An approved equal

1.5 QUALITY ASSURANCE

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.6 REFERENCES

- **ASTM A653/A653M** – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

- **ASTM B117** – Practice for Operating Salt-Spray (Fog) Apparatus
- **ASTM B221** – Aluminum and Aluminum Alloy Extruded Bars, Shapes and Tubes
- **ASTM D523** – Test Method for Specular Gloss
- **ASTM D714** – Test Method for Evaluating Degree of Blistering in Paint
- **ASTM D1654** – Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- **ASTM D2244** – Test Method for Calculations of Color Differences for Instrumentally Measured Color Coordinates
- **ASTM D2794** – Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
- **ASTM D3359** – Test Method for Measuring Adhesion by Tape Test
- **ASTM D6695** – Standard Practice for Xenon-Arc Exposures of Paint and Related Coatings

1.07 SUBMITTAL

The manufacturer's submittal package shall be provided prior to installation

1.08 PRODUCT HANDLING AND STORAGE

Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

PART 2 MATERIALS

2.01 GATE MANUFACTURER

Chain link cantilever gate shall be equal to the Ameristar TransPort Link gate system (with barb-wire extension), manufactured by Ameristar Perimeter Security Inc., in Tulsa, Oklahoma or an approved equal. The project main gate shall include the following:

Gate 1	Gate 2
Nominal opening size 26'	Nominal opening size 16'
Nominal height 6' with barb-wire extension	Nominal height 6' with barb-wire extension
Gate travel – Right viewed from outside	Gate travel – Right viewed from outside

2.02 GATE MATERIAL

A. The materials used for cantilever gate framing (uprights and diagonal bracing) shall be manufactured from **ASTM B221** aluminum (designation 6063-T-6) with yield strength of 25,000 PSI, a tensile strength of 30,000 PSI and a standard mill finish. The TransPort enclosed tracks shall be manufactured from ASTM B221 aluminum (designation 6063-T-6) with yield strength of 25,000 PSI, a tensile strength of

30,000 PSI and a standard mill finish.

B. Material for gate in-fill shall be chain link fabric meeting the wire mesh material and size specified for corresponding chain link fence.

C. Material for gate uprights and diagonal bracing shall be 2" square x ¼" wall aluminum. The cross-sectional shape of eth top and bottom enclosed-track shall confirm to the manufacturers Fast-Trak design with a single extrusion consisting of a 2" x 5" channeled support with integrated 2" x 2" enclosed-track raceway.

D. Steel material for fence posts shall be galvanized prior to forming in accordance with the requirements of **ASTM A653/A653M**, with minimum yield strength of 45,000 psi (310 MPa). The steel shall be hot-dip galvanized to meet the requirements of **ASTM A653/A653M** with a minimum zinc coating weight of 0.90 oz/ft^2 (276 g/m^2), Coating Designation G-90. Material for gate support posts shall be 4" square x 11 Ga tubing.

E. Suspension Rollers for top and bottom tracks shall be used at each support post to track connection. Each truck assembly shall be capable of being adjusted vertically via threaded rod for fine-tune adjustments. Truck assembly shall be constructed in a way so that the primary housing for the truck rollers shall pivot via ball-bearing connection to threaded rod.

2.03 GATE FABRICATION

A. Gate frame uprights and diagonal bracing shall be pre-fabricated and pre-punched to accept frame fasteners. Enclosed track shall be pre-punched to accept gate uprights. Posts shall be precut to specified lengths.

B. Enclosed track extrusions shall be mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Diagonal bracing shall me mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Chain link fabric shall be attached to gate uprights with tension-bands.

C. The manufactured gate components shall be subjected to the Ameristar thermal stratification coating process (high-temperature, in-line, multi-stage, and multi-layer) including, as a minimum, a six-stage pretreatment/wash and an electrostatic spray application of a polyester finish. The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm).

2.04 OPERATOR

Operator shall be light commercial grade slide gate similar to LiftMaster RSLI2UL with battery backup, gate real time alerts and a security control. The operator shall meet the

following specifications:

Usage Classification	Class II or III
Main AC Supply	120 Vac, Phase 1 (6.5 Amps including Accessory Outlets)
System Operating Voltage	12 Vdc Battery Run/Battery Backup
Accessory Power	12 Vdc, 500mA max. for ON + SW (switched)
Solar Power Max	12 Vdc at 30 watts max
Maximum Gate Weight	800 lbs (363.6 kg)
Minimum Gate Travel Distance	16 feet (7.62 m)
Maximum Gate Travel Distance	50 feet (15.24 m)
Maximum Gate Travel Speed	1.75 feet/second
Maximum Daily Cycle Rate	120 cycles/day
Maximum Duty Cycle	Continuous
Operating Temperature	Without Heater: -20°C to 60°C (-4°F to 140°F)
Expansion Temperature	Yes
External Entrapment Protection Device Inputs (non-contact and/or contact)	Main board – up to 2 close entrapment protection devices and 1 open entrapment protection device. Expansion board – up to 3 entrapment protection devices configurable to either close or open and up to 4 edge sensors using wireless edge sensor kit.
Limit & Force Adjustment	Yes
Remote Controls	3 units with visor clip (3-button: open, close and stop)
Internet Gateway	Yes, Software Account by User Ethernet Cable to Router at Control Building
Keyless Entry Pad	4-Digit Code (outside)
Warranty	3 year (limited) minimum
Installation	By manufacturer certified technician with entrapment protection (2 zones) and startup instruction.

PART 3 EXECUTION

3.01 PREPARATION

All new installation shall be laid out by the contractor in accordance with the construction plans.

3.02 GATE INSTALLATION

A. Cantilever support posts shall be set in concrete footers having a minimum depth of 48". The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only is shown by engineering analysis to be sufficient in strength for the intended application.

B. Gate to be installed per manufacturers gate installation instructions. Gate shall be installed in compliance with **ASTM F2200** standards.

3.03 GATE INSTALLATION MAINTENANCE

When cutting/drilling posts adhere to the following steps to seal the exposed steel surfaces

A. Remove all metal shavings from cut area

B. Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry

C. Apply 2 coats of custom finish paint matching fence color

3.04 GATE INSTALLATION

Gate posts shall be spaced according to the manufacturers' drawings, dependent on clear opening. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by eth manufacturer of the gate and shall be installed per manufacturer's recommendations.

3.05 OPERATOR INSTALLATION

Operator Installation shall meet manufacturer requirements and include a 1-day start-up instruction.

3.06 CLEANING

The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Seeding, planting grass, and fertilizing graded areas behind the structures, pipeline rights-of-way, roadway shoulders and other disturbed areas.

B. Seed protection.

C. Maintaining seeded areas until final acceptance.

1.02 RELATED WORK

A. Section 02125 – Erosion and Sedimentation Control

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging and location of packaging. Damaged packages are not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Damaged bags are not acceptable.

C. Deliver sod on pallets.

D. All material shall be acceptable to Engineer prior to use.

1.04 PLANTING DATES

A. This specification provides for the establishment of a permanent grass cover between the dates of March 1 and September 30. If finished earth grades are not completed in time to permit planting and establishment of the permanent grass during the favorable season between the dates specified above unless otherwise accepted, the Contractor will be required to plant a temporary cover to protect the new graded areas from erosion and to keep windborne dust to a minimum. The temporary cover shall be planted between October 1 and February 28 unless otherwise permitted.

PART 2 PRODUCTS

2.05 SOD

A. Sod shall be densely rooted, good quality centipede grass, tree from noxious weeds. The sod shall be obtained from areas where the soil is reasonably fertile. The sod shall be raked tree of all debris and the grass mowed to two inches before cutting. The sod shall contain practically all of the dense root system and not be less than one (1) inch thick. Sod shall be cut in uniform strips not less than twelve (12) inches in width and not less than twenty-four (24) inches in length.

2.06 ACCESSORIES

A. Straw Mulch: Oat or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition.

B. Excelsior Mulch: Excelsior mulch shall consist of wood fibers cut from sound, green timber. The average length of the fibers shall be 4 to 6 inches. The cut shall be made in such a manner as to provide maximum strength of fiber, but at a slight angle to the natural grain of the wood so as to cause splintering of the fibers when weathering in order to provide adherence to each other and to the soil.

C. Wood cellulose fiber shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form a homogenous slurry. The mulch fibers shall intertwine physically to form a strong moisture holding mat on the ground surface and allow rainfall to percolate into the underlying soil. The mulch shall be heat processed so as to contain no germination or growth-inhibiting factors. It shall be dyed (non-toxic) an appropriate color to facilitate metering of material.

2.07 PRODUCT REVIEW

A. The Contractor shall provide the Engineer with a complete description of all products before ordering. The Engineer will review all products before they are ordered.

PART 3 EXECUTION

3.01 PREPARATION

A. The areas to be seeded shall be made smooth and uniform and shall conform to the finished grade indicated on the plans.

B. Remove foreign materials, plants, roots, stones, and debris from surfaces to be seeded.

C. Grassing areas, if not loose, shall be loosened to a minimum depth of 3-inch before fertilizer, seed or sod is applied.

3.02 STAND OF GRASS

A. Before acceptance of the seeding performed for the establishment of permanent vegetation, the Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of re-establishment in the spring.

B. Before acceptance of the seeding performed for the establishment of temporary vegetation, the Contractor will be required to produce a stand of grass sufficient to control erosion for a given area and length of time before the next phase of construction or the establishment of permanent vegetation is to commence.

3.03 SEEDING DATES

A. Seeding shall be performed during the periods and at the rates specified in the seeding schedules. Seeding work may, at the discretion of the Contractor, be performed throughout the year using the schedule prescribed for the given period. Seeding work shall not be conducted when the ground is frozen or excessively wet. The Contractor will be required to produce a satisfactory stand of grass regardless of the period of the year the work is performed.

3.04 APPLYING LIME AND FERTILIZER

A. Following advance preparation and placing selected material for shoulders and slopes, lime, if called for based on soil tests and fertilizer, shall be spread uniformly over the designated areas and shall be thoroughly mixed with the soil to a depth of approximately 2-inches. Fertilizer shall be applied at the rate of 500 pounds per acre for the initial application unless otherwise directed by the Engineer. Lime shall be applied at the rate determined by the soil test. Unless

otherwise provided, lime will not be applied for temporary seeding. In all cases where practicable, acceptable mechanical spreaders shall be used for spreading fertilizer. On steep slopes subject to slides and inaccessible to power equipment, the slopes shall be adequately scarified. Fertilizer may be applied on steep slopes by hydraulic methods as a mixture of fertilizer and seed. When fertilizer is applied with combination seed and fertilizer drills, no further incorporation will be necessary. The fertilizer and seed shall be applied together when Wood Cellulose Fiber Mulch is used. Any stones larger than 2-1/2 inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

3.05 SEEDING

A. Seed shall be sown within 24 hours following the application of fertilizer and lime and preparation of the seedbed as specified in Section 3.4. Seed shall be uniformly sown at the rate specified by the use of acceptable mechanical seed drills. Rotary hand seeders, power sprayers or other satisfactory equipment may be used on steep slopes or on other areas that are inaccessible to seed drills.

B. The seeds shall be covered and lightly compacted by means of cultipacker or light roller if the drill does not perform this operation. On slopes inaccessible to compaction equipment, the seed shall be covered by dragging spiked chains, by light harrowing or by other satisfactory methods.

C. Apply water with fine spray immediately after each area has been sown.

D. Do not sow seed when ground is too dry, during windy periods or immediately following a rain.

E. If permitted by the special provisions, wood cellulose fiber mulch or excelsior fiber mulch may be used.

3.06 SEED PROTECTION (STRAW MULCH)

A. All seeded areas seeded with permanent grasses shall be uniformly mulched in a continuous blanket immediately following seeding and compacting operations, using at least 2 tons of straw per acre.

3.07 SEED PROTECTION (EXCELSIOR MULCH)

A. Seed shall be sown as specified in Section 3.5. Within 24 hours after the covering of seed, excelsior mulch shall be uniformly applied at the rate of 2 tons per acre. The mulch may be applied hydraulically or by other acceptable methods. Should

the mulch be placed in a dry condition, it shall be thoroughly wetted immediately after placing. The Engineer may require light rolling of the mulch to form a tight mat.

3.08 SEED PROTECTION (WOOD CELLULOSE FIBER MULCH)

A. After the lime has been applied and ground prepared as specified in Section 3.4, wood cellulose fiber mulch shall be applied at the rate of 1,500 pounds per acre in a mixture of seed and fertilizer. Hydraulic equipment shall be used for the application of fertilizer, seed and slurry of the prepared wood pulp. This equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which will provide an even distribution of the slurry on the various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons.

The seed, fertilizer, wood pulp mulch, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by the hydraulic seeding method specified herein. The materials shall be combined in a manner recommended by the manufacturer. The slurry mixture shall be so regulated that the amounts and rates of application shall result in a uniform application of all materials at rates not less than the amount specified. Using the color of the wood pulp as a guide, the equipment operator shall spray the prepared seedbed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream so as to fall like rain, allowing the wood fibers to build upon each other until an even coat is achieved.

3.09 SODDING

A. Sod shall be placed between March 1st and December 1st.

B. Sod shall be placed within 48 hours of cutting.

C. Sod shall be moist when laid and placed on moist ground. The sod shall be carefully placed by hand, beginning at the toe of slopes and working upwards. The length of the strips shall be at right angles to the flow of surface water. All joints shall be tightly butted and end joints shall be staggered at least 12 inches. The sod shall be immediately pressed firmly into the ground by tamping or rolling. Fill all joints between strips with fine screened soil. Sod on slopes shall be pegged with sod pegs to prevent movement. The sod shall be watered, mowed, weeded, repaired or

otherwise maintained, to insure the establishment of a uniform healthy stand of grass until acceptance. Contractor will be responsible for watering as needed to ensure sod lives.

3.10 MAINTENANCE

A. Maintain seeded surfaces until final acceptance.

B. Maintenance shall consist of providing protection against traffic, watering to ensure uniform seed germination and to keep surface of soil damp, and repairing any areas damaged as a result of construction operations or erosion.

3.11 ACCEPTANCE

A. Before acceptance of the seeding performed for the establishment of permanent vegetation, the Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of reestablishment in the spring.

END OF SECTION

Division 3

Concrete

PART 1 GENERAL

1.01 SUMMARY

A. This section consists of furnishing all labor, equipment and material to complete cast-in-place concrete as shown on the drawings and specified in the following paragraphs.

B. Unless specified otherwise, all cast-in-place concrete shall be a minimum compressive strength of 4000 psi on all formed concrete in excess of 18 inches of vertical height above grade.

C. Reference Specification reported by ACI Committee 301 – Specification for Structural Concrete – ACI 301-99

1.02 SUBMITTALS

A. Mix Design: Submit mix designs prepared in accordance with ACI 211.1 and 318 for approval prior to placing any concrete.

B. Manufacturers Data: Submit for curing materials to be used.

C. Suppliers/Manufacturer certifications; Submit for all concrete components and stool reinforcing.

D. Test Reports: Submit for all cylinder tests. Shop Drawings: Submit for steel reinforcing.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT

Conform to ASTM C150, Type 1.

2.02 WATER

Shall be potable and free of acids, alkalis, oil, and organic or other deleterious materials.

2.03 CONCRETE AGGREGATES

A. GENERAL: Shall conform to ASTN C33. Local aggregates not complying with

this standard may be used provided it can be shown by testing or a record of past performance that these aggregates produce concrete of adequate strength and durability. Use largest practicable aggregate size for each condition of placement subject to limitations stipulated in paragraph 3.3 of ACI 318.

B. Fine Aggregate: Clean, washed sand of hard, sound, uncoated grains.

C. Coarse Aggregate: Clean, washed, sound, and crushed to a maximum size of 1 ½".

2.04 CONCRETE ADMIXTURES

A. GENERAL: Only admixtures specified and acceptable to the Engineer prior to use shall be included in mix designs.

B. Water Reducing Agent: A water reducing agent conforming to ASTM C494 may be used. The following are acceptable:

1. Pozzolith – Masters Builders Company
2. Plastocrete – Sika Chemical Company
3. WRDA – Grace Construction Materials
4. An approved equal

C. Air Entrainment: All concrete shall entrain from two to four percent air, whether batched with, or without other admixtures. One of the following, conforming to ASTM C26O, may be used:

1. MB-VR – Masters Builders Company
2. Sika Aer – Sika Chemical Company
3. Darex Aer – Grace Construction Materials
4. An approved equal

2.05 STEEL REINFORCEMENT

Shall be deformed bars, grade 60 or welded wire fabric. Shall be free from rust, dirt, or any foreign coating.

2.06 CURING MATERIALS

A. Chemical curing: Shall be a liquid, membrane forming compound that conforms to ASTM C309 Class B as approved by the engineer.

B. Impervious Membrane Sheeting: Shall be a minimum of 4 mil polyethylene sheeting used in accordance with ASTM C171.

2.07 CONCRETE PROPERTIES FOR APPLICABLE COMPRESSIVE STRENGTHS

28 Day Compressive Strength (f's, psi)	Maximum Water-Cement Ratio by Weight (1b/lb)	Minimum Cement Content (1bs/cubic yard)
5000	0.4*	611
4000	0.45	564
3000	0.50	470
2000	.65	376

*The optimum water-cement ratio to mix design in excess of 4000 psi 28 day compressive strength shall be determined by various mix designs but not to exceed 0.40.

A. Slump Limits: Concrete, when placed, shall have a slump within the following limits as measured in accordance with ASTM C143:

1. Walls, beams, columns
2. Footings, caissons
3. Pavement, slabs

2.08 CEMENT GROUT AND DRYPACK

A. Cement Grout: Shall be one part Portland cement. 2 1/2 parts fine aggregate, and sufficient water for the mixture to flow under its own weight.

B. Drypack: Shall be one part Portland cement, 2 parts fine aggregate, and enough water to hydrate the cement (stiff mix). Do not mix more than can be used in 30 minutes.

PART 3 EXECUTIONS

3.01 BATCHING AND MIXING CONCRETE

A. Concrete shall be ready mixed concrete conforming to ASTM C94. Plant and truck mixers are subject to examination by the Engineer. Load tickets shall

include all required information and be legible, showing quantities of all constituents in the batch, and bearing the signature of the plant inspector or bonded weight master. Submit copies of all load tickets to the Engineer.

B. Mix concrete at least 10 minutes, 5 minutes of which is at the job, after the last addition of the water. Retempering in the truck is prohibited. All concrete in the truck longer than 1 1/2 hours after the water has been added or any that has become harsh or nonplastic, shall be rejected.

3.02 FORMS

Shall conform to the shape, lines, and dimensions of members called for on the plane. They shall be clean, tight fitting, and braced to produce correctly aligned concrete. Flexible forms shall be used on all curved lines having a radius of less than 200 feet.

3.03 PLACING REINFORCEMENT

Bars shall be accurately bent and placed, securely supported, and fastened to prevent movement. Splices shall be lapped 30 bar diameters and a minimum of 12". They shall also be staggered. Minimum clearance shall be maintained in accordance with ACI standards. Reinforcement shall tot be cut using a torch.

3.04 WATERSTOPS

Where shown on the drawings, waterstops shall be installed to provide watertight concrete. Waterstops shall be extruded flat strips either having a hollow center bulb or a barbell cross-section. All intersections shall be welded together to form a continuous seal.

3.05 FASTENING DEVICES, SLEEVES, AND INSERTS

Install all items required to be cast in the concrete prior to pouring.

3.06 PLACING THE CONCRETE

A. Prior to placing the concrete standing water, mud and foreign matter shall be removed from all forms, excavations, and existing concrete surfaces. Surfaces to be poured against shall be lightly wetted. The Engineer must approve the formwork and reinforcements prior to concrete placement.

B. The concrete shall be placed using suitable equipment as close as possible to its final location and in such a manner as to prevent segregation of the aggregate.

Any free vertical drop shall not exceed 4 feet.

C. Vibration: All concrete shall be consolidated using mechanical vibrating equipment. Vibration shall be transmitted directly to the concrete and not through the forms. The contractor shall provide back-up units in case of mechanical failure.

3.07 CURING

A. GENERAL

Concrete shall be kept moist for seven days after placement. Vertical forts may be left in place. Other surfaces exposed to the air shall be cured by either using a chemical curing compound or impervious membrane sheeting.

B. Chemical curing: Apply curing compound as soon as surface water has disappeared from the concrete surfaces. Apply compound in accordance with the manufacturer's recommendations.

C. Impervious Membrane Sheeting: The entire exposed surface shall be wetted thoroughly with a fine spray of water and then covered with sheeting. Overlap 12" when a continuous sheet is not used.

3.08 FINISHING

A. Unexposed Surfaces: Form tie holes, deep depressions, rock pockets, honeycombs, etc. shall be cleaned out, flushed with water, dry packed, cured, and then honed to a final correct surface.

B. Exposed Surfaces: Hone down fins, ridges, and high spots with abrasive stone or power grinder while concrete is green. Treat items under previous paragraph with same procedure listed there. Rub entire surface for a final sand finish surface.

C. Exposed Edges: Shall have, a ¾" chamfer except as shown on the drawings.

D. Slabs, Sidewalks, Etc.: Shall be floated and then receive a steel trowel finish except as noted on the drawings. Surfaces exposed to the weather or requiring a slip resistant surface shall receive a broom finish.

3.09 CONTROL JOINTS

A. Construction joints: Shall be formed using galvanized metal keyway or job-built wood forms with keyway.

B. Sawed joints: Shall be sawed within 24-hours of placing the concrete with a minimum depth of 1 ½".

C. Expansion Joints: Shall be located where new concrete is to be placed up to existing concrete and as shown on the drawing.

D. GENERAL: Joints shall be located so that the maximum area between shall not exceed 600 square feet. Length to width ratios shall not exceed 2 to 1. Refer to the drawings for a specific joint pattern.

3.10 TESTING

A. A professional, independent testing laboratory, approved by the Engineer, shall perform all testing. The contractor shall pay all costs of sampling and testing of concrete and be reimbursed in accordance with Specification Section 01410 – Testing Laboratory Services.

B. The Engineer shall receive 3 copies of each report in timely manner after each procedure.

C. Concrete Compression Cylinders: One set of five cylinders for each 50 cubic yards or fraction thereof for each day's placement of each mix design. The slump, temperature and air content shall also b recorded for each set. Test two cylinders at age seven days, two cylinders at twenty-eight days and hold one in reserve for testing at 56 days if previous test indicate a deficiency.

3.11 DEFFECTIVE WORK

Concrete not conforming with the plans and specifications, not formed as shown on the plans, has a detective surface, or lacks the required strength shall be removed from the job site at the Contractor's expense or replaced as directed by the Engineer.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE OF WORK

A. This specification covers the materials for and manufacture of specialty precast reinforced concrete units produced in accordance with the plans and these specifications.

1.2 REFERENCES

Where applicable, the latest editions of the following standards shall be considered a part of these specifications. In case of conflict, these specifications shall take precedence over the listed standard. (See also Article 2.4, Concrete Materials)

A. American Association of State Highway and Transportation Officials (AASHTO)

1. "Standard Specification for Highway Bridges"
2. "Guide Specifications for Structural Design of Sound Barriers"

B. ACI 304 – Guide for Measuring, Mixing, Transporting and Placing Concrete

C. ACI 318 - Building Code Requirements for Reinforced Concrete

D. ASTM C478 - Specification for Precast Reinforced Concrete Manholes Sections

E. ASTM C825 - Standard Specification for Precast Concrete Barriers

F. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

G. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures"

H. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures

I. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures

J. ASTM C915 - Standard Specification for Precast Reinforced Concrete Crib Wall Members

K. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals

L. ASTM C936 - Standard Specification for Solid Concrete Interlocking Paving Units

M. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants

N. ASTM C1227 - Standard Specification for Precast Concrete Septic Tanks

O. ASTM 1433 - Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers

P. ASTM C1478 - Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals

Q. AWS D1.1 - Structural Welding Code - Structural Steel

R. AWS D1.4 - Structural Welding Code - Reinforcing Steel

S. CRSI Manual of Standard Practice

1.3 FRANCHISE RPODUCTS

A. Products manufactured under franchise arrangements shall conform to all the requirements specified by the franchiser. Items not included in the franchise specification but included in this specification shall conform to the requirements in this specification.

1.4 SUBMITTALS

A. Product Data

1. For standard precast concrete units, the precast concrete producer will supply cut sheets showing conformance to project drawings and requirements and to applicable ASTM specifications listed in this specification. The Precast concrete producer shall certify that such products will meet the ASTM specifications.

2. For proprietary precast concrete units, the precast concrete producer may supply standard plans or informative literature. Supporting calculations and design details shall be available upon request. The Precast concrete producer shall warrant that such products will perform the intended task.

B. Shop Drawings

1. The plans for custom-made precast concrete units shall be shop drawings furnished by the precast concrete producer for approval by the Owner or his agent (specifier). These drawings shall show complete design, installation, and construction information in such detail as to enable the Owner to determine the adequacy of the proposed units for the intended purpose. Details of steel reinforcement size and placement as well as supporting design calculations, if appropriate, shall be included. The drawings shall include a schedule, which will list the size and type of precast concrete units at each location where they are to be used. The precast concrete units shall be produced in accordance with the approved drawings.

1.5. QUALITY ASSURANCE

A. Precast concrete producer shall demonstrate adherence to the standards set forth in the National Precast Concrete Association Quality Control Manual. Precast concrete producer shall meet requirements written in subparagraph 1 or 2.

1. NPCA Certification - The precast concrete producer shall be certified by the National Precast Concrete Association's Plant Certification Program prior to and during production of the products for this project.

2. Qualifications, Testing and Inspection

a. The Precast concrete producer shall have been in the business of producing precast concrete products similar to those specified for a minimum of 5 years. The precast concrete producer shall maintain a permanent quality control department or retain an independent testing agency on a continuing basis. The agency shall issue a report, certified by a licensed engineer, detailing the ability of the precast concrete producer to produce quality products consistent with industry standards.

b. The Precast concrete producer shall show that the following tests are performed in accordance with the ASTM standards indicated. Tests shall be performed for each 150 cu. yd. of concrete placed, but not less frequently than once per week.

1. Slump: C143
2. Compressive Strength: C31, C192, C39
3. Air Content (when air-entrained concrete is being used):

C231 or C173
4. Unit Weight: C138

c. The Precast concrete producer shall provide documentation demonstrating compliance with this subparagraph.

d. The Owner may place an inspector in the plant when the products covered by this specification are being manufactured.

1.6 DELIVERY, STORAGE AND HANDLING

A. Handling

1. Products shall be stored, handled shipped and unloaded in a manner to minimize damage. Lifting holes or inserts shall be consistent with industry standards. Lifting shall be accomplished with methods or devices intended for this purpose.

B. Acceptance at Site

1. The Owner's representative shall make final inspection and acceptance of the precast concrete products upon arrival at the jobsite.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. The precast concrete manufacturer must meet the guidelines written in article 1.5 paragraph A.

2.2 MANUFACTURED PRECAST UNITS

A. Precast Concrete: Provide all units shown in Contract Documents and as needed for a complete and proper installation

B. Design Criteria - Design units in accordance with:

1. Applicable local building code.
2. ACI 304 and 318.
3. CRSI Manual of Standard Practice.
4. Applicable ASTM Standard(s).

C. Finishes

1. Formed non-architectural surfaces: Surfaces cast against approved forms using industry practice in cleaning forms, designing concrete mixes, placing and curing concrete. Normal color variations, form joint marks, small surface holes caused by air bubbles, and minor chips and spalls will be tolerated but no major imperfections, honeycombs or other defects will be permitted.

2. Unformed surfaces: Surfaces finished with a vibrating screed, or by hand with a float. Normal color variations, minor indentations, minor chips and spalls will be tolerated but no major imperfections, honeycombs, or other defects shall be permitted.

3. Special finishes:

   a. Troweled, broom or other finishes shall be according to the requirements of project documents and performed per industry standards or supplier specifications.

   b. Precast concrete producers shall submit finishes for approval when required by the project documents. The sample finishes shall be approved prior to the start of production.

D. Patching and Repairs

1. No repair is required to formed surfaces that are relatively free of air voids and honeycombed areas, unless the surfaces are required by the design to be finished.

2. Repairing Minor Defects - Defects that will not impair the functional use or expected life of a manufactured precast concrete product may be repaired by any method that does not impair the product.

3. Repairing Honeycombed Areas - When honeycombed areas are to be repaired, all loose material shall be removed and the areas cut back into essentially horizontal or vertical planes to a depth at which coarse aggregate particles break under chipping rather than being dislodged. Proprietary repair materials shall be used in accordance with the manufacturer's instructions. If a proprietary repair material is not used, the area shall be saturated with water and, immediately prior to repair, the area should be damp, but free of excess water. A cement-sand grout or an approved bonding agent shall be applied to the chipped surfaces, followed immediately by consolidating an appropriate repair material into the

cavity.

4. Repairing Major Defects - Defects in precast concrete products which impair the functional use or the expected life of products shall be evaluated by qualified personnel to determine if repairs are feasible and, if so, to establish the repair procedure.

2.3 MATERIALS

A. Concrete - Concrete shall be a uniform mix of quality materials listed in Article 2.4. Mix proportions shall be determined by following the standards in ACI 318 Chapter 5. Recommendations for selecting proportions for concrete are given in detail in Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete (ACI 211.1). Recommendations for lightweight concrete are given in Standard Practice for Selecting proportions for Structural Lightweight Concrete (ACI 211.2).

1. Water-Cement Ratio

   a. Concrete that will be exposed to freezing and thawing shall contain entrained air and shall have water-cement ratios of 0.45 or less. Concrete which will not be exposed to freezing, but which is required to be watertight, shall have a water-cement ratio of 0.48 or less if the concrete is exposed to fresh water, or 0.45 or less if exposed to brackish water or sea water. For corrosion protection, reinforced concrete exposed to deicer salts, brackish water or seawater shall have a water-cement ratio of 0.40 or less.

2. Air Content

   a. The air content of concrete that will be exposed to freezing conditions shall be within the limits given in Table 1.

Table 1 Total Air Content For Frost-Resistant Concrete

Nominal Maximum Aggregate Size (Inches)	Air Content, % Severe Exposure	Moderate Exposure
3/8	6.0 to 9.0	4.5 to 7.5
1/2	5.5 to 8.5	4.0 to 7.0
3/4	4.5 to 7.5	3.5 to 6.5
1	4.5 to 7.5	3.0 to 6.0
1-1/2	4.5 to 7.0	3.0 to 6.0

*For specified compressive strengths greater than 5000 psi, air content may be reduced 1%.

3. Compressive Strength

   a. All concrete shall develop a minimum compressive strength of 4,000 psi in 28 days unless other strengths are designated on the drawings.

B. Portland Cement: ASTM C150, Type I, II, III or V.

C. Aggregates: ASTM C33 or C330.

D. Water: Potable or free of deleterious substances in amounts harmful to concrete or embedded metals.

E. Admixtures:

1. Air-entraining: ASTM C260
2. Water reducing, retarding, accelerating, high range water reducing: ASTM C494
3. Pozzolans, fly ash and other mineral admixtures: ASTM C618
4. Ground granulated blast furnace slag: ASTM C989
5. Pigments: Non-fading and lime-resistant

2.4 REINFORCEMENT AND CONNECTION MATERIALS

A. Provide all reinforcement, accessory and connection materials required. Concrete reinforcement shall be steel bars or welded wire fabric, or a combination thereof.

B. Reinforcing Bars:

1. Deformed Billet-steel: ASTM A615
2. Deformed Rail-steel: ASTM A616
3. Deformed Axle-steel: ASTM A617
4. Deformed Low-alloy steel: ASTM A706

C. Reinforcing Wire:

1. Plain Wire: ASTM A82
2. Deformed Wire: ASTM A496

D. Welded Wire Fabric:

1. Plain Wire: ASTM A185
2. Deformed Wire: ASTM A497

E. Epoxy Coated Reinforcement:

1. Reinforcing Bars: ASTM A775
2. Wires and Fabric: ASTM A884

F. Galvanized Reinforcement:

1. Reinforcing Bars: ASTM A767

G. Inserts and Embedded Metal - All items embedded in concrete shall be of the type required for the intended task, and meet the following standards:

1. Structural steel plates, angles, etc: ASTM A36

2. Proprietary items: In accordance with manufacturers published literature

3. Welded studs: AWS D1.1

4. Finishes (as required):

a. Shop primer: Manufacturers' standards
b. Hot-dipped galvanized: ASTM A152
c. Zinc-rich coating: MIL-P-2135 self-curing, one component, sacrificial
d. Cadmium coating: Manufacturers' recommendations

H. Joint Sealant and Joint Gaskets:

1. Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets: ASTM C443.
2. External Sealing Bands for Noncircular Sewer, Storm Drain, and Culvert Pipe: ASTM C877.
3. Joints for Concrete Pipe, Manholes, and Manufactured Box Sections Using Preformed Flexible Joint Sealants: ASTM C990
4. Specification for Elastomeric Joint Sealants: ASTM C920

I. Pipe Entry Connectors:

1. Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals: ASTM C923.

J. Grout:

1. Cement grout: Portland cement with enough water for the required

strength and sand for proper consistency. May contain mineral or chemical admixtures, if approved by Owner's representative.

2. Non-shrink grout: Premixed, packaged expansive and non-expansive shrink- resistant grout.

K. Interior Lining:

1. Precast concrete structures that are subject to sewer liquid or gases shall be lined (interior) with Induron Ceramic Epoxy – Ceramasafe90, Induron Acrylic – AC403 Elastomeric, TNEMEC Epoxy – Series 217/218/434-435, Agru Sure-Grip System concrete protective liner, or an approved equal.

2. Surface Preparation and Application: After the manhole has cured, the equivalent of seven days at 77 degrees F, the interior of the manhole exposed to liquids and gases shall be blasted and cleaned to remove all loose laitance, form oil, or other loose material. After cleaning, the lining material shall be applied to yield 40 mils for the complete system using a centrifugal lance applicator. No lining shall take place over grease, oil, etc., that would be detrimental to the adhesion of the compound to the substrate. The compound shall not be applied when the substrate temperature is below 40 degrees F or in adverse atmospheric conditions which will cause detrimental blistering, pinholing or porosity of the film. In no case shall the lining be applied when the concrete surface is above 14 percent moisture content. The lining shall be applied by applicators certified by the lining manufacturer. The workers shall be experienced and competent in the surface preparation, application and inspection of the lining to be applied.

3. Inspection:

a. All structures shall be checked using a magnetic film thickness gauge on metal coupons attached to five percent of the lining thickness.

b. All structures shall be pinhole detected with a non-destructive 2,500 volt test.

c. Each structure section shall be marked with the date of application of the lining system and with its numerical sequence of application of that date.

4. Handling: Equipment used to handle and transport the lined manholes shall be suitably designed and operated not to damage the lining. Any damage which occurs shall be repaired prior to the installation of the manholes in accordance with the manufacturer's

recommendations, so the repaired area is equal to the undamaged lining and coating in all respects.

5. Joints: All surfaces in the joint areas that are concrete and that are in contact with the sewer liquids and gases shall be prepared for coating and coated as specified for the structure. Any area in the joint area that is not smooth shall be made so using a quick setting epoxy grout. Care shall be exercised so that all areas exposed to the sewer liquids and gases are coated.

6. Lining shall be applied at the point of manufacture of the manhole and precast concrete product.

2.5 FABRICATION

A. Forms for manufacturing precast concrete products shall be of the type and design consistent with industry standards. They should be capable of consistently providing uniform products and dimensions. Forms shall be constructed so that the forces and vibrations to which the forms will be subjected can cause no product damage.

1. Forms shall be cleaned of concrete build-up after each use.
2. Form release agents shall not be allowed to build up on the form casting surfaces.

B. Reinforcement

1. Cages of reinforcement shall be fabricated either by tying the bars, wires or welded wire fabric into rigid assemblies or by welding where permissible in accordance with AWS D1.4. Reinforcing shall be positioned as specified by the design and so that the concrete cover conforms to requirements. The tolerance on concrete cover shall be one-third of that specified but not more than 1/2 in. Concrete cover shall not be less than 1/2 in. Positive means shall be taken to assure that the reinforcement does not move significantly during the casting operations.

C. Embedded Items

1. Embedded items shall be positioned at locations specified in the design documents. Inserts, plates, weldments, lifting devices and other items to be imbedded in precast concrete products shall be held rigidly in place so that they do not move significantly during casting operations.

D. Placing Concrete

1. Concrete shall be deposited into forms as near to its final location as practical. The free fall of the concrete shall be kept to a minimum. Concrete shall be consolidated in such a manner that segregation of the concrete is minimized and honeycombed areas are kept to a minimum. Vibrators used to consolidate concrete shall have frequencies and amplitudes sufficient to produce well consolidated concrete.

2. Cold Weather Requirements - Recommendations for cold weather concreting are given in detail in Cold Weather Concreting reported by ACI Committee 306.

   a. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather.
   b. All concrete materials and all reinforcement, forms, fillers, and ground with which concrete is to come in contact shall be free from frost.
   c. Frozen materials or materials containing ice shall not be used.
   d. In cold weather the temperature of concrete at the time of placing shall not be below 45□ F. Concrete that freezes before its compressive strength reaches 500 psi shall be discarded.

3. Hot Weather Requirements - Recommendations for hot weather concreting are given in detail in Hot Weather Concreting reported by ACI Committee 305.

   a. During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation that could impair required strength or serviceability of the member or structure. The temperature of concrete at the time of placing shall not exceed 90□ F.

E. Curing

1. Curing by Moisture Retention - Moisture shall be prevented from evaporating from exposed surfaces until adequate strength for stripping (Article 2.6, paragraph F) is reached by one of the following methods:

   a. Cover with polyethylene sheets a minimum of 6 mils thick.
   b. Cover with burlap or other absorptive material and keep continually moist.
   c. Use of a membrane-curing compound applied at a rate not to

exceed 200 sq. ft. per gallon, or per manufacturers' recommendations.

2. Surfaces that will be exposed to weather during service shall be cured as above a minimum of 3 days. Forms shall be considered effective in preventing evaporation from the contact surfaces. If air temperature is below 50°F the curing period shall be extended.

3. Curing with Heat and Moisture

a. Concrete shall not be subjected to steam or hot air until after the concrete has attained its initial set. Steam, if used, shall be applied within a suitable enclosure, which permits free circulation of the steam. If hot air is used for curing, precautions shall be taken to prevent moisture loss from the concrete. The temperature of the concrete shall not be permitted to exceed 160°F. These requirements do not apply to products cured with steam under pressure in an autoclave.

F. Stripping Products from Forms

1. Products shall not be removed from the forms until the concrete reaches the compressive strength for stripping required by the design. If no such requirement exists, products may be removed from the forms after the final set of concrete provided that stripping damage is minimal.

G. Shipping Products

1. Products shall not be shipped until they are at least 5 days old, unless it can be shown that the concrete strength has reached at least 75% of the specified 28-day strength, or that damage will not be caused which will impair the performance of the product.

2.6 SOURCE QUALITY CONTROL

A. Fabricate units in accordance with ACI 318 and the National Precast Concrete Association's Quality Control Manual for Precast Plants.

PART 3 EXECUTION

3.1 INSTALLATION

A. Site Access

1. General contractor shall be responsible for providing adequate access to the site to facilitate hauling, storage and proper handling of the precast concrete products.

B. Installation

1. Precast concrete products shall be installed to the lines and grades shown in the contract documents or otherwise specified.
2. Products shall be lifted by suitable lifting devices at points provided by the precast concrete producer.
3. Products shall be installed per the precast concrete producer's recommendation.

C. Water tightness

1. Where water tightness is a necessary performance characteristic of the precast concrete product's end use, watertight joints, connectors and inserts should be used to ensure the integrity of the entire system.

3.2 FIELD QUALITY CONTROL

A. Site tests - when testing is required for an underground product, one of the following methods need to be followed:

1. Vacuum testing prior to backfill according to ASTM C1244.
2. Water testing according to contract documents and precast concrete producer's recommendations.

END OF SECTION

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