INVITATION TO BID

PROPOSAL

BID NO. 12-0076-4

WILMINGTON CANAL DRAINAGE IMPROVEMENTS

PREBID CONF: 2:00PM, JULY 25, 2012

BID OPENING: 2:00PM, AUGUST 9, 2012

THE COMMISSIONERS OF CHATHAM COUNTY, GEORGIA

PETE LIAKAKIS, CHAIRMAN

COMMISSIONER HELEN J. STONE	COMMISSIONER TABITHA ODELL
COMMISSIONER JAMES J. HOLMES	COMMISSIONER DAVID M. GELLATLY
COMMISSIONER PATRICK O. SHAY	COMMISSIONER DEAN KICKLIGHTER
COMMISSIONER PATRICK J. FARRELL	COMMISSIONER PRISCILLA D. THOMAS

R. JONATHAN HART, COUNTY ATTORNEY

CHATHAM COUNTY, GEORGIA
DOCUMENT CHECK LIST

The following documents, when marked, are contained in and made a part of this Bid Package or are required to be submitted with the bid. It is the responsibility of the bidder to read, complete and sign, where indicated, and return these documents with his/her bid. **FAILURE TO DO SO MAY BE CAUSE FOR DISQUALIFYING THE BID.**

__X__ GENERAL INFORMATION AND INSTRUCTIONS TO BID WITH ATTACHMENTS

__X__ SURETY REQUIREMENTS (A Bid Bond of 5% with this ITB)

__X__ PROPOSAL

___ PLANS/DRAWINGS - **Plans and specifications must be purchased at Clayton Digital Reprographics by logging into www.cdrepro.com. Login to DFS. New users must register. For technical support contact Roger Oliver at (912) 352-3880, fax (912) 352-3881 or email: cdrsouth@cdrepro.com.**

__X__ BID SCHEDULE

___ PERFORMANCE BOND - **not required for this project**

___ PAYMENT BOND - **not required for this project**

___ CONTRACT

__X__ LEGAL NOTICE

__X__ ATTACHMENTS: A. DRUG FREE WORKPLACE; B. NONDISCRIMINATION STATEMENT; C. DISCLOSURE OF RESPONSIBILITY STATEMENT; D. CONTRACTOR/SUBCONTRACTOR AFFIDAVIT & AGREEMENT; E. DEBARMENT CERTIFICATION; F. CAP AGREEMENT; G. M/WBE PARTICIPATION COMPLIANCE REPORT; H. *SAVE* AFFIDAVIT.

____ DOCUMENTATION OF ABILITY TO PERFORM BID REQUIREMENTS. THIS MAY BE REQUIRED OF BIDDERS AFTER SUBMISSION OF BIDS.

COUNTY TAX CERTIFICATE REQUIREMENT - Contractor must supply a copy of their Tax Certificate from their location in the State of Georgia, as proof of payment of the occupational tax where their office is located.

CURRENT TAX CERTIFICATE NUMBER
CITY_____
COUNTY_____
OTHER_____

The Chatham County of Commissioners have established goals to increase participation of minority and woman owned businesses. In order to accurately document participation, businesses submitting bids or proposals are encouraged to report ownership status. A minority or woman business is defined as a business with 51% or greater minority of woman ownership. Please check ownership status as applicable:

African-American _____ **Asian American** _____ **Hispanic** _____

Native American or Alaskan Indian _____ **Woman** _____

In the award of "Competitive Sealed Proposals", minority/woman participation may be one of several evaluation criteria used in the award process when specified as such in the Request for Proposal.

RECEIPT IS HEREBY ACKNOWLEDGED OF ADDENDA NUMBERS_____

The undersigned bidder certifies that he/she has received the above listed and marked documents and acknowledges that his/her failure to return each, completed and signed as required, may be cause for disqualifying his/her bid.

BY:_____
DATE

_____
SIGNATURE

TITLE:_____

COMPANY:_____

CHATHAM COUNTY, GEORGIA
OFFICE OF THE PURCHASING AGENT
1117 EISENHOWER DRIVE, SUITE C
SAVANNAH, GEORGIA 31406
(912) 790-1622

Date: June 28, 2012 **BID NO. 12-0076-4**

GENERAL INFORMATION FOR INVITATION FOR BID/PROPOSAL

This is an invitation to submit a bid or proposal to supply Chatham County with construction, equipment, supplies and/or services as indicated herein. Sealed bids or proposals will be received at the Office of the Purchasing Agent, **at The Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia, up to 2:00PM, AUGUST 9, 2012** at which time they will be opened and publicly read. **The County reserves the right to reject all bids or proposals for any bid or proposal that is non-responsive or not responsible.**

Instructions for preparation and submission of a bid or proposal are contained in this Invitation For Bid/Proposal package. Please note that specific forms for submission of a bid/proposal are required. Bids must be typed or printed in ink. If you do not submit a bid/proposal, return the signed bid invitation sheet and state the reason; otherwise, your name may be removed from our bidders list.

A **pre-bid conference** has been scheduled to be conducted **and held at The Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia**, at **2:00PM, JULY 25, 2012** to discuss the specifications and resolve any questions and/or misunderstanding that may arise. **You are encouraged to attend.**

Any changes to the conditions and specifications must be in the form of a written addendum to be valid; therefore, the Purchasing Agent will issue a written addendum to document each approved change. Generally when addenda are required, the bid opening date will be changed.

Chatham County has an equal opportunity purchasing policy. Chatham County seeks to ensure that all segments of the business community have access to supplying the goods and services needed by County programs. The County affirmatively works to encourage utilization of disadvantaged and minority business enterprises in our procurement activities. The County provides equal opportunity for all businesses and does not discriminate against any persons or businesses regardless of race, color, religion, age, sex, national origin or handicap. The terms "disadvantaged business," "minority business enterprise," and "minority person" are more specifically defined and explained in the Chatham County Purchasing Ordinance and Procedures Manual, Article VII - Disadvantaged Business Enterprises Program.

This project is Special Purpose Local Option Sales Tax (SPLOST) Project. See paragraph 2.22 for MBE/WBE participation goals.

INSTRUCTIONS TO BIDDERS/PROPOSERS

1.1 **Purpose:** The purpose of this document is to provide general and specific information for use in submitting a bid or proposal to supply Chatham County with equipment, supplies, and/or services as described herein. All bids/proposals are governed by the Code of Chatham County, Chapter 4, Article IV, and the laws of the State of Georgia.

1.2 **How to Prepare Bid Proposals: All bid proposals shall be:**

a. Prepared on the forms enclosed herewith, unless otherwise prescribed, and **all documents must be submitted.**

b. Typewritten or completed with pen and ink, signed by the business owner or authorized representative, with all erasures or corrections initialed and dated by the official signing the proposal. ALL SIGNATURE SPACES MUST BE SIGNED.

Bidders are encouraged to review carefully all provisions and attachments of this document prior to submission. Each bid constitutes an offer and may not be withdrawn except as provided herein.

1.3 **How to Submit Bid Proposals:** All bid proposals shall be:

a. Submitted in sealed opaque envelopes, plainly marked with the bid number and title, date and time of bid opening, and company name.

b. Mailed or delivered as follows in sufficient time to ensure receipt by the Purchasing Agent on or before the time and date specified above.

1. Mailing Address: Purchasing Agent, 1117 Eisenhower Drive, Suite C, Savannah, Georgia 31416.

2. Hand Delivery: Purchasing Agent, Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia.

BIDS NOT RECEIVED BY THE TIME AND DATE SPECIFIED WILL NOT BE OPENED OR CONSIDERED.

1.4 **How to Submit an Objection:** Objections from bidders to this invitation to bid and/or these specifications should be brought to the attention of the County Purchasing Agent in the following manner:

a. When a pre-bid conference is scheduled, bidders shall either present their oral objections at that time or submit their written objections at least two (2) days prior to the scheduled pre-bid conference.

b. When a pre-bid conference is not scheduled, the bidder shall submit any objections he may

have in writing not less than five (5) days prior to the opening of the bid.

c. The objections contemplated may pertain to form and/or substance of the invitation to bid documents. Failure to object in accordance with the above procedure will constitute a waiver on the part of the business to protest this invitation to bid.

1.5 **Failure to Bid:** If a bid is not submitted, the business should return this invitation to bid document, stating reason therefore, and indicate whether the business should be retained or removed from the County's bidders list.

1.6 **Errors in Bids:** Bidders or their authorized representatives are expected to fully inform themselves as to the conditions, requirements, and specifications before submitting bids. Failure to do so will be at the bidder's own risk. In case of error in extension of prices in the bid, the unit price will govern.

1.7 **Standards for Acceptance of Bid for Contract Award:** The County reserves the right to reject any or all bids and to waive any irregularities or technicalities in bids received whenever such rejection or waiver is in the best interest of the County. The County reserves the right to reject the bid of a bidder who has previously failed to perform properly or complete on time contracts of a similar nature, or a bid from a bidder whom investigation shows is not in a position to perform the contract.

1.8 **Bidder:** Whenever the term "bidder" is used it shall encompass the "person," "business," "contractor," "supplier," "vendor," or other party submitting a bid or proposal to Chatham County in such capacity before a contract has been entered into between such party and the County.

1.9 **Responsible / Responsive Bidder:** *Responsible Bidder* means a person or entity that has the capability in all respects to perform fully and reliably the contract requirements. *Responsive Bidder* means a person or entity that has submitted a bid or proposal that conforms in all material respects to the requirements set forth in the invitation for bids or request for proposals.

1.10 **Compliance with Laws:** The bidder and/or contractor shall obtain and maintain all licenses, permits, liability insurance, workman's compensation insurance and comply with any and all other standards or regulations required by federal, state or County stature, ordinances and rules during the performance of any contract between the contractor and the County. Any such requirement specifically set forth in any contract document between the contractor and the County shall be supplementary to this section and not in substitution thereof.

1.11 **Contractor:** Contractor or subcontractor means any person or business having a contract with Chatham County. The Contractor/Vendor of goods, material, equipment or services certifies that they will follow equal employment opportunity practices in connection with the awarded contract as more fully specified in the contract documents.

1.12 ***Local Preference:** On 27 March, 1998 the Board of Commissioners adopted a Local Vendor Preference Ordinance. This Ordinance does not apply to construction contracts. However, contractors are encouraged to apply the same method when awarding bids to local and local M/WBE businesses when ever possible in order to promote growth in Chatham County's economy. **NOTE:** Local Preference **does not apply to Public Works Construction contracts.**

1.13 **Debarred Firms and Pending Litigation:** Any potential proposer/firm listed on the Federal or State of Georgia Excluded Parties Listing (Barred from doing business) **will not** be considered for contract award. Proposers **shall disclose** any record of pending criminal violations (Indictment) and/or convictions, pending lawsuits, etc., and any actions that may be a conflict of interest occurring within the past five (5) years. Any proposer/firm previously defaulting or terminating a contract with the County will not be considered. Also, any contractor or subcontractor that has pending litigation with the County will not be considered for contract award.

** All bidders or proposers are to read and complete the Disclosure of Responsibility Statement enclosed as an Attachment to be returned with response. Failure to do so may result in your solicitation response being rejected as non-responsive.

Bidder acknowledges that in performing contract work for the Board, bidder shall not utilize any firms that have been a party to any of the above actions. If bidder has engaged any firm to work on this contract or project that is later debarred, Bidder shall sever its relationship with that firm with respect to Board contract.

1.14 **Performance Evaluation:** On April 11, 2008, the Chatham County Board of Commissioners approved a change to the County Purchasing Ordinance requiring Contractor/Consultant Performance Evaluations, as a minimum, annually, prior to contract anniversary date.

Should Contractor/Consultant performance be unsatisfactory, the appointed County Project Manager for the contract may prepare a Contractor/Consultant Complaint Form or a Performance Evaluation to the County Purchasing Agent.

1.15 **Payment of Taxes**: No contract shall be awarded unless all real and personal property taxes have been paid by the successful contractor and/or subcontractors as adopted by the Board of commissioners on April 8, 1994.

1.16 **State Licensing Board for General Contractors:** Pursuant to Georgia law, the following types of contractors **must obtain a license from the State Licensing Board of Residential and General Contractors by July 1, 2008:**

* **Residential - Basic Contractor** (Contractor work relative to detached one-family and two-family residences and one-family townhouses not over three stories in height).

* **Residential - Light Commercial Contractor** (Contractor work or activity related to multifamily and multiuse light commercial buildings and structures).

* **General Contractor** (Contractor work or activity that is unlimited in scope regarding any residential or commercial projects).

See *Checklist for Submitting Bid* (page 22) for the type of license required for this project.

GENERAL CONDITIONS

2.1 **Specifications:** Any obvious error or omission in specifications shall not inure to the benefit of the bidder but shall put the bidder on notice to inquire of or identify the same from the County. Whenever herein mention is made of any article, material or workmanship to be in accordance with laws, ordinances, building codes, underwriter's codes, A.S.T.M. regulations or similar expressions, the requirements of these laws, ordinances, etc., shall be construed to be the minimum requirements of these specifications.

2.2 **Multiple Bids:** No vendor will be allowed to submit more than one bid. Any alternate proposals must be brought to the Purchasing Agent's attention during the Pre-bid Conference or submitted in writing at least five (5) days preceding the bid opening date.

2.3 Not Used.

2.4 **Prices to be Firm:** Bidder warrants that bid prices, terms and conditions quoted in his bid will be firm for acceptance for a period of sixty (60) days from bid opening date, unless otherwise stated in the bid.

2.5 **Completeness:** All information required by Invitation for Bids/Proposals must be completed and submitted to constitute a proper bid or proposal.

2.6 **Quality:** All materials, or supplies used for the construction necessary to comply with this proposal shall be of the best quality, and of the highest standard of workmanship.

Workmanship employed in any construction, repair, or installation required by this proposal shall be of the highest quality and meet recognized standards within the respective trades, crafts and of the skills employed.

2.7 **Guarantee:** Unless otherwise specified by the County, the bidder shall unconditionally guarantee the materials and workmanship on all material and/or services. If, within the guarantee period any defects occur which are due to faulty material and or services, the contractor at his expense, shall repair or adjust the condition, or replace the material and/or services to the complete satisfaction of the County. These repairs, replacements or adjustments shall be made only at such time as will be designated by the County as being least detrimental to the operation of County business.

2.8 **Liability Provisions:** Where bidders are required to enter or go onto Chatham County property to take measurements or gather other information in order to prepare the bid or proposal as requested by the County, the bidder shall be liable for any injury, damage or loss occasioned by negligence of the bidder, his agent, or any person the bidder has designated to prepare the bid and shall indemnify and hold harmless Chatham County from any liability arising therefrom. The contract document specifies the liability provisions required of the successful bidder in order to be awarded a contract with Chatham County.

2.9 **Cancellation of Contract:** The contract may be canceled or suspended by Chatham County in whole or in part by written notice of default to the Contractor upon non-performance or violation of contract terms. An award may be made to the next low bidder, for articles and/or services specified or they may be purchased on the open market and the defaulting Contractor (or his surety) shall be liable to Chatham County for costs to the County in excess of the defaulted contract prices. See the contract documents for complete requirements.

2.10 **Patent Indemnity:** Except as otherwise provided, the successful bidder agrees to indemnify Chatham County and its officers, agents and employees against liability, including costs and expenses for infringement upon any letters patent of the United States arising out of the performance of this Contract or out of the use or disposal for the account of the County of supplies furnished or construction work performed hereunder.

2.11 **Certification of Independent Price Determination:** By submission of this bid, the bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, that in connection with this procurement:

(1) The prices in this bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not be submit a bid for the purpose or restricting competition.

2.12 **Award of Contract:** The contract, if awarded, will be awarded to that responsible bidder whose bid/proposal will be most advantageous to Chatham County, price and other factors considered. The Board of Commissioners will make the determination as to which bid or proposal that serves as the best value to Chatham County.

2.13 **Procurement Protests:** Objections and protests to any portion of the procurement process or actions of the County staff may be filed with the Purchasing Agent for review and resolution. The Chatham County Purchasing Procedures Manual, Article IX - Appeals and Remedies shall govern the review and resolution of all protests.

2.14 **Qualification of Business (Responsible Bidder or Proposer):** A responsible bidder or proposer is defined as one who meets, or by the date of the bid acceptance can meet, certifications, all requirements for licensing, insurance, and registrations, or other documentation required by the Design Professional engaged to develop Scope of work, specifications and plans. These documents will be listed in the Special Conditions further on in this solicitation. Chatham County has the right to require any or all bidders to submit documentation of the ability to perform, provide, or carry out the service or provide the product requested.

Chatham County has the right to disqualify the bid or proposal of any bidder or proposer as being unresponsive or unresponsible whenever such bidder/proposer cannot document the ability to deliver the requested product.

2.15 **Chatham County Tax Certificate Requirement:** A current Chatham County Tax Certificate is required unless otherwise specified.

Please contact the Building Safety and Regulatory Services (912) 201-4300 for additional information.

2.16 Insurance Provisions, General: The selected CONTRACTOR shall be required to procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Bid. It is every contractor's responsibility to provide the County Purchasing and Contracting Division current and up-to-date Certificates of Insurance for multiple year contracts before the end of each term. **Failure to do so may be cause for termination of contract.**

2.16.1 General Information that shall appear on a Certificate of Insurance:

I. Name of the Producer (Contractor's insurance Broker/Agent).
II. Companies affording coverage (there may be several).
III. Name and Address of the Insured (this should be the Company or Parent of the firm Chatham County is contracting with).
IV. A Summary of all current insurance for the insured (includes effective dates of coverage).
V. A brief description of the operations to be performed, the specific job to be performed, or contract number.
VI. Certificate Holder (This is to always include Chatham County).

Chatham County as an Additional Insured: Chatham County invokes the defense of sovereign immunity. In order not to jeopardize the use of this defense, the County **is not** to be included as an Additional Insured on insurance contracts.

2.16.2 **Minimum Limits of Insurance** to be maintained for the duration of the contract:

a. **Commercial General Liability:** Provides protection against bodily injury and property damage claims arising from operations of a Contractor or Tenant. This policy coverage includes: premises and operations, use of independent contractors, products/completed operations, personal injury, contractual, broad form property damage, and underground, explosion and collapse hazards. Minimum limits: $1,000,000 bodily injury and property damage per occurrence and annual aggregate.

b. **Worker's Compensation and Employer's Liability:** Provides statutory protection against bodily injury, sickness or disease sustained by employees of the Contractor while performing within the scope of their duties. Employer's Liability coverage is usually included in Worker's Compensation policies, and insures common law claims of injured employees made in lieu of or in addition to a Worker's Compensation claim. Minimum limits: $500,000 for each accident., disease policy limit, disease each employee and Statutory Worker's Compensation limit.

c. **Business Automobile Liability:** Coverage insures against liability claims arising out of the Contractor's use of automobiles. Minimum limit: $1,000,000 combined single limit per accident for bodily injury and property damage. Coverage should be written on an Any Auto basis.

2.16.3 Special Requirements:

a. **Claims-Made Coverage:** The limits of liability shall remain the same as the occurrence basis, however, the Retroactive date shall be prior to the coincident with the date of any contract, and the Certificate of Insurance shall state the coverage is claims-made. The Retroactive date shall also be specifically stated on the Certificate of Insurance.

b. **Extended Reporting Periods**: The Contractor shall provide the County with a notice of the election to initiate any Supplemental Extended Reporting Period and the reason(s) for invoking this option.

c. **Reporting Provisions:** Any failure to comply with reporting provisions of the policies shall not affect coverage provided in relation to this request.

d. **Cancellation:** Each insurance policy that applies to this request shall be endorsed to state that it shall not be suspended, voided, or canceled, except after thirty (30) days prior to written notice by certified mail, return receipt requested, has been given to the County.

e. **Proof of Insurance:** Chatham County shall be furnished with certificates of insurance and with original endorsements affecting coverage required by this request. The certificates and endorsements are to be signed by a person authorized by the insurer to bind coverage on its behalf. All certificates of insurance are to be submitted prior to, and approved by, the County before services are rendered. The Contractor mus ensure Certificate of Insurance are updated for the entire term of the County.

f. **Insurer Acceptability:** Insurance is to be placed with an insurer having an A.M. Best's rating of A and a five (5) year average financial rating of not less than V. If an insurer does not qualify for averaging on a five year basis, the current total Best's rating will be used to evaluate insurer acceptability.

g. **Lapse in Coverage:** A lapse in coverage shall constitute grounds for contract termination by the Chatham County Board of Commissioners.

h. **Deductibles and Self-Insured Retention**: Any deductibles or self-insured retention must be declared to, and approved by, the County. At the option of the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retention as related to the County, its officials, officers, employees, and volunteers; or the Contractor shall procure a bond guaranteeing payment of related suits, losses, claims, and related investigation, claim administration and defense expenses.

2.16.4 **Additional Coverage for Specific Procurement Projects:**

a. **Professional Liability:** Insure errors or omission on behalf of architects, engineers, attorneys, medical professionals, and consultants.

Minimum Limits: $1 million per claim/occurrence
Coverage Requirement: If claims-made, retroactive date must precede or coincide with the contract effective date or the date of the Notice to Proceed. The professional must state if tail coverage has been purchased and the duration of the coverage.

b. **Builder's Risk: (For Construction or Installation Contracts)** Covers against insured perils while in the course of construction.
Minimum Limits: All-Risk coverage equal 100% of contract value
Coverage Requirements: Occupancy Clause - permits County to use the facility prior to issuance of Notice of Substantial Completion.

2.17 **Compliance with Specification - Terms and Conditions:** The Invitation to Bid, Legal Advertisement, General Conditions and Instructions to Bidders, Specifications, Special Conditions, Vendor's Bid, Addendum, and/or any other pertinent documents form a part of the bidders proposal or bid and by reference are made a part hereof.

2.18 **Signed Bid Considered Offer:** The signed bid shall be considered an offer on the part of the bidder, which offer shall be deemed accepted upon approval by the Chatham County Board of Commissioners, Purchasing Agent or his designee. In case of a default on the part of the bidder after such acceptance, Chatham County may take such action as it deems appropriate, including legal action for damages or lack of required performance.

2.19 **Notice to Proceed:** The successful bidder or proposer shall not commence work under this Invitation to Bid until a written contract is awarded and a Notice to Proceed is issued by the Purchasing Agent or his designee. If the successful bidder does commence any work or deliver items prior to receiving official notification, he does so at his own risk.

2.20 **Payment to Contractors:** Instructions for invoicing the County for products delivered to the County are specified in the contract document.

a. Questions regarding payment may be directed to the Finance Department at (912) 652-7905 or the County's Project Manager as specified in the contract documents.

b. Contractors will be paid the agreed upon compensation upon satisfactory delivery of the products or completion of the work as more fully described in the contract document.

c. Upon completion of the work or delivery of the products, the Contractor will provide the County or contractor with an affidavit certifying all suppliers, persons or businesses employed by the Contractor for the work performed for the County have been paid in full.

d. Chatham County is a tax exempt entity. Every contractor, vendor, business or person under contract with Chatham County is required by Georgia law to pay State sales or use taxes for products purchased in Georgia or transported into Georgia and sold to Chatham County by contract. Please consult the State of Georgia, Department of Revenue, Sales and Use Tax

Unit in Atlanta (404) 656-4065 for additional information.

2.21 **County's Rights Concerning Award:**

The County reserves the right, and sole and complete discretion to waive technicalities and informalities. The County further reserves the right, and sole and complete discretion to reject all bids and any bid that is not responsive or that is over the budget, as amended. In judging whether the bidder is responsible, the County will consider, but is not limited to consideration of, the following:

(a) Whether the bidder or principals are currently ineligible, debarred, suspended, or otherwise excluded from bidding or contracting by any state or federal agency, department, or authority;

(b) Whether the bidder or principals have been terminated for cause or are currently in default on a public works contract;

(c) Whether the bidder can demonstrate sufficient cash flow to undertake the project as evidenced by a Current Ratio of 1.0 or higher;

(d) Whether the bidder can demonstrate a commitment to safety with regard to Workers' Compensation by having an Experience Modification Rate (EMR) over the past three years not having exceeded an average of 1.2; and

(e) Whether the bidder's past work provides evidence of an ability to successfully complete public works projects within the established time, quality, or cost, or to comply with the bidder's contract obligations.

(f) Whether the bidder has made a **Good Faith Effort** to meet local participation goals as set forth herein in Paragraph 2.22.

2.22 The Chatham County Board of Commissioners has adopted an aggressive program that establishes goals for minority/female, small and disadvantaged business participation in construction, professional services, and general procurement.

a. The Chatham County Board of Commissioners under Georgia law may reject any bid as non-responsive if they feel a bidder did not exercise **"Good Faith Effort"** in obtaining the goal established for M/WBE participation.

b. The Chatham County Board of Commissioners adopted a policy establishing goals oriented to increase participation of minority and female owned businesses, through MBE/WBE certification and development. In order to accurately document participation, businesses submitting bids, quotes or proposals are encouraged to report ownership status. A bidder or vendor that is certified by any agency of the Federal Government or State of Georgia may submit a copy of their certification with their bid as proof of qualifications. Bidders that intend to engage in joint ventures or utilize subcontractors must submit to the County Contracts Administrator, a report on Minority/Woman Business Enterprise participation.

Goals established for this project is <u>30% MBE/ WBE combined</u> .

c. A Minority/Woman Business Enterprise (M/WBE) is a business concern that is at least 51% owned by one or more minority/female individuals (2) and whose daily business operations are managed and directed by one or more of the minority/female owners.

2.23 Bidders or proposers are required to make a **Good Faith Effort,** where subcontracting is to be utilized in performing the contract, to subcontract with or purchase supplies from qualified M/WBEs. Bidders or proposers are required to state if they intend to subcontract any part of the work. Goals will be established for each contract at the onset. **Forms** requiring the signatures of bidders or proposers are enclosed as **Attachments** and must be completed and returned with your bid response. If forms are not completed and submitted, the bid may be considered nonresponsive.

Each bidder or proposer is required to maintain records of such efforts in detail adequate to permit a determination of compliance with these requirements. All contracts will reflect **Good Faith Efforts** and reporting requirements for the term of the contract. The County particularly urges general contractors to give emphasis to subcontracting with local area firms. **For all questions regarding M/WBE participation and Good Faith Effort only,** contact : **Arneja Riley, Chatham County M/WBE Coordinator, 124 Bull Street, Suite 310 Savannah, Ga. 31401. Ph 912-652-7860; fax 912-652-7849; e-mail alriely@chathamcounty.org or http://purchasing.chathamcounty.org**

2.24 **GEORGIA OPEN RECORDS ACT** - The responses will become part of the County's official files without any obligation on the County's part. Ownership of all data, materials and documentation prepared for and submitted to Chatham County in response to a solicitation, regardless of type, shall belong exclusively to Chatham County and will be considered a record prepared and maintained or received in the course of operations of a public office or agency and subject to public inspection in accordance with the Georgia Open Records Act, Official Code of Georgia Annotated, Section 50-18-70, et. Seq., unless otherwise provided by law.

Responses to RFPs shall be held confidential from all parties other than the County until after the contract is awarded by the Board of Commissioners.

The vendor and their bid price in response to IFBs will be read allowed at public bid openings. After Bid Tabulations, the IFB shall be available for public viewing.

Chatham County shall not be held accountable if material from responses is obtained without the written consent of the vendor by parties other than the County, at any time during the solicitation evaluation process.

2.25 **GEORGIA TRADE SECRET ACT of 1990-** In the event a Bidder/Proposer submits trade secret information to the County, the information must be clearly labeled as a Trade Secret. The County will maintain the confidentiality of such trade secrets to the extent provided by law.

2.26 **CONTRACTOR RECORDS-**The Georgia Open Records Act is applicable to the records of all contractors and subcontractors under contract with the County. This applies to those specific contracts currently in effect and those which have been completed or closed for up th three (3) years following completion. Again, this is contract specific to the County contracts only.

2.27 **EXCEPTIONS-**All proceedings, records, contracts and other public records relating to procurement transactions shall be open to the inspection of any citizen, or any interested person, firm or corporation, in accordance with the Georgia Open Records Act except as provided below:

a. Cost estimates relating to a proposed procurement transaction prepared by or for a public body shall not be open to public inspection.

b. Any competitive sealed bidding bidder, upon request, shall be afforded the opportunity to inspect bid records within a reasonable time after the opening of all bids but prior to award, except in the event that the County decides not to accept any of the bids and to rebid the contract. Otherwise, bid records shall be open to public inspection only after award of the contract. Any competitive negotiation offeror, upon request, shall be afforded the opportunity to inspect proposal records within a reasonable time after the evaluation and negotiations of proposals are completed but prior to award except in the event that the County decides not to accept any of the proposals and to reopen the contract. Otherwise, proposal records shall be open to the public inspection only after award of the contract except as provided in paragraph "c" below. Any inspection of procurement transaction records under this section shall be subject to reasonable restrictions to ensure the security and integrity of the records.

c. Trade secrets or proprietary information submitted by a bidder, offeror or contractor in connection with a procurement transaction shall not be subject to public disclosure under the Georgia Open Records Act; however, the bidder, offeror or contractor must invoke the protections of this section prior to or upon submission of the data or other materials, and must identify the data or other materials to be protected and state the reasons why protection is necessary.

d. Nothing contained in this section shall be construed to require the County, when procuring by "competitive negotiation" (Request for Proposal), to furnish a statement of the reasons why a particular proposal was not deemed to be the most advantageous to the County.

2.28 **DEBARRED OR SUSPENDED SUBCONTRACTORS:** CONTRACTOR shall not subcontract, and shall ensure that no subcontracts are awarded at any tier, to any individual, firm, partnership, joint venture, or any other entity regardless of the form of business organization, that is on the Federal Excluded Parties List System (EPLS) at https://www.epls.gov or the State of Georgia, DOAS, State Purchasing Exclusion listing. Contractor shall immediately notify County in the event any subcontractor is added to either Federal or State listing after award of the subcontract.

2.29 **CONE OF SILENCE:**

Lobbying of Procurement Evaluation Committee members, County Government employees, and elected officials regarding this product or service solicitation, Invitation to Bid (ITB) or Request for Proposal (RFP) or contract by any member of a proposer's staff, or those people employed by any legal entity affiliated with an organization that is responding to the solicitation is strictly prohibited. Negative campaigning through the mass media about the current service delivery is strictly prohibited. Such actions may cause your proposal to be rejected.

2.30 **OWNER'S RIGHT TO NEGOTIATE WITH THE LOWEST BIDDER:**
In the event *all* responsive and responsible bids are in excess of the budget, the Owner, in its sole and absolute discretion and in addition to the rights set forth above, reserves the right either to (i) supplement the budget with additional funds to permit award to the lowest responsive and responsible bid, or (ii) to negotiate with the lowest responsive and responsible bidder (after taking all deductive alternates) only for the purpose of making changes to the Project that will result in a cost to the Owner that is within the budget, as it may be amended.

2.31 **REFERENCES - $500,000 or more:** On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of $500,000 or more, for bidders to be responsive each must provide information on the most recent five (5) projects with similar scope of work as well as other information to determine experience and qualifications as follows:

a. Project Name:_____
Location:_____
Owner:_____
Address:_____
City and State:_____
Contact:_____
Phone & Fax:_____
*Architect or Engineer:_____
Contact:_____
Phone & Fax:_____
Email:_____

b. The awarded bid amount and project start date.
c. Final cost of project and completion date.
d. Number of change orders.
e. Contracted project completion in days.
f. Project completed on time. Yes____ No____ Days exceeded_____.
g. List previous contracts your company performed for Chatham County by Project Title, date and awarded/final cost.
h. Has contractor ever failed to complete a project? If so, provide explanation.
i. Have any projects ever performed by contractor been the subject of a claim or lawsuit by or against the contractor? If yes, please identify the nature of such claim or lawsuit, the court in which the case was filed and the details of its resolution.

$499,000 and less: Provide references from owners of at least three (3) projects of various sizes for which contractor was the prime contractor. Include government owners if possible. If the contractor has performed any work for the Chatham County Board of Commissioners within the last five (5) years, at least one (1) of the three (3) owner references must be from the appropriate party within the Chatham County Government. provide in the format as in (a) above on the attached form.

Failure to provide the above information may result in your firm's bid being rejected and ruled as non-responsive.

NOTE: FORMS FOR YOU TO FILL OUT FOR YOUR REFERENCES ARE ATTACHED TO THE BACK OF THIS BID PACKAGE.

2.32 **CONSTRUCTION APPRENTICE PROGRAM HIRING**:

Chatham County has established a Construction Apprentice Program (CAP) to train area residents in the building trades. Successful Contractor shall be required to make a good faith effort to utilize labor from the CAP Program on this project when feasible. A Good Faith Effort will be demonstrated by documentation of inquiry into CAP labor available and resulting hiring of CAP labor or providing reasons for Contractor not utilizing any CAP labor. Form demonstrating Good Faith Effort is enclosed as Attachment F. Contractor shall complete the form and return with their first pay request. All questions regarding CAP student hiring should be directed to Construction Program Manager, Tara Sinclair at (912) 604-9574.

2.33 **SECURITY AND IMMIGRATION COMPLIANCE ACT AND SYSTEMATIC ALIEN VERIFICATION FOR ENTITLEMENTS (SAVE):**On July 1, 2008, the Georgia Security and Immigration Compliance Act (SB 529, Section 2) became effective. All contractors and subcontractors entering into a contract or performing work must sign an affidavit that he/she has used the E-Verify System. E- Verify is a no-cost federal employment verification system to insure employment eligibility. Affidavits are enclosed in this solicitation. You may download M-274 Handbook for Employers at http://www.dol.state.ga.us/spotlight/employment/rules.You may go to http://www.uscis.gov., to find the E-Verify information.

O.C.G.A. § 50-36-1, requires Georgia's counties to comply with the federal **Systematic Alien Verification for Entitlements (SAVE) Program**. SAVE is a federal program used to verify that applicants for certain "public benefits" are legally present in the United States. Contracts with the County are considered "public benefits." Therefore, the successful bidder will be required to provide the Affidavit Verifying Status for Chatham County Benefit Application prior to receiving any County contract. The affidavit is included as part of this bid package(Attachment H) but is only required of the successful bidder.

ADDITIONAL CONDITIONS

3.1 **Firm Fixed Price:** Contractor shall provide a firm fixed price which will be valid for acceptance within 90 days of receipt of bid

3.2. **METHOD OF COMPENSATION**. The compensation provided for herein shall include all claims by the CONTRACTOR for all costs incurred by the CONTRACTOR in the conduct of the Project as authorized by the approved Project Compensation Schedule and this amount shall be paid to the CONTRACTOR after receipt of the invoice and approval of the amount by the COUNTY. The COUNTY shall make payments to the CONTRACTOR within thirty (30) days from the date of receipt of the CONTRACTOR's acceptable statement on forms prepared by the CONTRACTOR and approved by the COUNTY.

Should the Project begin within any one month, the first invoice shall cover the partial period from the beginning date of the Project through the last day of the month (or on a mutually agreeable time) in which it began. The invoices shall be submitted each month until the Project is completed. Invoices shall be itemized to reflect actual expenses for each individual task; also refer to the requirements concerning changes, delays and termination of work under Sections I-8, 9, and 10 of the contract. Each invoice shall be accompanied by a summary progress report which outlines the work accomplished during the billing period and any problems that may be inhibiting the Project execution. The terms of this contract are intended to supersede all provisions of the Georgia Prompt Pay Act.

As long as the gross value of completed work is less than 50% of the total contract amount, or if the contractor is not maintaining his construction schedule to the satisfaction of the engineer, the County shall retain 10% of the gross value of the completed work as indicated by the current estimate approved by the engineer.

After the gross value of completed work becomes to or exceed 50% of the total contract amount within a time period satisfactory to the County, then the total amount to be retained may be reduced to 5% of the gross value of the completed work as indicated by the current estimate approved by the engineer, until all pay items are substantially completed.

When all work is completed and time charges have ceased, pending final acceptance and final payment the amount retained may be further reduced at the discretion of the County.

The CONTRACTOR may submit a final invoice to the County for the remaining retainage upon COUNTY'S acceptance of the Certificate of Substantial Completion. Final payment constituting the entire unpaid balance due shall be paid by the COUNTY to the CONTRACTOR when work has been fully completed and the contract fully performed, except for the responsibilities of the CONTRACTOR which survive final payment. The making of final payment shall constitute a waiver of all claims by Chatham County except those arising from unsettled liens, faulty or defective work appearing after substantial completion, failure of the work to comply with the requirements of the Contract Documents, or terms of any warranties required by the Contractor Documents or those items previously made in writing and identified by the COUNTY as unsettled at the time of final application for payment. Acceptance of

final payment shall constitute a waiver of all claims by the CONTRACTOR, except those previously made in writing and identified by the CONTRACTOR as unsettled at the time of final application for payment.

3.2.1. **FORCE ACCOUNT:** When no agreement is reached for additional work to be done at Lump Sum or Unit Prices, then such additional work shall be done based on the following Cost-Plus-Percentage basis of payment. The Georgia Department of Transportation specifications for the use of a force account will not be used.

a. For work performed by the prime contractor/general contractor, the contractor shall be reimbursed for actual cost incurred in doing the work, and an additional payment of 15% to cover overhead and profit.

b. For work performed by a sub-contractor, the sub-contractor shall be reimbursed for actual cost incurred in doing the work, and an additional payment of 10% to cover overhead and profit. The contractor shall be allowed an overhead and profit mark-up not to exceed 7% on the subcontractor's price. The County shall not recognize subcontractors of subcontractors.

c. The term "Actual Cost" shall include the cost of material and labor as follows:
   i. Material cost - Direct cost of material, sales tax, freight and equipment rental.
   ii. Labor cost - Man hour cost listed separately by trade, payroll costs including workman's compensation, social security, pension and retirement.

d. The term "Overhead and Profit" shall include bonds (Payment & Performance, Roof & Wall), insurance (Liability, Builders Risk), permits, supervision costs (cost of subcontractor to supervise own work, cost of contractor to supervise work of sub-contractor), proposal preparation and all administrative costs.

3.2.2. **LIQUIDATED DAMAGES:** Failure to complete the work within the duration plus any extension authorized in writing by the County Engineer shall entitle the County to deduct as "Liquidated Damages" from the monies due the Contractor the amount of **$400** for each calendar day in excess of the authorized construction time.

3.3 **SURETY REQUIREMENTS and Bonds:** (Check where applicable)

X **A.** **Such bidder shall post a bid bond, certified check or money order made payable to the Chatham County Finance Department in the amount of 5% of the bid price.**

B. **Contractor(s) shall post a payment/performance bond, certified check or money order made payable to the Chatham County Finance Department in the amount of 100% of the bid price if awarded the purchase. Such bond(s) are due prior to contract execution as a guarantee that goods meet specifications and will be delivered per contract. Such bonds will also guarantee quality performance of services and timely payment of invoices to any subcontractors.**

X **C.** **Whenever a bond is provided, it shall be executed by a surety authorized to do business in the State of Georgia and approved by Chatham County.**

D. **Bidder acknowledges Chatham County's right to require a Performance and Payment Bond of a specific kind and origin. "Performance Bond" means a bond with good and sufficient surety or surities for the faithful performance of the contract and to indemnify the governmental entity for any damages occasioned by a failure to perform the same within the prescribed time. Such bond shall be payable to, in favor of, and for the protection of the governmental entity for which the work is to be done. "Payment Bond" means a bond with good and sufficient surety or sureties payable to the governmental entity for which the work is to be done and intended for the use and protection of all subcontractors and all persons supplying labor, materials, machinery, and equipment in the prosecution of the work provided for in the public works construction contract.**

X E. **Forfeit the amount of the Bid Bond if he/she fails to enter into a contract with Chatham County to do and/or furnish everything necessary to provide service and/or accomplish the work stated and/or specified in this bid proposal for the bid amount, and;**

3.4 **Warranty Requirements:** (Check where applicable):

a. Provisions of item 2.12 apply.

b. Warranty required.

X 1. Standard warranty shall be offered with bid.

2. Extended warranty shall be offered with bid. The cost of the extended warranty will be listed separately on the bid sheet.

3.5 **Terms of Contract:** (check where applicable):

a. Annual Contract

b. One-time Purchase

X c. Other **ONE TIME CONTRACT**

CONVERSATIONS OR CORRESPONDENCE REGARDING THIS SOLICITATION OR REPORT BETWEEN PROSPECTIVE OFFERORS AND PERSONS OUTSIDE THE CHATHAM COUNTY PURCHASING OFFICE WILL NOT BE CONSIDERED OFFICIAL OR BINDING UNLESS OTHERWISE SPECIFICALLY AUTHORIZED WITHIN THIS DOCUMENT.

The undersigned bidder or proposer certifies that he/she has carefully read the preceding list of instructions to bidders and all other data applicable hereto and made a part of this invitation; and, further certifies that the prices shown in his/her bid/proposal are in accordance with all documents contained in this Invitation for Bids/ Proposals package, and that any exception taken thereto may disqualify his/her bid/proposal.

This is to certify that I, the undersigned bidder, have read the instructions to bidder and agree to be bound by the provisions of the same.

This _____ day of _____ 20 ____.

BY _____
SIGNATURE

_____
TITLE

_____
COMPANY

_____
Phone / Fax No's.

CHECKLIST FOR SUBMITTING BID

Sign below and submit this sheet with Bid

NOTE: All of the following items must be submitted with your Bid to be considered "responsive".

1. ACKNOWLEDGMENT OF ANY/ALL ADDENDUMS (Page 3 of ITB)

2. ORIGINAL SURETY BOND (5% OF BID) ALONG WITH *SURETY REQUIREMENTS* SHEET FILLED OUT (page 23 of ITB)

3. BID SHEET COMPLETELY FILLED OUT AND SIGNED.

4. "LIST OF SUBCONTRACTORS" SHEET FILLED OUT WITH ALL SUBCONTRACTORS AND SUPPLIERS.

5. "% TO MBE SUBCONTRACTORS/SUPPLIERS" (ON ATTACHMENT G) SHOWING % OF PROJECT THAT IS PROJECTED TO GO TO M/WBE SUBCONTRACTORS / SUPPLIERS MUST BE COMPLETELY FILLED OUT.

6. SECTION 2.28 OF ITB (page 16) REFERENCES: Read this section and submit the correct number of "References" (based on total dollar amount of project) Note: Supply ALL the information that is requested for each Reference. NOTE: *Forms for Reference Information are attached to this Bid Package.*

7. COMPLETE AND SUBMIT ALL *ATTACHMENTS* TO THE ITB (Attachments A thru H).

8. SUBMIT A COPY OF YOUR CURRENT *STATE OF GEORGIA UTILITY CONTRACTORS LICENSE.*

_____

NAME / TITLE

_____

COMPANY

_____

ADDRESS

_____

PHONE / FAX NO'S.

CHATHAM COUNTY, GEORGIA

SURETY REQUIREMENTS

A Bid Bond for five percent (5%) of the amount of the bid **is** required to be submitted with each bid.

A Performance Bond for one hundred percent (100%) of the bid **will not** be required of the successful bidder.

The Bidder certifies that he/she has examined all documents contained in this bid package, and is familiar with all aspects of the proposal and understands fully all that is required of the successful bidder. The Bidder further certifies that his/her bid shall not be withdrawn for thirty (30) days from the date on which his bid is publicly opened and read.

The Bidder agrees, if awarded this bid, he/she will:

A. Furnish, upon receipt of an authorized Chatham County Purchase Order, all items indicated thereon as specified in this bid proposal for the bid amount, or;

B. Enter a contract with Chatham County to do and/or furnish everything necessary to provide the service and/or accomplish the work as stated and/or specified in this bid proposal for the bid amount, and;

C. Furnish, if required, a Performance Bond, and acknowledges Chatham County's right to require a Performance Bond of a specific kind and origin, and;

D. Forfeit the amount of the Bid Bond as liquidated damages if he/she fails to enter a contract with Chatham County as stated in (B) above, within fifteen (15) days of the date on which he/she is awarded the bid, and/or;

E. Forfeit the amount of the Performance Bond as liquidated damages if he/she fails to execute and fulfill the terms of the contract entered. The amount of forfeiture shall be:

   1. The difference between his/her bid and the next lowest, responsible bid that has not expired or been withdrawn, or;

   2. The difference between his/her bid and the amount of the lowest, responsible bid received as a result of rebidding, including all costs related to rebidding.

_____ _____

COMPANY DATE

_____ _____

SIGNATURE TITLE

_____

TELEPHONE NUMBER

PROPOSAL

SPECIFICATIONS FOR:

WILMINGTON CANAL DRAINAGE IMPROVEMENTS

BID NO. 12-0076-4

The project is located on Wilmington Island along Wilmington Canal between North Cromwell Road and Wilmington Island Road in unincorporated Chatham County, Georgia.

The work will consist of furnishing all materials, labor and equipment for:

Replacing undersized stormwater pipes with larger pipes and box culverts. Associated work for the culvert replacements is included on the construction drawings. The project will replace only the pipes and their associated end treatments. No grading will be performed in the Wilmington Canal except as shown on the construction drawings. The proposed pipes are being placed below finish grade to provide a natural channel inside the pipe.

A location map, construction plans, technical specifications and special provisions for the project is provided elsewhere in these contract documents.

Note: This shall be a unit price contract. Quantities are approximate and payment shall be for actual in-place work measurements.

COMMENCEMENT AND COMPLETION:

WORK SHALL BEGIN WITHIN 10 DAYS AFTER RECEIPT OF "NOTICE TO PROCEED". ALL WORK SHALL BE COMPLETED WITHIN 360 CALENDAR DAYS AFTER THE TEN DAY PERIOD.

Wilmington Canal Drainage Improvements
June 2012

DEMOLITION					
Item	Description	Quantity	Unit	Unit Price	Total Price
1	Clear and Grub	0.32	AC		
2	Demolish Rip-Rap	70	SY		
3	Demolish 18" RCP	25	LF		
4	Demolish Concrete Slabs at 18" RCP	2	EA		
5	Demolish 30" RCP	30	LF		
6	Demolish 29"x42" CMP	80	LF		
7	Demolish 36" CMP	22	LF		
8	Demolish Endwalls at 36" CMP	2	EA		
9	Demolish 36" CPP	30	LF		
10	Demolish 39"x64" CMP	65	LF		
11	Demolish endwalls at 39"x64" CMP	2	EA		
12	Sawcut Pavement & Curb & Gutter	108	LF		
13	Demolish Curb & Gutter	252	LF		
14	Demolish Pavement and Base	310	SY		
15	Demolish Curb Inlet	2	EA		
16	Demolish Interference Manhole	3	EA		
17	Remove 8" Water Main	130	LF		
18	Demolish 8" Valve & MH	1	EA		
19	Demolish 8" Sanitary Sewer	74	LF		
20	Demolish 4" Force Main	40	LF		
DRAINAGE IMPROVEMENTS					
21	10'x4' Concrete Box Culvert	250	LF		
22	29"x45" RCEP	24	LF		
23	No. 57 Stone	120	CY		
24	Concrete Wingwalls at Box Culvert	6	EA		
25	Concrete Endwall at 29"x45" RCEP	2	EA		
26	Anti-Seep Collar at 29"x45" RCEP	1	EA		
27	Curb Inlet	4	EA		
28	Regrade Existing Canal	1120	LF		
29	Rip-Rap (Includes Fabric & Flowable Fill)	656	sy		
30	Asphalt Pavement & Base	310	SY		
31	24" Curb & Gutter	252	LF		
32	Earthen Roadway	532	SY		
WATER MAIN IMPROVEMENTS					
33	8" Line Stop	4	EA		
34	8"x8"x8" Tapping Sleeve & Valve	4	EA		
35	Manhole for Tapping Valve	4	EA		
36	16" Steel Casing Pipe	100	LF		
37	8" MJDI Watermain	170	LF		
38	Joint Restraints on Existing 8" Main	400	LF		

SANITARY SEWER IMPROVEMENTS					
39	Connect to Existing Sanitary Manhole	1	EA		
40	Saddle Sanitary Manhole	1	EA		
41	Sanitary Manhole	2	EA		
42	10" PVC Sanitary Sewer	60	LF		
43	10" DI Sanitary Sewer (FLxPE)	15	LF		
44	10" DI Sanitary Sewer (Flanged)	20	LF		
45	Pipe Supports for Sanitary Sewer	4	EA		
46	Pipe Supports for Force Main	2	EA		
47	4" Inserted Valve	1	EA		
48	4" DI Force Main (Flanged)	20	LF		
49	4" DI Force Main (FLxPE)	20	LF		
50	Flanged Adapter	2	EA		
51	8" DI Sanitary Sewer (Flanged)	20	LF		
52	8" DI Sanitary Sewer (FLxPE)	20	LF		
53	Flanged Adapter	2	EA		
MISCELLANEOUS					
54	Traffic Control & Signage	1	LS		
55	Erosion & Sedimentation Control	1	LS		
56	Water Management	1	LS		
57	Bypass Sewage Pumping	1	LS		
58	Temporary Utility Supports	1	LS		
59	Field Condition Allowance	1	LS	$ 20,000	$ 20,000
TOTAL PROJECT COST					$

Signature Date

NAME / TITLE

COMPANY

ADDRESS

PHONE / FAX NO'S

EMAIL

LIST OF SUBCONTRACTORS

I do _____, do not _____, propose to subcontract some of the work on this project. I propose to subcontract work to the following subcontractors:

NAME AND ADDRESS	TYPE OF WORK

SIGNED: _____

CONTRACTOR

ATTACHMENT A

DRUG - FREE WORKPLACE CERTIFICATION

THE UNDERSIGNED CERTIFIES THAT THE PROVISIONS OF CODE SECTIONS 50-24-1 THROUGH 50-24-6 OF THE OFFICIAL CODE TO GEORGIA ANNOTATED, RELATED TO THE **DRUG-FREE WORKPLACE**, HAVE BEEN COMPLIED WITH IN FULL. THE UNDERSIGNED FURTHER CERTIFIES THAT:

1. A Drug-Free Workplace will be provided for the employees during the performance of the contract; and
2. Each sub-contractor under the direction of the Contractor shall secure the following written certification:

_____ (CONTRACTOR) certifies to Chatham County that a Drug-Free Workplace will be provided for the employees during the performance of this contract known as **Wilmington Canal Drainage Improvements.**
(PROJECT)

pursuant to paragraph (7) of subsection (B) of Code Section 50-24-3. Also, the undersigned further certifies that he/she will not engage in the unlawful manufacture, sale, distribution, possession, or use of a controlled substance or marijuana during the performance of the contract.

_____ _____
CONTRACTOR DATE

_____ _____
NOTARY DATE

ATTACHMENT B

PROMISE OF NON-DISCRIMINATION STATEMENT

Know All Men By These Presence, that I (We), _____,
Name
_____, _____ (herein after
"Company"),
Title Name of Bidder
in consideration of the privilege to bid/or propose on the following Chatham **County project procurement Wilmington Canal Drainage Improvements.** hereby consent, covenant and agree as follows:

(1) No person shall be excluded from participation in, denied the benefit of or otherwise discriminated against on the basis of race, color, national origin or gender in connection with the bid submitted to Chatham County or the performance of the contract resulting therefrom;

(2) That it is and shall be the policy of this Company to provide equal opportunity to all business persons seeking to contract or otherwise interested with the Company, including those companies owned and controlled by racial minorities, and women;

(3) In connection herewith, I (We) acknowledge and warrant that this Company has been made aware of, understands and agrees to take affirmative action to provide minority and women owned companies with the maximum practicable opportunities to do business with this Company on this contract;

(4) That the promises of non-discrimination as made and set forth herein shall be continuing throughout the duration of this contract with Chatham County;

(5) That the promises of non-discrimination as made and set forth herein shall be and are hereby deemed to be made a part of and incorporated by reference in the contract which this Company may be awarded;

(6) That the failure of this Company to satisfactorily discharge any of the promises of non-discrimination as made and set forth above may constitute a material breach of contract entitling the County to declare the contract in default and to exercise appropriate remedies including but not limited to termination of the contract.

_____ _____
Signature Date

Attachment C

DISCLOSURE OF RESPONSIBILITY STATEMENT

Failure to complete and return this information will result in your bid/offer/proposal being disqualified from further competition as non-responsive.

1. List any convictions of any person, subsidiary, or affiliate of the company, arising out of obtaining, or attempting to obtain a public or private contract or subcontract, or in the performance of such contract or subcontract.

_____

2. List any indictments or convictions of any person, subsidiary, or affiliate of this company for offenses such as embezzlement, theft, fraudulent schemes, etc. or any other offenses indicating a lack of business integrity or business honesty which affects the responsibility of the contractor.

_____

3. List any convictions or civil judgments under states or federal antitrust statutes.

_____

4. List any violations of contract provisions such as knowingly (without good cause) to perform, or unsatisfactory performance, in accordance with the specifications of a contract.

_____

5. List any prior suspensions or debarments by any governmental agency.

_____

6. List any contracts not completed on time.

_____

7. List any penalties imposed for time delays and/or quality of materials and workmanship.

_____

8. List any documented violations of federal or any state labor laws, regulations, or standards, occupational safety and health rules.

_____

I,_____, as _____
Name of individual Title & Authority

of _____, declare under oath that

Company Name _____

the above statements, including any supplemental responses attached hereto, are true.

_____
Signature

State of _____

County of _____

Subscribed and sworn to before me on this _____ day of _____

2008 by _____ representing him/herself to be

_____ of the company named herein.

_____
Notary Public

My Commission expires:

_____

Resident State:_____

DPC Form #45

Attachment D

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm, or corporation which is contracting with (name of public employer) has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with (name of public employer), contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the (name of the public employer) at the time the subcontractor(s) is retained to perform such service.

_____
EEV / Basic Pilot Program* User Identification Number

_____ _____
BY: Authorized Officer or Agent Date
(Contractor Name)

_____
Title of Authorized Officer or Agent of Contractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
_____ DAY OF _____, 200_

_____
Notary Public
My Commission Expires:

_____

* As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot
Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

SUBCONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (name of contractor) on behalf of (name of public employer) has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

_____

EEV / Basic Pilot Program* User Identification Number

_____ _____

BY: Authorized Officer or Agent Date
(Subcontractor Name)

_____

Title of Authorized Officer or Agent of Subcontractor

_____

Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
_____ DAY OF _____, 200_

_____

Notary Public
My Commission Expires:

_____

* As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot
Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

ATTACHMENT E

CHATHAM COUNTY, GEORGIA

BIDDER'S CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

The undersigned certifies, by submission of this proposal or acceptance of this contract, that neither Contractor nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntary excluded from participation in this transaction by any Federal department or agency, State of Georgia, City of Savannah, Board of Education of local municipality. Bidder agrees that by submitting this proposal that Bidder will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, that participant shall attach an explanation to this document.

Bidder must verify Sub-Tier Contractors and Suppliers are not debarred, suspended, ineligible, pending County litigation or pending actions from any of the above government entities.

Certification – the above information is true and complete to the best of my knowledge and belief.

_____

(Printed or typed Name of Signatory)

_____

(Signature)

_____

(Date)

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001

END OF DOCUMENT Mod. CC P & C 6/2005

Attachment F

Construction Apprentice Program Documentation
(must be submitted to Arneja Riley County MWBE Coordinator with 1st Pay Request)

Contractor _____

Name of Project_____

Contract No. _____

1) Contractor has contacted CAP office to determine availability of specific labor classes which may be utilized for the project:

Date of Inquiry # of Available Participants

_____ _____

2) Anticipated number of CAP students that will be hired and related trade category:

#_____ Trade Category_____
#_____ Trade Category_____
#_____ Trade Category_____

3) If CAP students are not anticipated to be hired for this project, the contractor must briefly explain.

_____

_____

_____

_____

_____

Any questions regarding the Construction Apprentice Program and available participant labor should be directed to Tara Sinclair at (912) 604-9574.

Attachment G

Chatham County
Minority and Women Business Enterprise Program
Proposed MWBE Participation Report

Name of Bidder:_____

Name of Project:_____ Bid No:_____

M/WBE Firm	Type of Work	Contact Person/ Phone #	City, State	%	MBE or WBE

MBE Total_____% WBE Total_____% MWBE Combined_____%

The undersigned must enter into a formal agreement with M/WBE Contractor identified herein for work listed in this schedule conditioned upon execution of contract with the Chatham County Board of Commissioners.

Signature_____ Print_____

Phone (___)_____ Fax (___)_____

Attachment H

Systematic Alien Verification for Entitlements (SAVE)
Affidavit Verifying Status for Chatham County Benefit Application

By executing this affidavit under oath, as an applicant for a Chatham County, Georgia Business License or Occupation Tax Certificate, Alcohol License, Taxi Permit, Contract or other public benefit as reference in O.C.G.A. Section 50-36-1, I am stating the following with respect to my bid for a City of Savannah contract for _____. [Name of natural person applying on behalf of individual, business, corporation, partnership, or other private entity]

1.) _____ I am a citizen of the United States.

OR

2.) _____ I am a legal permanent resident 18 years of age or older.

OR

3.) _____ I am an otherwise qualified alien (8 § USC 1641) or non-immigrant under the Federal Immigration and Nationality Act (8 USC 1101 *et seq.*) 18 years of age or older and lawfully present in the United States.*

In making the above representation under oath, I understand that any person who knowingly and willfully makes a false, fictitious, or fraudulent statement or representation in an affidavit shall be guilty of a violation of Code Section 16-10-20 of the Official Code of Georgia.

Signature of Applicant: **Date**

_____ _____

Printed Name:

_____

SUBSCRIBED AND SWORN

BEFORE ME ON THIS THE _____DAY OF _____, 20___

Notary Public
My Commission Expires:

* _____

Alien Registration number for non-citizens.

SECTION 01600
SPECIAL CONDITIONS

PART 1 – PROJECT DESCRIPTION

1.01 LOCATION AND DESCRIPTION OF WORK

A. The project is located on Wilmington Island along the Wilmington Canal between North Cromwell Road and Wilmington Island Road in unincorporated Chatham County.

B. The work consists of the following:

1. Replacing undersized stormwater pipes with larger pipes and box culverts;

2. Associated work for the culvert replacements is included on the construction drawings. The project will replace only the pipes and their associated end treatments. No grading is to be performed in the Wilmington Canal except as shown on the construction drawings. The proposed pipes are being placed below finish grade to provide a natural channel inside the pipe.

C. Access to the site to install the stormwater pipes shall be along the existing rights-of-way. At the completion of the project the Contractor shall restore this area to equal or better than its pre construction condition.

PART 2 – CONTRACT DOCUMENTS

2.01 TECHNICAL SPECIFICATIONS

A.	01600	Special Conditions
B.	02070	Selective Demolition
C.	02110	Site Clearing
D.	02204	Earthwork
E.	02210	Soil Erosion Control
F.	02275	Rip-Rap
G.	02550	Water Distribution System
H.	02554	Wastewater Collection System
I.	02555	Protective Coating for Existing and New Concrete and Masonry Sanitary Sewer Structures
J.	02570	Traffic Control
K.	02600	Pavement
L.	02720	Storm Drainage
M.	02722	Water Management Services
N.	02902	Grassing
O.	03300	Cast-In-Place Concrete

2.02 DRAWINGS

A.	Sheet CO	Cover Sheet
B.	Sheet G1.1	Sheet Index, Notes & Legend
C.	Sheet T1.1	Traffic Control Plan – Winchester Drive
D.	Sheet T1.2	Traffic Control Plan – Clarendon Road
E.	Sheets C1.1-C1.2	Existing Utilities Plan
F.	Sheets D1.1-D1.2	Demolition Plan
G.	Sheets C3.1-C3.4	Plan and Profile
H.	Sheet C5.1	Paving & Drainage Details
I.	Sheet C5.2	GDOT Standard 2530P
J.	Sheet C5.3	GDOT Standard 2535P
K.	Sheets C5.4-C5.7	Water & Sewer Details
L.	Sheet EC1.1	ES&PC Sheet Index, Notes & Legend
M.	Sheets EC.1-EC.2	ES&PC Initial Phase
N.	Sheets EC.3-EC.4	ES&PC Intermediate/Final Phase
O.	Sheet EC.5	ES&PC Details
P.	Sheets EC.6-EC.7	ES&PC Notes
Q.	Sheet EC.8	ES&PC Plan Checklist

PART 3 – PRECONSTRUCTION AND POST-CONSTRUCTION INDPSECTIONS

3.01 PRECONSTRUCTION INSPECTION

A. A preconstruction conditions video (standard DVD format) is required and must be submitted to Chatham County Department of Engineering for approval prior to start of any land disturbing work. Special emphasis shall be given to record pre-disturbance condition of roadway pavements, curbing, sidewalks, driveways, buildings, utilities and other improvements located within or within 100 feet of the project limits. This is in addition to other inspections and surveys required of the Contractor or performed by the County. The video shall be prepared by a professional photographer having experience in similar work and approved by the County. A voice narrative shall identify location and features of the preconstruction video. If the voice narrative is unclear, a typewritten version of the narrative shall be provided.

3.02 POST-CONSTRUCTION INSPECTION

A. The Contractor shall provide and pay all costs of a video inspection record of the completed pipe systems produced by a qualified sewer inspection company or agency (Chatham County or City of Savannah inspection crews are acceptable, however the Contractor shall remain responsible for paying all costs). The video inspection record shall be provided on standard DVD and compatible with County viewing software. All deficiencies identified by the inspection shall be corrected by the Contractor prior to acceptance of the work as substantially complete.

PART 4 – STAKING

4.01 CONSTRUCTION STAKING AND CONTROL OF WORK

A. The County shall engage a surveyor registered by the State of Georgia to provide initial construction stakeout and demarcation project limits and property lines. Ongoing control of the project work shall be the responsibility of the Contractor. The cost for resurvey work to reestablish initial project controls shall be paid for by the Contractor. The Contractor shall provide access and schedule all work in order to accommodate the survey work by the County's surveyor.

PART 5 - DOCUMENTATION

5.01 DOCUMENTATION TO BE PROVIDED WITH REQUESTS FOR PAYMENT

A. In addition to the documentation described elsewhere in the Contract Documents, the Contractor shall submit with each request for payment the following:

1. Inspection reports of the sediment and erosion control facilities as described in the General Permit No. GAR100002. A copy of the Georgia Soil and Water Conservation Commission certification card(s) of the person(s) completing the reports shall also be submitted. Missing or incomplete documentation of inspection reports may be cause for delay/denial of payment.

2. Copies of material delivery tickets. The Contractor shall be responsible for collecting these documents at the time of delivery. The delivery tickets shall not relieve the Contractor of his responsibility to ensure the materials are in accordance with the contract documents. Missing or incomplete documentation of delivered materials may be cause for delay/denial of payment.

3. Prior to submitting a request for payment, the Contractor shall review the extent of work completed with the County's representative for accuracy and completeness.

PART 6 – EROSION AND SEDIMENTATION CONTROL

6.01 DUTIES

A. The Contractor will be responsible for installation, maintenance and repair of the sedimentation and erosion control facilities and for any modifications or adjustments necessary for the project to remain in compliance with the Georgia Erosion and Sedimentation Act during performance of the work. The Contractor will have on site at all times of construction activity a Georgia Soil and Water Conservation Commission Level 1A certified person.

B. The contractor shall perform sediment and erosion control inspection and reporting requirements, recording daily precipitation amounts, and other duties as described in the contract documents. Inspection reports shall be provided on

forms provided by the County or as approved by the County. Signed copies of the Contractor's reports shall be submitted to the County with each Request for Payment. Water quality testing and reporting will be provided by the County.

C. The total contract amount will be reduced by an amount as specified in the fines section below for each occurrence of failure to conform to the sediment and erosion control requirements of the contract. For the purpose of this paragraph an occurrence shall be defined as each 24-hour period with consecutive 24-hour periods being measured as separate occurrences. This fee shall be in addition to any penalties or assessments made against the Contractor for non-compliance of the Georgia Water Quality Control Act.

PART 7 - FINES AND LIQUIDATED DAMAGES

7.01 FINE

A. A $300 per day fee shall be assessed against the Contractor and withheld from the Lump Sum Contract Price for each and every day that the erosion and sedimentation control plan is not in proper operation. This fee shall be in addition to any penalties or assessments made against the Contractor for non-compliance of the Georgia Water Quality Control Act.

7.02 LIQUIDATED DAMAGES

A. Liquidated Damages shall be assessed at $400 per calendar day for work not completed within the Contract period. The full amount of liquidated damages will be deducted from the final payment to the Contractor.

PART 8 - ALLOWANCE

8.01 FIELD CONDITION ALLOWANCE

A. The Field Condition Allowance shown on the bid sheet shall belong to Chatham County. Bidders shall not use this Allowance to assume any Contractor costs known or unknown at the bidding. Chatham County must approve use of the Allowance. Bidders shall include this Field Condition Allowance within their base bid. Any unused allowance shall revert to Chatham County.

PART 9 - SPECIAL REQUIREMENTS OF CONSTRUCTION

9.01 REQUIREMENTS

A. Work hours shall be limited to 7:00 am to 7:00 pm Monday through Friday and shall exclude holidays unless otherwise approved by Chatham County.

B. All work is to be performed within the existing right of ways and easements. **The Contractor shall obtain an Encroachment Permit from the Department of Public Works prior to any work within road rights of way**. Permission to use private property outside of these areas shall be obtained by the Contractor in

writing. Copies of such agreements shall be provided to the Chatham County Engineering Department.

C. The Contractor shall provide temporary sheet pile cofferdams or other approved methods upstream and downstream of the excavation and pumping facilities to control water as needed in any open excavations as described in the contract specifications. A soil berm/dam is not permitted within the Canal banks.

D. The Contractor shall schedule the replacement of the culverts so that the weather does not prevent each pipe from being installed within as few days as possible. Only one culvert crossing shall be installed at a time unless permission is received by Chatham County to do otherwise. During the installation of a culvert temporary access shall be provided to all resident's property adjacent to the project.

E. Watering past the date of substantial completion of the work shall be provided on seeded areas to achieve full coverage to match existing conditions and as accepted by Chatham County.

F. There are existing waterlines and sewer lines to be relocated within the project. All water and sewer lines are under the jurisdiction of the City of Savannah. All relocations shall be coordinated with the City of Savannah. The Contractor shall coordinate the pipe laying work with the water system owner.

G. An existing gas line shall be relocated at Clarendon Road. The utility owner is Atlanta Gas Light. The owner shall be responsible for the relocation of the gas line. The Contractor shall coordinate the gas relocation with the owner.

H. The Contractor shall provide traffic control during the construction of the project. No work shall commence until a detailed traffic control plan is reviewed and approved by Chatham County. Winchester Drive and Clarendon Road shall be closed to traffic during construction. Only one road shall be closed at any one time. The Contractor shall notify all emergency services of any road closure as well as the school system for bus routes. All signage regarding closure shall be posted no less than 72 hours prior to any closures.

I. Unsuitable material shall be removed and replaced with suitable material meeting the requirements of the specifications. Measurement of unsuitable material shall exclude excavation of all materials within the limits of excavation shown on the drawings. Measurements of unsuitable material shall be made by cross section method as approved by Chatham County. Measurement by truck count will not be allowed unless otherwise stated.

END OF SECTION

SECTION 02070
SELECTIVE DEMOLITION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of selective demolition work is indicated on drawings.

1.03 JOB CONDITIONS

A. Condition of Structures: Chatham County assumes no responsibility for actual condition of items to be demolished.

B. Partial Demolition and Removal: Items indicated to be removed but of value to Contractor may be removed as work progresses. Transport salvaged items from site as they are removed.

C. Storage or sale of removed items on site will not be permitted.

D. Protections: Provide temporary barricades and other forms of protection as required to protect the County's personnel and the general public from injury due to selective demolition work.

1.05 DAMAGES

A. Promptly repair damages caused to adjacent facilities by demolition work at no cost to the County.

1.06 TRAFFIC

A. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with adjacent occupied or used facilities.

1.07 EXPLOSIVES

A. Use of explosives will not be permitted.

1.08 UTILITY SERVICES

A. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

B. Do not interrupt existing utilities serving occupied or used facilities, except as authorized by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

PART 2 – PRODUCTS

None in this section

PART 3 – EXECUTION

3.01 PREPARATION

A. Prior to commencement of selective demolition work, check areas in which work will be performed.

B. Cover and protect equipment and fixtures to remain from damage when demolition work is performed in areas from which such items have not been removed.

3.03 DEMOLITION

A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.

B. Demolish concrete in small sections. Cut concrete at junctures with construction to remain using power-driven masonry saw or hand tools. Do not use power-driven impact tools.

C. If unanticipated mechanical, electrical, or structural elements, which conflict with intended function or design, are encountered, investigate and measure both nature and extent of the conflict. Contact the Chatham County Engineering Department for direction.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish and other materials resulting from demolition operations from site. Transport and legally dispose of materials off site.

B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

C. Burning of removed materials is not permitted on project site.

END OF SECTION

SECTION 02110
SITE CLEARING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Removal of surface debris.

B. Removal of trees, shrubs, and other plant life.

C. Topsoil excavation.

1.01 RELATED SECTIONS

A. Section 02204 – Earthwork.

B. Section 02720 – Storm Drainage.

1.01 OMITTED

1.02 REGULATORY REQUIREMENTS

A. Conform to applicable Chatham County codes for environmental requirements, and disposal of debris.

B. Coordinate clearing Work with utility companies.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Provide tree protection materials as detailed on the construction drawings.

PART 3 – EXECUTION

3.01 PREPARATION

A. Verify existing plant life designated to remain is tagged or identified.

B. Identify a waste area for placing removed materials.

3.02 PROTECTION

A. All trees on site will be removed within the limits of construction except those marked specifically by Chatham County to remain during construction. No trees may be removed prior to the preconstruction conference. All trees not to be removed will be protected from injury.

B. Protect bench marks, survey control points, and existing structures from damage or displacement.

C. Protect all remaining utilities.

D. Clearing operations shall be conducted to prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction, and to provide for the safety of employees and others.

3.02 CLEARING

A. Clear areas required for access to site and execution of work. Clearing shall consist of felling and cutting trees into sections, and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within area to be cleared. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be removed completely from the site, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within cleared areas shall be trimmed of dead branches 1-1/2 inch or more in diameter. Limbs and branches to be trimmed shall be neatly cut close to the trunk of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with accepted tree wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations. Clearing shall also include removal and disposal of structures obtruding, encroaching upon, or otherwise obstructing the work.

3.02 REMOVAL

A. Where indicated or directed, trees and stumps shall be removed from areas outside those areas designated for clearing and grubbing. Work shall include felling of such trees and removal of their stumps and roots. Trees shall be disposed of as hereinafter specified.

B. Remove debris, rock, and other extracted plant life from site.

3.02 DISPOSAL

A. Disposal of trees, branches, snags, brush, stumps, etc., resulting from clearing and grubbing shall be the Contractor's responsibility and shall be disposed of by removal from site. All costs in connection with disposing of materials will be at the Contractor's expense. All liability of any nature resulting from disposal of cleared and grubbed material shall become the Contractor's responsibility. Disposal of all materials cleared and grubbed will be in accordance with rules and regulations of the State of Georgia. No material will be burned.

3.02 GRUBBING

A. Grubbing shall consist of removal and disposal of stumps, roots larger than one inch in diameter, and matted roots from designated grubbing areas. This material, together with logs and other organic or metallic debris not suitable for building of pavement subgrade shall be excavated and removed to a depth of not less than 18

inches below original surface level of the ground in embankment areas and not less than 2 feet below finished earth surface in excavated areas. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform to original adjacent ground.

END OF SECTION

SECTION 02204
EARTHWORK

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

A. Section 02110 – Site Clearing

B. Section 02720 – Storm Drainage

1.03 OMITTED

1.04 REFERENCES (LATEST REVISION)

A. ASTM D 448 – Sizes of Aggregate for Road and Bridge Construction.

B. ASTM D 1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.

C. ASTM D 2487 – Classification of Soils for Engineering Purposes (Unified Soil Classification System).

D. ASTM D 6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

E. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

F. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

1.05 SUBMITTALS

A. Materials Source: Submit gradation analysis, proctor results, and soil classification for all borrow material.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with Federal, State of Georgia, County of Chatham, and City of Savannah 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 6938.

C. Testing laboratory shall operate in accordance with ASTM D 3740 and E 329 and be acceptable to the Engineer.

D. The testing laboratory and Project Engineer/Project Representative shall be given sufficient notice prior to taking any of the tests.

E. Chatham County shall select and engage the testing laboratory. Testing laboratory shall be responsible to Chatham County. Payment for laboratory and all tests shall be by Chatham County, except Chatham County specifically reserves the right to deduct from Contractor's payment, expenses and charges of testing laboratory when:

1. Contractor gives notice the work is ready for inspection and testing, and fails to be ready for the test, and/or

2. Testing of the Contractor's work, products or materials fail, and retesting is required, and/or

3. Contractor abuses the services or interferes with the work of the testing laboratory in the conduct of this work.

F. Test results shall be furnished to the County prior to continuing with associated or subsequent work.

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 reasonably free of roots, trash, rock larger than 2 inches, 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 or wetted to appropriate moisture contents prior to compaction. Additionally, fill soils used for the top 2 feet of fill beneath roads shall have no more than 15% passing the # 200 sieve.

C. Contractor shall furnish all borrow material.

D. Contractor shall be responsible for and bear all expenses in developing borrow sources including securing necessary permits, drying the material, haul roads, clearing, grubbing, excavating the pits, placing, compaction and restoration of pits and haul roads to a condition satisfactory to property owners and in compliance with applicable federal, state, and local laws and regulations.

2.08 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 topsoil and stockpile on site at a location approved by the County at the Contractor's expense.

B. Topsoil shall be placed to a depth of 4 inches over all disturbed or proposed landscaped areas.

C. Topsoil shall be provided at Contractor's expense if it is not available from site.

D. Any remaining topsoil will be hauled off site at the Contractors expense.

E. Do not excavate wet topsoil.

3.08 EXCAVATION

A. Suitable excavation material shall be transported to and placed in fill areas within limits of the work.

B. Unsuitable material encountered in areas to be paved shall be excavated 2 feet below final grade and replaced with suitable material from site or borrow excavations. Contractor shall notify the County if more than 2 feet of excavation is needed to replace unsuitable material.

C. Unsuitable and surplus excavation material not required for fill shall be disposed of off site.

D. Proper drainage, including sediment and erosion control, shall be maintained at all times.

E. Unsuitable materials as stated herein are defined as highly plastic clay soils, of the CH and MH designation, border line soils of the SC-CH description, and organic soils of the OL and OH description based on the Unified Soils Classification System. Further, any soils for the top 2 feet of pavement subbase shall have no more than 15% passing the # 200 sieve.

3.08 GROUND SURFACE PREPARATION FOR FILL

A. All vegetation, 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 where 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.

3.08 FILL

A. Shall be placed in successive horizontal layers not exceeding 12 inches in loose depth for the full width of the cross-section and compacted as required.

3.08 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. 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.

D. Paved Areas – Subgrade to within 0.05 feet of the drawing elevations less the compacted thickness of the base and paving.

E. Ditches banks shall be finished graded, dressed, and seeded within 14 calendar days of work to reduce erosion and permit adequate drainage.

3.08 PROTECTION

A. Graded areas shall be protected from traffic, erosion, settlement, or any washing away occurring from any cause prior to acceptance.

B. Contractor shall be responsible for protection of below grade utilities shown on the drawings or indicated by the County 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.

3.08 DRAINAGE

A. Contractor shall be responsible for providing surface drainage away from all construction areas. This shall include maintenance of any existing ditches or those constructed in the immediate vicinity of the work. Contractor shall provide proper and effective measures to prevent siltation of wetlands, streams, and ditches on both the public and private properties.

3.08 FIELD QUALITY CONTROL

A. Compaction testing shall be performed in accordance with ASTM D 6938. Where tests indicate the backfill does not meet specified requirements, the backfill shall be reworked or removed and replaced, and then retested.

B. Unpaved areas - at least 90% of maximum laboratory density within 2% optimum moisture content unless otherwise approved by the County.

C. Paved Areas and Under Structures - top 6 inch layer of subbase to at least 98% of maximum laboratory density within 2% optimum moisture content. Layers below top 6 inches shall be compacted to 95% of maximum laboratory density within 2% optimum moisture content.

D. Rolling and compaction equipment and methods shall be subject to acceptance by the County. Acceptance 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 subbase 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.

3.08 PROOF ROLLING

A. Shall be required on the subbase of all curb and gutter and paved areas and on the base of all paved areas where designated by the County. Proof rolling shall take place after all underground utilities are installed and backfilled. The operation shall consist of rolling the subbase or base with a fully loaded 10 wheeled dump truck. A full load shall consist of 10 to 12 cubic yards of soil or

rock. The dump truck shall be capable of traveling at a speed of two to five miles per hour and be in sound mechanical shape with no exhaust leaks or smoking from burning oil. The County shall determine number of passes and areas rolled.

END OF SECTION

SECTION 02210
SOIL EROSION CONTROL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions apply to this section.

1.02 DESCRIPTION OF WORK

A. Extent of soil erosion control work includes all measures necessary to meet the requirements of this section.

B. Erosion and sediment control measures shall be installed prior to any construction activity.

C. Soil erosion and sediment control measures shall include all temporary and permanent means of protection and trapping soils of the construction site during land disturbing activity. Activity covered in this contract shall meet standards of NPDES General Permit for the state where work is performed.

1. PURPOSES

A. Contractor is to achieve the following goals:

1. Minimize soil exposure by proper timing of grading and construction.

2. Retain existing vegetation whenever feasible.

3. Vegetate and mulch denuded areas as soon as possible.

4. Divert runoff away from denuded areas.

5. Minimize length and steepness of slopes when it is practical.

6. Reduce runoff velocities with sediment barriers or by increasing roughness with stone.

7. Trap sediment on site.

8. Inspect and maintain erosion control measures.

1.09 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of soil erosion control systems products of types and sizes required, whose materials have been in satisfactory use for not less than 5 years unless otherwise approved by the County.

B. Codes and Standards: Comply with all applicable Local, State and Federal Standards pertaining to soil erosion control.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instruction for soil erosion control materials and products.

PART 2 – PRODUCTS

2.01 GRASSING MATERIALS

A. Refer to Section 02902 - Grassing.

2.02 HAY BALES

A. Standard size, densely baled straw or hay, wrapped with synthetic or wire bands (two minimum per bale).

2.03 SILT FENCE

A. Silt fence shall be a woven geotextile fabric sheet. Fabric shall be a synthetic polymer composed of at least 85% by weight propylene, ethylene, amide, ester, or vinylidene chloride, and shall contain stabilizer and/or inhibitors added to the base plastic to make filaments resistant to deterioration due to ultra-violet and/or heat exposure. Fabric should be finished so the filaments will retain their relative position with respect to each other. Fabric shall be free of defects, rips, holes, or flaws.

B. Fabric shall meet the following requirements:

Woven Fabrics	
Grab Strength	90 lbs.
Burst Strength	175 PSI
UV Resistance	80%

2.03 RIP-RAP

A. Refer to Section 02275 – Rip-Rap.

2.02 PRODUCT REVIEW

A. Contractor shall provide the County with a complete description of all products before ordering. The County will review all products before they are ordered.

PART 3 – EXECUTION

3.01 GENERAL

A. All disturbed soil areas except those to support paving shall be graded and protected from erosion by grassing. Disturbed areas must be grassed within 14 days of work ending unless work is to begin again before 21 days.

3.02 GRASSING

A. Refer to Section 02902 - Grassing.

3.03 SILT FENCE

A. Silt fence shall be placed at approximate location shown and installed in accordance with the detail on the construction drawings. Contractor shall maintain silt fence as required by state regulations.

3.04 DUST CONTROL

A. Contractor shall use all means necessary to control dust on and near the work when dust is caused by operations during performance of work or if resulting from the condition in which any subcontractor leaves the site. Contractor shall thoroughly treat all surfaces required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of work on site.

3.02 RIP-RAP

A. Refer to Section 02275 – Rip-Rap.

3.02 CONSTRUCTION EXIT

A. Construct exit at the location shown per detail on the construction drawings. Contractor shall maintain construction exit as required by state regulations.

3.02 INLET PROTECTION

B. Install inlet protection per detail on the construction drawings. Contractor shall maintain inlet protection as required by state regulations until all disturbed surfaces are stabilized.

END OF SECTION

SECTION 02275
RIP-RAP

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Material placed as bank protection and erosion control.

1.01 RELATED SECTIONS

A. Section 02720 – Storm Drainage.

1.01 ALLOWABLE TOLERANCES

A. Depth of rip-rap blanket as shown on the drawings and in these specifications is a minimum depth.

1.01 OMITTED

1.02 REFERENCES (LATEST REVISION)

A. ASTM C 150 – Portland Cement.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Stone Rip-Rap: Shall be hard quarry or field stone of such quality the pieces will not disintegrate on exposure to water, sunlight or weather. Stone shall be solid and non-friable and range in weight from a minimum of 25 pounds to a maximum of 150 pounds. At least 50 percent of the stone pieces shall weigh more than 60 pounds. The stone pieces shall have a minimum dimension of 12 inches. Documents indicating stone analysis, source and other pertinent data (i.e. - filter fabric) shall be submitted for review by the County prior to delivery.

B. Concrete: Shall have a compressive strength of 2,500 psi. Provide a design mix using # 89 granite stone.

C. Filter Fabric: Shall be a woven fabric of monofilament and multifilament yarn equivalent to Mirafi FW700. Fabric shall be finished so the filaments will retain their relative position with respect to each other. Fabric shall contain stabilizers and/or inhibitors added to make filaments resistant to deterioration due to ultraviolet and/or heat exposure. Fabric shall be free of flaws, rips, holes or defects.

2.01 PRODUCT REVIEW

A. Contractor shall provide the County with a complete description of all products before ordering. The County will review all products before they are ordered.

PART 3 – EXECUTION

3.01 PREPARATION

A. The surface to receive rip-rap shall be prepared to a relatively smooth condition free of obstruction, depressions, debris, rises, and soft or low density pockets of material. Contours and elevations on construction drawings are to the surface of rip-rap material.

3.01 PLACEMENT

A. Filter fabric shall be placed with the long dimension running up slope. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. Fabric shall be anchored in place with securing pins of the type recommended by fabric manufacturer. Pins shall be placed on or within 3 inches of the over-lap. Place fabric so upstream strip will overlap the downstream strip. Fabric shall be placed loosely to give and avoid stretching and tearing during placement of the stones.

B. Minimum depth or thickness of stone blanket shall be 12 inches with no under tolerance. Stones shall be dropped no more than three feet during construction. Placing shall begin at bottom of slope. Provide a toe trench if required as detailed on the construction drawings. Entire mass of stone shall be placed to conform with lines, grades, and thickness shown on the plans. Rip-rap shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the underlying material. Placing of rip-rap in layers, or by dumping into chutes, or by similar methods likely to cause segregation, will not be permitted.

C. Larger stones shall be well distributed and the entire mass of stone shall conform to gradation specified. All material used in rip-rap protection shall be placed and distributed so there will be no large accumulations of either the larger or smaller sizes of stone.

D. It is the intent of these specifications to produce a fairly compact rip-rap protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stones by mechanical equipment may be required to secure the results specified.

E. After placement, fill voids between stones with concrete. Voids shall be filled the entire depth of stone.

END OF SECTION

INDEX TO

SECTION 02550 - WATER DISTRIBUTION SYSTEM

SECTION 02550
WATER DISTRIBUTION SYSTEM

PART 1 - PRODUCTS

Products and materials used in the work shall conform to the following:

1.01 PIPE:

A. Ductile Iron Pipe - Shall conform to ANSI/AWWA C150/A21.50 latest revision and ANSI/AWWA C151/A21.51 latest revision for laying condition two. All pipe shall be cement lined in accordance with ANSI/AWWA C104/A21.4 latest revision.

1. All Pipe Larger than 12 inches shall be ductile iron.

B. P.V.C. Pipe - All P.V.C. pipe shall bear the seal of the National Sanitation Foundation. All waterline pipe shall be the latest revision of APWA color blue in color. Certificates of conformance with the following specifications shall be furnished with each lot of pipe supplied.

Pipe 4-inches through 12-inches shall conform to all requirements of ANSI/AWWA C900, latest revision, with a minimum pressure rating of 150 psi (DR 18), and shall have the following minimum wall thickness:

4"	0.267 inches
6"	0.383 inches
8"	0.503 inches
10"	0.617 inches
12"	0.733 inches

C. Plastic Tubing - Tubing shall conform to the following:

1. Polyethylene - 1" Polyethylene tubing shall conform to all requirements of ASTM D1248, grade P34, Class C; ASTM D2737, PE3408: ASTM D3350, cell class 335424C; and AWWA C901. The tubing shall be pressure class 200 with SDR 9. Marking of the tubing shall include: nominal pipe size, PE 3408, SDR 9, PC 200, AWWA C901, Manufacturers name and seal or mark of testing agency certifying suitability of the pipe material for potable water products as per AWWA

C901 Section 6.1.2.

2" water service line shall be polyethylene conforming to AWWA C901.88/ASTM D-1248, ASTM D-2239, ASTM D-2737, ASTM D-3035. No 1.5", 2.5" or 3" will be allowed.

2. Copper Tubing – 1" & 2" Copper tubing shall be seamless and shall conform to ANSI/AWWA C800 and ASTM B88, Type K, containing not less than 99.90% copper and not more than 0.04% phosphorus,

suitable for use with a working pressure of 150 psi. No 1.5", 2.5", or 3" will be allowed.

D. All plastic and copper tubing 2" and smaller shall be copper tube size (cts).

1.02 JOINTS:

A. Flanged Joints - Shall conform to ANSI/AWWA C115/A21.15 latest revision. Bolts shall conform to ANSI B18.2.1 and nuts shall conform to ANSI B18.2.2. Gaskets shall be rubber, either ring or full face, and shall be 1/8-inch thick. Gaskets shall conform to the dimensions recommended by ANSI/AWWA C115/A21.15 latest revision. Flanged joints shall not be used for buried installations.

B. Mechanical Joints - In ductile iron pipe shall conform to ANSI/AWWA C111/A21.11 latest revision.

C. Push-On Joints - In ductile iron pipe shall conform to ANSI/AWWA C111/A21.11 latest revision.

D. Plastic Pipe - Joints in plastic pipe 4-inches and larger shall meet all requirements of ANSI/AWWA C900 latest revision. Joints in 1" and 2" plastic tubing shall conform to ASTM D3139 latest revision. Solvent joints shall not be used. Butt-fused or compression type only for plastic tubing.

E. Restrained Joints - Restrained joints for pipe, valves and fittings shall be mechanical joints with ductile iron retainer glands equivalent to "Megalug" or push-on type joints equivalent to "Lock-Ring," "TR Flex", or "Super Lock" and shall have a minimum rated working pressure of 250 psi. Mechanical joint retainer glands shall comply with the manufacturer's specifications for the pipe material (ductile iron vs. PVC).The joints shall be in accordance with the applicable portions of ANSI/AWWA C111/A21.11. The manufacturer of the joints shall furnish certification, witnessed by an independent laboratory, that the joints furnished have been tested at a pressure of 500 psi without signs of leakage or failure. All wedge assemblies and related parts of restraint devices shall be processed through an iron-phosphate spray, rinse and drying operation in preparation for coating application. The coating shall consist of a minimum of two coats of liquid Xylan® fluoropolymer coating with heat cure to follow each coat. All casting bodies of restrained joints shall be surface pretreated with an

iron-phosphate spray, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance. The coating system shall be Mega-Bond™ by EBAA Iron, or approved equal. Restrained joints shall be capable of being deflected after assembly. Restrained joints shall have a preset deflection of no more than 5 degrees and shall be able to take up 3 degrees of deflection after burial.

F. Fluorinated Hydrocarbon Gaskets - Fluorinated hydrocarbon gaskets shall conform to the requirements of ANSI/AWWA C111/A21.11-90 (Trade

names may include, but are not limited to "Fluoral" or "Viton") and shall be required where petroleum exposure may occur.

1.03 FITTINGS:

A. Fittings for Ductile Iron or Plastic Pipe - Shall be compact ductile iron, manufactured in accordance with ANSI/AWWA C153/A21.53 latest revision. They shall be cement lined in accordance with ANSI/AWWA C104/A21.4 latest revision. An asphaltic coating with a thickness of 1 mil shall be applied to all fittings. Fittings shall be designed to accommodate the type of pipe used.

B. Fittings for Flanged Pipe - Shall be manufactured in accordance with ANSI/AWWA C110/A21.10, latest revision and pressure rated at 150 psi.

C. Fittings for Tubing - Shall be brass or bronze, compression type.

1.04 POLYETHYLENE ENCASEMENT:

Polyethylene encasement shall be used on all ductile iron pipe, and shall be in tube form conforming to the requirements of ANSI/AWWA C105/A21.5 latest revision. The polyethylene film shall have the following characteristics:

Tensile Strength:	m
Elongation:	300
Dielectric	percent
Strength:	minimum
Thickness:	800V/mil thickness minimum
1,2	Nominal thickness of .008 in. (8 mil)
00	
psi	
mini	
mu	

1.05 CAUTION TAPE:

Caution tape shall consist of a minimum 4.0 mil thickness inert polyethylene plastic that is resistant to alkalis, acids and other destructive elements found in the soil. The tape shall have a minimum 3" width and a

minimum tensile strength of 2,800 psi. A continuous warning message repeated every 16" to 36" shall be imprinted on the tape surface. The tape shall contain an opaque color concentrate designating the color code appropriate to the line being buried (Water Systems - Safety Precaution Blue with "Caution - Buried Water Line Below" imprinted in black). Caution tape shall be installed 24" above the pipe on all water mains.

1.06 TRACING WIRE:

Tracing wire shall be #12 gauge insulated single strand copper wire, and shall be installed on all water mains and service laterals from the main to the meter, and provide continuous electrized conductivity. Area markers shall be at least every 500' with tracer wire attached, unless a manhole, fire hydrant and air release are available. Manhole shall provide a 6' lead attached to the inside of lid and ring. On laterals, the tracing wire shall terminate inside the meter box.

1.07 STEEL CASING:

Casing pipe shall be steel conforming to ASTM A139, yield point of 35,000 psi, of the diameter and thickness shown on the contract drawings for each crossing. All pipe within casing shall be restrained joint ductile iron.

1.08 CASING SPACERS:

Casing Spacers shall be bolt on style with a shell made in two (2) sections of Heavy T-304 Stainless Steel. Connecting flanges shall be ribbed for extra strength. The shell shall be lined with a PVC liner. All nuts and bolts shall be 18-8 Stainless Steel. Runners shall be made of Ultra High Molecular Weight Polymer with inherently high abrasion resistance and a low coefficient of friction. Runners shall be supported by risers made of Heavy T-304 Stainless Steel. The combined height of the supports and runners shall keep the carrier pipe a minimum of 0.75" from the casing pipe at all times. Casing Spacers shall be as manufactured by Cascade Waterworks Manufacturing Company, or approved equal.

1.09 GATE VALVES:

A. Four (4) Inches and Larger Valves - Shall be cast iron or ductile iron body, bronze mounted, resilient wedge design, with non-rising stems, conforming to ANSI/AWWA C509. They shall have ends to match the pipe to which they are attached. Attachment to plastic pipe shall be made by special adapters. Valves shall have a minimum working pressure of 200 psi and be tested at 400 psi. Valves shall open counter-clockwise.

Valves shall be furnished with "O" ring packing. One (1) "O" ring shall be located above the thrust collar and one (1) below. The thrust collar shall be

permanently lubricated and have an anti-friction washer on top of the thrust collar.

B. Two (2) Inch - Shall be all brass ball valve type. The pressure rating shall be 175 psi. See Part 1.14 for specifications. No 2" gate valves shall be allowed.

C. Valve Boxes - Underground 2" valves and fire hydrant valves shall be installed in accepted valve boxes. The valve boxes shall be embedded in No. 57 stone wrapped with filter fabric, with shaft extension sections to cover and protect the valve and permit easy access and operation. The cover shall be cast iron and shall be marked "WATER". The box and any extensions needed shall be cast iron having a crushing strength of 1,500 psi. Valve boxes shall conform to the detail shown. The top section shall be the slip type, adjustable for elevation.

D. Valve Manhole - Gate valves 4" and larger shall be installed in a manhole. Manholes shall be precast concrete, unless authorized by the Water Department. Brick manholes will not be allowed and shall conform to the details. Valves 10-inch and larger shall be in 6-foot diameter manholes or vaults.

1. Brick manholes shall be new whole brick of good quality laid in cement mortar. The bottom of the manhole shall be concrete. Brick manholes shall only be allowed where precast manholes cannot be used.

a. Concrete - Concrete shall have a compressive strength of 3,000 psi in 28-days. Concrete shall be ready-mixed conforming to ASTM C904. Reinforcing steel shall conform to ASTM C615, Grade 60. Mesh reinforcing shall conform to ASTM A185. Concrete covering deposited directly against the ground shall have a minimum thickness of 3-inches between the reinforcing and the ground.

b. Mortar - Mortar shall be composed of one part by volume of Portland cement and two parts of sand. The Portland cement shall conform to ASTM C160, Type I. The sand shall conform to AASHTO Standard A45 and shall be of an acceptable gradation. The quantity of water in the mixture shall be sufficient to produce a workable mortar, but in no case exceed 7 gallons of water per sack of cement. Water for mixing shall be potable water, clean and free of harmful acids, alkalies and organic impurities. The mortar shall be used within 30 minutes from the time the ingredients are mixed with water.

c. Brick Masonry - Brick shall conform to ASTM C62, Grade SW or C-55, Grade P-I or P-II. The joints shall be completely filled with mortar and shall be smooth and free from surplus mortar on the inside of the structure. Brick structures shall be plastered with ½-inch of mortar over the entire outside surface of the walls. For

square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course, and for round structures, brick shall be laid radially with every sixth course a stretcher course.

2. Precast Concrete manholes shall have a minimum wall thickness of five inches. Manholes shall be manufactured with 4,000 P.S.I. concrete, type II cement. Wall reinforcement shall meet ASTM-478 and also have a No. 4 rebar hoop around each pipe opening. Bottom slabs shall be five inches thick and be reinforced with No. 4 rebar at 9" O.C.E.W. All items shall be wet cast. Dry casting or low slump concrete will not be allowed. All bases will have proper lifting hooks in the bottom slabs (min. of 3) and there shall be no penetrating lifting holes on any structures. No holes will be allowed within six inches of any joint on structures. All manholes shall have a coating as per Section 02555.

This shall be the minimum requirements for wall and slab thickness/ rebar. It shall be the responsibility of the Contractor to insure that the manhole(s) are designed properly for the loading conditions as indicated on the plans. Should the loading conditions require greater structural integrity than the minimum, as herein specified, it shall be the responsibility of the Contractor to utilize the maximum design.

Gaskets shall be O-Ring or Type A or B "Tylox," or equivalent, conforming to ASTM C-443; Mastic shall be "Ram-nek," or equivalent, with primer. The primer shall be applied to all contact surfaces of the manhole joint at the factory in accordance with the manufacturer's instructions.

3. Frames and Covers – Manhole frame and covers shall be out of gray cast iron per ASTM A48, Class 30 without perforations and suitable for addition of cast iron or steel rings for upward adjustment of top. The word "WATER" shall be cast into the face of the cover in 1-1/2 to 2 inch letters raised flush with the top of the cover. Frames and covers shall have machine ground seats, a coating of coal tar pitch varnish, and be an approved equal to U.S. Foundry and Manufacturing Corp. 170-D. All manhole rings and covers shall be made water tight by means of dovetail grooves and gaskets in the cover. No stacking lugs shall be allowed.

4. Tops of manholes outside of roads, streets, and highways shall be built to grades 1-inch above the existing ground surface unless otherwise shown on the plans. Manholes in roads, streets, or highways shall be built to the pavement grade, the grade designated on the plans, or as directed by the Engineer.

1.10 BUTTERFLY VALVES:

All butterfly valves shall be of the tight-closing, rubber seated type, with rubber seat positively locking in place sealing against flow from either direction. No metal-to-metal seating surfaces will be permitted. Valves

shall be bubble-tight at rated pressures with flow in either direction. Butterfly valves shall conform to ANSI / AWWA C504, Class 150B. Butterfly valves shall not be used on pipe smaller than 14" unless, otherwise specified.

1. Valve body end connections for buried valves shall be installed using restrained joints.

2. Valve shafts shall be stainless steel and may consist of a one-piece unit or may be the "Stub Shaft" type. A stub shaft comprises two separate shafts inserted into the valve disc hubs. Each stub shaft shall be inserted into the valve disc hubs for a distance of at least 1½ shaft diameters.

3. Valve discs shall be solid ductile iron with an epoxy coating making it corrosion resistant. The thickness of the discs shall not exceed

2¼ times the shaft diameter.

4. Valve seats shall be natural or synthetic rubber providing 360 degrees uninterrupted seating. The resilient seat shall be adjustable or replaceable in the field without burning or grinding. The seat shall be molded over a stainless steel ring for support and secured to the disc by corrosion resistant, self locking stainless steel screws.

5. All internal ferrous metal surfaces in the waterway shall be factory coated with a non-toxic, two-component, holiday-free, thermo- setting epoxy to a nominal thickness of 4 mils.

6. All butterfly valves shall be manually operated. Operators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position without creeping or fluttering. Operators shall be furnished with externally adjustable mechanical stop limiting devices. Valves shall have a 2-inch square operating nut and shall be installed with extension stems to extend the operating nut in accordance with the project details. The operator shall be integrally mounted on the valve mounting flange and shall have all gearing totally enclosed for buried service. Maximum force for operating nut shall be 40 pounds.

1.11 TAPPING VALVES:

All tapping valves shall be provided with a standard flange on one end for bolting to the tapping sleeve. The outlet end shall be mechanical joint, flanged for bolting to a standard tapping machine. All tapping valves shall be resilient seat. No double disc shall be permitted. In all other respects, tapping valves shall comply with the requirements for gate valves. Tapping valves and tapping sleeves 12" diameter and smaller shall be compatible with the Mueller tapping machine.

1.12 TAPPING SLEEVES:

Tapping Sleeves shall be compact ductile iron mechanical joint type

conforming to ANSI/AWWA C153/A21.53 for fittings 4" - 16" or ANSI/AWWA C110/A21.10 for fittings larger than 16", latest revision. They shall be sized to fit the intercepted pipe and be equivalent to Mueller H-615/715. All tapping sleeves and valves shall be pressure tested prior to tapping. The tapping sleeve shall include the necessary pressure test port.

13 AIR RELEASE VALVE:

Air Release Valve shall be 1-inch screwed inlet equivalent to Crispin Model No. PL10. The air release valve shall be designed to permit automatic escape of large quantities of air from the pipeline when the line is being filled and must also allow accumulating air to escape while the line is in operation and under pressure. All internal trim parts shall be stainless steel. No plastic parts will be permitted. The floats shall be stainless steel.

The body and cover shall be cast iron conforming to ASTM A48, Class 35 and shall be able to operate at pressures up to 300 psi.

The valve shall be provided with a cast iron cowl. This cowl covers the discharge opening of the valve to prevent dirt and other debris from falling into the seated area, but allows free discharge of air or water which may blow by.

1. Corporation stops for combination air/vacuum valves shall be 1" Brass or Bronze with 1" inlet and 1" outlet outside iron pipe threads equivalent to Mueller Model #H-10013.

2. Tapping saddles for combination air/vacuum valves shall be equivalent to Smith-Blair No. 313-015.

All air release valves shall be installed in precast concrete manholes in accordance with Part 1.09.D.2 and shall include flat tops.

14 SMALL BALL VALVE:

Ball Valve 2-inch and smaller shall be designed for a working pressure of not less than 175 PSI. End connection shall be threaded. The body and all parts shall be made of 85-5-5-5 red brass in accordance with AWWA C800 and ASTM B62 latest revision. The ball shall be fluorocarbon coated red brass with molded Nitrile (BUNA-N) seats sealed in place. All internal parts shall be permanently assembled by way of a metal to metal body joints with sealed threads. Operator shall have two (2) Nitrile (BUNA-N) "O"-Rings and a bronze lock ring. Ball valve shall be Ford B11-777, Ford B81-777W or approved equal.

1.15 POST HYDRANTS:

Shall be equivalent to Mueller 2-1/8" Post Type Hydrant, have one way main valve opening and one 2½" hose nozzle. All internal and external parts shall conform to Section 2.15 Fire Hydrants.

1.16 FIRE HYDRANTS:

A. General - Hydrants shall be manufacturer's current model design and construction. All units to be complete including joint assemblies. Physical characteristics and compositions of various metal used in the hydrant components shall meet the requirements as specified in ANSI/AWWA C502 latest revision. Hydrant shall be suitable for working pressure of 150 psi and shall be hydrostatically factory tested to 300 psi.

B. Bonnet - Bonnet shall be of the dry reservoir type. Bonnet must have a lubricating fitting for ease of lubrication. All parts shall be removable through top of hydrant without removing entire barrel section from safety

flange.

C. Nozzles and Caps - The hydrant shall have two (2) 2¼-inch connection and one (1) 4½" steamer connection, National standard threads. Nozzles shall be bronze and have interlocking lugs to prevent blowout. Nozzle caps shall not be equipped with chains.

D. Seat Ring - Seat ring shall be bronze to bronze. The bronze shall be Grade A, B, D, or E.

E. Drain Valves and Openings - Positive operating drain valves shall be provided to assure drainage of fire hydrant when the main valve is closed. Drain openings shall have bronze bushings.

F. Main Valve - Valve shall be designed to close with the pressure and remain closed. Valve shall be bronze Grade A, B, D, or E, that will resist rocks or other foreign matter. Valve shall have a full 4½-inch opening.

G. Barrel and Safety Flanges - Hydrant shall have a safety-type vertical barrel with a minimum 3½-foot bury and be designed with safety flange and/or bolts to protect the barrel and stem from damage and to eliminate flooding when hydrant is struck. Bury depth shall be cast on barrel of hydrant. All risers necessary for deeper bury applications shall be provided by the hydrant manufacturer. A maximum riser height of 1' shall be allowed.

H. Operating Stop and Nut - Hydrant shall have a positive stop feature to permit opening of hydrant without over travel of stem. The operating stop shall be located at the bottom of the hydrant by means of a capnut or stop nut at the end of the main valve stem. Operating nut shall be bronze, 1¼", point to flat, pentagon.

I. Bolts and Nuts - Bolting materials shall develop the physical strength requirements of ASTM A307. Bolts, studs, washers and nuts shall be made from a corrosion-resistant material such as low zinc bronze, monel, stainless steel or low alloy steel conforming to ASTM A242.

J. Inlet - Bottom inlet of hydrant shall be provided with mechanical joint connection as specified and shall be 6-inch nominal diameter.

K. Direction of Opening - Hydrants shall be designed to close "right" or clockwise and open "left" or counter-clockwise.

L. Coatings - All inside portions of the hydrant shall be coated in accordance with ANSI/AWWA C550 latest revision. The exterior portion of hydrant above ground level shall be painted with two (2) coats of red primer paint equivalent to Hydrant Hide Red Setter #9050 as manufactured by Pennsbury Coatings Corporation. After the hydrant has been accepted

and placed in service, the exterior, above-ground portion of the hydrant shall be painted with two (2) coats of yellow hydrant enamel equivalent to Hydrant Hide Old Yeller #9032 as manufactured by Pennsbury Coatings Corporation.

M. Joint Assemblies - Mechanical joint assemblies shall conform to ANSI/AWWA C111/A21.11 latest revision.

N. Inspection and Affidavit - Hydrants furnished under this specification shall be subject to inspection and acceptance by City personnel, and, if required, shall have full access to manufacturer's facilities for inspection and observation of tests. Manufacturer is also required to furnish the City with an affidavit of compliance with specifications covering all materials and test procedures relating to construction of the hydrants.

1.17 CORPORATION STOPS:

Corporations stops shall be red brass of 85-5-5-5 composition and shall be manufactured in conformance with ANSI/AWWA C800 and ASTM B62. The key and body seating surfaces shall be accurately machined and fit to a taper of 1¾-inches per foot. The stem and retaining nut shall be so designed that failure from over-tightening of the retaining nut results in thread stripping rather than stem fracture. Corporation stops shall be equivalent to Mueller H-15008 or Ford F-1000.

1.18 CURB STOPS:

Curb stops shall be a 1-inch brass ball valve with a ball valve lock provided for each valve manufactured in conformance with ANSI/AWWA C800. The curb stop shall be closed bottom design and sealed against external leakage at the top by means of a non-adjustable resilient pressure actuated seal, and shall be provided with a secondary resilient seal disposed above the pressure seal for added protection of the bearing surfaces against ground water infiltration. Shut off shall be effected by a resilient pressure actuated seal so disposed in the key as to completely enclose the inlet body port in the closed position. All ball valves shall be ¼ turn valves and the full open and closed position shall be controlled by check lugs which are integral parts of the key and body. The pressure

rating shall be 175 psi. The ball valves shall be equivalent to Ford Ball Valve No. B41-343W. Valves shall be full part, packed joint with 1" diameter compression connection on the inlet side and 1" diameter female iron pipe thread connection on the meter side.

1.19 TAPPING SADDLES

Tapping saddles shall be equivalent to Smith-Blair 313-015 with a 1-inch AWWA tapped connection. Tapping saddles shall be used on 2" and 4" pipes. All 1", 2" and 4" taps on water lines smaller than six (6) inches will require a tapping saddle, regardless of the water main size. Brass saddle shall be Ford 202B Brass Saddle. No service taps shall be allowed on transmission mains larger than 12" unless approved by the City.

20 PERMANENT SAMPLING STATION:

Sampling Stations shall be 36" minimum bury, with a 3/4" FIP Inlet and a 3/4" unthreaded nozzle. The station shall be enclosed in a lockable, non-removable, aluminum-cast housing. When opened, the station shall require no key for operation, and the water shall flow in an all-brass waterway. All working parts shall be made of brass and shall be removable from above ground without digging. A copper vent tube shall allow the station to be pumped free of standing water. The vent tube shall be opened or closed via an easily accessible pet cock. Exterior pipings hall be galvanized. The sampling station shall be Kupferle "Eclipse No. 88", or approved equal.

1.21 STANDARD METER BOX:

A. Meter Box shall be manufactured of high grade super flexion, or equal. The physical properties shall be in accordance with the following standards latest revision:

Property	Standard
1. Tensile Strength	ASTM D-638
2. Flexural Modulus	ASTM D-790
3. Notched Izod Impact-Strength	ASTM D-256
4. Deflection Temperature	ASTM D-648

B. The Meter Box shall have a minimum body weight of six (6) pounds. Wall thickness at the top of the box shall be no less than 3/4". The box shall have a minimum of four (4) reinforcing ribs on the long sides for crush strength. The Meter Box shall be Brooks Series 1419, or approved equal.

C. Standard Lid - The Meter Box Lid shall be constructed of high grade cast

iron with a non-skid surface. The lid shall have a weight of twelve (12) to seventeen (17) pounds and shall have a lip of 1 3/4" and shall fit firmly into the box without shifting or vibrating under normal pedestrian or traffic loading. Lid shall be flush with the side of the box and shall not overhang.

D. Lid Flange - The Lid Flange shall be no less than 4" in width and shall be constructed of high grade cast iron and shall be sized to fit on the standard Meter Box and shall be compatible with the standard lid. All mounting hardware shall be stainless steel.

22 COUPLINGS

All couplings shall be mechanical joint solid sleeves. All Couplings shall be compact Class 350 ductile iron, manufactured in accordance with ANSI / AWWA A21.53 / C153, latest revision. Mechanical joints shall be manufactured in accordance with ANSI / AWWA A21.11/C111/ All

couplings shall be cement lined in accordance with ANSI/AWWA A21.4/C104. Mechanical joint nuts and bolds shall be Corten or ductile iron, high strength, low alloy steel per ANSI/AWWA A21.11/C111. An asphaltic coating with a thickness of 1 mil shall be applied to all couplings. Couplings shall be designed to accommodate the type of pipe used. Couplings or fittings in accordance with Part 1.03 shall be used at all transitions from ductile iron to PVC pipe.

1.23 BLOW-OFF HYDRANTS

All blow-off hydrants shall be manufactured to fit in a standard 5¼" valve box and shall include a 2" coupling riser and a self draining valve with a 2" FIP inlet connection. The operating screw shall fit a standard ¾" bolt socket or a 7/8" pentagon. All working parts shall be brass, and shall be removable without excavation. All blow-off hydrants shall be equal to the MainGuard™ Model No. 79 Valve Box Blow-off Hydrant by The Kupferle Foundry Company of St. Louis, Missouri.

24 BACKFLOW PREVENTION DEVICES

All service laterals shall include backflow prevention devices in accordance with the City of Savannah, Cross Connection Control Policy.

PART 2 – EXECUTION

2.01 INSTALLATION:

Ductile iron pipe shall be laid in accordance with ANSI/AWWA C600; Plastic pipe shall be laid in accordance with AWWA M23, ASTM D2774, UNI-Bell UNIB-3 and the pipe manufacturer's recommendations.

A. Alignment and Grade - The water mains shall be laid and maintained to lines and grades established by the plans and specifications, with fittings, valves, and hydrants at the required locations unless otherwise accepted by the owner. Valve-operating stems shall be oriented in a manner to allow proper operation. Hydrants shall be installed plumb.

1. Prior Investigation - Prior to excavation, investigation shall be made to the extent necessary to determine the location of existing underground structures and conflicts. Care shall be exercised by the contractor during excavation to avoid damage to existing structures. The pipe manufacturer's recommendations shall be used when the watermain being installed is adjacent to a facility that is cathodically protected.

2. Unforeseen obstructions - When obstructions that are not shown on the plans are encountered during the progress of work and interfere

so that an alteration of the plans is required, the owner will alter the plans, or order a deviation in line and grade, or arrange for removal, relocation, or reconstruction of the obstructions.

3. Clearance - When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the acceptance of the owner, to provide clearance as required by federal, state, and local regulations or as deemed necessary by the owner to prevent future damage or contamination of either structure.

4. Depth of Pipe - The Contractor shall perform excavation of whatever substances are encountered to a depth that will provide a minimum cover over the top of the pipe of 36-inches from the existing or proposed finished grade, for pipe 12-inches and smaller. Pipe larger than 12-inches in diameter shall have 48-inches of cover from the finished grade. A maximum cover of 60" (inches) from finished grade shall be used unless approved by the City to avoid a conflict. If the cover will be less than 36", duct iron pipe shall be used.

5. Fluorinated Hydrocarbon Gaskets - Fluorinated hydrocarbon gaskets are intended for use in soils where a possibility of petroleum contamination is present. Fluorinated hydrocarbon gaskets shall only be used where specifically called for on the drawings.

B. Trench Construction - The trench shall be excavated to the alignment, depth, and width specified or shown on the plans and shall be in conformance with all federal, state, and local regulations for the protection of the workers.

1. Trench Preparation - Trench preparation shall proceed in advance of pipe installation only as far as stated in the specifications or as directed by the owner. Discharge from any trench-dewatering pumps shall be conducted to natural drainage channels, storm sewers, or as directed by applicable regulatory agencies. Excavated material shall be placed in a manner that will not obstruct the work nor endanger the

workers or the public, or obstruct sidewalks, driveways, roadways, or other structures. Placement of excavated material shall be done in compliance with federal, state, and local regulations.

2. Pavement Removal - Removal of pavement and road surfaces shall be a part of the trench excavation. The amount removed shall depend on the width of trench required for installation of the pipe and the dimensions of the area into which valves, hydrants, manholes, or other structures will be installed. The dimensions of pavement removed shall not exceed the dimensions of the opening required for installation of pipe, valves, hydrants, specials, manholes, and other structures by more than 6 inches in any direction, unless otherwise required or accepted by the owner. Methods such as sawing, drilling, or chipping shall be used to ensure the breakage of pavement along straight lines. Pavement removal shall occur in accordance with the City of Savannah standard details.

3. Width - The width of the trench at the top of the pipe shall be the same as that afforded by the single-pass capabilities of normally available excavating equipment, and shall be ample to permit the pipe to be laid and joined properly and to allow the backfill to be placed as specified. Trenches shall be of such extra width, when required, to permit the placement of timber supports, sheeting, bracing, and appurtenances as required by the safety requirements of the agency having jurisdiction.

4. Bell holes - Holes for the bells shall be provided at each joint, but shall be no larger than necessary to allow joint assembly and to ensure that the pipe barrel will lie flat on the trench bottom. Pushon type joints require only minimum depressions for bell holes. Other than noted previously, the trench bottom shall be true and even to provide support for the full length of the pipe barrel, except that a slight depression may be provided to allow withdrawal of pipe slings or other lifting tackle without damaging coating or polyethylene encasement.

5. Clearances and bedding procedures shall be observed for pieces of concrete or masonry and other debris or subterranean structures, such as masonry walls, piers, or foundations, that may be encountered during excavation. When encountered, all structures shall be removed to provide a clearance below and on each side of all pipe, valves, and fittings of at least 18 inches for pipe sizes 24 inches or smaller and 24 inches for pipe sizes 30 inches or larger. When excavation is completed, a layer of appropriate backfill material shall be placed on the bottom of the trench to the previously mentioned depths, leveled, and tamped.

6. Previous excavations - Should the trench pass over a sewer or other previous excavation, the trench bottom shall be sufficiently compacted to provide support equal to that of the native soil or to conform to other regulatory requirements in a manner that will prevent damage to the existing installation.

7. Protection of Property - Trees, shrubs, fences, and all other property and surface structures shall be protected during construction, unless their removal is shown in the plans and specifications or directed by the owner. Any cutting of tree roots or branches shall be done only as directed by the City of Savannah Engineering Department. Temporary support, adequate protection, and maintenance of all underground and surface structures, drains, sewers, and other obstructions encountered in the progress of the work shall be provided in accordance with specifications or

applicable regulations. All properties that have been disturbed shall be restored as nearly as practical to their original condition.

8. Unsuitable subgrade material - When the subgrade is found to include ashes, cinders, refuse, organic material, or other unsuitable material, such material shall be removed to a minimum of at least 6 inches below the bottom of the pipe or to the depth ordered by the engineer. The removed material shall be replaced, under the direction of the engineer, with clean, stable backfill material. The bedding shall be consolidated and leveled so that the pipe may be installed.

9. Safety - Appropriate traffic-control devices shall be provided in accordance with federal, state, and local regulations to regulate, warn, and guide traffic at the work site.

C. Pipe Installation - Proper implements, tools, and facilities shall be provided and used for the safe and convenient performance of the work. All pipe, fittings, valves, and hydrants shall be lowered carefully into the trench by means of a derrick, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench. Where necessary, the trench shall be dewatered prior to installation of the pipe. Chains shall not be allowed to transport of lower pipe into the trench.

1. Examination of material - All pipe, fittings, valves, hydrants, and other appurtenances shall be examined carefully for damage and other defects immediately before installation.

2. Pipe ends - All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit, or any foreign materials before the pipe is laid.

3. Pipe cleanliness - Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing, or other materials shall be placed in the pipe at any time. Excessive flush water required to clean the pipe after installation may be charged to the contractor.

4. Pipe placement - As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with acceptable backfill material.

5. Direction of bells - It is common practice to lay pipe with the bells facing the direction in which work is progressing; however, it is not mandatory. For example, when the main is being laid on a slope, the pipe is frequently laid with the bells facing uphill for ease of installation. The direction of the bells is not functionally related to the direction of flow within the main.

6. Pipe plugs - At times when pipe-laying is not in progress, the open ends of pipe shall be closed by a temporary watertight plug approved by the owner. The plug shall be fitted with a means for venting. When practical, the temporary plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation, should the trench fill with water. Prior to removal of a permanent plug for extending the line or for any other reason, air and/or water pressure in the line shall be released.

7. Joint deflection - When it is necessary to deflect pipe from a straight line in either the horizontal or vertical plane, the amount of joint deflection shall not exceed that shown in Tables 1 or 2. The deflections listed are maximum deflections and should not be exceeded.

8. Pipe cutting - Cutting pipe for insertion of valves, fittings, or closure pieces shall be done in conformance with all safety recommendations of the manufacturer of the cutting equipment. Cutting shall be done in a safe, workmanlike manner without creating damage to the pipe or cement-mortar lining.

9. Cut ends and rough edges shall be ground smooth, and for pushon joint connections the cut end shall be beveled by methods recommended by the manufacturer and accepted by the owner.

TABLE 1
MAXIMUM JOINT DEFLECTION*
FULL-LENGTH PIPE PUSH-ON TYPE JOINT DUCTILE IRON PIPE

		Maximum Offset - S (in)		Approx. Radius of Curve R Produced by Succession of Joints (ft)	
Nom. Pipe Size (in)	Deflection Angle - (Deg)	L=18' ft	L=20' ft	L=18' ft	L-20' ft
4	5	19	21	205	230
6	5	19	21	205	230
8	5	19	21	205	230
10	5	19	21	205	230
12	5	19	21	205	230
14	3*	11	12	340	380
16	3*	11	12	340	380
18	3*	11	12	240	380
20	3*	11	12	240	380
24	3*	11	12	240	380
30	3*	11	12	340	380
36	3*	11	12	340	380
42	2*	7.5	8	510	570
48	2*	7.5	8	510	570

• For 14-inch and larger push-on joint, maximum deflection angle may be larger than shown above. Consult the manufacturer.

TABLE 2
MAXIMUM JOINT DEFLECTION
FULL-LENGTH PIPE-MECHANICAL-JOINT
PIPE

		Maximum Offset - S (in)		Approx. Radius of Curve R Produced by Succession of Joints (ft)	
Nom. Pipe Size (in)	Deflection Angle - (Deg)	L=18' ft	L=20' ft	L=18' ft	L-20' ft
4	8-18	31	35	125	140
6	7-07	27	30	145	160
8	5-21	20	22	195	220
10	5-21	20	22	195	220
12	5-21	20	22	195	220
14	3-35	13.5	15	285	320
16	3-35	13.5	15	285	320
18	3-00	11	12	340	380
20	3-00	11	12	340	380
24	2-23	9	10	450	500
30	2-23	9	10	450	500
36	2-05	8	9	500	550
42	2-00	7.5	8	510	570
48	2-00	7.5	8	510	570

D. Valve and Fitting Installation

1. Examination of material - Prior to installation, valves shall be checked for direction of opening, number of turns to open, freedom of operation, tightness of bonnet bolts and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage, and cracks. Valves shall be closed before being installed.

2. Placement - Valves, fittings, plugs, and caps shall be set and joined to the pipe in the manner specified in Sec. C for cleaning, laying and joining pipe, except that 12-inch and larger valves should be provided with special support, such as crushed stone, concrete pads, or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.

3. Valve location - Valves in water mains shall, where practical, be located within or immediately adjacent to the street property lines unless shown otherwise on the plans.

4. Mains shall be drained through drainage branches or blow-offs. Drainage branches, blow-offs, air vents, and appurtenances shall be provided with control valves and shall be located and installed as shown on the plans. Drainage branches or blow-offs shall not be directly connected to any storm or sanitary sewer, submerged in any stream, or be installed in any other manner that will permit back siphonage into the distribution system.

5. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.

6. Plugs and caps - All dead ends on new mains shall be closed with plugs or caps that are suitably restrained to prevent blowing off under test pressure. If a blow-off valve precedes the plug or cap, it too shall be restrained against blowing off. All dead ends shall be equipped with suitable blow-off facilities.

E. Hydrants - Hydrants shall be set at such elevations that the connecting pipe and tee will have the same depth of cover as the distribution mains. Hydrants and valves shall have the interiors cleaned of all foreign matter before installation. Not less than 1 cubic foot of crushed stone shall be placed around the base of the hydrant. See Detail on the Drawings.

Where hydrants are to be moved, the lateral shall be extended with 6-inch pipe, and the hydrant reinstalled at the end of the lateral. Minimum clearance under steamer cap on fire hydrants shall be 18" from final grade.

Existing hydrants that are relocated, and therefore, temporarily out of service, shall be placed in service within a period of 24 hours. All preliminary connection requirements shall be completed as promptly as possible to insure that the hydrant is operational within the above time

frame. The contractor shall be responsible for insuring that valves on the hydrant laterals are accessible and remain in an open position. Payment for relocated hydrants will not be made until the hydrant has been checked and is operational. In the event that the 24 hour time schedule cannot be met, due to conditions beyond the control of the contractor, then the contractor shall so notify the City Water Distribution Administrator. It shall then be the responsibility of the latter to notify the City Fire Department and identify the location of the inactive hydrant. Once the hydrant is in service, it shall be the responsibility of the Contractor to so advise the City Water Distribution Administrator.

The time frame and procedures outlined in the above paragraph shall also apply for old hydrants replaced with new hydrants. Old hydrants shall be removed as soon as new hydrants are placed in service and shall be delivered to the City Lot.

Anchorage for hydrants shall be provided using Megalug joint restraints or equal.

F. Backfill and Compaction - All trenches and excavation shall be backfilled immediately after the pipes are laid therein, unless other protection of the pipe line is directed. The backfilling material shall be selected and deposited with special reference to the future safety of the pipes. The material shall be completely void of rocks, stones, bricks, roots, sticks or any other debris that might cause damage to the pipe and tubing or that might prevent proper compaction of the backfill. Except where special methods of bedding and tamping are provided for, clean earth or sand shall be solidly tamped about the pipe up to a level at least 2' above the top of the pipes, and shall be carefully deposited to uniform layers, each layer solidly tamped or rammed with proper tools so as not to injure or disturb the pipeline. The remainder of the backfilling of the trench shall be carried on simultaneously on both sides of the pipe in such a manner that injurious side pressure does not occur. The material used shall be selected from excavated material anywhere on the work if any of the material is suitable. For purpose of definition the sand used should contain less than 10% by weight of loam and clay that passes a 3/4" sieve with no more than 5% remaining on a No. 4 sieve.

Under traffic areas, the top 12-inches of backfill material shall be compacted to a density of not less than 100% as determined by ASTM D-1556 or D-2922. Below the 12-inch line to, and including the area around the pipe, the density shall not be less than 95% at optimum moisture. In areas other than traffic areas, the backfill shall be compacted to 95% density, at optimum moisture. Laboratory test shall conform to ASTM-D-698.

Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally made to conform to the surface of the ground. Backfilling shall be carefully performed, and the original surface restored to the full satisfaction of the Engineer immediately after installation.

Where PVC pipe is installed, the Contractor shall take precautions, in accordance with ASTM D2321, during the backfill operations so as not to create excessive side pressures, or horizontal or vertical deflection of the pipe, nor impair flow capacity.

G. Joint Restraint - All bends, plugs, valves, caps and tees on 2" pipe and larger, shall be provided with joint restraints equivalent to Mega-Lugs. Additional restraint shall be as indicated on the drawings.

H. New Service Connections - The Contractor shall tap the main and install a service connection to each vacant lot or as directed by the Engineer in accordance with the detail shown on the plans for Water Service Connections. Plastic or copper tubing for service lines shall be installed in a manner that will prevent abrupt changes or bends in any direction. Tracing wire in accordance with Part 1.06 shall be installed on all service laterals extending from the main to the curb stop. The Contractor shall exercise extreme caution to prevent crimping of the tubing during handling, storage and installation. The tubing shall have an absolute positive connection to the water main to prevent leakage. Taps shall be made perpendicular to the main. A water service connection shall be marked on the curb with a "W". The mark shall be made with a branding iron on the vertical face of the curb and shall be a minimum of ¼-inch in depth. All laterals shall be locked during construction, testing and disinfection. The Contractor may unlock the laterals only when water is being blown off to prepare for testing. When the water system is accepted by the City, all laterals shall be completed by removing the locks and placing the curb stop in a Standard Meter Box as shown on the Detail. Copper tubing is intended for use in soils where a possibility of petroleum contamination is present and shall only be used where specifically called for on the drawings.

I. Connect Existing House Service - The Contractor shall tap the main and install a house service connection to each existing water meter. Taps shall be made perpendicular to the main and opposite the existing meter. Plastic tubing for house service lines shall be installed in a manner that will prevent abrupt changes or bends in any direction. The Contractor shall exercise extreme caution to prevent crimping of the tubing during handling, storage, and installation. The tubing shall have an absolute positive connection to the water main to prevent leakage. The Contractor shall locate and excavate the existing lateral connections, cut and plug the existing lateral at the main, remove the existing curb stop, and connect the new lateral to the meter. The new work shall be tested, cleaned and disinfected prior to connecting to the existing meter. All laterals shall be locked during construction, testing and disinfection. The contractor may unlock the laterals only when water is being blown off to prepare for testing or when the laterals are being connected to the existing meters.

J. Jacking and Boring - Steel casing of the diameter shown on the plans shall be jacked or bored in the location indicated. Joints between sections of the steel casing shall be of a continuous weld made by a certified welder. Boring or jacking shall be in accordance with the provisions of

Section 615 of the Georgia DOT Standard Specifications. Carrier pipe shall be installed as shown on the Detail. After the carrier pipe has been installed, the ends of the casing shall be sealed with Class "C" concrete after being checked by the Engineer.

Where the work involves a highway, the Resident Engineer of the State Department of Transportation shall be notified three (3) days before the crossing is started. Where the work involves a railroad, the work shall conform to the requirements of AREA specifications and the Division Superintendent of the Railroad shall be notified three (3) days prior to beginning the work. Before commencing work within the rights-of-way of the railroads or highways, the Contractor shall verify that the Owner has obtained the required permits.

K. Detection Tape - Detection tape will be used over all pipe and tubing 2" or larger. The tape shall be laid 24" above existing main.

Tracing wire shall be securely fastened to fire hydrants, valves, and valve covers according to the specification. Locate wire for laterals shall extend 1' (foot) beyond the curb stop.

L. Tracing Wire - Tracing wire will be installed on all water mains and water service laterals directly on top of the water line. Tracing wire shall be securely fastened to fire hydrants, valves, and valve covers according to the specification. Locate wire for laterals shall extend 1' (foot) beyond the curb stop. The wire shall be secured to the pipe with tape or other acceptable methods at spacings of no more than 36" apart. Where water service laterals connect to water mains, the wire insulation shall be stripped so that the bare wires can and shall be joined securely together and wrapped with a rubberized insulation tape. The insulation tape shall completely cover all areas of the exposed wire. The insulated wire must maintain electrical continuity. This tracing wire system shall be checked and tested by the contractor, in the presence of City personnel, prior to acceptance of the water main installation. All equipment, meters, detectors, etc., needed for testing shall be furnished by the Contractor.

M. Polyethylene Encasement - Polyethylene encasement shall be used on all ductile iron piping, fittings, valves and appurtenances and installed according to the requirements of ANSI/AWWA C105/A21.5, Sec. 5.4, Method A.

N. Air Relief Valves - Tapping saddles shall be used when installing air relief valves on non-metallic pipe less than 6" in diameter. A direct tap shall be made on all pipe 6" in diameter and larger.

II. LOWERING WATER MAINS:

A. The existing water lines shall be lowered to the control elevations shown on the plans or as specified by the Engineer. The water mains that are to be lowered shall be completely uncovered to the bottom of the main. At all changes in grade or line, the pipe shall be firmly wedged against the vertical face of the trench to prevent a joint from blowing off. The main

shall be lowered to its new elevations by removing the earth from under the main and along-side the pipe uniformly. Deflections in the joints of

the main, while lowering or when its final lowered position shall not exceed three (3) degrees for an 18 foot length of pipe. All joints shall be reworked with Megalugs so that they do not leak. The joint work shall be done in such a manner as to secure tight joints without over straining the bell. The lowered pipe shall be true to line and grade.

B. Trench Excavation - Trenches shall be of necessary width for the proper lowering of the pipe. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portions of the pipe sections where it is necessary to excavate for bell holes and for the proper sealing of pipe joints. Bell holes and depressions for joints shall be dug after the trench bottom has been graded. In order that the pipe rests upon the prepared bottom for as nearly its full length as practicable, the depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Care shall be taken not to excavate below the depths indicated. Unauthorized over excavation shall be backfilled with accepted backfill material and compacted per Section 2.01, Paragraph F, at no cost to the owner. Unstable soil that is not capable of properly supporting the pipe shall be removed to a minimum of at least 6 inches below the bottom of the pipe or to the depth ordered by the owner. The removed material shall be replaced with accepted backfill material and compacted per Section 2.01, Paragraph F.

3 OFFSET EXISTING WATER MAINS:

A. Where water mains must be offset to avoid interference with new structure or pipe the contractor shall notify the Engineer for instructions and methods for said work. Prior to any work on existing mains, the contractor shall notify the Water Distribution Administrator a minimum of four (4) days in advance of required shut-off.

4 SEPARATION BETWEEN WATER AND SEWER:

A. Water mains and/or laterals shall not be laid closer than 10 feet horizontally to a sanitary or storm sewer without written instruction from the engineer. Some deviation may be allowed on a case by case basis if approved by the City for installation of the water main closer to a sewer, provided that the water main is laid in a separate trench, such that the bottom of the water main is at least 18 inches above the top of the sewer. In no case, shall the water and sewer lines be closer than 5' horizontally edge to edge. Water mains crossing sewers should be laid to provide a minimum vertical distance of 18 inches between the invert of the water main and the top of the sewer line. The water and sewer lines must be ductile iron when laid in violation of the separation requirements. One full length of water pipe shall be located so both joints will be as far from the sewer as possible.

5 PROCEDURES FOR CONNECTIONS OF WATER MAINS:

A. Purpose - To insure that there is a physical disconnection of any new untested water main from existing water mains owned and operated by the City of Savannah.

B. Procedure - Any physical connection of untested water mains with existing

City of Savannah water mains is prohibited except when acceptable backflow prevention devices have been installed, tested and checked by City personnel.

1. Any new water main to be tested must be capped and restrained with retaining glands or thrust blocks to prevent blow out or leakage during the pressure testing.

2. Water for filling and flushing the new water main will be obtained from only approved and specified fire hydrant or special wet tap of the existing City main. This physical connection for obtaining water for the new untested main shall be protected by a RPZ backflow preventor. Appropriate taps of sufficient size must be made at the end of the new system to allow air to escape during the filling sequence.

3. This physical tie-in with the existing City System must be physically disconnected after sufficient water for hydrostatic testing and disinfection has been obtained.

4. Once the new water system has demonstrated adequate hydrostatic testing and has been chlorinated in accordance with paragraph 2.06, the new system must be flushed using the filling method in Step Two (2). The system or main will then be subjected to bacteriological testing. After bacteriological test the system must be open flushed and connected to existing system within 72 hours.

5. The permanent connection to the new system must be made with clean materials. The connection will be made with solid ductile iron sleeves. Any connection with stainless steel or similar metal full circle clamps is prohibited. Once the connection has been made, the new system must be flushed using water from the existing system to insure adequate flow and velocity into the new water system.

6. If a wet tap is required, the contractor will be responsible for preparing the site. This preparation includes the excavation and installation of the tapping sleeve. The contractor will make available a lifting device for the tapping machine and at least a 100 CFM Air Compressor to power the tapping machine.

The City will provide the tapping machine and one man to operate the unit.

All taps of 12" and smaller diameter will be made by the City Water

Distribution Department unless authority has been granted in writing by the Water Distribution Superintendent for a private firm to perform the wet tap for a particular new main.

C. Water for Construction - Metering Requirements -

1. All water used for construction shall be metered. Water meters, either temporary or permanent, shall be the responsibility of the contractor to purchase from the City.

2. Fire hydrant meters obtained from the City of Savannah shall be obtained by making an application with the Water Revenue Department and making a deposit of $ 1,000.00 to cover the cost of any damage or theft of meters.

3. Fire hydrant meters shall be picked up at the Water Operations Department by presenting receipt that the $ 1,000.00 deposit has been paid.

a. Fire hydrant meters shall be brought to the Water Distribution Department for inspection and testing at least once a year.

4. A double check valve will be installed on the fire hydrant meter prior to installation. The double check assembly shall be the responsibility of the contractor. No fire hydrant meter shall be used without a double check valve assembly. The fire hydrant meter and double check assembly shall be supported on the fire hydrant to relieve weight on the fire hydrant 2½" outlet.

5. The contractor shall be responsible to notify the Water Revenue Office of the location of the fire hydrant meter on a bi-monthly basis for the purpose of billing. Water Revenue will inform the contractor of the required date for the call-in during the initial meter application process. Failure to call in on the required date shall result in immediate confiscation of the meter and return of the deposit minus the cost of the water used and/or damages to the meter.

6. It shall be the responsibility of the contractor to estimate the volume of water required during construction and include the cost in the installation price of the water main.

7. When fire hydrant meters are returned to the Water Distribution Department, an inspection and test will be made on the meter. Any damage to the meter shall be deducted from the deposit made by the Contractor.

D. All permanent or temporary meters installed shall be equipped with double check valves or RPZ which will be the responsibility of the contractor to install in accordance to the specifications. Construction meters shall be obtained through the normal meter application process. Construction meters shall be used during all phases of the construction project. Upon

completion of the project, the meter must be disconnected and returned to the Water Distribution Department for final processing and return of the deposit for the meter. All laterals to the meter shall be removed from the tap at the main to the meter location.

6 TESTING, FLUSHING, AND DISINFECTION OF NEW WATER MAINS

A. Filling and Hydrostatic Testing of New Mains

Upon complete installation and prior to connection to the City's existing

water mains, all new water mains shall be hydrostatically tested in accordance with Section 02550, Part 3.01 of these specifications. Where any portion of the line fails to meet the hydrostatic requirements of Section 02550, Part 3.01, repairs shall be made and the entire new main shall be retested. All filling and hydrostatic testing of new mains shall be coordinated with and witnessed by the City's inspector.

Temporary connections to the City's existing water system for the purpose of filling and/or flushing of new mains shall be approved by the City's inspector prior to installation of said connections. A City of Savannah approved backflow prevention device shall be used for all such temporary connections. A test certification shall be required on all backflow prevention devices not supplied by the City of Savannah prior to their use. The test certification shall indicate that the backflow prevention device has been tested and approved within the previous 12 months, by an individual holding a valid State of Georgia Backflow Prevention Assembly Tester license.

The rate at which new mains are filled shall be controlled to allow air to escape the mains during the filling process and to prevent sudden increases in system pressure due to water hammer at such time as the line becomes full. The rate of filling may also be limited by system operation requirements as determined by the City's Water Supply and Treatment Department.

Under NO circumstance, other than a life threatening emergency, shall the contractor, his employees, and/or representatives operate any valve which will allow flow into or out of the City's existing water system. In the event of a non-life threatening emergency condition, the Contractor shall contact the City's inspector or the City's Water Supply and Treatment Department (351-3434) for approval prior to valve operation.

B. Flushing Of New Mains

Upon successful completion of hydrostatic testing, all new mains shall be flushed to remove all foreign material from within the mains. Flushing shall generally be accomplished at the highest practical flow rate. However, limitations of existing water system operational demand and pressure, as well as drainage areas receiving flush water may exist. Such flow rate limitations shall not relieve the contractor from providing a clean water main and all requirements of chlorination and bacteriologic sampling shall remain in full force (see Section 02550, Parts 2.06 C and 2.06 E).

Not less than 48 hours (2 working days) prior to the desired commencement of flushing, the Contractor shall contact the City's inspector for the purpose of coordinating the flushing effort.

Prior to flushing, the Contractor shall identify the area(s) into which

flushed water will be drained. Such drainage area shall be approved by the City's inspector prior to flushing. The Contractor shall provide sufficient supervision to monitor the designated drainage area and to insure that flooding and/or erosion of private property does not occur. Where public roadways are to be used, the Contractor shall monitor water volumes and traffic to insure flushing does not create a hazard to traffic. The Contractor may request that an effected street be closed to traffic during the flushing period. However, such closings shall be subject to the requirements and approval of the City's Traffic Engineering Department.

Under NO circumstance, other than a life threatening emergency is the contractor, his employees, and/or representatives to operate any valve which will allow flow into or out of the City's existing water system. In the event of a non-life threatening emergency condition, the Contractor shall contact the City's inspector or the City's Water Supply and Treatment Department (351-3434) for approval prior to valve operation.

Water Mains 10" and Smaller

For water mains with a nominal diameter up to and including 10 inches, a double detector check valve shall be used between the City's water main and the new main to be flushed. The double detector check valve shall be not less than 6 inches in diameter. A test certification shall be required on all backflow prevention devices not supplied by the City of Savannah prior to their use. The test certification shall indicate that the backflow prevention device has been tested and approved within the previous 12 months, by an individual holding a valid State of Georgia Backflow Prevention Assembly Tester license.

Flushing shall continue until the water is clear to the eye and no foreign material is observed. Examination for sediments of a sample collected in a clear container and allowed to stand for approximately 5 minutes will provide an indication of the necessity to continue flushing. Termination of flushing based on such an indication shall not relieve the contractor from providing a clean water main and all requirements of chlorination and bacteriologic sampling shall remain in full force (see Section 02550, Parts 2.06 C and 2.06 E).

Water Mains 12" and larger

For water mains with a nominal diameter of 12 inches and larger, a double detector check valve shall be used between the City's water main and the new main to be flushed. The double detector check valve shall be not less than 10 inches in diameter. A test certification shall be required on all backflow prevention devices not supplied by the City of Savannah prior to their use. The test certification shall indicate that the backflow prevention

device has been tested and approved within the previous 12 months, by an individual holding a valid State of Georgia backflow prevention license. For new water mains 12 inches in diameter and larger, the Contractor

shall collect a sample from the flushed main that is apparently clear and shall deliver same to the Water Supply and Treatment laboratory located at the I&D Water Plant for examination and determination of apparent successful flushing. Review of the sample by the laboratory is only an indication of apparent successful flushing and shall in no way imply that disinfection will be successful or that satisfactory bacteriological tests will be obtained. Termination of flushing based on such an indication shall not relieve the contractor from providing a clean water main and all requirements of chlorination and bacteriologic sampling shall remain in full force (see Section 02550, Parts 2.06 C and 2.06 E).

C. Disinfection of New Mains

All new water mains shall be disinfected in accordance with these specifications prior to being connected to the City's existing water system.

1. Chemicals to be used in the disinfection of new water mains shall be as follows:

a. Liquid (gas) Chlorine – conforming to ANSI/AWWA B301 containing 100% available chlorine and packaged in steel containers. Liquid chlorine shall be used only 1) in combination with appropriate gas-flow chlorinators and ejectors to provide a controlled high-concentration solution feed to the water be chlorinated; 2) under the direct supervision of someone familiar with the physiological, chemical, and physical properties of liquid chlorine and who is trained and equipped to handle any emergency that may arise; and 3) when appropriate safety practices are observed to protect working personnel and the public.

b. Sodium hypochlorite – conforming to ANSI/AWWA B300. However, sodium hypochlorite shall NOT be used in granular or tablet form. The use of sodium hypochlorite shall require that all granules or tablets shall be completely dissolved in an appropriate amount of water to obtain the desired chlorine concentration. The sodium hypochlorite solution may then be pumped into the new mains to achieve required levels of free chlorine for disinfection.

c. Calcium hypochlorite – conforming to ANSI/AWWA B300. However, calcium hypochlorite shall NOT be used in granular or tablet form. The use of calcium hypochlorite shall require that all granules or tablets shall be completely dissolved in an appropriate amount of water to obtain the desired chlorine concentration. The calcium hypochlorite solution may then be pumped into the new mains to achieve required levels of free chlorine for disinfection.

2. Method of Chlorination

a. Tablet Method – Shall NOT be used.

b. Continuous Feed Method – Prior to chlorination, the main(s) and all stub outs, fire hydrants and other appurtenances to the main(s) shall be filled with water and all air shall have be removed. Chlorine shall be fed into the new main(s) on a continuous basis such that the available free chlorine shall be not less than 50 mg/l throughout the entire length of the main(s). Minimum chlorine residual shall be confirmed by sampling at each end of the main(s) plus one sample for every 1200 ft. of pipe length. Upon successful introduction of chlorine to the minimum concentration, all valves shall be closed such that no water may enter or exit the main(s) being disinfected. Said chlorinated water shall be allowed to sit undisturbed within the main(s) for a period of not less than 24 hours. During the aforementioned 24 hour period no additional disinfectant (i.e. chlorine) shall be added to the main(s) at any point. After not less than 24 hours, samples shall be collected from each of the initial sampling points and each sample shall be checked for free chlorine residual. The residual free chlorine in each of the "24-hour" samples shall be not less than 25 mg/l.

In the event that the residual free chlorine in any one or more of the "24-hour" samples is less than 25 mg/l, the entire main(s), including stub outs, fire hydrants and appurtenances shall be flushed and dechlorinated in accordance with Section 02550, Part 2.06.D.3. Upon completion of the required flushing, the entire main(s), including stub outs, fire hydrants and appurtenances shall be rechlorinated in accordance with Section 02550, Part 2.06 (C).

c. Slug Method - This method shall NOT be used for the disinfection of any new water main having a total volume of less than 500,000 gallons. Where the total volume of the new main to be disinfected is greater than 500,000 gallons and the slug method is to be used for disinfection, all stub outs, laterals and other appurtenances to the main(s) shall be filled with water and all air shall be removed prior to the commencement of chlorine injection. Chlorine shall be fed into the new main(s) on a continuous basis such that a continuous slug of heavily chlorinated water shall be developed. The available free chlorine residual shall be not less than 100 mg/l throughout the length of the slug. The length of the chlorinated slug shall be not less than twenty (20) percent of the entire length of the main to be disinfected. After the heavily chlorinated slug has been developed, water from the existing water system shall be introduced into the new main to move the slug throughout the entire length of the new main as well as into all stub outs, laterals, and appurtenances. The rate of movement of the slug shall be such that all portions of the new main, including stub outs, laterals and appurtenances shall be in contact with the slug for a period of

not less than three (3) hours. As the slug is moved through the main, sampling shall occur at each end of the slug and at intervals of not more than 1000 feet through out the length of the

slug. All sample locations, sample times, and sample results shall be recorded and verification of the minimum three (3) hour contact time shall be provided in a sampling report.

d. If at any time during the disinfection process the free chlorine residual of the slug falls below 75 mg/l, the flow shall be stopped and chlorination equipment shall be moved to the head of the slug. Flow shall resume and additional chlorine shall applied to restore the free chlorine within the slug to not less than 100 mg/l.

D. Removal of Heavily Chlorinated Water

Upon successful chlorination as described in Section 02550, Part 2.06 C, the contractor shall thoroughly flush the new main(s) so as to reduce free chlorine residuals to water system background levels. Flushing of the heavily chlorinated water shall require dechlorination. Hydrogen Peroxide (H_2O_2) shall be used for all dechlorination processes. Sulfur Dioxide (SO_2), Sodium Bisulfite ($NaHSO_3$), Sodium Sulfite (Na_2SO_3), and/or Sodium Thiosulfate ($Na_2S_2O_3 \cdot 5H20$) shall **not** be used.

Note: Hydrogen Peroxide (H_2O_2) dechlorination, requires approximately 0.5 lbs of 100% Hydrogen Peroxide solution to neutralize 1.0 lbs of 100% Chlorine. Appropriate adjustments must be made for actual solution concentration of Hydrogen Peroxide to be used and residual Chlorine to be neutralized to obtain necessary Hydrogen Peroxide feed rates. The following can be used as a guide for determining necessary feed rates:

$$H_2O_2 \text{ (gal/hr)} = \frac{Cl_2 \times \text{gpm} \times}{0.003 \times \%\text{Conc}}$$

Where:

Cl_2 – Free chlorine residual (mg/l) of water to be neutralized.
gpm – Flow rate of water to be neutralized into which H_2O_2 is being injected.
%Conc – Percent concentration of H_2O_2 being used. (i.e. 10% solution is 10 NOT 0.1)

Gallons of Hydrogen Peroxide (H_2O_2) required to neutralize various residual chlorine concentrations in 100,000 gallons of water.

Mg /l	H_2O_2 Concentration		
	10 %	**15 %**	**20 %**
1	0.5	0.33	0.25

2	1.0	0.67	0.5
10	5.0	3.4	2.5
50	25	17	12.5

E. Bacteriological Sampling

All bacteriological samples shall be collected by the City's inspector. All bacteriological testing shall be performed by the City of Savannah Water Supply and Treatment Laboratory. Bacteriological testing by any other entity shall not be acceptable. Results of the bacteriological testing shall be faxed to the City's inspector as soon as they are available. Results of bacteriological testing shall not be given by the lab directly to the contractor.

Bacteriological tests shall be failed as follows:

1. Where bacteriological tests indicate that too much trash exists within the sample.

2. Where more than ten (10) non-coliform bacteria are found on any tested sample.

3. Where any coliform bacteria or e-coli bacteria are found on any tested sample.

4. Any other reason, as deemed by the lab, that may yield suspicion that the samples and/or test results are not of sufficient quality to warrant acceptance.

Upon successful completion of proper chlorination/dechlorination in accordance with Section 02550, Parts 2.06 C and 2.06 D, the new main(s) shall be sampled for bacteriological contamination in two stages as follows:

Stage 1 Sampling

At a minimum, bacteriological samples shall be collected at each end of the new main(s) for mains not greater than 500 feet in length. Where new main(s) exceed 500 feet in length, intermediate samples shall be taken at intervals of not more than 1200 feet along the entire length of the new main(s). Intermediate samples shall be evenly distributed through the main(s) to the

extent possible.

In the event that Stage 1 bacteriological testing is failed, the contractor may **(ONE TIME ONLY)** re-flush the main(s) in accordance with Section 02550, Part 2.06 B and repeat the required Stage 1 bacteriological sampling, without re-chlorination and in accordance with this specification.

Stage 2 Sampling

There shall be NO flushing between Stage 1 and Stage 2 sampling.

Not less than 24 hours following the collection of the Stage 1 bacteriological samples, a second set (Stage 2) of bacteriological samples shall be collected from the same sampling points.

All bacteriological samples for both Stage 1 and Stage 2 must be acceptable to the lab prior to connecting the new main(s) to the existing water system and/or to any portion of the new water main(s) which has previously passed bacteriological testing.

F. Disinfection and Bacteriological Phasing of New Mains

The new main(s) to be sampled shall be considered as a single unit such that failure of a single bacteriological sample shall constitute a failure of the entire new main(s). Where new mains are being chlorinated and tested in phases, each phase shall be considered as a single unit and the failure of one phase shall not impact the acceptance or failure of any other phase. However, phasing of a system of new mains, or phasing of a single long main shall be established prior to the commencement of disinfection and shall proceed in geometric order beginning at the existing water system, such that water from an untested or failed phase shall not pass through a phase which has been accepted.

7 DISPOSAL AND TREATMENT OF HEAVILY CHLORINATED WATER

A. The waters and/or environment into which the chlorinated water is to be discharged shall be inspected and analyzed. If there are any possibilities that the chlorinated discharge will cause damage to the environment, the chlorinated water may be discharged by either of the following two (2) methods:

1. Should a City of Savannah Sanitary Sewer manhole be in the vicinity and after confirmation and approval of the City of Savannah Water Quality Department, the chlorinated water may be discharged into the manhole.

2. A neutralizing chemical shall be added to the discharge water to neutralize thoroughly or decrease the chlorine residual to less than 0.5 mg/l (or amount permitted to be discharged.)

The neutralizing chemicals required to neutralize various chlorine residual concentrations in 100,000 gallons, are listed in the following table:

Table 2.07* Amounts of Chemicals Required to Neutralize Various Residual Chlorine Concentrations in 100,000 gal (378.5m3) of Water

Chemical Required Residual Chlorine Concentration (Na2S203.5H20) mg/L	H202 @ 50% lb (kg)
1	0.3 (0.14)
2	0.6 (0.28)
10	6.7 (3.05)
50	33.5 (15.23)

*AWWA Specification C651-92, Page 15

B. Containers

Depending on the chemical used for dechlorination, the storage containers will vary from gas cylinders, liquid in 50 gallon (190 L) drums, or dry compounds. Dilution tanks and mixing tanks will be required when using dry compounds and may be necessary when using liquid compounds to deliver the proper dosage. Solution containers should be covered to prevent evaporation and spills.

C. Feed Equipment, Mixing, and Contact Requirements Equipment

In general, the same type of feeding equipment used for chlorine gas may be used with minor modifications for gas. However, the manufacturer should be contacted for specific equipment recommendations. No equipment should be alternately used for the two gases. The common type of dechlorination feed equipment utilizing sulfur compounds includes vacuum solution feed of sulfur dioxide gas and a positive displacement pump for aqueous solutions of sulfite or bisulfite.

The selection of the type of feed equipment utilizing sulfur compounds shall include consideration of the operator safety and overall public safety relative to the work area. The selection and design of sulfur dioxide feeding equipment shall take into account that the gas reliquifies quite easily. Special precautions must be taken when using ton (909 kg) containers to prevent reliquefaction.

Where necessary to meet the operating ranges, multiple units shall be provided for adequate peak capacity and to provide a sufficiently low feed rate on turn down to avoid

depletion of the dissolved oxygen concentrations in the receiving waters. Mixing Requirements

The dechlorination reaction with free or combined chlorine will generally occur within 1520 seconds. Mechanical mixers are required unless the mixing facility will provide the required hydraulic turbulence to assure thorough and complete mixing. The high solubility of S02 prevents it from escaping during turbulence.

Contact Time
A minimum of 30 seconds for mixing and contact time shall be provided at the design peak hourly flow or maximum rate of pumpage. A suitable sampling point shall be provided downstream of the contact zone. Consideration shall be given to a means of re-aeration to assure maintenance of an acceptable dissolved oxygen concentration in the stream following sulfonation if required.

Protective and Respiratory Gear

The respiratory air-pac protection equipment is the same as for chlorine. (Refer to The Compressed Gas Association Publication CGA G-3-1988, "Sulfur Dioxide").

D. Sampling and Control

City personnel will be responsible for the collection of water samples from new water lines or systems.

A minimum of 48 hours prior to chlorination/dechlorination (where required) shall be required for the contractor to contact the City Water Supply & Treatment at 351-3434, so Water/Sewer may schedule the collection of the required sample(s). For Private Development projects, contractors shall contact the City Engineer's office at 651-6510.

Facilities shall be included for sampling the dechlorinated effluent for residual chlorine. Provisions shall be made to monitor for dissolved oxygen concentration after suffonation when required by the regulatory agency.

E. Testing and Control

Provisions shall be made for manual or automatic control of sulfonator feed rates based on chlorine residual measurement or flow, when needed.

2.08 EXISTING SYSTEM

The existing water distribution system in service shall be kept in service until the new system has been constructed, sterilized, and accepted by the City of Savannah Water and Sewer Bureau.

2.09 GRASSING:

All disturbed areas shall be grassed in accordance with Section 02485 "GRASSING" unless otherwise indicated.

PART 3 - TESTING

1 HYDROSTATIC AND LEAKAGE TESTS:

A. The new main(s), including stub outs, laterals, fire hydrants, and appurtenances shall be hydrostatically tested to a minimum of 150 psi at the highest point of the main(s) for a period of not less than 2 hours in accordance with ANSI/AWWA C600. In the event that a pressure gauge cannot be placed at the highest point of the new main(s) the test pressure at the gauge shall be increased by 1 psi for every 2.31 feet of rise between the elevation of the gauge and the elevation of the highest point of the new main(s).

B. A maximum loss of 3 psi will be allowed during static testing. A leakage recovery test will not be acceptable. The contractor shall notify the City inspector not less than 48 hours (2 working days) prior to applying pressure for testing. Pressure tests shall be witnessed by the City's inspector.

3.02 COMPACTION TESTING:

Laboratory tests of the soil shall be made in accordance with ASTM D-698. In-place density tests shall be made in accordance with ASTM D-1556 or D-2922. Results of the tests shall be furnished to the Engineer by the testing laboratory.

The minimum number of tests required for backfill over sewer in traffic area shall be 1 per 100 lf for each 4 feet of depth or portion thereof.

The minimum number of tests required for backfill over sewer in non-traffic areas shall be 1 per 200 lf for each 6 feet of depth or portion thereof.

END OF SECTION

INDEX TO

SECTION 02554 - WASTEWATER COLLECTION SYSTEM

SECTION 02554
WASTEWATER COLLECTION SYSTEM

PART 1 - PRODUCTS

Materials used in the work shall be those named in the Bid Proposal. In multiple type bids, the selection of the type of material will be at the option of the Owner. Material and equipment used in the work shall conform to one of the following:

1.01 SEWER PIPE:

A. Gravity Sewer

Unless specified otherwise the type of pipe shall be:

Depth	Type
Less Than 4'	Ductile Iron
4' and Greater	PVC-SDR 26

4' to 20' (Note: The maximum allowable depth shall be 20' (feet) from proposed grade).

1. PVC Pipe - Shall be SDR 26 polyvinyl chloride plastic and shall meet all requirements of ASTM D-3034, latest revision. PVC pipe shall be installed in accordance with ASTM D-2321, latest revision. All pipe shall be suitable for use as a gravity sewer conduit and shall be green in color. Provisions must be made for contraction and expansion at each joint with a rubber ring. Pipe sizes and dimensions shall be as shown in the table below. Standard laying lengths shall be 13'(feet)(± 1-inch) for all sizes. Fittings shall meet the same specification requirements as the pipe.

Nom. Size	Outside Diameter Average	Min. Wall Thickness
4"	4.215"	0.162"
6"	6.275"	0.241"
8"	8.400"	0.323"
10"	10.500"	0.404"
12"	12.500"	0.481"

Tests on PVC Pipe - Shall be designed to pass all tests at 73E F. (± 3E F.)

2. Ductile Iron - Shall conform to ANSI A 21.50 (AWWA C 150) latest revision, ANSI A 21.51 (AWWA C 151) latest revision and ASTM A-746 latest revision. All pipe shall be thickness Class 50 or greater unless otherwise noted. All ductile iron pipes

and fittings shall be bituminous coated approximately 1 mil. thick on the outside and lined with Protecto 401 Ceramic Epoxy on the inside. Fittings shall meet the same specification requirements as the pipe.

a. Coating on the outside shall be a bituminous coating approximately 1 mil thick. The finished coating shall be continuous, smooth, neither brittle when cold or sticky when exposed to the sun, and shall be strongly adherent to the iron.

b. Protecto 401 Ceramic Epoxy interior lining shall conform to ASTM E-96, ASTM B-117, ASTM G-95, ASTM D-714.

The interior of the pipe shall receive 40 mils nominal dry film thickness of Protecto 401 Ceramic Epoxy. Interior lining shall not be applied below 40 degree F. Only less than 4.0 mils loss of interior coating is acceptable after one million cycles on a +/- 22.5° sliding aggregate slurry abrasion tester using a sharp natural siliceous gravel with a particle size between 2mm and 10mm. Lining application, inspection, certification, handling and surface preparation of the area to receive the protective coating shall be in accordance with the Protecto 401 manufacturer specification and requirements. Lining shall not be used on the face of the flange.

B. Force Main Pipe

1. PVC Pipe - Plastic pipe shall be PVC Class 200, C-900 for 12"(inch) and smaller and Class 200, C-905 for 14" (inch) and larger. All pipe shall conform to ASTM D-2241 and be installed in accordance with ASTM D-2321.

Pipe shall bear the National Sanitation Foundation seal of approval and shall comply with the requirements of Type I, Grade I (PVC 1120) of the ASTM resin specification D-1784. Certificates of conformance with the foregoing specifications shall be furnished with each lot of pipe supplied.

PVC pipe for force mains shall be green in color, and shall be furnished in nominal 18 to 20'(foot) laying lengths unless otherwise noted.

2. Ductile Iron Pipe - Shall conform to AWWA C-150, AWWA C-151 and ASTM A-746 latest revisions. All pipe shall be thickness Class 50 unless otherwise noted.

Coatings and Linings: All ductile iron pipes and fittings shall be bituminous coated approximately 1 mil thick on the outside and lined with 40 mils of Protecto 401 Ceramic Epoxy in the inside.

a. Coating on the outside shall be a bituminous coating approximately 1 mil thick. The finished coating shall be continuous, smooth, neither brittle when

cold or sticky when exposed to the sun, and shall be strongly adherent to the iron.

b. Protecto 401 Ceramic Epoxy interior lining shall conform to Permeability rating ASTM E-96-669366, Salt Spray ASTM B-117-85, Cathodic Disbondment ASTM G6-95, and Immersion Testing ASTM D-714-87.

The interior of the pipe shall receive 40 mils nominal dry film thickness of Protecto 401 ceramic epoxy. Interior lining shall not be applied below 40°F.

Lining application, inspection, certification, handling and surface preparation of the area to receive the protective coating shall be in accordance with the Protecto 401 manufacturer specification and requirements. Lining shall not be used on the face of the flange.

1.02 SEWER PIPE JOINTS:

A. Gravity Sewer Pipe

1. Joints for PVC Pipe - Shall be integral wall bell and spigot with a rubber ring gasket. The joints shall conform to ASTM D-3212 latest revision and the gaskets shall conform to ASTM F-477 latest revision.

2. Joints for Ductile Iron Pipe - Shall comply with the requirements of 1.02 B.2.

B. Force Main Pipe

Joints shall be in accordance with ASTM D-3036. All PVC fitting must have NSF-61 approval and must comply with, or exceed AWWA C907. Saddle type fittings shall not be used.

1. Plastic pipe shall be jointed by means of a rubber ring bell joint which shall be an integral part of the barrel or solvent welded at the factory. The joints shall have a space to provide expansion and contraction of the pipe without leaking. Fittings for plastic pipes shall be PVC with ring tightened rubber joints; or ductile iron with adapters to PVC pipe. Pipe shall be manufactured to ductile iron pipe equivalent outside diameter.

The bell shall consist of an integral wall section with a bonded-in solid cross section elastomeric ring which meets the requirements of ASTM F-477 and ASTM D-3139. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall and meet the requirements of UNI-BELL-B-11.

Each standard and random length of pipe shall be tested to two times the rated pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.

2. Ductile Iron Joints – For various applications should meet the below criteria:

   a. Flanged Joints: Shall conform to ANSI Specification 21.2(AWWAC–150). Flanges shall be Class 125. Gaskets for flanged pipe and fittings shall be 1/16"(inch) ring gasket of red sheet rubber. Bolts and bolt studs shall conform to ANSI Specification B 16.1 (AWWA C-153).

   b. Mechanical Joints: In cast and ductile iron pipe shall conform to ANSI Specification A 21.11 (AWWAC-111). All glands shall be made of ductile iron only.

   c. Push-On Joints: Shall have a rubber gasket that fits into a retainer recess in the bell and produces a watertight joint when the spigot is pushed home.

   d. Restrained Joints - Restrained joints for pipe, valves and fittings shall be mechanical joints with ductile iron retainer glands equivalent to "Megalug" or push-on type joints equivalent to "Lock-Ring," "TR Flex", or "Super Lock" and shall have a minimum rated working pressure of 250 psi. Mechanical joint retainer glands shall comply with the manufacturer's specifications for the pipe material (ductile iron vs. PVC).The joints shall be in accordance with the applicable portions of ANSI/AWWA C111/A21.11. The manufacturer of the joints shall furnish certification, witnessed by an independent laboratory, that the joints furnished have been tested at a pressure of 500 psi without signs of leakage or failure. All wedge assemblies and related parts of restraint devices shall be processed through an iron-phosphate spray, rinse and drying operation in preparation for coating application. The coating shall consist of a minimum of two coats of liquid Xylan® fluoropolymer coating with heat cure to follow each coat. All casting bodies of restrained joints shall be surface pre-treated with an iron-phosphate spray, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance. The coating system shall be Mega-Bond™ by EBAA Iron, or approved equal. Restrained joints shall be capable of being deflected after assembly. Restrained joints shall have a preset deflection of no more than 5 degrees and shall be able to take up 3 degrees of deflection after burial.

e. Couplings - All connections of new sewer pipe to existing sewer pipe shall occur using rigid couplings. Flexible (e.g. Fernco) couplings shall not be allowed. Couplings shall be PVC double bell type, ductile iron mechanical joint solid sleeve type or ductile iron straight and transition type (e.g., Dresser Couplings) depending on the application.

C. Ductile Iron Fittings

Fittings shall consist of bends, tees, crosses, caps and plugs, reducers, tapped tees, sleeves, etc. All fittings furnished shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data. Fittings shall have cast on them the pressure rating, nominal diameter of openings, manufacturer's name, foundry location, plant code, and degrees of fraction of the circle. Cast letters and figures shall be on the outside body of the fitting. Ductile iron welded on outlets is not acceptable.

a. Fittings for Push-On and Mechanical Joint Pipe Shall be ductile iron, manufactured in accordance with ANSI A21.10 (AWWA C-110) or ANSI A21.53 (AWWA C-153) standards. Fittings shall be designed to accommodate the type of pipe used.

b. Fittings for Flanged Pipe: Shall be manufactured in accordance with ASNI B16.1, Class 125 flanges. Bolt circles and bolt holes shall also meet ANSI B16.1.

D. Air Release Valve - Shall be designed for sewage service. The valve shall be constructed of a cast iron body, stainless steel or bronze trim, and stainless steel float. The inlet shall be 2" (inches), 5/16" (inch) orifice and have a venting capacity of 35 c.f.f.a.m, however, at 10lbs. working pressure it should not vent less than 25 cfm of free air. The working pressure shall be as specified in the contract. Sewage air release valves shall be Crispin UX20 or equal. Piping, nipples, and plugs shall be Schedule 40, type 316 stainless steel. Air release valves shall be installed at all high points in the force main and/or as designated by the engineer. It shall conform to the detail shown. A copy of the O&M manual shall be given to the City prior to acceptance. Provide 3" (inch) diameter or larger clean out port.

The manhole and installation of the valve shall be in accordance with the City of Savannah Standard Construction Detail, S-11. Prior to deciding on the location of any air release valve, the Contractor shall provide the Engineer with an accurate profile of the installed force main so that high points in the system can be determined. The locations of the air release valves shall be field adjusted based on the locations of the high points.

1.03 MANHOLES:

A. Precast Concrete - Precast manholes shall have a minimum wall thickness of five

inches. Cone sections shall have a minimum wall thickness of 8" (inch) at their top. Manholes shall be manufactured with 4,000 P.S.I. concrete, type II cement that meet ASTM C-150 and absorption shall not exceed 6%. Wall reinforcement shall meet ASTM C-478 and also have a No. 4 rebar hoop around each pipe opening. The flat top slab sections shall handle HS-20 traffic loadings. Bottom slabs shall be 6 inches thick for manholes up to and including 48 inches in diameter and 8 inches thick for larger diameter manholes and be reinforced with No. 4 rebar at 9"(inch) O.C.E.W. All items shall be wet cast. Dry casting or low slump concrete will not be allowed. All bases will have proper lifting hooks in the bottom slabs (min. of 3) and there shall be no penetrating lifting holes on any structures. No holes will be allowed within 6" (six) inches of any joint on structures. All manholes shall have a coating as per Section 02555.

This shall be the minimum requirements for wall and slab thickness/rebar. It shall be the responsibility of the Contractor to insure that the manhole(s) are designed properly for the loading conditions as indicated on the plans. Should the loading conditions require greater structural integrity than the minimum, as herein specified, it shall be the responsibility of the Contractor to utilize the maximum design.

Manhole sections shall be free from large honeycomb, cracks, spalls, large chips, exposed reinforcing, and broken bells and spigots. Edges of bells and spigots shall be even and straight. Mastic shall be "Ram-nek," or equivalent, with primer. The primer shall be applied to all contact surfaces of the manhole joint at the factory in accordance with the manufacturer's instructions.

B. Frames and Covers - Manhole frame and covers shall be out of gray cast iron per ASTM A48, Class 35 without perforations and suitable for addition of cast iron or steel rings for upward adjustment of top. The word "SANITARY" shall be cast into the face of the cover in 1.5"(inches) to 2"(inch) letters raised flush with the top of the cover. Frames and covers shall have machine ground seats, a coating of coal tar pitch varnish, and be an approved equal to U.S. Foundry and Manufacturing Corp. No. USF 195-ORS. All manhole rings and covers shall be made water-tight by means of dovetail grooves and gaskets in the cover. Provide circular cover with two (2) pulls for removing manhole cover spaced at 180 degrees and weighing not less than 120 pounds.

Proof Load Testing: Traffic service castings shall have a first article proof load test conducted and the results of that proof load test shall be made available to the City upon request. The proof load test shall be conducted in accordance with the methods and procedures outlined in AASHTO M306-04, Section 5, Proof Load Testing. The casting shall be tested on a suitable and calibrated load testing machine and the casting shall hold a 40,000 pound proof load for one minute without experiencing any cracks or detrimental permanent deformation.

C. Pipe Connections - Pipe/manhole connector shall be one piece rubber boot secured to

pipe with stainless steel clamp band and to the manhole with stainless steel expansion ring. Kor-N-Seal Boot, A-lock or equal. Space between Kor-N-Seal boot and pipe OD shall be filled with non-shrink grout.

D. Steps – Steps in manholes shall be 3/8"(inch)steel rods coated with polypropylene material.

1.04 CASING:

A. Casing pipe shall be steel conforming to ASTM A-139, minimum yield strength point of 35,000 psi of the diameter shown on the drawings at each crossing. The minimum wall thickness shall be 0.25"(inches) for 24" (inch)diameter and smaller, and 0.375"(inch) for larger diameters.

The pipe ends shall be tapered where welding is required. Full pipe lengths shall be provided. No pipe casing lengths less than 8'(feet) shall be allowed unless approved by the Owner. All casing welds shall be continuous and made by a certified welder. All pipe within casings shall be restrained joint ductile iron.

B. CASING SPACERS:

Casing Spacers shall be bolt on style with a shell made in two (2) sections of Heavy T-304 Stainless Steel. Connecting flanges shall be ribbed for extra strength. The shell shall be lined with a PVC liner. All nuts and bolts shall be 18-8 Stainless Steel. Runners shall be made of Ultra High Molecular Weight Polymer with inherently high abrasion resistance and a low coefficient of friction. Runners shall be supported by risers made of Heavy T-304 Stainless Steel. The combined height of the supports and runners shall keep the carrier pipe a minimum of 0.75"(inch) from the casing pipe at all times. Casing Spacers shall be as manufactured by Cascade Waterworks Manufacturing Company, or approved equal.

1.05 SERVICE CONNECTIONS:

A. Tee-wyes shall be a minimum of 4"(inches)and shall be the same diameter as the run of the pipe. They shall be of the same material as the sewer main. Tee-wyes shall be used for all service connections to new sewer main.

B. Service Saddles: Service Saddles shall be flexible sewer saddles with double stainless steel straps or PVC Inserta Tees **TM**. Service Saddles shall only be allowed for new service connections to existing sewer mains.

1.06 LATERALS:

Laterals under traffic loads shall be ductile iron conforming to Paragraph 1.01.A, with push-on joints. Laterals under non-traffic loads can be Polyvinyl Chloride with

bells and natural rubber rings for jointing, conforming to Paragraph 1.01.A. All PVC sewer laterals shall be constructed with SDR 26 pipe.

A saw cut "S" shall be cut in the top of the curb directly over the lateral location. Tracing wire shall be adhered to the lateral from the main and up to the cleanout.

1.07 METAL DETECTOR TAPE:

Detector tape shall be installed over all nonmetallic gravity sewer. The tape will be equivalent to Terra-Tape by Griffolyn co., Inc. of Houston, Texas. The tape shall be at least 2"(inches)wide and "green" with the "black" words "Caution Buried Force Main Below" or "Caution Buried Sewer Line Below" noted on the tape. The tape shall have a tensile strength of not less than 4,000 psi, a dart impact strength of not less than 120 grams per 1.5 mils, be not less than 0.0055" (inches) thick, and include sufficient metal to allow easy detection from above ground. The detector tape shall be designed to last as long as the pipe it is installed over, even in adverse soils.

1.08 TRACING WIRE:

All force mains and sanitary sewer laterals below grade shall have a #12 gauge 30 mil insulated single strand copper wire installed directly on top of the pipe line. The wire shall be secured to the pipe with tape or other accepted methods at spacings of no more than 36" (inch) apart. Where appurtenances connect to the force main, the wire insulation shall be stripped so that the bare wires can and shall be joined securely together and wrapped with a rubberized insulation tape. The insulation tape shall completely cover all areas of the exposed wire. The insulated wire must maintain electrical continuity. In addition, tracing wire shall locate laterals by connecting cleanouts to gravity sewers. All these This tracing wire system shall be checked and tested by the contractor, in the presence of the engineer or project representative, prior to acceptance of the force main installation. All equipment, meters, detectors, etc. needed for testing shall be furnished by the Contractor.

Plastic Tracing Wire Stations equal to Rhino TriView FlexTM shall be installed every 500'(feet) along the force main. Tracing wire shall be connected to the station and shall be marked as "Sanitary Sewer Force Main."

1.09 FORCE MAIN SUBSURFACE MARKERS:

Omni-balls or equal shall be installed above force main pipe at all bends, and at least every 500' (feet) along straight pipe runs.

1.10 POLYETHYLENE ENCASEMENT:

Polyethylene encasement shall be used on all ductile iron pipe, and shall be in tube form conforming to the requirements of ANSI/AWWA C105/A21.5 latest revision.

The polyethylene film shall have the following characteristics:

Tensile Strength:	1,200 psi minimum
Elongation:	300 percent minimum
Dielectric Strength:	300V/mil thickness minimum
Thickness:	Nominal thickness of .008 in. (8 mil)

1.11 STONE BEDDING:

Shall be graded crushed granite with the following gradation:

Square Opening Size	Percent Passing
1"	100%
3/4"	90 to 100%
3/8"	0 to 65%
No. 4	0 to 25%

1.12 BORROW:

Where it is determined that sufficient suitable material is not available from the site to satisfactorily backfill the pipe to at least 2' (feet) above the top of the pipe, the Contractor shall furnish suitable sandy borrow material to accomplish the requirements. The material shall have not more than 60% passing the No. 100 sieve, nor more than 20% passing the No. 200 sieve

1.13 PRODUCT REVIEW:

A. The Contractor shall provide the Engineer with a complete description of all products before ordering. The Engineer shall review and approve all products before they are ordered.

PART 2 - EXECUTION

2.01 CONSTRUCTION OBSERVATION:

The line, grade, deflection and infiltration of sewers shall be tested by the Contractor under the direction of the Engineer. The Engineer will have the right to require that any portion of the work be done in his presence and if the work is covered up after such instruction, it shall be exposed by the Contractor for observation. However, if the Contractor notifies the Engineer that such work is scheduled and the Engineer fails to appear within 48 hours, the Contractor may proceed without him. All work done and materials furnished shall be subject to review by the Engineer or project representative. Improper work shall be reconstructed. All materials which do not

conform to the requirements of the specifications shall be removed from the work upon notice being received from the Engineer for the rejection of such materials. The Engineer shall have the right to mark rejected materials so as to distinguish them as such. The Contractor shall give the Project Engineer or Project Representative a minimum of 48 hours notice for all required observations or tests.

2.02 LOCATION AND GRADE:

The line and grade of the sewers and the position of all manholes and other structures are shown on the drawings. The grade line as given on the profile or mentioned in these specifications means the invert or bottom of the inside of the pipe, and the price for trenching shall include the trench for the depth below this line necessary to lay the sewer to this grade, but measurements for payment will be made only to the grade line. Master control lines and bench marks have been provided by the Engineer. The Contractor shall be responsible for the proper locations and grade of the sewers.

2.03 EXCAVATION:

The Contractor shall perform all excavations of every description and of whatever substance encountered to the depth shown on the plans or specified for all sewers, manholes and other appurtenances. All trenches shall be properly dewatered before laying pipe, by the use of well points, pumping or other methods accepted by the Engineer. The top portion of trenches may be excavated with sloping or vertical sides, except that the width of trench to a height of 2'(feet) above the top of the pipe shall not exceed 2'(feet) greater than the diameter of the pipe. A minimum of 6" (inches) of stone bedding shall be required for all sewers and force mains. The bedding shall extend to one-half of the pipe diameter.

Where the character of the soil is such that the Engineer determines it unsuitable for pipe bedding, an additional foot of excavation will be authorized and the trench backfilled with stone. Excavation in excess of the depths and widths required for sewers, manholes and other structures shall be corrected by backfilling with stone to the proper grade.

The limit of excavation shall be such to allow for placing and removing forms, installing sheeting, shoring, bracing, etc. The Contractor shall pile excavated material in a manner that will not endanger the work and will avoid obstructing sidewalks, driveways, power poles, etc. Drainage shall be kept clear.

2.04 BRACING AND SHEETING:

The sides of all trenches shall be securely held by trench boxes, stay bracing, or by skeleton or solid sheeting and bracing, as required by the soil conditions encountered, to protect the adjoining property and for safety in accordance with OSHA requirements. Where shown on the drawings or where directed by the Engineer, the

Contractor must install solid sheeting to protect adjacent property and utilities. The sheeting shall be steel or timber and the Contractor shall submit design data, including the section modules of the members and the arrangement for bracing at various depths, to the Engineer for review before installing the sheeting. Sheeting shall be removed in units when the backfilling has reached the elevation necessary to protect the pipe, adjoining property and utilities.

When sheeting or shoring above the elevation cannot be safely removed, it shall be left in place. Timber left in place shall be cut off at least 2' (feet) below the surface.

2.05 LAYING PIPE:

A. Gravity Sewer Installation:

All gravity sewer pipe shall be laid upgrade with spigots pointing downgrade. The pipe shall be laid in a trench prepared in accordance with Paragraph 2.03 "Excavation," so that after the sewer is complete, the interior surface shall conform on the bottom accurately to the grades and alignment fixed or given by the Engineer. All pipe shall be cleaned out and left clean. Every third joint shall be filled around immediately after being properly placed. The recommendations of the manufacturer of the particular pipe joint used shall be adhered to.

The sewer lines shall be straight and show a uniform grade between manholes. Any sags or bellies in the pipe sections shall not extend longer than 10' (feet) or hold water more than one-eighth of the pipe's inside diameter.

B. Force Main Installation

Depth of Pipe – The Contractor shall perform excavation of whatever substances are encountered to a depth that will provide a minimum cover over the top of the pipe of 36" (inches) from the proposed finished grade, for pipe 12" (inches) and smaller. Pipe larger than 12" (inches) in diameter shall have 48" (inches) of cover from the finished grade. A maximum cover of 60" (inches) from finished grade shall be used unless approved by the City to avoid a conflict. If the cover will be less than 36" (inches), ductile pipe shall be used.

The force main shall be laid in a ditch prepared in accordance with Paragraph 2.03 "Excavation", so that after the force main is complete, the interior surface shall conform on the bottom accurately to the grades and alignment fixed or given by the Engineer. Special care should be taken to provide a firm bedding in good material, select borrow, stone backfill or Class "A" concrete, as authorized, for the length of each joint and one-half of the circumference. Install stone bedding to a depth of 6" (inches) beneath the FM pipe and up to the spring line of the pipe. Holes shall be provided to relieve bells from bedding strain, but not so large as to allow separation of the bell from the barrel by settlement after backfilling. All pipe shall be cleaned

out and left clean. Every third joint shall be filled around immediately after being properly placed. The recommendations of the manufacturer of the particular pipe joint used shall be adhered to.

2.06 METAL DETECTOR TAPE:

As a part of the installation of gravity or force main sewer, the Contractor shall place metallic detector tape, suitably coded, over the installed pipes at a depth not to exceed 18" (inches) below the finished surface.

2.07 SEPARATION BETWEEN WATER & SANITARY SEWERS:

Water mains and/or laterals shall not be laid closer than 10 feet horizontally to a sanitary or storm sewer without written instruction from the engineer. Some deviation may be allowed on a case by case basis if approved by the City for installation of the water main closer to a sewer, provided that the water main is laid in a separate trench, such that the bottom of the water main is at least 18 inches above the top of the sewer. In no case, shall the water and sewer lines be closer than 5' (feet) horizontally edge to edge. Water mains crossing sewers should be laid to provide a minimum vertical distance of 18" (inches) between the invert of the water main and the top of the sewer line. The water and sewer lines must be ductile iron when laid in violation of the separation requirements. One full length of water pipe shall be located so both joints will be as far from the sewer as possible.

2.08 STONE BEDDING:

Stone bedding shall be installed 6" (inches) below all sewer pipes and to one-half of the pipe diameter. Stone shall be placed 6" (inches) deep and 2' (feet) wider than the pipe at the barrel, and up to the springline of the sewer pipe. The pipe shall be carefully bedded in the stone as specified on City of Savannah Detail S-26, or in accordance with the manufacturer's recommendations.

2.09 CONNECTIONS TO EXISTING SEWER MAINS:

Connections to existing sewer mains may be performed with the use of two difference connections devices:

A. A saddle matching the existing main line pipe diameter with either 4" or 6" (inch) lateral connections may be used. The existing lines must be cut with a round cutter so that the opening will allow the hub of the saddle to fit inside the opening. Square holes cut with a pipe saw will not be acceptable. The saddles must be gasketed. Stainless steel straps must be used to attach the saddle to the existing sewer main. The sewer main must be protected from existing debris around the pipe from entering the line during the attachment of the saddle. The area around the existing sewer pipe must be compacted to 100% density. All saddles must be

attached to the sewer main at either the 2:00 or 10:00 position. No laterals will be attached to the sewer main at the 12:00 position.

B. The other alternative to attaching sewer laterals to an existing main is by using an Inserta Tee. This device can be connected to the main by drilling an appropriate size round hole for the 4" or 6" (inch) lateral. The proper Inserta Tee for the existing sewer line pipe material must then be installed by inserting the rubber boot inside the sewer main. A PVC insert, lubricated properly, is then inserted inside the boot, then a stainless steel strap ties the boot to the insert. The insert then accepts PVC pipe of the appropriate size. The site must then be 100% compacted around the lateral. All connections to existing sewer mains must be inspected by the City prior to backfilling.

2.10 BACKFILLING:

A. All trenches and excavation shall be backfilled immediately after the pipes are laid therein, unless other protection of the pipe line is directed. The backfilling material shall be selected and deposited with special reference to the future safety of the pipes. Except where special methods of bedding and tamping are provided for, select backfill or sandy borrow shall be solidly tamped about the pipe up to a level at least 2' (feet) above the top of the pipes and shall be carefully deposited to uniform layers, each layer solidly tamped or rammed with proper tools so as not to injure or disturb the pipeline. The remainder of the backfilling of the trench shall be carried on simultaneously on both sides of the pipe in 8" - 12" (inch) layers in such a manner that injurious side pressure does not occur. The material used shall be selected from excavated material anywhere on the work site if any of this material is suitable.

Under the traffic areas the top 12" (inches) of backfill material shall be compacted to a density of not less than 100% at optimum moisture. Below the 12" (inch) line and to and including the area around the pipe the density shall not be less than 95% at optimum moisture. In areas other than traffic areas, the backfill material shall be compacted to 95% density at optimum moisture. Compaction tests shall be conducted in accordance with ASTM D-1556 or D-2922 by an independent testing laboratory. The tests are to be taken at the direction of the Engineer to average not more than 100" (foot) intervals. Laboratory Tests shall conform to ASTM D-698.

Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally made to conform to the surface elevation of the ground. Backfilling shall be carefully performed and the original surface restored to the full satisfaction of the Engineer immediately after the installation.

Where thermoplastic (P.V.C.) pipe is installed, the Contractor shall take precautions in accordance with ASTM D-2321, during the backfill operations so as not to create excessive side pressures, or vertical or horizontal deflection of the pipe so as not to impair flow capacity.

2.11 JACKING AND BORING:

Steel casing of the diameter shown on the plans shall be jacked and bored in the locations indicated. Joints between sections of the steel casing shall be welded by a certified welder. Boring and jacking shall be in accordance with the provisions of Section 65 of the Georgia Department of Transportation Standard Specifications. After the carrier pipe has been installed, the ends of the casing shall be sealed with Class "C" concrete after observation by the Engineer.

Where the work involves a State highway, the Resident Engineer of the State Department of Transportation shall be notified by the Contractor three (3) working days before the crossing is started. Where the work involves a railroad, the work shall conform to the requirements of American Railway Engineering Association specifications and the Division Superintendent of the Railroad shall be notified three (3) working days prior to beginning the work. Before commencing work within the rights-of-way of the railroads or highways, the Contractor shall verify that the Owner has obtained the required permits.

2.12 MANHOLES:

Manholes shall be constructed on compacted bedding material so structure is plumb and pipe inverts are at the proper extension where shown on the drawings or where directed by the Engineer. Manholes shall be installed at the end of each line, at all changes in grade, size, or alignment, at all intersections, and at distances not greater than 400' feet). The channel in the bottom of the manholes shall be smooth and properly rounded and the invert channel shall be same size as installed sewer line. Special care must be exercised in laying the channel and adjacent pipes to grade. Invert piping shall not extend inside manhole any further than 2" (inches). The slope of the invert benches shall provide a minimum of 2" higher than the crown of the pipe. The tops of manholes outside of roads shall be built to the ground surface unless otherwise shown on the plans. Manholes in roads shall be built to grades designated by the Engineer. Manhole sections with either honeycomb defects; exposed reinforcing; broken/fractured bell or spigot or cracked walls will be subject to rejection by the Engineers for use on the project. When mastic sealant is used, improperly applied primer will also be cause for rejection.

No leaks in any manhole will be acceptable. All repairs made from inside the manhole shall be made with non-shrink grout.

A 0.1' (feet) minimum drop shall be required through all manholes where the horizontal alignment change is less than 45 degrees. A 0.2'(foot) minimum drop shall be required through all manholes where the horizontal alignment change is 45 degrees to 90 degrees. Horizontal alignment changes greater than 90 degrees at a

single manhole shall not be allowed. A wide sweep invert shall be required for all manholes where the horizontal alignment change is 90 degrees.

2.13 PROTECTION OF EXISTING SANITARY SEWER SYSTEMS:

During the construction of new Sanitary Sewer Systems, the existing sanitary sewer shall be protected at the point of connection with use of a pneumatic or mechanical plug. This isolation shall remain in place until the new system is fully accepted. Provisions must be in place to prevent sediment and excess water from entering the City's existing Sanitary Sewer System.

The isolation of the new system must be performed at the Contractor's expense. Any breach of this isolation shall be resolved by the Contractor to meet City expectations and standards. The Contractor may also be liable and responsible for remediation costs due to this breach.

2.14 CLEANING:

Prior to mandrel tests, televising, and before acceptance of the gravity sewer systems, all sewer lines shall be cleaned to the satisfaction of the Engineer. Where any obstruction occurs, the contractor will be required to clean the sewers by flushing and by means of rod and swabs or other instruments. Cleaning of new sewers is to be completed without impacting the existing sewer system.

2.15 TESTING AND INSPECTION

A. Leakage Testing: Mains and Laterals

All new public and private gravity sewers and laterals shall be pressure tested a minimum of 30 days following final backfill in accordance with the Time-Pressure Drop Method specified in ASTM F1417 - Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air, latest revision. The procedure is summarized as follows:

1. Isolate the section of the sewer line to be tested using inflatable plugs or stoppers.

2. Cap all laterals and stubs using glued caps. All caps and plugs shall be securely braced to prevent blow-out.

3. One of the plugs or caps shall have an inlet tap or other provision for connecting a hose to a portable air control source.

4. Connect the air hose to the inlet tap and portable air control source. The air source equipment shall include necessary valves and pressure gages to pressurize an oil-free air source at a controlled rate into the test section.

5. Add air slowly to the test section until the pressure inside the pipe reaches 4 psi greater than the average backpressure of any groundwater submerging the pipe. (NOTE: All test pressures are measured as gage pressure, which is any pressure greater than atmospheric pressure. Since water produces a pressure of 0.43 psi per foot of depth, air test pressures must be increased to offset the depth of groundwater over the sewer line. If the groundwater is 2' (feet) or more above the top of the pipe at the upstream end, or if the required test pressure exceeds 9 psi, this test should not be used.)

6. Disconnect the air supply and allow a minimum of two minutes for pressure stabilization.

7. Measure the pressure drop over the following time period, depending on the diameter of the sewer pipe being tested (based on a maximum test section length of 400' (feet) between manholes):

8 inch:	6 minutes
10 inch:	8 minutes
12 inch:	12 minutes
15 inch:	18 minutes
18 inch:	26 minutes

8. Acceptable pressure drop over time period: Not more than 0.5 psi.

The testing shall be performed by the Contractor, and a representative of the City shall be present to observe the test. The Contractor shall be responsible for all costs associated with performing the leakage testing, locating leaks, repairing leaks, and conducting additional leakage testing as necessary until the system passes the pressure test. No gravity sewers or laterals will be accepted by the City without a passing pressure test.

B. Deflection – Mains:

It is the responsibility of the Contractor to assure that backfill is sufficient to limit deflection for all PVC pipe, 8" (inch) diameter and larger, to no more than 5% of the internal diameter of the pipe which shall be tested by a mandrel permitting no greater than maximum 5% deflection. All pipe shall be tested no sooner than 30 days after installation. All pipe not passing the 5% deflection limitation test shall be repaired or removed and replaced.

The mandrel shall be pulled through the pipe (SDR-26) with the following diameter:

Nominal Pipe Size	AV I.D.	Mandrel Diameter
8"	7.754"	7.37"
10"	9.692"	9.20"
12"	11.538"	10.96"

C. Deflection - Laterals:

It is the responsibility of the Contractor to assure that installation and backfill is sufficient to limit obstructions and deflections in the laterals. Laterals shall be tested by dropping a tennis ball in the upstream end of the pipe. The tennis ball must show up at the next downstream manhole. If not, the lateral must be repaired or removed and replaced. The tennis ball may be followed by water to help with its travel to the next downstream manhole.

D. Televising:

After the completion of successful mandrel tests and cleaning, all newly constructed sewer lines must be televised by the City prior to acceptance. Accordingly, all sewer lines, 8" (inch) in diameter and larger, that are installed within accepted public right-of-ways and easements will be televised, including those lines on private property that are connected to the public lines. Contractors will be charged a fee, currently $0.85/linear feet for all size sewers, by the City, and will be responsible for preparing the lines to insure that they are cleaned and free of debris prior to televising. Contractor shall notify the Inspector on his progress prior to the televising request. Details and procedures of this program are included in the Televising Procedures Manual developed by the City's Water Quality Control Department who will be providing the television services. Contractors will be responsible for becoming familiar with this manual. This Manual is available on the City's Website.

E. Compaction:

Laboratory tests of the soil shall be made in accordance with ASTM D-698. In-place density tests shall be made in accordance with ASTM D-1556 or D-2922. Results of the tests shall be furnished to the Engineer by the testing laboratory. The minimum number of tests required shall be:

Backfill over sewer in traffic areas ..... 1 per 100 linear feet or less for each 4' (feet) or depth or portion thereof.

Backfill over sewer in non-traffic areas ..... 1 per 200 linear feet or less for each 6' (feet) of depth or portion thereof.

2.16 CLOSING PIPE:

When the work or pipe laying is suspended, either for night or at other times, the end of the gravity sewer or force main pipe must be closed with a water tight cover. The Contractor will be held responsible for keeping the gravity sewer or force main free from obstruction. Plugs shall remain in pipe ends until all water is removed from the trench.

2.17 GRASSING:

Grassing of areas disturbed during construction shall be in accordance with Section 02485 - Grassing.

2.18 ACCEPTANCE OF PORTIONS OF THE WORK:

The Owner reserves the right to accept and use any portion of the work whenever it is considered to the City's interest to do so. The Engineer shall have power to direct on what line the Contractor shall work and the order thereof.

2.19 RECORD DATA:

As required under Section 1500, Paragraph 54, of the General Conditions, the Contractor is required during construction to keep accurate, legible records of the location of all new sewers, force mains, tees and laterals. This record data will include survey coordinates of all bends and fittings on the force main. These records will be made available to the Engineer before his final review for incorporation into the consulting Engineer's Record Drawings. Final payment to the Contractor will be withheld until all such information is received and accepted.

END OF SECTION

INDEX TO

SECTION 02555 - PROTECTIVE COATING FOR EXISTING AND NEW CONCRETE AND MASONRY SANITARY SEWER STRUCTURES

SECTION 02555 - PROTECTIVE COATING FOR EXISTING AND NEW CONCRETE AND MASONRY SANITARY SEWER STRUCTURES

PART 1 – GENERAL

1.01 GENERAL

A. This specification covers labor, materials, and equipment required for protecting and/or rehabilitating the interior of concrete sanitary sewer structures by application of a coating to protect the concrete structure from hydrogen sulfide and acid generated by microbiological sources present in the municipal wastewater environment. The protective coating shall also eliminate infiltration, repair voids, and enhance the structural integrity of the sanitary sewer structure.

B. Cementitious material will not be allowed for the protective coating, however, it will be allowed for patching operations.

C. For new sanitary sewer manholes and valve pits: The protective coating shall be an acrylic polymer-base concrete coating and sealant. Procedures for surface preparation and application are described herein.

D. For force main discharge manholes (including the second manhole downstream from a force main discharge), drop manholes and lift station wetwells: The protective coating shall be a polymer based polyurethane or a high-build, solvent-free epoxy coating. For lift station wetwells, the coating limits shall include from the top of fillet, wetwell walls, and roof. Coating system shall overlap 1" to 2" where hatches sit on the roof; but shall exclude the banked floor. Procedures for surface preparation, cleaning, application and testing are described herein.

E. This specification also covers labor, materials, and equipment required for corrosion protection of the ductile iron discharge pipes and fittings within lift station wetwells.

1.02 REFERENCES

A. ASTM D638 - Tensile Properties of Plastics.

B. ASTM D790 - Flexural Properties of Unreinforced/Reinforced Plastics.

C. ASTM D695 - Compressive Properties of Rigid Plastics.

D. ASTM D4414 - Standard Practice for Measurement of Wet Film

Thickness of Organic Coatings by Notched Gauges

E. ASTM D4541 - Pull-off Strength of Coatings Using a Portable Adhesion Tester.

F. ASTM D2584 - Volatile Matter Content.

G. ASTM D2240 - Durometer Hardness, Type D.

H. ASTM D543 - Resistance of Plastics to Chemical Reagents.

J. ASTM C109 - Compressive Strength Hydraulic Cement Mortars.

K. ACI 506.2-77 - Specifications for Materials, Proportioning, and Application of Shotcrete.

L. ASTM C478 - Bond Strength to Concrete: Concrete Failed.

M. ASTM C496 - Tensile Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.

N. ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.

O. ASTM - The published standards of the American Society for Testing and Materials, West Conshohocken, PA.

P. NACE - The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX.

Q. SSPC - The published standards of the Society of Protective Coatings, Pittsburgh, PA.

R. ASTM C396 - Compressive Strength of Cement Mortars.

S. ASTM C580 - Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concrete.

T. ASTM D4541 - Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.

U. ASTM D4787 - Standard Practice for Continuity Verification of Liquid or Sheet Depth Applied to Concrete Substrates.

1.03 SUBMITTALS

A. Product Data:

1. Technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.

2. Material Safety Data Sheets (MSDS) for each product used.

3. Project specific guidelines and recommendations.

5. Warranty Certificate in accordance with Part 1.08 of this Section.

6. For Lift Station Wetwells:

a. Provide reference documentation to confirm that the proposed coating system has a proven record of performance when used in the intended application, including a list of at least five (5) successful installations that have been in service for a period of ten (10) years. The reference list shall include the name of the facility, the application date, a contact person, and a telephone number.

b. Applicator Qualifications:

1) Manufacturer certification that Applicator has been trained and approved in the handling, mixing and application of the products to be used.

2) Certification that the equipment to be used for applying the products has been manufactured or approved by the concrete rehabilitation products manufacturer, protective coating manufacturer, and certified for proper use for this specific application.

3) Written documentation of four (4) recent references of Applicator (involving wetwells with surface area of approximately 3,000 square feet) indicating successful application of a polyurethane or a high-build solvent-free epoxy coating.

4) Applicator must provide written documentation of having installed a minimum of 40,000 sq.ft. of protective coating similar to that specified within the last two (2) years.

5) Any project specific guidelines for the project.

6) Design details for any additional ancillary systems and equipment to be used in site and surfaced preparation, application and testing.

1.04 QUALITY ASSURANCE

A. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE and SSPC standards and the protective coating manufacturer's recommendations.

B. Coating Manufacturer's authorized field representative shall be on site prior to the application of the coating system to verify that the substrate has been properly prepared, and during the application of the coating system to certify that the coating system has been properly applied. The authorized field representative will provide the Owner with an accurate and objective written report stating inspection observations on the preparation, application, and final inspection verifing adherence to coating manufacturer recommendations, industry standards, and the written specifications.

1.05 DELIVERY, STORAGE, AND HANDLING

A. All materials are to be kept dry, protected from weather and stored under cover.

B. Protective coating materials are to be stored according to manufacturer's recommendations. Do not store near flame, heat or strong oxidants.

C. Repair and protective coating materials are to be handled according to their material safety data sheets.

1.06 SITE CONDITIONS

A. Applicator shall conform with all local, state and federal regulations including those set forth by OSHA, RCRA and the EPA and any other applicable authorities.

B. Method statements and design procedures are to be provided by the Contractor when confined space entry is required.

C. During coating operations of existing manholes and lift station wetwells, Contractor shall provide temporary flow bypassing of the structure if required by the City.

1.07 ACCESS TO THE WORK SITE

A. Contractor shall provide proper facilities for such access and observation of the Work and also for any inspection or testing by others. If any Work is covered contrary to the request of the City of Savannah (COS) Representative, it must, if requested by the COS Respresentative, be uncovered for observation and replaced at the Contractor's expense.

B. Contractor shall provide access to site inspection.

1.08 WARRANTY

A. Sanitary Sewer Manholes and Valve Pits:

All materials and workmanship shall be warranted to the owner for a period of five (5) years.

B. Force Main Discharge Manholes, Drop Manholes and Lift Station Wetwells:

Manufacturer shall warrant all work against defects in materials and workmanship for a period of ten (10) years from the date of final acceptance of the project. Manufacturer shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship if any develop during said ten (10) year period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner. No prorated warranties or exclusions for improper application will be accepted. Manufacturer shall also be responsible for the costs associated with bypass pumping to maintain continuous service if repairs are necessary during the warranty period.

PART 2 - PRODUCTS

2.01 REPAIR MATERIALS

A. Cementitious patching, repair, and structural restoration materials used shall be only those specified and pre-approved. Project specific submittals shall be provided including application, cure time and surface preparation procedures which permit optimum bond strength with protective coating.

B. Repair materials shall be used to fill voids, structurally reinforce and/or rebuild substrate surfaces, etc. as determined necessary by the engineer and protective coating applicator. Quick blending, rapid setting, high early strength, fiber reinforced, non-shrink repair mortar that can be trowelled or pneumatically spray applied must be compatible with the specified

protective coating and shall be applied in accordance with the manufacturer's recommendations.

C. The following products are accepted and approved as compatible repair basecoat materials for protective topcoating for use within the specifications.

1. Infiltration Control

All fast setting materials furnished shall be applied directly to active leaks under hydrostatic pressure from the exterior of the concrete in wetwell structures or control by dewatering methods. Materials shall consist of rapid setting cements and various accelerating agents. Material shall not contain chlorides, gypsum, or metallic particles.

Should groundwater be encountered, Contractor shall be responsible for utilizing a dewatering system(s) to remove water from the excavations.

2. Repair, patching, and structural restoration

All material furnished shall be designed to fill voids and to repair or reconstruct where no hydrostatic pressure exists. Material shall consist of rapid setting cements, NSG aggregates, and various accelerating agents. Material shall not contain chlorides, gypsum, or metallic particles.

All structural restoration materials shall be specifically designed for the rehabilitation of wastewater pump station wetwells and other related concrete structures. Materials shall contain poly fiber reinforcement, fused calcium aluminate, and chemical admixtures.

D. STRUCTURAL RESTORATION MATERIAL PROPERTIES:

Product type	Fused Calcium Aluminate or Fiberglass Cementitious
Cure Time	<48 hours
Curing gases	Non-toxic
Compressive Strength	5,000 psi
Tensile Strength	500 psi
Flexural Strength	600 psi
Shrinkage	0% at 90% Relative Humidity

2.02 SANITARY SEWER MANHOLES AND VALVE PITS

A. Exterior Coating Material

The exterior of all manhole and valve pit structures shall be coated with three coats of a factory or field applied acrylic polymer-base concrete coating and sealant that is neither asphalt nor coal tar based. Acceptable coating is ConSeal CS-55, colors gray or black, as manufactured by Concrete Sealants, New Carlisle, Ohio or equal. The total dry film thickness shall be 3.5 mils. Coating shall be applied to the tongue and groove area of the manhole sections as well.

B. Interior Coating Material

The interior of all manhole and valve pit structures shall be coated with three coats of a factory or field applied acrylic polymer-base concrete coating and sealant that is neither asphalt nor coal tar based. Acceptable coating is ConSeal CS-55, colors gray or black, as manufactured by Concrete Sealants, New Carlisle, Ohio or equal. The total dry film thickness shall be 3.5 mils. Coating shall be applied to the tongue and groove area of the manhole sections as well. The coating manufacturer and applicator shall inspect and certify all coatings prior to leaving the pre-cast facility.

2.02 FORCE MAIN DISCHARGE MANHOLES, DROP MANHOLES AND LIFT STATION WETWELLS

A. Structural Restoration & Coating Products:

1. Quadex & Raven 405 Products
2. Sauereisen No.-F120/121 & No.-210S Products
3. Spectrashield Liner System Products
4. Strong-Seal® High Performance Mix
5. Thoroc SP15 Spray Mortar & Sewerguard® HBS100 Epoxy Liner
6. Or apporved equal

B. Protective Coating Material:

Product type	Polyurethane or solid Epoxy
Color	Light
Compressive Strength	4,000 psi

Tensile Strength, psi	1,500 psi
Hardness, Type D	60
Bond Strength – Concrete	>Tensile Strength of Concrete
Dry Film Thickness	125 mils

2.04 STRUCTURAL RESTORATION MATERIAL AND PROTECTIVE COATING APPLICATION EQUIPMENT

A. Structural restoration mortars and protective coatings shall be applied with manufacturer approved equipment.

PART 3 - EXECUTION

3.01 ACCEPTABLE APPLICATORS

A. Repair mortar must be applied by manufacturer trained and approved applicators. The repair mortar shall be applied according to manufacturer's recommendations.

B. Protective coating must be applied by a Certified Applicator of the protective coating manufacturer and according to manufacturer specifications.

3.02 EXAMINATION

A. Appropriate actions shall be taken to comply with local, state and federal regulatory and other applicable agencies with regard to environment, health and safety.

B. All bidders are required to verify that they have visited the jobsite, and are familiar with the conditions and the entire scope of work. Bidders shall field verify the attached plans and perform their own quantity measurements prior to bidding.

C. Contractor shall provide a minimum 24 hour notice to the COS Inspector / Representative for the following conditions:

1. after final surface preparation is completed but before structure rehabilitation;
2. after patching operations have cured, and
3. after each coating layer is applied.

D. Installation of the protective coating shall not commence until the concrete substrate has properly cured in accordance with these specifications.

E. Temperature of the surface to be coated should be maintained between 60° F and 100° F during application. Prior to and during application, care should be taken to avoid exposure of direct sunlight or other intense heat source to the structure being coated. Where varying surface temperatures do exist, care should be taken to apply the coating when the temperature is falling versus rising (i.e., late afternoon into evening vs. morning into afternoon).

3.03 SURFACE PREPARATION

A. Applicator shall inspect all surfaces specified to receive a protective coating prior to surface preparation. The existing piping, valves, and appurtenances shall be protected during structural rehabilitation and protective coating application.

The pipes and connectors are to be top coated with 30-50 mils DFT nominal. The pipes and connectors are to be primed by the fabricator with epoxy primer (not coldtar or asphaltic base) that is compatible with the protective coating. After installation, the pipes are to be pressure washed using at a minimum 5,000 PSI and 4 GPM washer and/or abrasive blast cleaned to an SSPC-SP7 'brush-off' specification as necessary for the window of overcoating of the primer.

B. All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.

C. All concrete or mortar that is not sound or has been damaged by chemical exposure shall be removed to a sound concrete surface or replaced.

D. Old concrete must be firm and structurally sound as specified by the Engineer.

E. Surface preparation method(s) should be based upon the conditions of the substrate, service environment and the requirements of the protective coating to be applied.

F. Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating and the substrate. At a minimum, this will be achieved with a low pressure water cleaning equipment using a 0 degree rotating nozzle at a minimum 3,500 psi and 4 gpm. Other methods such as high pressure water jetting (refer to NACE Standard No. 6 /SSPC-SP 13), abrasive blasting, shotblasting, grinding, scarifying and/or acid etching may also be used. In addition, detergent water cleaning and hot water blasting may be necessary to remove oils,

grease or other hydrocarbon residues from the concrete. The method(s) used shall be performed in a manner that provides a uniform, sound clean, neutralized surface that is not excessively damaged.

3.04 APPLICATION OF REPAIR MATERIALS

A. Areas where structural steel has been exposed or removed shall be repaired in accordance with the Project Engineer's recommendations.

B. Repair/Structural Restoration materials shall meet the specifications here and as described in part 2.01A of these specifications. The materials shall be applied utilizing proper equipment on to specified surfaces. The structural restoration material shall match the original undamaged surface.

C. Infiltration shall be stopped by using a material which is compatible with the specified repair mortar, waterproof quick setting mortar-type, that is suitable for topcoating with the specified protective coating. Contractor shall completely identify the types of grout, mortar, and sealant for repair of leak defects and provide case histories of successful use.

D. Infiltration areas that require crack injection shall be covered in this scope of work. Injection holes shall be drilled through the wetwell at 120 degree angles from each other at the same plane of elevation. Rows shall be separated no more than three vertical feet, and the holes shall be staggered with the holes in the rows above and below. Provide additional injection holes near observed defects and pipe seals. A minimum of 6 injection holes shall be provided per defect.

Grout shall be injected through holes under pressure with a suitable probe. Injection pressure shall not cause damage to the wetwell structure or surrounding surface features. Grout shall be injected through the lowest holes first. Grouting from the ground surface will not be allowed. Provide additional injection holes if necessary to ensure grout travel, verified by field observation of grout at adjacent defects or holes. Patch injection holes using a waterproof quick setting mortar after cleaning with a drill.

E. The approved repair materials shall provide a smooth surface with an average profile equivalent to coarse sandpaper to optimally receive the protective coating. No bugholes or honeycomb surfaces should remain after the final trowel procedure of the repair mortar.

F. The repair materials shall be permitted to cure according to manufacturer recommendations. Curing compounds should not be used unless approved for compatibility with the specified protective coating.

G. After required cleaning and repair is performed, all surfaces shall be inspected for remaining laitance prior to protective coating application. Any evidence of remaining contamination or laitance shall be removed by additional abrasive blast, shotblast or other approved method. If repair materials are used, refer to these specifications for surface preparation. Areas to be coated must also be prepared in accordance with these specifications after receiving a repair mortar and prior to application of the protective coating.

3.05 APPLICATION OF PROTECTIVE COATING

A. Application procedures shall conform to the recommendations of the protective coating manufacturer, including material handling, mixing, environmental controls during application, safety, and spray equipment.

B. The equipment shall be specifically designed to accurately ratio and apply the specified protective coating materials and shall be regularly maintained and in proper working order.

C. The protective coating material must be applied by a Certified applicator of the protective coating manufacturer.

D. Specified surfaces shall be coated by a moisture tolerant, solvent-free, protective coating properties as described in these specifications.

E. Application equipment approved by the coating manufacturer shall be used to apply each coat of the protective coating. .

F. If necessary, subsequent topcoating or additional coats of the protective coating should occur as soon as the basecoat becomes tack free, ideally within 12 hours but no later than the recoat window for the specified products. Additional surface preparation procedures will be required if this recoat window is exceeded.

3.06 TESTING AND INSPECTION

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

B. After the protective coating has set hard to the touch it shall be inspected with high-voltage holiday detection equipment meeting ASTM D4787 – Standard Practice for Continuity Verification of Liquid or Sheet Depth Applied to Concrete Substrates. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied. All detected

holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating material can be hand applied to the repair area. All touch-up/repair procedures, for areas that do not meet the specified thickness, shall follow the protective coating manufacturer's recommendations.

The NACE Certified Coatings Inspector must be present and monitor the holiday testing (and repairs, if necessary). The final inspection report is to include the holiday testing results.

C. A final visual inspection shall be made by the Inspector and manufacturer's representative. Any deficiencies in the finished coating shall be marked and repaired according to the procedures set forth herein by Applicator.

END OF SECTION

SECTION 02570
TRAFFIC CONTROL

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section covers furnishing, installation, and maintenance of all traffic control devices, portable signal equipment, warning signs, and temporary traffic lanes used during construction of the project.

1.02 RELATED WORK

A. Section 02720 – Storm Drainage

B. Section 02600 – Pavement

1.03 RESPONSIBILITY

A. The Contractor shall furnish, install, and maintain all necessary automated signals, barricades, concrete traffic barriers, warning signs, traffic barriers, traffic lanes, and other protective devices. Ownership of these temporary warning devices shall remain with the Contractor provided devices are removed promptly after completion and acceptance of work to which devices pertain. If such warning devices are left in place for more than 30 days after specified time for removal, Owner shall have the right to remove such devices and to claim possession thereof.

PART 2 – PRODUCTS

2.01 MATERIALS

A. All barricades signs, and traffic control signal devices shall conform to requirements of the current Georgia Manual on Uniform Traffic Control Devices except as may be modified in these project specifications.

B. Portable traffic control signal devices, barricades, signs and other Control Devices shall be either new or in acceptable condition when first erected on Project and shall remain in acceptable condition throughout the construction period.

C. All signs shall have a black legend and border on an orange reflectorized background and will be a minimum of engineering grade reflective.

PART 3 – EXECUTION

3.01 ERECTION

A. Prior to commencement of any actual construction on the project, Contractor shall erect appropriate advance warning signs and place concrete traffic barriers where necessary. Subsequently, as construction progresses and shifts from one

side of road to the other, temporary lanes must be installed to provide continuous two way traffic and bike thoroughfare. All appropriate signs and traffic control devices pertinent to the work shall be erected ahead of construction site to advise and warn travelling public of activity and any necessary detours.

3.02 DELAYS TO TRAFFIC

A. Except in rare and unusual circumstances, two-way traffic shall be maintained at all times by temporary and/or permanent roads. There are to be no traffic delays during the hours between 7 AM – 10 AM and 4 PM – 10 PM. Between the hours of 10 AM and 4 PM the maximum delay is to be 15-minutes.

B. When traffic is halted temporarily due to transition procedures including the ingress and egress of construction vehicles, Contractor shall provide necessary flagging personnel with proper equipment and clothing to hold such traffic.

C. If Contractor's proposed traffic control plan involves more than occasional disruption to alternating one way traffic through the work, then temporary, signalized control equipment will be required.

3.03 TEMPORARY TRAFFIC LANES

A. Two-lane traffic shall be maintained at all times unless prior written permission has been given and all necessary flagging personnel and/or signage has been installed. Temporary lane line stripes shall be applied to the detour paving, as agreed to by Engineer and Owner's representative. The no-passing double center-line stripes shall be yellow. Such stripes shall be a temporary, degradable, reflectorized tape strip. All temporary striping shall be maintained throughout the period traffic control is needed.

B. Contractor is responsible for installation and removal of all temporary roads and trails throughout the construction process. These detour roads are to be in accordance with the Pavement Specifications herein.

3.04 SIGNS AND BARRICADES

A. Contractor shall provide a detailed map showing location and verbage of all traffic control signs and methods for the project. All critical warning signs for the project will be a minimum of engineering grade reflective material and include appropriate flashing lights.

B. Appropriate Safety Barricades shall be installed between bicycle trails, sidewalks, and the temporary traffic lanes. These barricades shall be impact resistant for passenger vehicles with a travelling speed of 40 mph.

1. Advance warning signs: These signs shall be placed approximately 500 feet in advance of the construction site and detour on each approach to the construction area with subsequent warning signs every 250 feet, until construction site is met.

2. Road Construction Signs: Before and during construction of the detour, advance road construction signs shall be located as already stated above. The construction site detour lanes will have reflective trestle type barricade with flashing lights spaced a maximum of 25 feet apart to delineate each side of any temporary roadway. Additional signage shall be placed to indicate a reduced speed limit of 10 mph for the entire construction area. Other signs as appropriate to a particular activity in the work area shall be erected in advance of that activity.

3. Barricades: While detour is open to traffic, a line of concrete traffic barricades shall be placed across the closed roadway to channelize traffic onto detour. They shall be spaced across the blocked roadway end to end so no vehicle will be able to pass between any two adjacent barricades.

4. Barriers: Shall be wooden having a minimum of 3 horizontal 6 inch rails spaced 20 inches on center. Markings for barrier rails shall be 6 inches wide alternate orange and white reflectorized stripes sloping downward at 45 degrees in the direction traffic is to pass. During hours of darkness, the Contractor shall place and maintain flashing warning lights on tops of all barriers.

5. Direction Arrow Signs: At each change in traffic direction along the detour, Contractor shall install a sign with an arrow indicating change in traffic direction. This sign is to be located across the pavement from and facing on-coming traffic.

6. End Construction Sign: This sign shall be 60 inches x 24 inches and erected approximately 200 feet beyond end of construction area on the right-hand side.

END OF SECTION

SECTION 02720
STORM DRAINAGE

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Construction of box culverts, pipes, drainage inlets, manholes, headwalls, and various drainage structures.

1.01 RELATED SECTIONS

A. Section 02204 – Earthwork

B. Section 02275 – Rip Rap

1.01 OPTIONS

A. Where manufacturers of material or equipment are named in the specifications, Contractor may use equipment or materials of other manufacturers provided they are reviewed and accepted by the County as equivalent to those specified.

1.01 REFERENCES (Latest Revision)

A. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

B. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

C. ASTM C 76 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

D. ASTM C 443 – Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

E. ASTM D 1056 – Flexible Cellular Materials – Sponge or Expanded Rubber.

F. ASTM D 1751 – Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non–extruding and Resilient Bituminous Types).

G. ASTM D 1752 – Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

H. ASTM C 150 – Portland Cement.

I. ASTM C 144 – Aggregate for Masonry Mortar.

J. ASTM C 207 – Hydrated Lime for Masonry Purposes.

K. ASTM C 55 – Concrete Brick.

L. ASTM C 478 – Precast Reinforced Concrete Manhole Sections.

M. ASTM C 1433 – Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers.

N. ASTM D 1557 – Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

O. ASTM D 6938 – In Place Density and Water Content of Soil and Soil–Aggregate by Nuclear Methods (Shallow Depth).

P. Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, 2001 Edition.

Q. Georgia Department of Transportation Standard Details.

1.01 QUALITY ASSURANCE

A. Material Review – Contractor will furnish the County with a description of all material and shop drawings before ordering. The County will review the Contractor's submittals and provide in writing an acceptance or rejection of material.

B. Manufacturer – Material and equipment shall be standard products of a manufacturer who has manufactured them for a minimum of 2 years and provides published data on their quality and performance.

C. Subcontractor – A subcontractor for any part of the work must have experience on similar work, and if required, furnish the County with a list of projects and Owners or Engineers who are familiar with their competence.

D. Design – Devices, equipment, structures, and systems not designed by the County and Contractor wishes to furnish, shall be designed by either a Registered Professional Engineer or by someone the County accepts as qualified. If required, complete design calculations and assumptions shall be furnished to the County before ordering.

E. Testing Agencies – Soil tests shall be taken by a testing laboratory operating in accordance to ASTM D–3740 and E–329 and be acceptable to the County prior to engagement. Mill certificates of tests on materials made by manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests, spot checked by an outside laboratory and furnishes satisfactory certificates.

1.01 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Material shall be unloaded in a manner avoiding damage and shall be stored where it will be protected and will not be hazardous to traffic. Contractor shall

repair any damage caused by the storage. Material shall be examined before installation. Neither damaged nor deteriorated material shall be used in the work.

1.01 SEQUENCING AND SCHEDULING

A. Contractor shall arrange work so sections of pipes between structures are backfilled, checked, pavement replaced, and the section placed in service as soon as reasonable after installation.

1.01 ALTERNATIVES

A. The intention of these specifications is to produce the best system for the County. If Contractor suggests alternate material, equipment or procedures will improve results at no additional cost, the County will examine suggestion, and if accepted, it may be used.

1.01 EXISTING UTILITIES

A. All known utility facilities are shown schematically on the construction drawings, and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown, will not relieve the Contractor of responsibility under this requirement. "Existing Utilities Facilities" means any utility existing on the project in its original, relocated, or newly installed position. Contractor will be held responsible for cost of repairs to damaged underground facilities; even when such facilities are not shown on the drawings.

B. The Contractor shall call for underground utility locations before starting work. Underground utilities location service can be contacted at 1–800–282–8411 (GA) or 811.

1.01 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 6938.

C. Testing laboratory shall operate in accordance with ASTM D 3740 and E 329 and be acceptable to the County.

D. Testing laboratory and County shall be given sufficient notice prior to taking any tests.

E. The County shall select and engage the testing laboratory. Testing laboratory shall be responsible to the County. Payment for laboratory and all tests shall be by the County, except the County specifically reserves the right to deduct from Contractor's payment, expenses and charges of testing laboratory when:

1. Contractor gives notice work is ready for inspection and testing, and fails to be ready for the test, and/or

2. testing of the Contractor's work, products, or materials fail, and retesting is required, and/or

3. Contractor abuses the services or interferes with work of testing laboratory in conduct of this work.

F. Test results shall be furnished to the County prior to continuing with associated or subsequent work.

PART 2 – PRODUCTS

2.01 PIPE

A. Concrete Pipe – Shall be reinforced Class III unless otherwise specified and shall conform to ASTM Specification C–76. Pipe shall be manufactured without lifting holes. Joints shall be either 'O' ring watertight flexible rubber, or tongue and groove as indicated on the plans.

1. 'O' Ring Joints – Shall be water tight flexible rubber gasket and shall meet ASTM Specification C–443.

2. Tongue and groove joints shall utilize mastic sealant and the exterior shall be wrapped with geotextile material.

2.01 DRAINAGE STRUCTURES

A. Details – See plans.

B. Concrete – Reinforced and non–reinforced.

1. Minimum compressive strength = 3,000 p.s.i. at 28 days.

2. Reinforcing shall be covered by a minimum 1 inch of concrete for top slabs and 1–1/2 inches for walls and bases and 3 inches where concrete is deposited directly against the ground.

3. Expansion joint filler materials shall conform to ASTM D 1751 or D 1752.

A. Mortar – Connection of pipe and drainage structures shall be composed of one part by volume of Portland cement and two parts of sand. The Portland cement shall conform to ASTM C–150, Type I or II. The sand shall conform to ASTM C–144 and shall be of an accepted gradation. Hydrated lime may be added to the mixture of sand and cement in an amount equal to 25% of cement volume used. Hydrated lime shall conform to ASTM C–207, Type S. Quantity of water in the mixture shall be sufficient to produce a workable mortar, but shall in no case exceed 7 gallons of water per sack of cement. Water shall be clean and free of

harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes from time ingredients are mixed with water.

B. Brick Masonry – Brick shall conform to ASTM Specification C–55, Grade S. Mortar for jointing and plastering shall consist of one part Portland cement and two parts fine sand. Lime may be added to the mortar in an amount not more than 25% of the cement volume used. Joints shall be completely filled and shall be smooth and free from surplus mortar on the inside of structure. Brick structures shall be plastered with 1/2 inch of mortar over entire outside surface of the walls. For square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course, and for round structures, brick shall be laid radially with every sixth course a stretcher course.

C. Precast – Shall be constructed in accordance with ASTM C–478 or C–1433 and conform to details on the project drawings.

1. Joints – Shall be tongue and groove sealed with flexible gaskets or mastic sealant. Gaskets shall be O–Ring or Type A or B "Tylox" conforming to ASTM C443 and mastic shall be "Ram–nek" or equivalent with primer. Primer shall be applied to all contact surfaces of manhole joints at the factory in accordance with manufacturer's instructions.

2. Steps – Shall be polypropylene equivalent to M.A. Industries, Type PS–1 or PS–1–PF. Steps shall be installed at the manhole factory and in accordance with recommendations of step manufacturer. Manholes will not be acceptable if steps are not installed accordingly.

3. Leaks – No leaks in the manhole will be acceptable. All repairs made from inside the manhole shall be made with mortar composed of one part portland cement and two parts clean sand; mixing liquid shall be straight bonding agent equivalent to "Acryl 60."

F. Frame, cover & grating shall conform to details shown on the project drawings. Grates in pavement and in other flush–mounted type surfaces shall be of a "bicycle–safe" configuration consisting of 45 degree diagonal bars or slotted grates with a maximum clear opening of 1 inch and a maximum length of 9–inches. In any case, the long dimension of openings should be located transverse to direction of traffic when possible.

2.01 FILTER FABRIC

A. Shall be a non–woven heat–bonded fiber of polypropylene and nylon filaments equivalent to Mirafi 140 N. The fabric shall be finished so filaments will retain their relative position with respect to each other. Fabric shall contain stabilizers and/or inhibitors added to the base plastic to make filaments resistant to deterioration due to ultraviolet and/or heat exposure. The product shall be free of flaws, rips, holes, or defects.

2.01 TRACING WIRE

A. Tracing wire shall be #12 gauge insulated single strand copper wire.

2.02 SOILS AND STONE AGGREGATES

A. Stone aggregate shall be clean crushed granite or concrete meeting the gradation requirements of grade No. 57.

B. Materials used for bedding, haunching, and initial backfill shall be as shown in the following table and shall meet requirements and classifications of ASTM D2321 and ASTM D2487.

Class	Type	Soil Group Symbol D 2487	Description	Percentage Passing Sieve Sizes		
				1–1/2 inch (40 mm)	**No. 4 (4.75 mm)**	**No. 200 (0.075 mm)**
IB	*Manufactured, Processed Aggregates; dense–graded, clean.*	*None*	*Angular, crushed stone (or other Class 1A materials) and stone/sand mixtures with gradations selected to minimize migration of adjacent soils; contain little or no fines.*	*100%*	*≤50%*	*<5%*
II	*Coarse – Grained Soils, clean*	*GW*	*Well–graded gravels and gravel–sand mixtures; little or no fines.*	*100%*	*<50% of "Coarse Fraction"*	*<5%*
		GP	*Poorly–graded gravels and gravel–sand mixtures; little or no fines.*			
		SW	*Well–graded sands and gravelly sands; little or no fines.*		*>50% of "Coarse Fraction"*	
		SP	*Poorly–graded sands and gravelly sands; little or no fines.*			
	Coarse–Grained Soils; borderline clean to w/fines.	*Eg. GW–GC, SP–SM.*	*Sands and gravels that are borderline between clean and with fines.*	*100%*	*Varies*	*5% to 12%*
III	*Coarse–Grained Soils with Fines*	*GM*	*Silty gravels, gravel–sand–silt mixtures.*	*100%*	*<50% of "Coarse Fraction"*	*5%*
		GC	*Clayey gravels, gravel–sand–clay mixtures.*			
		SM	*Silty sands, sand–silt mixtures.*		*>50% of "Coarse Fraction"*	
		SC	*Clayey sands, sand–clay mixtures.*			
IVA	*Fine–grained soils (inorganic)*	*ML*	*Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity.*	*100%*	*100%*	*>50%*

		CL	*Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays.*			

2.03 PRODUCT REVIEW

A. Contractor shall provide the County with a complete description of all products before ordering. The County will review all products by the submittal of shop drawings before they are ordered.

PART 3 – EXECUTION

3.01 ON SITE OBSERVATIONS OF WORK

A. The line, grade, deflection, and infiltration of storm sewers shall be tested by Contractor under direction of the County. The County will have the right to require any portion of work be completed in their presence and if work is covered up after such instruction, it shall be exposed by Contractor for observation. All work completed and material furnished shall be subject to review by the County. All improper work shall be reconstructed. All materials not conforming to requirements of specifications shall be removed from the work upon notice being received from the County for rejection of such materials. The County shall have the right to mark rejected materials to distinguish them as such.

B. Contractor shall give the County sufficient notice for all required observations or tests. Storm sewers shall be dry for observation by the County. Lines under water shall be pumped out by Contractor prior to observation, at no additional cost to the County.

C. It will also be required of Contractor to keep accurate, legible records of the location of all storm sewer lines and appurtenances. These records will be prepared in accordance with paragraph on "Record Data and Drawings" in the Special Conditions. Final payment to the Contractor will be withheld until all such information is received and accepted.

3.03 EXCAVATION FOR PIPE AND STRUCTURES

A. Excavated material shall be piled a sufficient distance from the trench banks to avoid overloading to prevent slides or cave–ins.

B. Remove from site all material not required or suitable for backfill.

C. Grade as necessary to prevent water from flowing into excavations.

D. Remove all water accumulating in the excavation, from surface flow, seepage, or otherwise, by pumping or other acceptable method.

E. Sheeting, bracing or shoring shall be used as necessary for protection of the work and safety of personnel.

3.03 TRENCHING FOR PIPE

A. Removal of Unsuitable Material – Where wet or otherwise unstable soil, incapable of supporting the pipe is encountered in bottom of trench, such material shall be removed to depth required and replaced to proper grade with stone or sand foundation as determined by the County. This foundation shall be compacted to 95% modified proctor.

3.03 PROTECTION OF UTILITY LINES

A. Existing utility lines shown on drawings or locations of which are made known to the Contractor prior to excavation, and are to be retained, as well as utility lines constructed during excavation operations, shall be protected from damage during excavation and backfilling.

3.03 FOUNDATION AND BEDDING

A. Stone Foundation – Where the subgrade of pipe is unsuitable material, Contractor shall remove unsuitable material to a depth determined by the County or Geotechnical Consultant and furnish and place stone foundation in trench to stabilize subgrade.

B. Sand Foundation – Where the character of soil is unsuitable, even though dewatered, additional excavation to a depth determined by the County or Geotechnical Consultant shall be made and replaced with clean sand furnished by Contractor.

C. Bedding for pipe shall provide a firm surface of uniform density throughout the entire length of pipe. Before laying pipe, trench bottom shall be de–watered by the use of well points. Where well points will not remove the water, Contractor shall construct sumps and use pumps to remove all water from bedding surface. Pipe shall be carefully bedded in stone accurately shaped and rounded to conform to lowest 1/3 outside portion of circular pipe, or lower curved portion of arch pipe for the entire length of pipe. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making the particular type joint.

D. Concrete Pipe:

1. Materials for bedding concrete pipe shall be either Class II, Class III, or Class IB if processed, to minimize migration of adjacent material.

2. Depth of bedding shall be equal to 1/24 the outer diameter of pipe or 3 inches, whichever is greater.

3. Bedding area under the center of pipe, for a width 1/3 outer diameter of pipe, known as middle bedding, shall be loosely placed. Remainder of bedding for full width of the trench shall be compacted to a minimum density of 85% for Class II bedding and 90% for Class III bedding as determined by ASTM D1557.

3.03 HAUNCHING, INITIAL BACKFILL, AND FINAL BACKFILL

A. Haunching – After the bedding has been prepared and pipe is installed, Class II or Class III soil shall be placed along both sides of pipe, in layers not exceeding 6 inches in compacted depth. Care shall be taken to insure thorough compaction and fill under haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers and rammers. Haunching shall extend up to the spring line of pipe and be compacted to following densities:

1. RCP: Minimum density shall be 90% as determined by ASTM D1557.

B. Initial Backfill – Shall be compacted to a minimum density of 95% as determined by ASTM D1557.

C. Final Backfill – Shall be select materials compacted to a minimum of 98% as determined by ASTM D1557 if pipe is under pavement. If pipe is in grassed areas final backfill may be native materials compacted to a minimum density of 90% as determined by ASTM D1557.

3.02 PLACING PIPE

A. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipe lines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall have been checked before backfilling. When storm drain pipe terminates in a new ditch, headwall or end section, together with ditch pavement, if specified, shall be constructed immediately as called for on the plans. Ditch slopes and disturbed earth areas shall be grassed and mulched as required. Contractor will be responsible for maintaining ditches and take immediate action subject to acceptance, keeping erosion of the ditch bottom and slopes to a minimum during life of contract. No additional compensation will be given to Contractor for the required diversion of drainage and/or dewatering of trenches. Grassing the trench backfill shall conform to requirements of Section 02902 – "Grassing."

B. Concrete Pipe: Laying shall proceed upgrade with spigot ends of bell and spigot pipe and tongue ends of tongue and groove pipe pointing in the direction of flow. Place pipe in trench with the invert conforming to required elevations, slopes, and alignment. Provide bell holes in pipe bedding in order to insure uniform pipe support. Fill all voids under the pipe by working in backfill material.

D. Tracing Wire – Tracing wire will be installed on all storm sewers and subgrade drain directly on top of the pipe. The wire shall be secured to pipe with tape or other acceptable methods at spacings of no more than 36 inches apart. The insulated wire must maintain electrical continuity. The tracing wire shall be stubbed up into each drainage structure. This tracing wire system shall be checked and tested by Contractor, in presence of the County, prior to acceptance of the installation. All equipment, meters, detectors, etc., needed for testing shall be furnished by the Contractor.

3.02 JOINTS IN PIPES

A. Concrete Pipe – Joints in concrete pipe shall be either 'O' ring watertight flexible rubber or tongue and groove as indicated on the plans. Maintain pipe alignment and prevent infiltration of fill material at joints during installation.

1. 'O' ring joints shall meet the requirements of ASTM C443. They shall utilize either a rubber gasket with a circular cross section or a rectangular cross section. Gaskets shall have no more than one splice, except two splices of the gasket will be permitted if nominal diameter of pipe exceeds 54 inches. Manufacturer's recommendations and requirements shall be followed.

2. Tongue and groove joints shall utilize a bituminous mastic such as Ram–Nek or accepted equivalent. The joint surfaces shall be primed according to manufacturer's recommendations. Care shall be taken to insure mastic material completely and uniformly seals the joint.

3. All joints shall receive two layers of filter fabric completely around exterior of the joint. Filter fabric shall be a minimum of 2 feet wide, centered on the joint, and overlapped a minimum of 1 foot.

3.02 FIELD QUALITY CONTROL

A. Soil and density tests shall be made by a testing laboratory acceptable to the County. Laboratory tests of the soil shall be made in accordance with ASTM D 1557. In–place density tests shall be made in accordance with ASTM D 6938. Results of tests shall be furnished to the County.

The minimum number of tests required shall be:

Haunching and Initial Backfill in all areas....	1 per 100–linear feet of pipe, minimum of one per run of pipe for both the haunching and initial backfill zones.
Final Backfill over pipe in traffic areas.....	1 per 100–linear feet or less for each 4–feet of depth or portion thereof.
Final Backfill over pipe in non–traffic areas.....	1 per 500–linear feet or less for each 6–feet of depth or portion thereof.

The minimum percent of compaction of the backfill material (in accordance to ASTM D1557) shall be the following:

In traffic Areas.	98% of maximum laboratory density.
In non–traffic Areas . . .	90% of maximum laboratory density, unless otherwise accepted by the County.

B. All installed pipes shall be televised and video recorded. The video observation shall include a complete pan view of each joint. If the video observation indicates problems, further televising may be required. Additional televising and video recording will be at no additional cost to the County.

3.02 DRAINAGE STRUCTURES

A. Drainage structures shall be constructed of materials specified for each type and in accordance with details shown on the drawings.

END OF SECTION

SECTION 02722
WATER MANAGEMENT SERVICES

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide all supervision, labor, material and equipment required to provide continuous, uninterrupted storm drainage for the duration of the construction. The temporary storm drainage system (ditch, pipe, pump, flap gates, and any other necessary stormwater management devices) shall have a minimum conveyance equal to or greater than the existing storm drainage system.

1.01 RESPONSIBILITY

A. The Contractor shall install, furnish, and maintain all necessary temporary storm drainage systems to provide the same existing level of flood protection 24 hours per day, 7 days per week. The Contractor shall maintain the drainage system to allow continuous, uninterrupted drainage throughout the construction period. In addition, the Contractor will provide a supervisory level individual to be on call at all times to maintain, modify, and respond to weather dictated demands. Upon construction completion, the Contractor shall promptly remove any temporary storm drainage system and restore the area to its original or better condition.

B. The Contractor is responsible for all cost and liability for any water damages resulting from improper execution of the water management's services.

C. Contractor is responsible for floodproofing the construction area. Contractor is responsible for all cost, liability, time, material, equipment, etc. for flood damages occurring to the construction project.

D. The Contractor shall be responsible for the control of groundwater within work areas at all times during construction.

PART 2 – PRODUCTS

2.01 MATERIALS

A. All material and equipment used in the stormwater management operations shall be new or in acceptable condition when first installed and shall remain in an acceptable condition throughout the construction period.

END OF SECTION

SECTION 02902
GRASSING

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. Construction plans and specifications.

1.02 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. Store in cool, dry locations away from contaminants.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Damaged bags are not acceptable. Store in cool, dry locations away from contaminants.

C. Deliver sod on pallets.

D. All material shall be acceptable to the County prior to use.

1.03 PLANTING DATES

A. This specification provides for establishment of a permanent grass cover. If finished earth grades are not completed in time to permit planting and establishment of permanent grass during the favorable season between dates specified unless otherwise accepted, Contractor will be required to plant a temporary cover to protect new graded areas from erosion and to keep windborne dust to a minimum. The temporary cover shall be maintained until the permanent vegetation can be planted within the favorable season.

PART 2 – PRODUCTS

2.01 SUBMITTALS

A. Contractor shall submit source and species certification documents to the County for review prior to installation. Supply complete information on all analysis/test methodologies and results; laboratory certifications, manufacturer's specifications, and agency approvals to the County prior to placement of soil

mixtures. Landscape Contractor shall make modifications and improvements to soil mixes deemed necessary by the soil analysis to meet requirements specified here in before, and to ensure proper growing medium for plant material.

2.02 SEED

A. All seed shall conform to State Laws and requirements and regulations of the State Department of Agriculture.

B. The varieties of seed, as specified in Section 2.03, shall be individually packaged or bagged, and tagged to show name of seed, net weight, origin, germination, lot number, and other information required by the State Department of Agriculture.

C. The County reserves the right to test, reject, or accept all seed before seeding.

2.02 SEEDING SCHEDULE

A.

SEED	RATE	PLANTING DATES
Bermuda (hulled)	6 lbs/acre	February 15 – June 30
Bermuda (unhulled)	6 lbs/acre	November 1 – January 31
Rye	30-lbs/acre	September 1 – February 28

2.02 FERTILIZER

A. Commercial fertilizer of accepted type, conforming to State fertilizer laws at the rate as recommended by soils test.

2.02 LIME

A. Agricultural grade, ground limestone at the rate as recommended by soils test.

2.02 ACCESSORIES

A. Straw Mulch: Oat or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition.

2.02 PRODUCT REVIEW

A. Contractor shall provide the County with a complete description of all products before ordering. The County will review all products before they are ordered.

PART 3 – EXECUTION

3.01 PREPARATION

A. Areas to be seeded shall be made smooth and uniform and shall conform to the finished grade indicated on 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 inches before fertilizer, seed or sod is applied.

D. Amendments to soils shall be incorporated into loosened 3-inch top soil layer as recommended by soils tests.

3.02 STAND OF GRASS

A. Before acceptance of permanent vegetation, Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and winter weather and be capable of re-establishment in spring.

B. Before acceptance of temporary vegetation, 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 establishment of permanent vegetation is to commence.

3.02 SEEDING DATES

A. Seeding shall be performed during periods and at rates specified in the schedule. Seeding work may, at discretion of Contractor, be performed throughout the year using schedule prescribed for given period. Seeding work shall not be conducted when the ground is frozen or excessively wet. Contractor will be required to produce a satisfactory stand of grass regardless of the period of year work is performed.

3.02 APPLYING LIME AND FERTILIZER

A. Following advance preparation and placing selected material for shoulders and slopes, lime and fertilizer, if called for based on soil tests, shall be spread uniformly over the designated areas, and shall be thoroughly mixed with the soil to a depth of approximately 2 inches. Fertilizer and lime shall be applied at the rate recommended by required soils 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. Any stones larger than 2-1/2 inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

3.02 SEEDING

A. Seed shall be sown within 24 hours following application of fertilizer and lime and preparation of the seedbed as specified in Section 3.4. Seed shall be uniformly

sown at 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 inaccessible to seed drills.

B. 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.

3.02 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.

PART 4 – MAINTENANCE, WARRANTY AND ACCEPTANCE

4.01 MAINTENANCE

A. Maintain grassed 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. Maintenance shall also include, but is not limited to, watering, weeding, cultivating, removal of dead material, lawn mowing, fertilizing, and other necessary operations.

C. The Contractor shall maintain all proposed plantings until the date of substantial completion issued by the County.

4.04 ACCEPTANCE

A. Before acceptance of seeding performed for the establishment of permanent vegetation, Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and winter weather and be capable of reestablishment in spring.

B. A minimum coverage of 80% density over 100% of the disturbed area is required for seeded areas before project acceptance. Sprig and sod areas shall have 95% coverage over 100% of the disturbed area prior project acceptance.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SCOPE

A. These specifications cover cast-in-place concrete for use in curb and gutters, and other related items.

B. The following subjects are considered outside of the scope of these specifications:
   1. Recast concrete products.
   2. Heavy duty paving concrete
   3. Terrazzo
   4. Insulating Concrete
   5. Lightweight concrete

1.06 CONSTRUCTION LOADS

A. Construction loads shall not exceed what the member is able to carry safely and without damage. The Contractor is responsible for providing all supplemental support necessary to protect the structure until the concrete has reached it's specified design strength.

1.02 REFERENCES (LATEST REVISION)

A. ACI - American Concrete Institute, P.O. Box 19150, Detroit MI 48219-0150

B. ASTM - American Society for Testing and Materials, 1916 Race St. Philadelphia, PA 19103

C. AASHTO - American Association of State Highway and Transportation Officials 444 North Capital Street, N.W., Suite 225, Washington DC 20001

D. CRSI - Concrete Reinforcing Steel Institute, 933 North Plum Grove Road, Schaumburg, IL 60195

PART 2 – PRODUCTS

2.01 CEMENTS

A. Portland cement shall conform to ASTM C 150. Portland blast furnace slag cement or Portland Pozzolan cement shall conform to ASTM C 595.

2.02 ADMIXTURES

A. Admixtures to be used in concrete, when required or permitted, shall conform to the following appropriate specifications:
   1. Air-entraining admixtures, ASTM C 260

2. Water-reducing, retarding, and accelerating admixtures, ASTM C494

3. Pozzolanic admixtures, ASTM C 618
4. Fiber reinforcement shall be 1/2" or 3/4" collated, fibrillated polylpropylene fibers meeting the requirements of ASTM C 1116, para. 4.1.3, Type III.

E. Admixtures used in the work shall be of the same composition as those used in establishing the concrete proportions.

2.06 WATER

A. Mixing water for concrete shall meet requirements of ASTM C 94.

2.02 AGGREGATES

A. Aggregates for normal weight concrete shall meet the requirements for ASTM C 33 unless otherwise specified.

B. Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregate, as well as the combination of sizes when two or more are used, shall meet the appropriate grading requirements of the applicable ASTM specifications.

CHAPTER 3 – PROPORTIONING

3.01 GENERAL

A. Concrete for all parts of the work shall be of the specified quality and capable of being placed without excessive segregation. When hardened, concrete shall develop all characteristics required by these specifications and the contract documents.

3.02 STRENGTH

A. The specified compressive strength of the concrete (f'c) for each portion of curb and gutters shall be a minimum of 3000 psi unless a greater strength requirement is indicated on the contract drawings or herein. Driveway and road paving shall have a compressive strength of not less than 5000 psi. Strength requirements shall be based on 28-day compressive strength unless a different test age is specified. The compressive strength of the concrete shall be determined by ASTM C39.

3.02 DURABILITY

A. Concrete shall be air entrained and shall conform to the air content limits of ACI 301, Table 3.4.1.

B. The water-cement ratio shall not exceed 0.53 by weight.

C. For all concrete in which aluminum or galvanized metal is to be embedded, it shall be demonstrated by test that the mixing water of the concrete, including that contributed by the aggregates and any admixture used, will not contain a deleterious amount of chloride ion.

3.04 SLUMP

A. The concrete shall be proportioned and produced to have a slump of 4 inches or less. The slump shall be determined by ASTM C 143.

3.02 MAXIMUM SIZE OF COARSE AGGREGATE

A. The nominal size of the aggregate shall not be more than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between reinforcing bars. See ASTM C 33 for tolerance on oversize for various nominal maximum size designations.

3.02 ADMIXTURES

A. The amount of calcium chloride shall not exceed 2 percent by weight of cement. The amount of calcium chloride shall be determined by the method of described in AASHTO T260.

B. For all concrete which will remain in contact with aluminum or galvanized metal, the limitation of Section 3.3.3 shall apply unless protective measures acceptable to the County are provided.

C. All admixtures shall be used in accordance with the manufacturer's instructions except as otherwise specified.

D. Where fiber reinforcement is called for, it shall be added to the concrete in the manner and rate recommended by the manufacturer. Unless otherwise prohibited by the manufacturer, the minimum rate of application shall be 1 lb. of polypropylene fibers per cubic yard of concrete.

3.05 MIX DESIGN

A. The Contractor shall submit proposed concrete mix designs for each type of concrete in the project. Proposed concrete proportions shall be subject to acceptance by the County based on demonstrated ability to produce concrete meeting all requirements of the specifications. Concrete proportions shall be established on the basis of previous field experience as specified in ACI 301, Section 3.9 with materials to be employed in the work; or by laboratory trial batches as specified in ACI 301, Section 3.10. Contractor is not authorized to batch any concrete for use in this project until mix design has been approved by the County.

PART 4 – FORM WORK

4.01 FORMWORK

A. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall have sufficient rigidity to maintain specified tolerances. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor.

B. Earth cuts shall not be used as forms for vertical surfaces unless specifically allowed by the County. The Contractor is responsible for ensuring that all earth cuts meet OSHA trenching regulations.

C. Before placing the reinforcing steel or the concrete, the surfaces of the forms shall be covered with an acceptable coating material that will effectively prevent absorption of moisture, prevent bond with the concrete, and not stain the concrete surfaces.

D. Under no circumstances shall formwork be removed prior to 24 hours after placement of concrete.

E. Tolerances for formed surfaces shall be in compliance with ACI 301, Table 4.3.1.

F. Unless otherwise specified, formwork shall meet the requirements of ACI 301, Chapter 4.

PART 5 – REINFORCEMENT

5.01 BARS

A. Reinforcing Bars shall be deformed except spirals, which may be plain bars. Reinforcing bars shall be Grade 60 conforming to one of the following specifications: ASTM A 615, ASTM A 616(incl. supplementary reqmt. S1), ASTM A 617, ASTM A 706. If called for on plans, reinforcing bars shall be epoxy-coated in accordance with ASTM A775

5.02 WELDED WIRE FABRIC

A. Welded Wire Fabric shall be fabricated from smooth or deformed wire and shall conform to the wire size and wire spacing required or indicated on the contract drawings. Welded wire fabric shall conform to one of the following specifications:

1. ASTM A 185, except welded intersections shall be spaced not farther apart than 12 inches in the direction of the principal reinforcement.
2. ASTM A 497, except welded intersections shall be spaced not farther apart than 16 inches in the direction of the principal reinforcement.

5.03 BAR SUPPORTS

A. Wire bar supports shall be in accordance with Class 1, maximum protection, or Class 2, moderate protection in Chapter 3 of the CRSI Manual of Standard Practice.

B. Precast concrete brick bar supports may be used to support rebar mats or welded wire mesh in slab-on-grade construction. Clay bricks are prohibited.

5.03 WELDING

A. Welding of reinforcing bars or welded wire fabric is specifically prohibited.

5.02 FABRICATION

A. Fabrication of reinforcing bars shall be in accordance with the standard fabricating tolerances in Fig. 4 and 5 of ACI 315.

5.02 PLACING REINFORCEMENT

A. Reinforcement shall be placed within the tolerances and guidelines specified in ACI 301, Chapter 5.6 and 5.7. Minimum concrete cover for reinforcement shall be as required in para. 5.7.1 of ACI 301.

B. Field bending of bars partially embedded in concrete shall not be permitted unless specifically accepted by the County.

PART 6 – JOINTS AND EMBEDDED ITEMS

6.01 CONSTRUCTION JOINTS

A. Construction Joints shall be located and detailed on the contract drawings. Unless otherwise indicated on the drawings, all reinforcement shall be continued across the joints.

6.02 CONTRACTION JOINTS

A. Saw-cut joints shall be located and detailed as indicated on the contract drawings. Cutting shall be timed properly with the set of concrete. Cutting shall be started as soon as the concrete has hardened sufficiently to prevent aggregates being dislodged by the saw. Cutting shall be completed before shrinkage stresses become sufficient to produce cracking.

6.02 EXPANSION JOINTS

A. Expansion joints shall be located as shown on the contract drawings but shall be spaced no further apart than 80 feet along the curb and gutter.

B. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors bonded on only one side of joints) shall not be permitted to extend continuously through any expansion joint.

C. Pre-molded expansion joint filler shall conform to one of the following specification: ASTM D 994, ASTM D 1751, or ASTM D 1752.

6.04 JOINT SEALANT

A. All expansion joints shall be sealed per detail on project drawings. Other joints to be sealed will be indicated on the project drawings. Joint sealant shall meet the requirements of ASTM C 920, Type S or M, Grade P, Class 25.

6.02 CURB AND GUTTER

A. Curb and Gutter sections shall be constructed in sections of uniform length not to exceed 10 feet in length or be less than 5 feet in length. If slip-form or extruded construction is used, contraction joints shall be located at intervals no greater than 10 feet by sawing the hardened concrete at the proper time. The depth of the saw-cut shall be one-fourth of the thickness of the curb and gutter section. The maximum width of the cut shall be 1/4 inch and shall be sawed no later than 24 hours after the pour.

PART 7 – PRODUCTION OF CONCRETE

7.01 READY-MIXED CONCRETE

A. Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94, except as otherwise provided in this chapter.

7.02 BATCHING

A. Concrete produced by on-site volumetric batching and continuous mixing shall be batched and mixed in accordance with and shall conform to all requirements of ASTM C 685.

PART 8 – PLACING OF CONCRETE

8.01 PREPARATION

A. Form work shall be completed; snow, ice and water shall be removed; reinforcement shall be secured in place; expansion joint material, anchors, and other embedded items shall be positioned; and the entire preparation shall be accepted by the County prior to placing concrete.

B. The subgrade shall be well drained and of adequate and uniform load bearing capacity. The minimum in-place density of the subgrade soils shall be as required in the specifications.

C. Concrete shall not be placed on frozen ground. The subgrade shall be free of frost before concrete placing begins.

D. Subgrades shall be moist at the time of concreting. If necessary, they shall be dampened with water in advance of concreting, but there shall be no standing water on the subgrade or any muddy or soft spots when the concrete is placed.

8.05 CONVEYING AND PLACING

A. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.

B. The loss of slump in pumping or pneumatic conveying equipment shall not exceed 2 inches. Concrete shall not be conveyed through pipe made of aluminum or aluminum alloy.

C. Concrete shall be deposited continuously, or in layers of such thickness that no concrete will be deposited which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located as indicated on the contract documents or as permitted by the Couinty. Placing shall be carried on at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Concrete which has partially hardened or has been contaminated by foreign materials shall not be deposited. Temporary spreaders in forms shall be removed which the concrete placing has reached an elevation rendering their service unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior acceptance has been obtained by the County.

D. Concrete shall be deposited as nearly as possible in its final position to avoid segregation due to re-handling or flowing. Concrete shall not be subjected to any procedure which will cause segregation.

E. All concrete shall be consolidated by vibration, spading, rodding or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Use of vibrators to transport concrete within forms shall not be allowed. A spare vibrator shall be kept on the job site during all concrete placing operations.

F. Unless adequate protection is provided and acceptance is obtained from the County, concrete shall not be placed during rain, sleet, or snow.

G. The temperature of the plastic concrete, as placed, shall be no lower than 55 F and no higher than 90 F. The air temperature shall be at least 35 degrees F and rising when concrete is mixed and placed.

PART 9 – REPAIR AND REPLACEMENT

9.01 REPAIR OF SURFACE DEFECTS

A. All honeycombed and other defective concrete shall be removed down to sound concrete and patched. When chipping away loose or defective material, no featheredging will be permitted.

9.02 TIE HOLES

A. Tie holes shall be plugged with patching mortar unless stainless steel, noncorrosive, or acceptably coated ties are used.

9.02 EXISTING DRIVEWAYS AND SIDEWALKS

A. Where a portion of an existing concrete driveway is removed, the existing section shall be cut to a minimum depth of 4-inches with a suitable saw prior to breaking out pavement.

PART 10 – SURFACE FINISHES

10.01 FINISHES

A. Formed Surfaces of concrete shall be given the finishes specified below unless the contract documents specify otherwise:
   1. Rough form finish - For all concrete surfaces not exposed to public view

   2. Smooth form finish - For all concrete surfaces exposed to public view.

C. Rough form finish - No selected form facing materials shall be specified for rough form finish surfaces. Tie holes and defects shall be patched. Fins exceeding 1/4 in. in height shall be chipped off or rubbed off. Otherwise, surfaces shall be left with texture imparted by the forms.

D. Smooth form finish - The form facing material shall produce a smooth, hard, uniform texture on the concrete. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. It shall be supported by studs or other backing capable of preventing excessive deflection. Materials with raised grain, torn surfaces, worn edges, patches, dents, or other defects which will impair the texture of the concrete surface shall not be used. All fins shall be completely removed. No later than the day following form removal, the concrete surfaces shall be wetted and rubbed with carborundum brick or other abrasive until uniform color and texture are produced.

E. Tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and shall be floated to a texture reasonably consistent with that of the formed surfaces. Final treatment on formed surfaces shall continue uniformly across the unformed surfaces.

PART 11 – CURING AND PROTECTION

11.01 GENERAL

A. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete.

11.02 PRESERVATION OF MOISTURE

A. For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing:
   1. Ponding or continuous sprinkling.
   2. Application of absorptive mats of fabric kept continuously wet.
   3. Application of waterproof sheet materials, conforming to ASTM C 171.

   4. Application of a curing compound conforming to ASTM C309 in accordance with manufacturer's recommendation. It shall not be used on any surface against which additional concrete or other material is to be bonded unless it is proven that the curing compound will not prevent bond.

A. Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed. After form removal the concrete shall be cured until the end of the time prescribed in Section 11.2.3 by one of the above methods.

B. Curing in accordance with the above requirements shall be continued for at least 7 days in the case of all concrete except high-early strength concrete for which the period shall be at least 3 days.

11.05 TEMPERATURE CONTROL

A. When the mean daily outdoor temperature is less than 40 F, the temperature of the concrete shall be maintained between 50 and 70 F for the required curing period of Section 11.2.3. Combustion heaters shall not be used during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.

PART 12 – TESTING

12.01 FIELD SAMPLING AND TESTING

A. Field sampling and testing shall be performed by an independent testing lab contracted by the County. Samples of concrete shall be taken at random locations and at such times to represent the quality of the materials and work throughout the project. The laboratory shall provide the necessary labor, materials, equipment, and facilities for sampling the concrete and for casting, handling and storing the concrete samples at the site of work. Sampling of plastic concrete will be in accordance with ASTM C172. Samples for pumped concrete shall be taken at the hose discharge point. Samples for other concrete shall be taken at the hopper of concreting equipment or transit mix truck.

12.02 ADDITIONAL TESTING

A. The Contractor shall pay for the following services when required:
   1. All testing, test results, or certifications required to verify that a proposed material item or mix design meets the requirements of the specifications.

2. Additional testing and inspection required because of changes in materials or proportions requested by the Contractor.
3. Additional testing of materials or concrete occasioned by their failure by test or inspection to meet specification requirements. For example, if compressive test results indicate concrete in place may not meet structural requirements, tests shall be made to determine if the structure or portion thereof is structurally sound. Tests may include, but not be limited to, cores in accordance with ASTM C 42 and any other load tests acceptable to the County. Costs of such tests will be borne by the Contractor.

12.04 NOTICE

A. To facilitate testing and inspection, the Contractor shall advise the County and the designated testing agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of quality tests and inspection of forms.

12.02 STRENGTH TESTS

A. The strength of the concrete will be verified by the testing laboratory during placement of the concrete. Verification shall be accomplished by testing standard cylinders of concrete samples taken at the job site.

B. As a minimum, one set of four standard cylinders shall be cast of each class of concrete based on the most stringent of the following requirements as applicable:

1. for each 50 cubic yards or less
2. for each 200 feet of curb and gutter
3. for each 4000 square feet of surface area
4. for each day a pour is made

A. Testing of specimens for compressive strength shall be in accordance with ASTM C39. Tests shall be made at 7 and 28 days from time of casting. Two test cylinders from each group of four shall be tested at the end of 7 days and two shall be tested at the end of 28 days. Each strength test result shall be the average of the strengths of two test cylinders (cast from material taken from a single load of concrete) at 28 days.

B. The strength level of the concrete will be considered satisfactory so long as the average of all sets of three consecutive strength results equal or exceed the specified strength f'c and not more than 10% of the strength test results shall have values less then this value. No individual strength test shall be less than the specified strength f'c by more than 500 psi.

12.05 SLUMP TEST

A. The slump shall be as specified when measured in accordance with ASTM C 143. Samples for slump determination shall be taken from the concrete during placing. Tests shall be made at the beginning of concrete placing operations and at subsequent intervals to insure that the specification requirements are met.

When concrete is pumped, slump tests shall be taken from concrete at the discharge end of the pump hose. Slump tests shall also be performed whenever standard cylinders are cast.

12.02 TEMPERATURE AND AIR CONTENT TEST

A. Temperature tests shall be made at frequent intervals during hot or cold weather conditions until satisfactory temperature control is established. Whenever standard cylinders are cast, temperature tests shall be performed. Air content tests shall be in accordance with ASTM C 231 and shall be measured whenever standard cylinders are cast.

PART 13 – FLOWABLE FILL

13.01 FLOWABLE FILL

A. The mixture of dry material per cubic yard shall be 50 pounds cement, 600 pounds fly-ash, and 2,500 pounds sand. Depending on the slump requested for the specific job, water added shall be 65 gallons (541 pounds) for a 6-inch slump, to 55 gallons (458 pounds) for a 3-inch slump. One cubic yard of 6-inch slump will contain more than 27 cubic feet due to the additional water. Unconfined compressive strength will be 80 psi at 7 days and 150 psi at 28 days.

END OF SECTION

Pipemakers Phase 2-Section 2 Pre Bid Meeting Minutes
Thursday June 14, 2012
2:00 p.m. Chatham County Purchasing

Sign in sheets were passed around for all attendees to sign in. Bob Marshall introduced himself and stated he would be handling the procurement of this project for Chatham County. Bob introduced Bill Uhl with Chatham County Engineering as the project manager. Bob introduced Tim Baumgartner and Ben Lockhart with EMC Engineering as Chatham County's engineering consultant for the project.

Bids are due on July 10, 2012 by 2:00 p.m. at the Chatham County Purchasing Office on Eisenhower Drive. The electronic clock at the purchasing office is the clock that will be used to determine when bids are received. No bids will be received after 2:00 p.m. on July 10, 2012. Bidders are responsible for making sure their bids are in to Purchasing on time.

To bid the project as a general contractor you must be on the plan holders list. The Chatham County website has information for obtaining plans to bid the project.

After the pre bid meeting all questions must be submitted to Bob Marshall in writing. Questions may be faxed or e-mailed to Bob. The deadline for submitting questions is July 3, 2012 (1 week prior to the bid date) at 2:00 p.m. No questions will be received after this time.

MWBE participation for the project is 30% since SPLOST funds are being used. Arneja Riley can be contacted directly for any questions regarding the MWBE participation for the project.

Bob Marshall reminded everyone that bids the project as a general contractor has to fill out all of the county provided forms in the bid package. Failure to not fill out all of the required forms will result in a bid not being considered due to it not being responsive.

Bill Uhl gave an overview of the project which included the following items:

- Long linear project with limited access.
- Contractor will have to comply with FAA guidelines with regards to height of equipment used.
- There is a 35 ft. m.s.l. height requirement for equipment working around the runway and taxiways
- No work can be performed around the runway when ILS is in use during times of bad weather
- Water flow may be encountered in the canal during the construction of the project. Contractor will have to bypass water flows in the canal during construction.
- Liquidated damages will be assessed if the project is not complete on time.
- Project has 3 reaches which consist of a base bid and 2 add alternates.
- The GA Power line crossings at the end of Bourne Avenue will not be de-energized. Contractors will need to plan work accordingly to work around these lines.
- There is an elevated sanitary forcemain that will have to be relocated. Chatham County anticipates being able to make the new connections with interruption of service. Additional information regarding the forcemain will be issued by addendum.
- Bidders will be required to adhere to their submitted list of subcontractors. No switching of sub-contractors will be allowed once construction begins.

Pipemakers Phase 2-Section 2 Pre Bid Meeting Minutes
Thursday June 14, 2012
2:00 p.m. Chatham County Purchasing

- The Corps of Engineers permit for the project requires the monitoring of historic artifacts. Site visits will be made periodically during the project by a representative of Chatham County.
- The contractor will be required to prepare the NOI, NOT, and perform daily and weekly NPDES inspections.
- Access to property will be via Dean Forest Road, Distribution Drive and Ida J. Gadsen Drive.
- The contractor that is awarded the project will be required to prepare preconstruction videos, pictures and any other documentation to document existing conditions prior to construction.
- The GA Air National Guard cable shown on the drawings has been de activated and will not have to be relocated.
- There are two soils reports available in the bid package for contractors use.
- Silt fence will be in place prior to any tree removal or clearing operations. Trees that are cut down will not be chipped up and spread over the project site.
- FAA Form 7460-1 will be filled out by the contractors and submitted with their bid. Additional information to fill out this form will be issued by addendum.
- A site visit will be scheduled for the week of June 25, 2012.

The meeting adjourned around 3:00 p.m. Copies of the sign in sheet were provided to bidders who wanted them.

#1

REFERENCES - $500,000 or more: On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of $500,000 or more, for bidders to be responsive each must provide information on the most recent five (5) projects with similar scope of work as well as other information to determine experience and qualifications as follows:

a. Project Name:_____
Location:_____
Owner:_____
Address:_____
City and State:_____
Contact:_____
Phone & Fax:_____

*Architect or Engineer:_____
Contact:_____
Phone & Fax:_____
Email:_____

b. The awarded bid amount and project start date. _____
c. Final cost of project and completion date. _____
d. Number of change orders. _____
e. Contracted project completion in days. _____
f. Project completed on time. Yes____ No____ Days exceeded_____.
g. List previous contracts your company performed for Chatham County by Project Title, date and awarded/final cost.
h. Has contractor ever failed to complete a project?_____ If so, provide explanation.
i. Have any projects ever performed by contractor been the subject of a claim or lawsuit by or against the contractor? _____ If yes, please identify the nature of such claim or lawsuit, the court in which the case was filed and the details of its resolution.

#2

REFERENCES - $500,000 or more: On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of $500,000 or more, for bidders to be responsive each must provide information on the most recent five (5) projects with similar scope of work as well as other information to determine experience and qualifications as follows:

a. Project Name:_____
Location:_____
Owner:_____
Address:_____
City and State:_____
Contact:_____
Phone & Fax:_____

*Architect or Engineer:_____
Contact:_____
Phone & Fax:_____
Email:_____

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#3

REFERENCES - $500,000 or more: On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of $500,000 or more, for bidders to be responsive each must provide information on the most recent five (5) projects with similar scope of work as well as other information to determine experience and qualifications as follows:

a. Project Name:_____
Location:_____
Owner:_____
Address:_____
City and State:_____
Contact:_____
Phone & Fax:_____

*Architect or Engineer:_____
Contact:_____
Phone & Fax:_____
Email:_____

b. The awarded bid amount and project start date. _____
c. Final cost of project and completion date. _____
d. Number of change orders. _____
e. Contracted project completion in days. _____
f. Project completed on time. Yes____ No____ Days exceeded_____.
g. List previous contracts your company performed for Chatham County by Project Title, date and awarded/final cost.
h. Has contractor ever failed to complete a project?_____ If so, provide explanation.
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#4

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a. Project Name:_____
Location:_____
Owner:_____
Address:_____
City and State:_____
Contact:_____
Phone & Fax:_____

*Architect or Engineer:_____
Contact:_____
Phone & Fax:_____
Email:_____

b. The awarded bid amount and project start date. _____
c. Final cost of project and completion date. _____
d. Number of change orders. _____
e. Contracted project completion in days. _____
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#5

REFERENCES - $500,000 or more: On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of $500,000 or more, for bidders to be responsive each must provide information on the most recent five (5) projects with similar scope of work as well as other information to determine experience and qualifications as follows:

a. Project Name:_____
Location:_____
Owner:_____
Address:_____
City and State:_____
Contact:_____
Phone & Fax:_____

*Architect or Engineer:_____
Contact:_____
Phone & Fax:_____
Email:_____

b. The awarded bid amount and project start date. _____
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i. Have any projects ever performed by contractor been the subject of a claim or lawsuit by or against the contractor? _____ If yes, please identify the nature of such claim or lawsuit, the court in which the case was filed and the details of its resolution.

LEGAL NOTICE
CC NO. 165286
Invitation to Bid

Sealed Bids will be received until 2:00 P.M. on AUGUST 9, 2012 and publicly opened in Chatham County Purchasing & Contracting Department, at The Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia, for: BID NO. 12-0076-4 WILMINGTON CANAL DRAINAGE IMPROVEMENTS.

PRE-BID CONFERENCE: 2:00 P.M., JULY 25, 2012. A PreBid Conference will be held at the Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia. You are encouraged to attend.

Bid Packages, Technical Specifications and Plan sheets are available and must be purchased from Clayton Digital Reprographics (CDR) located at 1000-I Eisenhower Drive, Savannah, Georgia, 31406. CDR phone: 912-352-3880, fax 912-352-3881, e-mail: cdrsouth@cdrepro.com

The Bid Package can be downloaded and printed from the County website http://purchasing.chathamcounty.org Also, all firms requesting to do business with Chatham County must also register on-line at website http://purchasing.chathamcounty.org

For any additional questions regarding this bid , please contact Robert Marshall, Senior Procurement Specialist, at 912-790-1622.or rmarshal@chathamcounty.org
Bid Bond shall be required at the time of bid. (5% of total bid)
Payment and Performance Bonds (100% of bid) will be required for this project at the time of contract award.

CHATHAM COUNTY HAS THE AUTHORITY TO REJECT ALL BIDS AND WAIVE MINOR FORMALITIES.

"CHATHAM COUNTY IS AN EQUAL OPPORTUNITY EMPLOYER, M/F/H, ALL BIDDERS ARE TO BE EQUAL OPPORTUNITY EMPLOYERS"

MARGARET H. JOYNER, PURCHASING AGENT

SAVANNAH NEWS/PRESS INSERT: JUL. 13, JUL.23, 2012
Please send affidavit to:
Chatham County Purchasing & Contracting Department
P.O. Box 15180
Savannah, Georgia 31416
(912) 790-1622