SAVANNAH
Public Works & Water Resources

BIDDING, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS FOR THE CONSTRUCTION OF

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

CIP# SW-534-19

FOR

THE CITY OF SAVANNAH, GEORGIA

VOLUME 1 OF 1

MAYOR	VAN JOHNSON
CITY MANAGER	MICHAEL BROWN

NOVEMBER 2018

PREPARED BY:

City of Savannah, GA
and
Thomas & Hutton Engineering Co.
Savannah, GA

Section 00 1100

INVITATION TO BID

Sealed proposals for **Travis Field Water Reclamation Facility Force Main (SW-534-19)** will be received by the City of Savannah in the office of the Purchasing Director, Coastal Georgia Center, 305 Fahm Street, Savannah, GA 31401, until 1:30PM EST on Tuesday, **December 22, 2020**. The names of the respondents will be read aloud at 1:30PM EST of the same day and no further bids will be accepted. The Disadvantaged Business Enterprises Provisions will be evaluated, and those bids found to be in compliance with the DBE Provisions shall be opened and read aloud at 1:30 PM on Tuesday, December 29, 2020. Bidders' attention is directed to Section 00 1110, paragraph 8, Receipt of Bids, which describes this process in detail.

The work to be done consists of the following generally described items:

> Construction of approximately 17,000 L.F. of 30" effluent force main to include approximately 2,400 L.F. of directional drill, 400 L.F. of jack & bore, erosion control, outfall structure, air release valves, erosion control ,as well as pipe line testing, and other related ancillary work to complete the construction

Plans, specifications and contract documents are available from the designated reprographic company at contractor's expense. Contractors may request to purchase those documents by visiting the City's website at http://www.savannahga.gov/index.aspx?NID=592 and clicking on Construction Bids and Plan holder's List tab to enter the reprographics company's website. You must register on the reprographics company's website to view plans, specs and plan holder's list.

In an effort to ensure that all segments of the business community have access to information, a Contractor's Drawing Room has been established. Plans and specifications are on file and may be examined at the Savannah Entrepreneurial Center, 801 E. Gwinnett Street (corner of Paulsen and Gwinnett) (912) 652-3582.

All bidders are encouraged to attend a **pre-bid teleconference** which will be held at **10:00 AM EST** on Tuesday, December 1, 2020 please use the call in number, 720-740-9665 enter access code 8250082, if you would like to attend this meeting. Project scheduling, coordination requirements, minority participation, and questions of interpretation will be addressed at this time.

Bids must be accompanied by a Bid Bond on the form included hereto and shall be secured by a surety company, certified check or cashier's check in an amount equal to at least 5% of the amount of the bid. A contract performance and payment bond each in the amount of 100% of the contract amount will be required of the successful bidder.

PAYMENT AND PERFORMANCE BONDS MAY BE WAIVED FOR A CONTRACT AWARDED UNDER $100,000.

THE BID BOND FOR THIS CONTRACT WILL NOT BE WAIVED.

All bids must be made and all work performed as provided in Section 00 1300, City Labor Standards, and Section 00 1330 of the Federal Labor Standards Provisions as to employment of Savannah labor.

This is a bid for construction and therefore the City's local vendor preference ordinance will not apply.

Contractors and subcontractors shall have all necessary licenses and shall furnish such license numbers before entering into contracts with the Mayor and Aldermen of the City of Savannah.

The City of Savannah reserves the right to reject any and all bids and to waive any informalities in the bidding.

Bidders must comply with the President's Executive Order Nos. 11246 and 11375 which prohibit discrimination in employment regarding race, creed, color, sex or national origin.

Bidders must comply with Section 2-4078 of the City Code regarding wage rates, Title VI of the Civil Rights Act of

1964, the **Davis-Bacon Act**, the Anti-Kickback Act, and the Contract Work Hours Standard Act.

Bidders are cautioned as follows: By signing this bid or offer, the Bidder will be deemed to have signed and agreed to the provisions of the "Certification of Non-Segregated Facilities" in this solicitation. The "Certification" provides that the bidder does not maintain or provide for his employee's facilities which are segregated on a basis of race, creed, color, or national origin, whether such facilities are segregated by directive or on a defacto basis. The Certification also provides that he will not maintain such segregated facilities. Failure of a bidder to agree to the Certification of Non-Segregated Facilities will render his bid or offer non-responsive to the terms of solicitations.

The City of Savannah actively encourages minority employment and minority participation in all its capital improvement projects. The Bidder shall comply with Section 00 1310, Disadvantaged Business Enterprises Provisions, which requires the Bidder to submit documentation of compliance with these provisions in a separate sealed envelope with their bid. Further attention is called to contract conditions contained herein pertaining to non-discrimination, equal employment opportunity, subcontract and opportunities for project area residents.

The City of Savannah has established a 20% DBE goal for this project of which at least half (10%) should be met by a Local DBE. A good faith effort must be made to achieve both goals.

The contractor, or any subcontractor, submitting a bid for utility contracting, as defined in O.C.G.A. Section 43-14-2 to a utility system as defined in said section, shall conform to O.C.G.A. Section 43-14-8.2 et seq. with reference to Utility Contractor's Licenses and shall submit the bid with the license numbers, as issued by the Division of Utility Contractors, affixed on the outside of the bid envelope as provided by O.C.G.A. Section 43-14-8.2(h). Utility contracting means a proposal to perform utility work, the cost of which exceeds $100,000.00, to a utility system as defined in O.C.G.A. Section 43-14-2(17).

A Utility Contractor's License will be required for this project.

Bids shall be submitted in three (3) separate sealed envelopes. The first envelope shall contain the Disadvantaged Business Enterprises Provisions and shall be clearly marked with the Project Name, Event Number and Section 00 1310 Disadvantaged Business Enterprises Provisions. The second envelope shall contain the Bidder's Qualifications and shall be clearly marked with the Project Name, Event Number and Section 00 1135 Bidder's Qualifications. The third sealed envelope shall contain all other bid requirements and shall be clearly marked with the Project Name and Event Number and Utility Contractor's License Number (when required). The envelopes containing the Disadvantaged Business Enterprises provisions and Bidder's Qualifications shall be attached to the outside of the bid envelope and delivered to:

PURCHASING DIRECTOR
305 Fahm Street
Savannah, GA 31401

Mark the outside of the bid envelope as follows:

PROJECT NAME: **Travis Field Water Reclamation Facility Force Main**
CIP NUMBER: **SW-534-19**
EVENT NUMBER: **8192**

Section 00 1130

BID PROPOSAL

MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH
POST OFFICE BOX 1027
SAVANNAH, GA 31402

PROJECT TITLE: Travis Field Water Reclamation Facility Force Main

PROJECT NUMBER: SW-534-19

DATE SUBMITTED:_____

Gentlemen:

Having carefully examined the Plans, Specifications, and other Contract Documents relating to **Travis Field Water Reclamation Facility Force Main (SW534-19)** dated _____ and Addendum No.(s) _____, and also having carefully inspected the premises and the conditions affecting the work, the undersigned hereby proposes and agrees to furnish all materials, labor, skill, equipment, tools, and other items of every kind and description specified, needed or used for the complete execution of all work covered by and in conformity with the aforesaid Plans, Specifications, and other Contract Documents prepared by Thomas & Hutton Engineering Co. and the City of Savannah and all Amendments and Addenda thereto, for the sums hereinafter stated.

In the event only one bid is received, the bid will be kept by the Owner. The contract, or commodity, will then be re–advertised and additional bids will be solicited, and the new bid date will be TBD, 2020. If on the new bid date, again only one bid is received, it will be opened, analyzed and, if approved by the Mayor and Aldermen, awarded.

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

BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

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

a. BIDDER has examined and carefully studied the Plans and Specifications for the work and contractual documents relative thereto, and has read all Technical Provisions, Supplementary Conditions, and General Conditions, furnished prior to the opening of Bids and can fulfill the requirements of the work to be performed.

b. BIDDER further acknowledges hereby receipt of the following Addenda:

ADDENDUM NO.	DATE

c. BIDDER has visited the site and become familiar with and is satisfied as to the general, local and site conditions possibly affecting cost, progress, performance and furnishing of the Work.

d. BIDDER is familiar with and is satisfied as to all federal, state, and local Laws and Regulations possibly affecting cost, progress, performance and furnishing of the Work.

e. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions, at or contiguous to the site, and all drawings of physical conditions in or relating to existing surface or subsurface structure, at or contiguous to the site (except underground Facilities), have been identified in the Supplementary Conditions. BIDDER acknowledges such reports and drawings are not Contract Documents and may not be complete for BIDDER's purposes.

   BIDDER acknowledges OWNER and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to Underground Facilities, at or contiguous to the site. BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities), at or contiguous to the site or otherwise, or which relate any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including those identified in the bidding documents, associated safety precautions and programs incident thereto.

   BIDDER does not consider any additional examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the times, price and other terms and conditions of the Bidding Documents.

f. BIDDER is aware of the general nature of Work to be performed by Owner and others at the site relating to Work for which this Bid is submitted as indicated in the Bidding Documents.

g. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

h. BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies BIDDER has discovered in the Bidding Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER. The Bidding

Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

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

j. Bidder has fully coordinated with the railroads, Atlanta Gas Company, Georgia DOT and has included in the base bid price all the insurance fees, coordination, materials, labor, and all other related work to complete the work.

BIDDER will complete the Work in accordance with the Plans & Contract Documents for the prices as shown in Schedule of Bid Proposal. The total contract price shall include the allowances specified and shall include all lump sum costs related to the construction of the force main and related equipment. The lump sum costs shall also include all Taxes, insurances, bonds, permits, fees, overhead & profit, mobilization/demobilization, start-up & commissioning, and project administration.

The City of Savannah will pay for the followings:

a- Land Disturbing Activity Permit
b- EPD N.O.I
c- Third party laboratory testing (retesting of failed test shall be paid by the General Contractor)

Mobilization/Demobilization <u>shall not exceed 1.25%</u> of total contract amount.

SCHEDULE OF BID PROPOSAL

1. 30" Diameter Direct Bury Force Main

For construction, installation, testing, start-up and commissioning of the 30" force main. The lump sum price shall include pipe, valves, manholes, air relief valves, access road improvement, erosion control, and all other Misc. items to include mobilization, insurance, permit fees, overhead & profits, etc.

Total Amount for Item No. 1 _____

_____

Dollars ($_____)

2. Directional Drill Pipe Installation

For construction & installation, and necessary equipment to install casing, force main piping, testing, start-up, and commissioning.

Total Amount of Item No. 2: _____ Dollars

($_____)

3. Jack & Bore Pipe Installation

For construction & installation and necessary equipment to install casing, force main piping, testing, start-up, and commissioning.

Total Amount of Item No. 3: _____Dollars

($_____)

4. Outfall Structure

For Construction of the outfall structure as shown on plans to include erosion protection, riprap, and all other Misc. items to complete a functional structure.

Total Amount of Item No. 4: _____Dollars

($_____)

5. Crushed Stone Bedding Allowance

For 2,000 CY of Crushed Stone Bedding.

Unit price per cubic yard,_____ Dollars ($_____/ CY)

Total amount of Item No. 5 _____ Dollars

($_____)

6. Remove and Replace Unsuitable Material

For removal of 5,000 CY of unsuitable material and replacement with approved offsite borrow material for construction of the wastewater treatment plant.

Unit price per cubic yard _____ Dollars ($_____ / CY)

Total amount of Item No. 6 _____ Dollars

($_____)

TOTAL AMOUNT OF BID - Items 1, 2, 3, 4, 5, and 6 inclusive:

_____

_____ Dollars

($_____)

The undersigned agrees that this Proposal may not be revoked or withdrawn after the time is set for the opening of bids but shall remain open for acceptance for a period of sixty (60) calendar days following such time.

Upon receipt by mail or by hand delivery of the Notice of Acceptance of the Bid Proposal and Project Manual within sixty (60) calendar days after the time for the opening of bids, the undersigned agrees to execute within ten (10) calendar days a Contract (Form of Agreement between Contractor and Owner) for the work for the above–stated compensation and at the same time to furnish and deliver to the Owner a Performance Bond, Payment Bond, Certificate of Insurance, and Contractor Certification forms in accordance with the instructions found in the Project Manual.

The undersigned agrees to commence actual physical work on the site with an adequate force and equipment within ten (10) calendar days from the date to be specified in the Notice to Proceed from the Owner and to complete fully all work within **400** calendar days. It is also agreed that **40** days are included in the specific contract time for this portion of the project for adverse weather days per Article II of the agreement.

Enclosed herewith is a Bid Bond in the amount of _____DOLLARS ($_____) being not less than 5% of the Total Bid. The Bid Bond must be submitted on the required form provided with the Invitation to Bid.

If this Proposal is accepted within sixty (60) days after the date set for the opening of bids and the undersigned fails to execute the Contract within ten (10) calendar days after receipt from the OWNER/Engineer, or if the bidder fails to furnish both a Performance Bond and Payment Bond, the obligation of the Bid Bond will remain in full force and effect and the money payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure; otherwise the obligation of the Bid Bond will be null and void.

This Bid Proposal is respectfully submitted by:

_____	_____
Bidder (Print Name)	GA Business Tax Certificate No.
_____	_____
Signature (Owner, Partner or Corp. Officer)	
	_____
	Address
_____	_____
Title	Telephone Number
	If Corporation, affix seal here (SEAL)

Section 00 1135

BIDDER'S QUALIFICATIONS

LEGAL NAME OF BIDDER:_____

STREET ADDRESS:_____

CITY, STATE, ZIP CODE_____

WHEN ORGANIZED:_____

WHEN AND WHERE INCORPORATED:_____

LICENSED OR REGISTERED TO DO BUSINESS IN STATE OF GEORGIA: __ YES __ NO

LICENSED TO DO BUSINESS IN CITY OF SAVANNAH: ___ YES ___ NO

CITY OF SAVANNAH BUSINESS LICENSE NUMBER:_____

IF NO, IN WHAT GEORGIA MUNICIPALITY DOES YOUR COMPANY HAVE A BUSINESS LICENSE:_____

BUSINESS LICENSE NUMBER FOR SAID GEORGIA MUNICIPALITY:_____

FEDERAL I.D. NUMBER: _____

If Partnership, list all partners and their addresses:

_____ _____
_____ _____
_____ _____
_____ _____

If there is no Georgia Partner, give name and address of agent for service of process in Georgia.

_____ _____
_____ _____
_____ _____
_____ _____

If an individual owner is not a Georgia resident, give name and address of agent for service of process in Georgia.

_____ _____
_____ _____
_____ _____
_____ _____

Bidder's Minimum Qualifications

Bidder shall demonstrate a minimum of 10 years of firm and 10 years of key team member experience in construction of large diameter water and/or force mains in construction for municipal, public, or private agencies.

The Bidder shall also spotlight three (3) relevant water and/or force main projects larger than 24" in diameter, and length of 12,000 L.F or more, constructed within the past ten (10) years. At least two (2) projects must include horizontal directional drill. At least two (2) projects must include jack & bore.

Descriptions of the three (3) relevant projects shall contain the following information:

- Project Name and Owner
- Owner contact information (including email address)
- Description of procurement method
- Contract value
- Year completed
- Description of the project demonstrating relevance to the City's needs
- Percentage of your firm's self-performance
- Percentage of Sub-Contractors' utilization
- Final construction cost at completion.

Include resumes for key team members (project manager, superintendent) in the bid package. Resumes should be two (2)-page maximum length per key team member.

Include Bidder's experience modification rate (EMR) calculated by the National Council on Compensation Insurance or similar rating bureau for the last five (5) years.

Documentation of the Bidder's Minimum Qualifications shall be provided in a separate sealed envelope, marked as "Bidder's Qualifications", and included with the Bid Proposal.

The foregoing statement of qualifications is submitted under oath:

Should the work require compliance with the Georgia State Construction Industry Licensing Board Rules and Regulations, the Contractor and any Subcontractor shall list the appropriate License number(s):

Main Contractor's License Number: _____

Main Contractor's DUNS Number: _____

Subcontractor #1 License Number: _____

Subcontractor #1 Name: _____

Subcontractor #2 License Number: _____

Subcontractor #2 Name: _____

Subcontractor #3 License Number: _____

Subcontractor #3 Name: _____

(List additional if appropriate)

Respectfully submitted,

Company Name:_____

Street Address:_____

City, State, Zip Code:_____

By:_____

Title:_____

Attach satisfactory evidence of the authority of the officer, or officers, signing on behalf of a corporation.

INDEX TO

SECTION 00 1700 – MEASUREMENT AND PAYMENT

SECTION 00 1700

MEASUREMENT AND PAYMENT

PART 1 – MEASUREMENT

1.1 MEASUREMENT

The items listed in the proposal shall be considered as sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not listed in the bid form shall be deemed to be a part of the item that it is associated with and shall be included in the cost of the unit shown on the bid form. Payment for the unit shown on the bid form shall be considered to cover the cost of all labor, material, equipment and performing all operations necessary to complete the work in place. The unit of measurement shall be the unit shown on the bid form (if shown). Payment shall be based upon the actual quantity multiplied by the unit prices. Where work is to be performed at a **lump sum price**, the lump sum shall include all operations and elements necessary to complete the work. No payment will be made for any material wasted, unused, rejected, or used for the convenience of the Contractor.

1.2 CONTRACTOR'S DETAILED ITEMIZATION

The *selected bidder* shall provide the Engineer and the Owner with a *Detailed Itemization* of all the construction costs to include mobilization, L.F. of the force main by size, method & material, number of fittings, number of valves, manholes, equipment, material, labor, insurance (to include railroad, DOT, & gas line), bonds, overhead, and other costs related to the construction of Travis Field Water Reclamation Facility Force Main. The Engineer will utilize these breakdowns to process monthly pay requests. Each item will be paid based on the L.F. or percentage of completion at the end of each pay period.

PART 2 – PAYMENT

2.1 30" DIAMETER DIRECT BURY FORCE MAIN

Payment shall be paid monthly according to the Contractor's provided detailed breakdown for each task. The monthly payment will be based on liner footage or percentage completed for each item, material in storage, valves, Manholes, air relies valves, and erosion control footage installed.

2.2 DIRECTIONAL DRILL PIPE INSTALLATION

Payment shall be paid monthly according to the Contractor's provided detailed breakdown for each task. The monthly payment will be based on liner footage or percentage completed for directional drill task.

2.3 JACK & BORE PIPE INSTALLATION

Payment shall be paid monthly according to the Contractor's provided detailed breakdown for J&B task. The monthly payment will be based on liner footage or percentage completed for jack& bore task.

2.4 OUTFALL STRUCTURE

Payment shall be based on the lump sum bid allowance for the outfall structure. The monthly payment will be based on the percentage completed for structure.

2.5 CRUSHED STONE BEDDING

Payment shall be on the basis of the cubic yard unit price in the Bid Proposal which shall include placement of crushed stone bedding. This allowance is for the "foundation" stone only and shall not include the cost of "bedding" stone or the "haunching" stone as shown on the plans.

2.6 REMOVE & REPLACE UNSUITABLE MATERIAL ALLOWANCE

Payment shall be on the basis of the in-place, cubic yard unit price in the Bid Proposal which shall include the removal and lawful reuse or disposal of unsuitable material and replacement with approved offsite borrow material for construction of the force main.

END OF SECTION

SAVANNAH
savannahga.gov

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

PREPARED FOR:

MAYOR AND ALDERMAN OF THE CITY OF SAVANNAH

MAYOR
VAN R. JOHNSON, II

ALDERMEN

KESHA GIBSON-CARTER
BERNETTA B. LANIER
LINDA WILDER-BRYAN
DR. ESTELLA EDWARDS SHABAZZ
ALICIA MILLER BLAKELY
DETRIC LEGGETT
NICK PALUMBO
KURTIS PURTEE

CITY MANAGER
PAT MONAHAN

ISSUED FOR BIDS
NOVEMBER 2020

J-27788.0000

PREPARED BY:

THOMAS & HUTTON

GEORGIA REGISTERED PROFESSIONAL ENGINEER

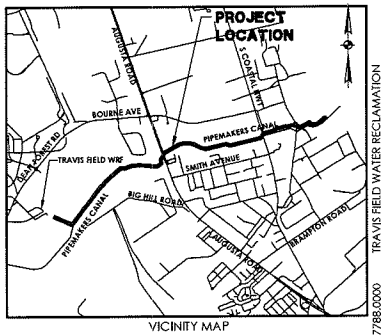
BID SET - NOT FOR CONSTRUCTION

REVISION HISTORY

REV. NO.	REVISION	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2020

SUBMITTAL HISTORY

SUBMITTED TO	DATE



VICINITY MAP
SCALE: 1" = 3000'

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
J-27788.0000
10-2-19

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EC2.8	ES&PC PLAN
EC2.9	ES&PC PLAN
EC2.10	ES&PC PLAN
EC2.11	ES&PC PLAN

811 Know what's below. Call before you dig.

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405
p: 912.234.5300
www.thomasandhutton.com

GENERAL NOTES:

1. MAPPING AND TOPOGRAPHY SHOWN HEREIN INFORMATION BASED UPON INFORMATION PREPARED BY THOMAS & HUTTON, GDOT AND SUBCONTRACTORS TO GDOT, INCLUDING THE LOCATION OF SUBSURFACE UTILITIES.
2. ALL ELEVATIONS REFER TO NAVD 88.
3. SUPPLEMENTAL TOPOGRAPHIC INFORMATION PROVIDED BY THOMAS & HUTTON ENGINEERING COMPANY, PROJECT NO. 27788.0000.
4. THE CONTRACTOR SHALL NOT BEGIN CONSTRUCTION UNTIL THE PROPER PERMITS HAVE BEEN ISSUED.
5. ALL WORK SHALL CONFORM TO APPLICABLE STATE, COUNTY, AND MUNICIPAL REQUIREMENTS AND CODES.
6. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES BEFORE WORK COMMENCES, VERIFY THE SIZE AND LOCATIONS OF ALL UTILITIES WITHIN THE PROJECT LIMITS, AND NOTIFY THE ENGINEER OF CONFLICTS OR VARIANCES TO THE PLANS PRIOR TO BEGINNING WORK OR PURCHASE OF MATERIALS.
7. CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH LOCAL UTILITY COMPANIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION AND ANY NECESSARY REPAIRS TO EXISTING UTILITY LINES.
8. THE CONTRACTOR SHALL IMMEDIATELY REPAIR ANY DAMAGE TO EXISTING UTILITIES AT THE SOLE EXPENSE OF THE CONTRACTOR.
9. CONTACT THE ONE CALL LOCATE LINE AT 1-800-282-7411 A MINIMUM OF SEVENTY-TWO (72) HOURS PRIOR TO COMMENCING OF CONSTRUCTION ACTIVITIES FOR LOCATION OF CITY WATER AND SEWER LINES, AND OTHER UTILITIES.
10. ALL UTILITY POLES ADJACENT TO PROPOSED CONSTRUCTION MUST BE SECURED PRIOR TO ANY ADJACENT DISTURBANCE AND THE CONSTRUCTION PROCEDURE MUST BE APPROVED BY THE UTILITY COMPANY.
11. ALL SIGNS, MAIL BOXES, SHRUBBERY, FENCES, LANDSCAPING OR EXISTING STRUCTURES INTERFERING WITH CONSTRUCTING SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
12. CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY BRACING, SHEETING AND DEWATERING TO COMPLETE THE PROJECT, PROTECT THE CONSTRUCTION WORKERS AND ALL ADJACENT STRUCTURES, TREES, LANDSCAPING, AND IS RESPONSIBLE FOR ALL REPAIR AND COST TO RETURN AREA TO ORIGINAL CONDITION.
13. THE CONTRACTOR SHALL PROTECT AND SAVE ALL SPECIMEN TREES, AND/OR ANY TREE DESIGNATED ON THE PLANS OR BY THE OWNER. CONTRACTOR TO PROTECT AND SAVE TREES BY INSTALLING 4-FOOT-HIGH TEMPORARY CHAIN LINK FENCE AROUND THE TREE. FENCING SHALL CONFORM TO CITY OF SAVANNAH TREE PROTECTION DETAIL.
14. TREE PROTECTION BARRICADES, IF REQUIRED, SHALL BE INSTALLED PRIOR TO ANY CLEARING ACTIVITY AND MAINTAINED UNTIL INSTRUCTED BY THE OWNER OR ENGINEER TO REMOVE THEM.
15. IT IS THE OBLIGATION OF THE CONTRACTOR TO MAKE THEIR OWN INTERPRETATION OF ALL SURFACE AND SUBSURFACE DATA AVAILABLE AS TO THE NATURE AND EXTENT OF THE MATERIALS TO BE EXCAVATED, WASTED, GRADED, AND COMPACTED. THE INFORMATION SHOWN ON THESE PLANS IN NO WAY GUARANTEES THE AMOUNT OR NATURE OF THE MATERIAL TO BE ENCOUNTERED.
16. THE CONTRACTOR WILL NOTIFY THE ENGINEER IF UNSUITABLE MATERIAL IS DISCOVERED PRIOR TO BEGINNING ANY REMOVAL OPERATION.
17. ALL SUITABLE MATERIAL EXCAVATED DURING UTILITY CONSTRUCTION SHALL BE USED ON SITE. ANY EXCESS MATERIAL SUITABLE OR UNSUITABLE SHALL BE DISPOSED OF OFF-SITE AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSAL OF ALL CONSTRUCTION DEBRIS.
18. THE CONTRACTOR SHALL GRASS ALL AREAS DISTURBED BY CONSTRUCTION IMMEDIATELY AFTER THE DISTURBANCE.
19. CONTROL OF STORMWATER THROUGHOUT THE CONSTRUCTION PERIOD, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE EXISTING DRAINAGE CONVEYANCES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. ALL PENALTIES, CLAIMS AND FEES IMPOSED ON THE OWNER AS A RESULT OF DAMAGE CAUSED BY ACTIONS OF THE CONTRACTOR, THEIR EMPLOYEES OR SUBCONTRACTORS SHALL BE BORNE IN FULL BY THE CONTRACTOR.
20. THE CONTRACTOR SHALL COORDINATE DEMOLITION AND IMPAIRMENTS TO MINIMIZE TRAFFIC INTERFERENCE AND OPERATIONS OF FACILITIES.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL DEVICES AND MEASURES AS NECESSARY TO MEET THE REQUIREMENTS OF THE GEORGIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (GAMUTCD). CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO OWNER FOR REVIEW AND ACCEPTANCE PRIOR TO STARTING CONSTRUCTION.
22. "AS-BUILT" DRAWINGS SHALL BE PROVIDED BY THE CONTRACTOR AND MUST BE SIGNED BY A REGISTERED LAND SURVEYOR. THE CONTRACTOR SHALL PROVIDE A SET OF "MARKED UP" AS BUILT DRAWINGS AS WELL AS A CD/DVD CONTAINING THE AS BUILT INFORMATION IN ELECTRONIC FORM. AT A MINIMUM THE AS BUILT INFORMATION SHALL INCLUDE MANHOLE LOCATIONS, FRAME AND INVERT ELEVATIONS, DIAMETER, THE LOCATIONS OF SEWER PIPE, STEEL CASING, RIP-RAP, SLEEVES, PAVING AND GRAVEL REPLACEMENT, STORM SEWER REPLACEMENT AND ALL OTHER CONSTRUCTION INSTALLATIONS. ALL OF THIS SHALL BE VERIFIED BY A LAND SURVEYOR REGISTERED IN THE STATE OF GEORGIA.

SEWER COLLECTION/FORCE MAIN NOTES:

THE FOLLOWING NOTES ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THEY ARE BASED UPON THE CITY OF SAVANNAH WATER AND SEWER PLANNING AND ENGINEERING (WSPE) DEPARTMENT STANDARD SPECIFICATIONS AND DETAILS AS PROVIDED ON THE CITY'S WEBSITE http://www.savannahga.gov/13/Water-Sewer/Planning-Engineering. THE CONTRACTOR SHALL REVIEW THESE STANDARDS AND DETAILS ALONG WITH THE SPECIFICATION AND DETAILS PROVIDED AS PART OF THESE CONTRACT DOCUMENTS BEFORE INITIATING THE WORK OF THIS CONTRACT. ALL CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH CURRENT CITY OF SAVANNAH SPECIFICATIONS AND REQUIREMENTS. **REFER TO CITY'S STANDARD SPECIFICATION SECTION 02554 WASTEWATER COLLECTION SYSTEM.**

1. THE CONTRACTOR SHALL COORDINATE THE RELOCATION, RECONNECTION, AND THE ABANDONMENT OF ALL SEWER UTILITIES WITH THE CITY OF SAVANNAH SEWER CONVEYANCE AND WATER DISTRIBUTION DEPARTMENT A MINIMUM OF 72 HOURS PRIOR TO CONNECTION ACTIVITIES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL RECONNECTION ACTIVITIES WITH THE CITY OF SAVANNAH, CHATHAM COUNTY, GDOT, ENGINEER, AND AFFECTED PROPERTY OWNERS.
3. ALL SEWER LATERALS NOT BEING USED SHALL BE IDENTIFIED AND CAPPED AT THE MAIN WHERE POSSIBLE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING PROTECTIVE COATING PER CITY'S STANDARD SPECIFICATION SECTION 02555 PROTECTIVE COATING FOR EXISTING AND NEW CONCRETE AND MASONRY SANITARY SEWER STRUCTURES.
5. THE WORK SHALL BE CONDUCTED IN SUCH A MANNER TO PREVENT ANY INTERRUPTION IN SERVICE. THE EXISTING SEWER COLLECTION AND FORCE MAIN SYSTEMS IN SERVICE SHALL BE KEPT IN SERVICE UNTIL THE NEW SYSTEMS HAS BEEN CONSTRUCTED, TESTED, AND ACCEPTED BY THE CITY OF SAVANNAH WATER RESOURCES DEPARTMENT.
6. PVC PIPE FOR GRAVITY SEWER SHALL BE SDR 26 POLYVINYL CHLORIDE PLASTIC AND SHALL MEET ALL REQUIREMENTS OF THE ASTM D-3034 FOR DIAMETERS 4" THROUGH 15", LATEST REVISION OR ASTM F679 FOR DIAMETERS 18" THROUGH 48", LATEST REVISION. PVC PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D-2321, LATEST REVISION. ALL PIPES 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. STANDARD LAYING LENGTHS SHALL BE FOURTEEN (14) FEET OR TWENTY (20) FEET, + 1-INCH, FOR ALL SIZES. FITTINGS SHALL MEET THE SAME SPECIFICATION REQUIREMENTS AS THE PIPE.
7. PVC PIPE FOR FORCE MAIN SHALL BE PVC SDR 18, C-900, DUCTILE IRON PIPE SHALL BE D.I. PRESSURE CLASS 350. ALL PIPE SHALL CONFORM TO ASTM D-2241 AND BE INSTALLED IN ACCORDANCE WITH ASTM D-2321. PVC PIPE FOR FORCE MAINS SHALL BE GREEN IN COLOR AND SHALL BE FURNISHED IN NOMINAL 16 TO 20 FOOT LAYING LENGTHS UNLESS OTHERWISE NOTED.
8. ALL PIPE, FITTINGS, VALVES, AND OTHER APPURTENANCES SHALL BE EXAMINED CAREFULLY FOR DAMAGE AND OTHER DEFECTS IMMEDIATELY BEFORE INSTALLATION. DAMAGED OR DEFECTIVE MATERIALS WILL NOT BE ACCEPTED OR INSTALLED.
9. RESTRAINED JOINTS, WHERE SHOWN OR NOTED, 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 350 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.
10. TRACER WIRE SHALL BE INSTALLED ON ALL FORCE MAINS, WITH DIRECT BURIAL CONNECTORS, AND PROVIDE CONTINUOUS ELECTRIFIED CONDUCTIVITY. AREA MARKERS SHALL BE AT LEAST EVERY 500 FEET WITH TRACER WIRE ATTACHED, UNLESS A MANHOLE IS AVAILABLE. A SIX (6) FOOT LEAD ATTACHED TO THE INSIDE OF THE RING AND COVER SHALL BE PROVIDED AT MANHOLES. ON LATERALS, THE TRACER WIRE SHALL CONNECT THE CLEAN-OUT TO THE GRAVITY SEWER.
11. ALL FORCE MAINS SHALL HAVE OMNI-BALLS OR EQUAL INSTALLED AT ALL FITTINGS AND BENDS. OMNI-BALLS SHALL BE PLACED ALONG ALL STRAIGHT RUNS AT MAXIMUM 400 LINEAL FOOT (LF) INTERVALS. THE MAXIMUM DEPTH OF OMNI-BALLS SHALL BE 24-INCHES BELOW THE FINISHED GRADE.
12. PRIOR TO MANDREL TESTS, TELEVISING, AND BEFORE ACCEPTANCE OF THE GRAVITY SEWER SYSTEMS AS WELL AS THE FORCE MAINS, 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 SAND BY MEANS OF ROD AND SWABS OR OTHER INSTRUMENTS. CLEANING OF NEW SEWERS IS TO BE COMPLETED WITHOUT IMPACTING THE EXISTING SEWER SYSTEM; DEBRIS/FOREIGN MATERIAL FROM THE NEW LINE (I.E. DIRT, SAND, AND TRASH) SHALL NOT BE DISCHARGED INTO THE EXISTING SYSTEM.
13. ALL SEWER PIPES SHALL BE TESTED PER PART 2.16 CITY'S STANDARD SPECIFICATION SECTION 02554 WASTEWATER COLLECTION SYSTEM.
14. WHEN THE WORK OR PIPE LAYING IS SUSPENDED, EITHER FOR THE 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.
15. ALL MANHOLE TOPS ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE AND SET MANHOLE TOPS RELATIVE TO FINISHED GRADES AS SHOWN ON THE DETAIL.

CASING PIPE MATERIALS AND INSTALLATION

1. CASING SHALL BE STEEL PIPE CONFORMING TO THE REQUIREMENTS OF ASTM DESIGNATION A-139. THE MINIMUM CASING PIPE SIZE AND WALL THICKNESS SHALL BE AS SHOWN HEREIN. FOR SIZES NOT INCLUDED, OR FOR SPECIAL DESIGN CONSIDERATIONS, APPROVAL SHALL BE OBTAINED FROM THE ENGINEER OF RECORD.
2. FOR CROSSING OF STATE ROADS, CASING MATERIALS AND INSTALLATION SHALL CONFORM TO GADOT STANDARDS. LATEST EDITION, OR AS MINIMUM SHALL COMPLY WITH THE FOLLOWING TABLES:

Minimum Steel Pipe Casing Dimensions for Ductile Iron Pipe

Carrier Pipe	Steel Casing Pipe Size		Highway & DOT Bores < 200 L.F.		Highway & DOT Bores > 200 L.F.		Railroad Bores		
I.D. (Nom.)	Pressure System	Gravity System	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in) Pressure	Gravity	Weight Class
4	12	16	0.375	STD	0.500	XS	0.500	0.500	XS
6	16	20	0.375	STD	0.500	XS	0.500	0.500	XS
8	18	24	0.375	STD	0.500	XS	0.500	0.500	XS
10	20	24	0.375	STD	0.500	XS	0.500	0.500	XS
12	24	30	0.375	STD	0.500	XS	0.500	0.500	XS
16	30	36	0.375	STD	0.500	XS	0.500	0.532	XS
18	36	48	0.375	STD	0.500	XS	0.532	0.688	XS
24	38	48	0.375	STD	0.500	XS	0.532	0.688	XS
30	48	54	0.375	STD	0.500	XS	0.688	0.781	XS
36	54	60	0.375	STD	0.500	XS	0.781	0.844	XS

Minimum Steel Pipe Casing Dimensions for Plastic Pipe

Carrier Pipe	Steel Casing Pipe Size		Highway & DOT Bores < 200 L.F.		Highway & DOT Bores > 200 L.F.		Railroad Bores		
I.D. (Nom.)	Pressure System	Gravity System	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in) Pressure	Gravity	Weight Class
4	8	16	0.375	STD	0.500	XS	0.500	0.500	XS
6	10	20	0.375	STD	0.500	XS	0.500	0.500	XS
8	12	24	0.375	STD	0.500	XS	0.500	0.500	XS
10	16	24	0.375	STD	0.500	XS	0.500	0.500	XS
12	16	30	0.375	STD	0.500	XS	0.500	0.500	XS
16	20	36	0.375	STD	0.500	XS	0.500	0.532	XS
18	24	48	0.375	STD	0.500	XS	0.532	0.688	XS
24	30	48	0.375	STD	0.500	XS	0.532	0.688	XS
30	36	54	0.375	STD	0.500	XS	0.688	0.781	XS
36	42	60	0.375	STD	0.500	XS	0.781	0.844	XS

3. WASTEWATER AND WATER CARRIER PIPES TO BE INSTALLED WITHIN THE SPECIFIED CASINGS SHALL BE EQUIPPED WITH RESTRAINED JOINT CONNECTIONS. PIPE AND FITTINGS SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF THESE STANDARDS, WITH MINIMUM DUCTILE IRON PIPE CLASS 350.
4. NON-CORROSIVE CASING INSULATORS SHALL BE USED. THE CASING RUNNER HEIGHT SHALL BE LARGE ENOUGH SO THAT IT DOES NOT INTERFERE WITH THE PIPE-RESTRAINED JOINTS. STAINLESS STEEL NUTS AND BOLTS SHALL BE USED. INSTALLATION AND SPACING OF CASING INSULATORS SHALL BE AS REQUIRED BY THE MANUFACTURER.
5. FOR SIZES OUTSIDE OF THESE RANGES, CONTACT ENGINEER OF RECORD.

SURVEY NOTES:

1. FIELD EQUIPMENT USED FOR THIS SURVEY: GEOMAX ZOOM90 R2
2. THE FIELD DATA UPON WHICH THIS MAP OR PLAT IS BASED HAS A CLOSURE RATIO OF 1 FOOT IN 83,292 FEET, AN ANGULAR ERROR OF 0.39" PER ANGLE POINT, AND WAS ADJUSTED USING THE COMPASS RULE METHOD.
3. ELEVATIONS ARE BASED ON NAVD88, UNLESS OTHERWISE NOTED.
4. COORDINATES AND DIRECTIONS ARE BASED ON GEORGIA STATE PLANE COORDINATE SYSTEM (NAD83), EAST ZONE.
5. ACCORDING TO F.I.R.M. MAP NO. 13051C, PANEL 0135H, REVISED AUGUST 16, 2018, MAP NO. 13051C, PANEL 0120G, REVISED AUGUST 16, 2018, AND MAP NO. 13051C, PANEL 0045G, REVISED AUGUST 16, 2018 THE PROPERTY SHOWN ON THIS PLAT LIES IN ZONE AE (BFE 9, 10 & 11) AND X SHADED.
6. WETLANDS THAT MAY EXIST ON THE PROPERTY ARE UNDER THE JURISDICTION OF THE CORPS OF ENGINEERS AND/OR THE DEPARTMENT OF NATURAL RESOURCES. LOT OWNERS AND THE DEVELOPER ARE SUBJECT TO PENALTY BY LAW FOR DISTURBANCE TO THESE PROTECTED AREAS WITHOUT PROPER PERMIT AND APPROVAL.
7. THE POSITION OF UNDERGROUND UTILITIES SHOWN ON THIS DRAWING IS BASED UPON THE LOCATION OF SURFACE APPURTENANCES AND/OR SURFACE MARKINGS AND SHOULD BE CONSIDERED APPROXIMATE. THE EXACT LOCATION, SIZE, TYPE AND DEPTH OF UNDERGROUND UTILITIES SHOWN HEREON OR ANY OTHER UTILITIES THAT MAY EXIST, CAN ONLY BE DETERMINED VIA AN EXCAVATION OF THE UTILITY.
8. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE SEARCH AND IS SUBJECT TO ANY EASEMENTS AND RESTRICTIONS OF RECORD.
9. THE CERTIFICATION, AS SHOWN HEREON, IS PURELY A STATEMENT OF PROFESSIONAL OPINION BASED ON KNOWLEDGE, INFORMATION AND BELIEF, AND BASED ON EXISTING FIELD EVIDENCE AND DOCUMENTARY EVIDENCE AVAILABLE. THE CERTIFICATION IS NOT AN EXPRESSED OR IMPLIED WARRANTY OR GUARANTEE. WHERE A CONFLICT EXISTS BETWEEN THE RULES OF THE GEORGIA BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS AND O.C.G.A. 15-6-67, THE REQUIREMENTS OF LAW PREVAIL.

LEGEND

- AIR RELEASE MANHOLE
- BENCHMARK
- CONC. MONUMENT FOUND
- CONTROL POINT
- UNDERGROUND UTILITY LINE MARKER
- POST
- SIGN
- SANITARY MANHOLE
- GRATE INLET
- LIGHT POLE
- POWER POLE
- TELEPHONE BANDHOLE

LINE-TYPE LEGEND (BOUNDARIES)

- ADJOINER PROPERTY LINE
- FLOOD ZONE LIMITS
- INTERIOR PARCEL/LOT LINE
- RIGHT OF WAY LINE
- FRESHWATER WETLAND EDGE
- TOP BANK
- BOTTOM BANK
- TOP OF BANK

LINETYPE LEGEND (PLANIMETRICS)

- WOODS LINE
- RAIL ROAD TRACKS
- GUARD RAIL
- DITCH/CREEK CENTER-LINE
- CHAIN LINK/WOODEN FENCE
- ROAD CENTER-LINE

LINE-TYPE LEGEND (UTILITIES)

- UNDERGROUND TELEPHONE LINE
- UNDERGROUND NATURAL GAS LINE
- OVERHEAD POWER LINE
- UNDERGROUND POWER LINE
- SANITARY SEWER FORCE MAIN
- STORM DRAINAGE LINE
- WATER DISTRIBUTION LINE
- GRAVITY SEWER LINE

HATCH PATTERN LEGEND

- RIP-RAP
- CONCRETE PAVEMENT
- FRESHWATER WETLAND (NON-JURISDICTIONAL)
- GRAVEL/EARTH DRIVE

SURVEY REFERENCES:

1. PLAN AND PROFILE SHEET, STATION 163+50 TO 148+00 PIPEMAKERS CANAL WIDENING – PH 2 – SECTION 1, SAVANNAH, CHATHAM COUNTY, GEORGIA, PREPARED FOR CHATHAM COUNTY, GEORGIA BY EMC ENGINEERING SERVICES, INC. DATED JANUARY 2013. PROJECT NO. 10-0107. SHEET 8 OF 27.
2. PLAN AND PROFILE SHEET, STATION 178+50 TO 163+50 PIPEMAKERS CANAL WIDENING – PH 2 – SECTION 1, SAVANNAH, CHATHAM COUNTY, GEORGIA, PREPARED FOR CHATHAM COUNTY, GEORGIA BY EMC ENGINEERING SERVICES, INC. DATED JANUARY 2013. PROJECT NO. 10-0107. SHEET 7 OF 27.
3. RECORD DRAWINGS PIPEMAKER'S CANAL WIDENING PROJECT, PREPARED FOR CHATHAM COUNTY, GEORGIA, PROJECT NO. PIP-BR-4-1 FEBRUARY 2003. PREPARED BY EMC ENGINEERING SERVICES, INC. DATED SEPTEMBER 1999.
4. RECORD DRAWINGS PIPEMAKERS CANAL WIDENING PROJECT, PHASE 2 – SECTION 1, EMC PROJECT NO. 10-0107, APRIL 2013PREPARED FOR CHATHAM COUNTY, GEORGIA, PREPARED BY EMC ENGINEERING SERVICES, INC. DATED JANUARY 2013.
5. PLAT SHOWING PROPOSED EASEMENT ACROSS THE PROPERTY OF (NOW OR FORMERLY) SOUTHERN INDUSTRIAL REALTY COMPANY BEING A PART OF A SECTION IN THE S/E PT. TRAVIS FIELD, CHATHAM COUNTY, GEORGIA. PREPARED BY THOMAS & HUTTON ENGINEERING, DATED MAY . 1987.
6. PLAT OF PROPOSED 2.08 ACRE PERMANENT EASEMENT ACROSS THE PROPERTY OF THE GARDEN CITY TERMINAL OF THE GEORGIA PORTS AUTHORITY, PREPARED BY THOMAS & HUTTON ENGINEERING, DATED MAY 8, 1987, RECORDED IN PLAT BOOK 9-P, PAGE 138, CHATHAM COUNTY RECORDS.
7. PLAT OF PROPERTY ACQUISITION FOR PIPEMAKERS CANAL R/W THROUGH THE LANDS OF THE GEORGIA PORTS AUTHORITY, PREPARED BY TMC ENGINEERING SERVICES, INC. DATED SEPTEMBER 20, 2000.
8. AS BUILT AUGUST, 1972 OF SANITARY SEWAGE TREATMENT IMPROVEMENTS, TRAVIS FIELD, PREPARED BY ERNEST F. GUNN CONSULTING ENGINEERS, INC. DATED MARCH 1970.
9. PIPEMAKERS RELOCATED EASEMENT (PROPOSED), PREPARED BY MOFFATT & NICHOL.
10. CITY OF SAVANNAH, GEORGIA PIPE MAKER'S CANAL EFFLUENT PUMPING AND TRANSMISSION PROJECT, C.I.P. S-803-68. EP GRANT NO. C 13- 378-12. PREPARED BY THOMAS & HUTTON ENGINEERING, CO., DATED MARCH 1987.

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	REVISIONS	BY	DATE
0			CDR	11-2020

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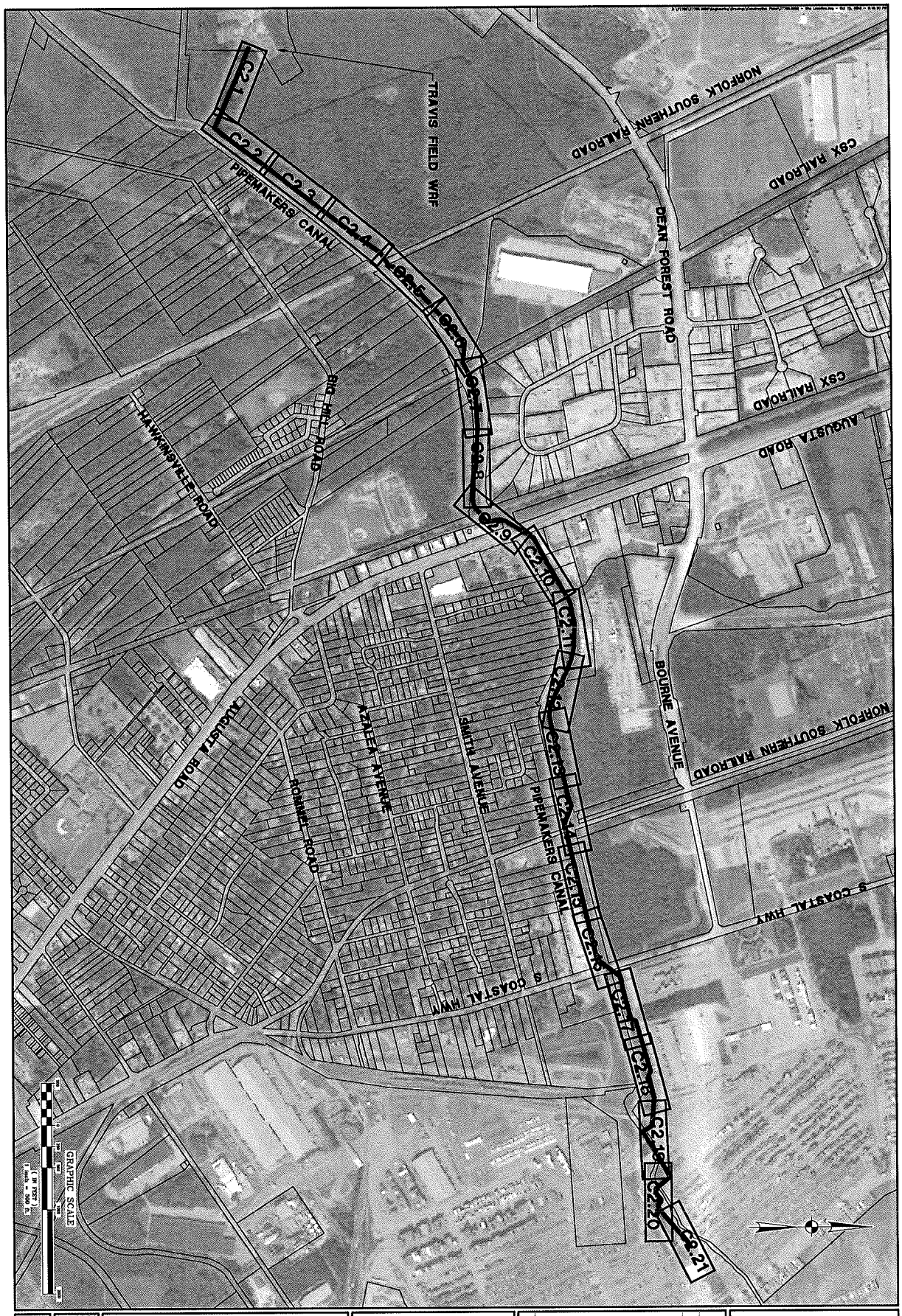
SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
GENERAL NOTES

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: 1" = 1'

G1.1



C1.1

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OVERALL SITE LAYOUT

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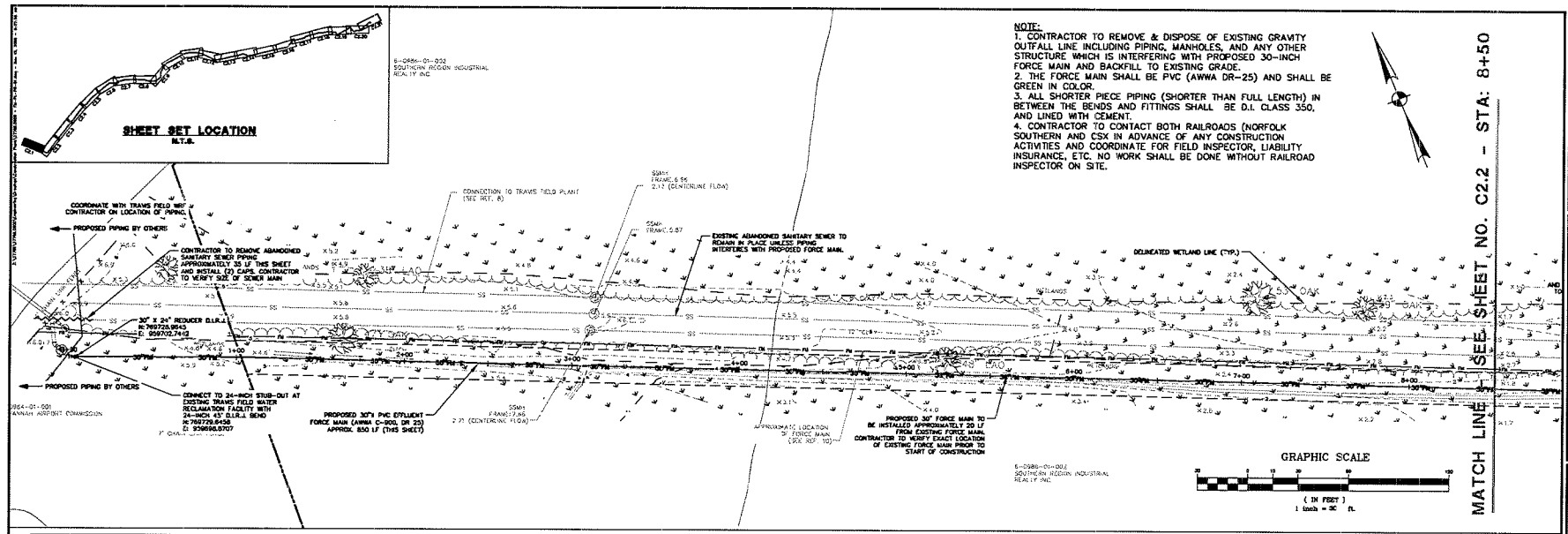
0	ISSUED FOR BIDS	CDR	11-2020

BID SET - NOT FOR CONSTRUCTION



TRAVIS FIELD FORCE MAIN ALIGNMENT--01
STATIONS: 0+80 - 8+50
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2020

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SAVANNAH
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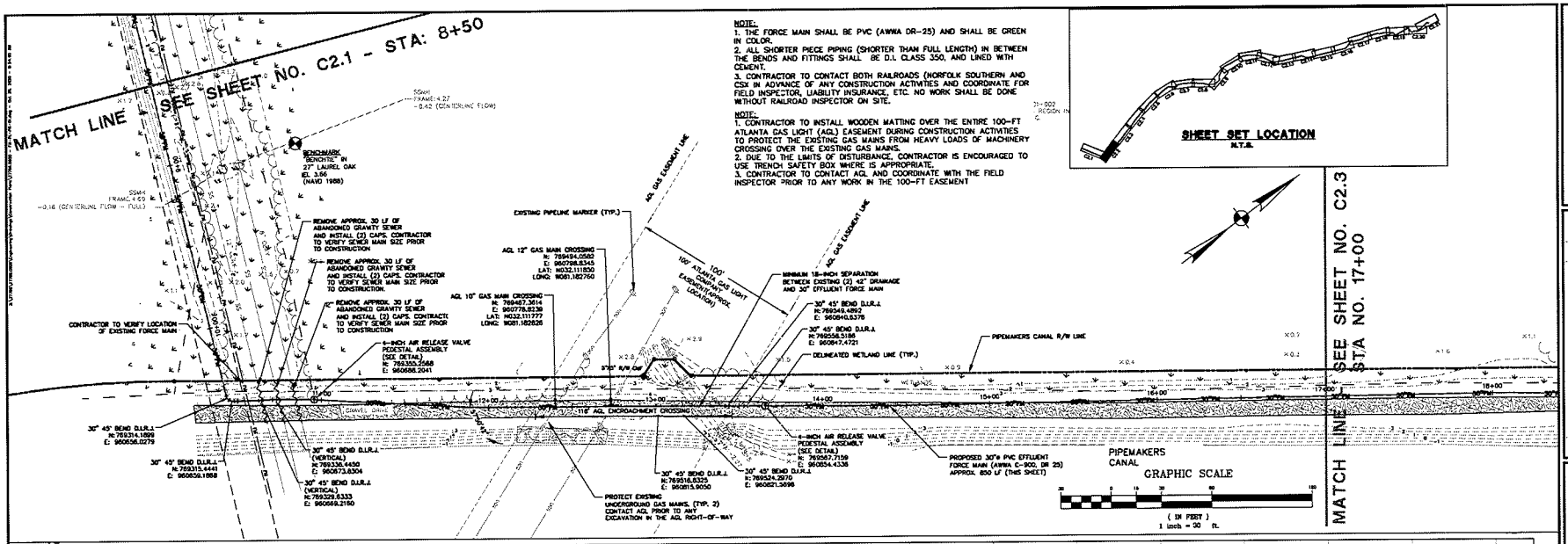
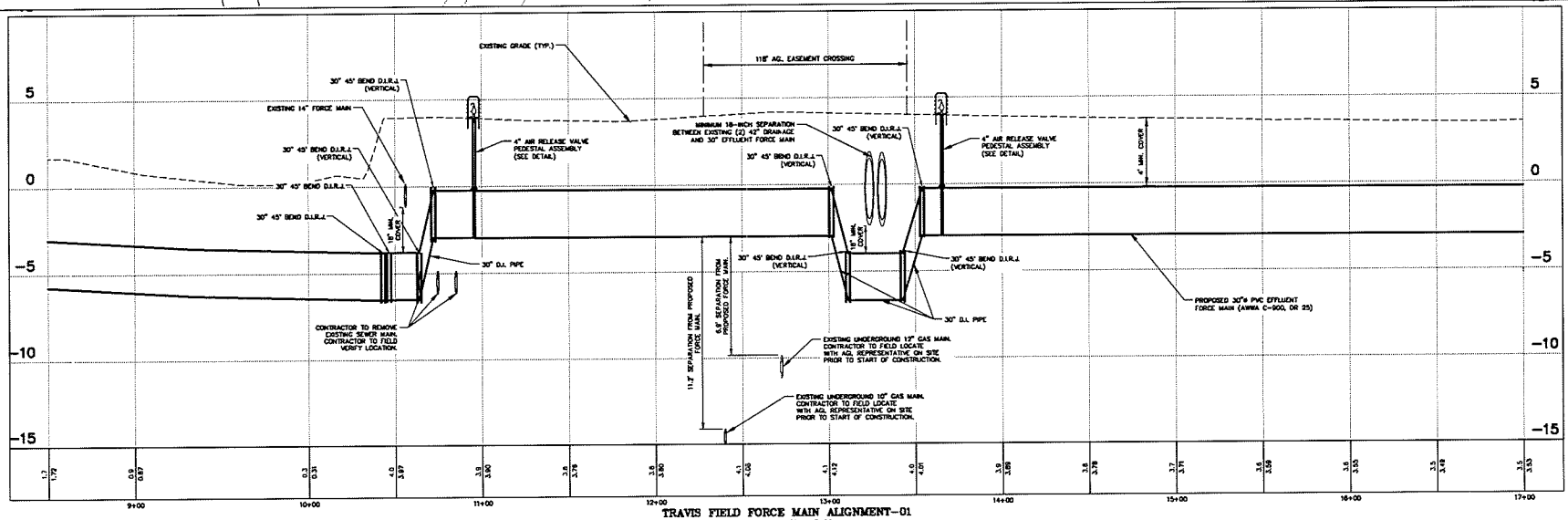
FORCE MAIN PLAN & PROFILE

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.1





TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 9+50 - 17+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	BY	DATE
0	REVISIONS		

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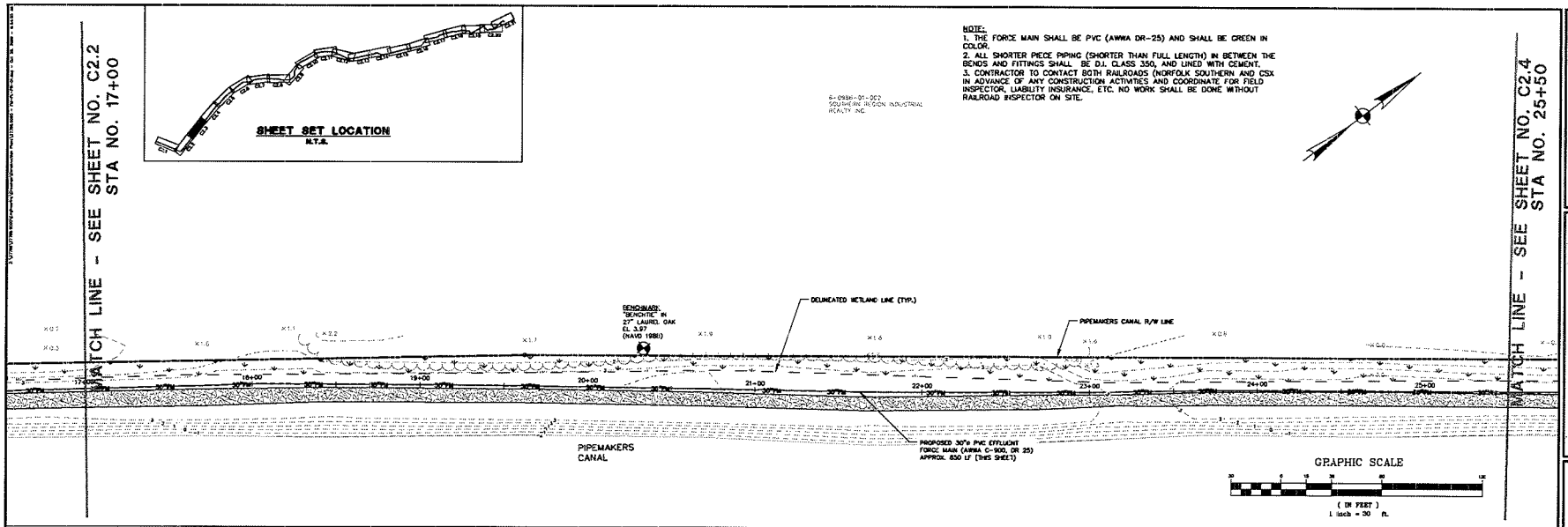
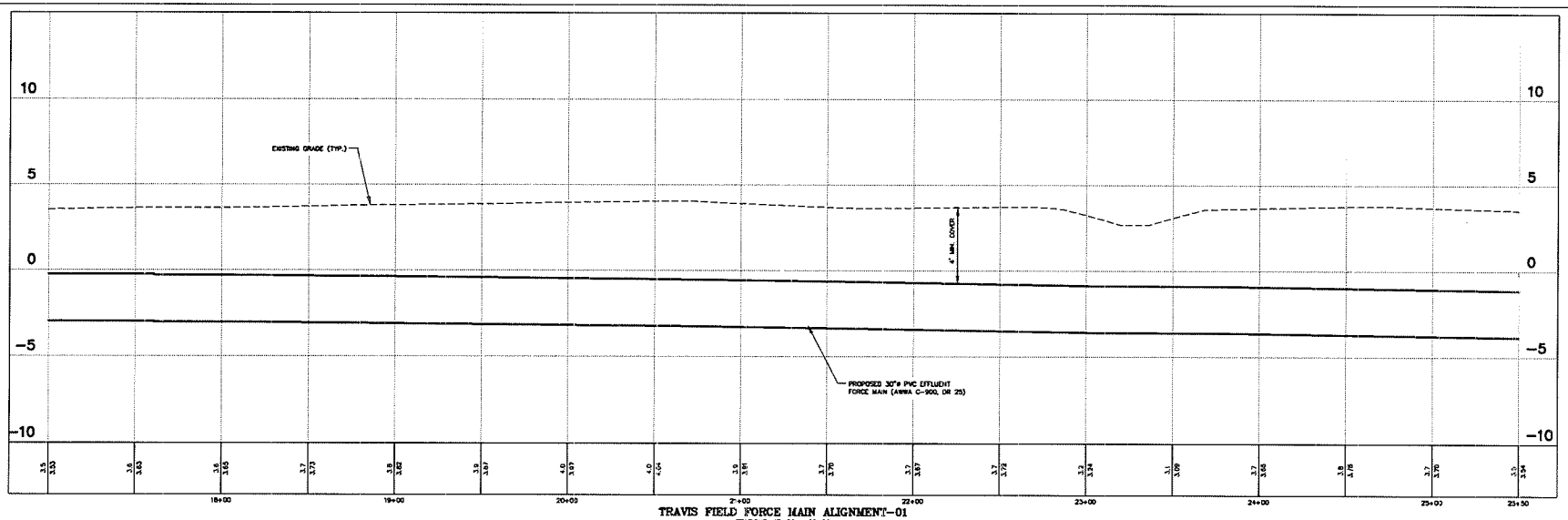
FORCE MAIN PLAN & PROFILE

JOB NO: J-27780.0000
DATE: 10-2-18
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.2





TRAVIS FIELD FORCE MAIN ALIGNMENT-01

STATIONS: 17+00 - 25+50
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
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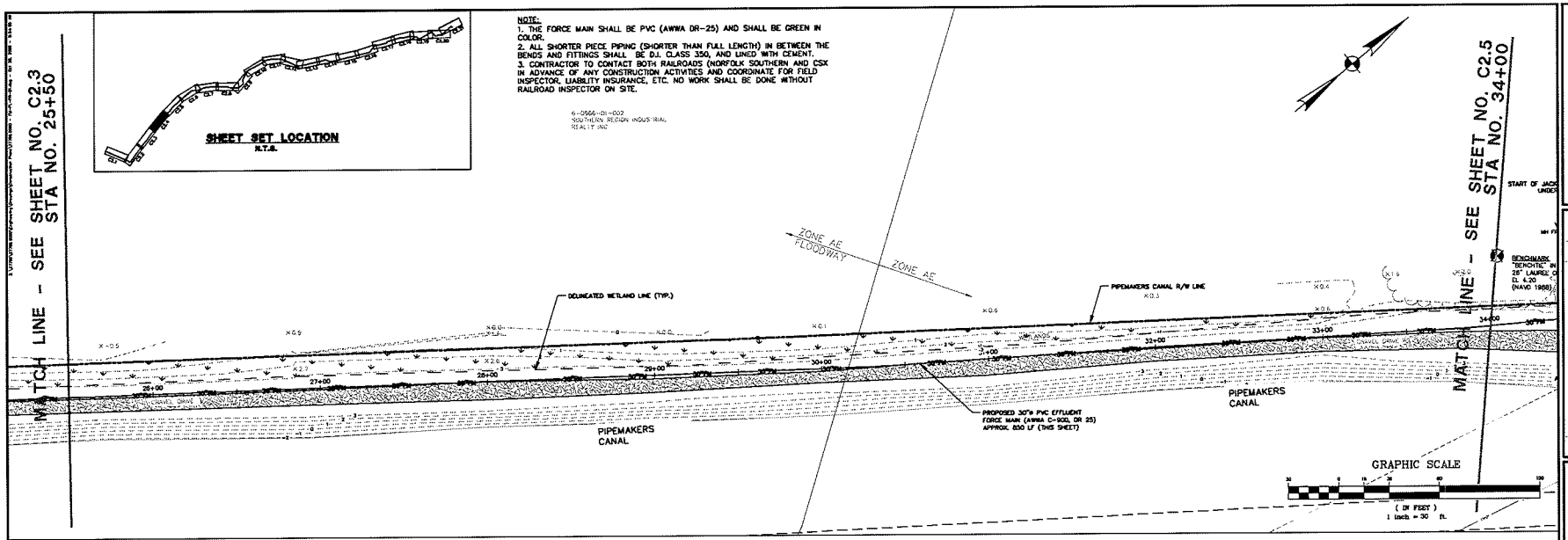
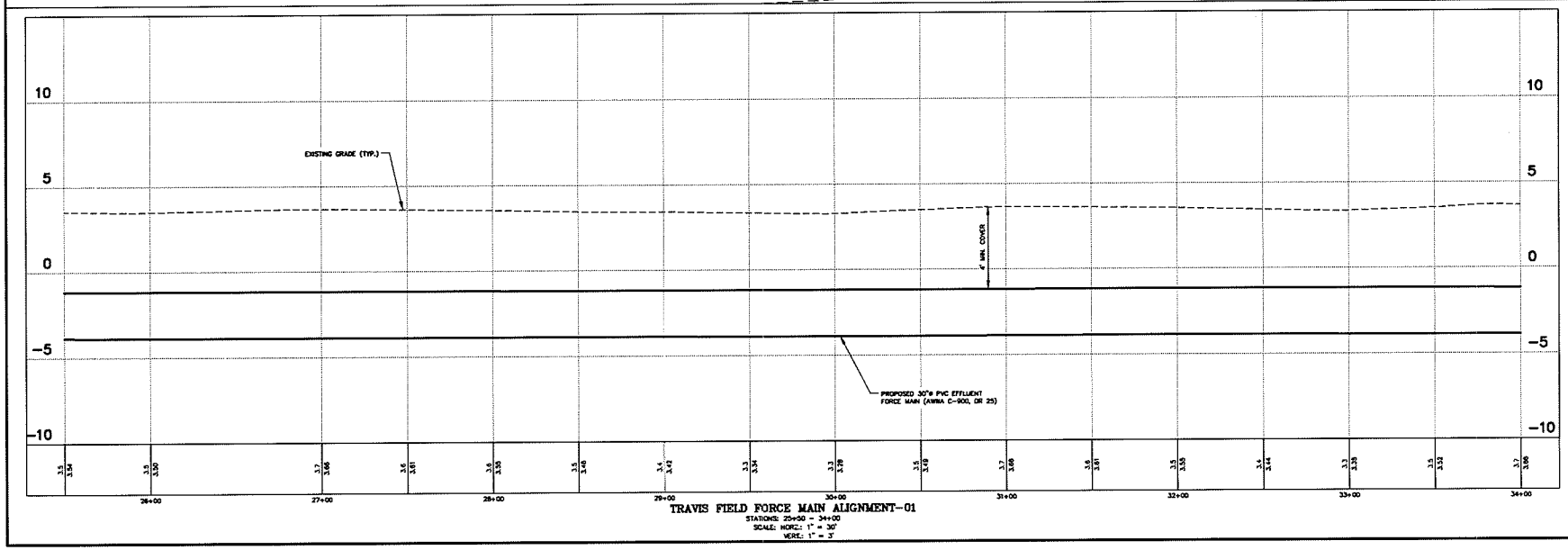
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO: J-2778.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.3





TRAVIS FIELD FORCE MAIN ALIGNMENT-01

STATIONS: 25+50 - 34+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 5'

BID SET - NOT FOR CONSTRUCTION

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0			CDR	11-2020

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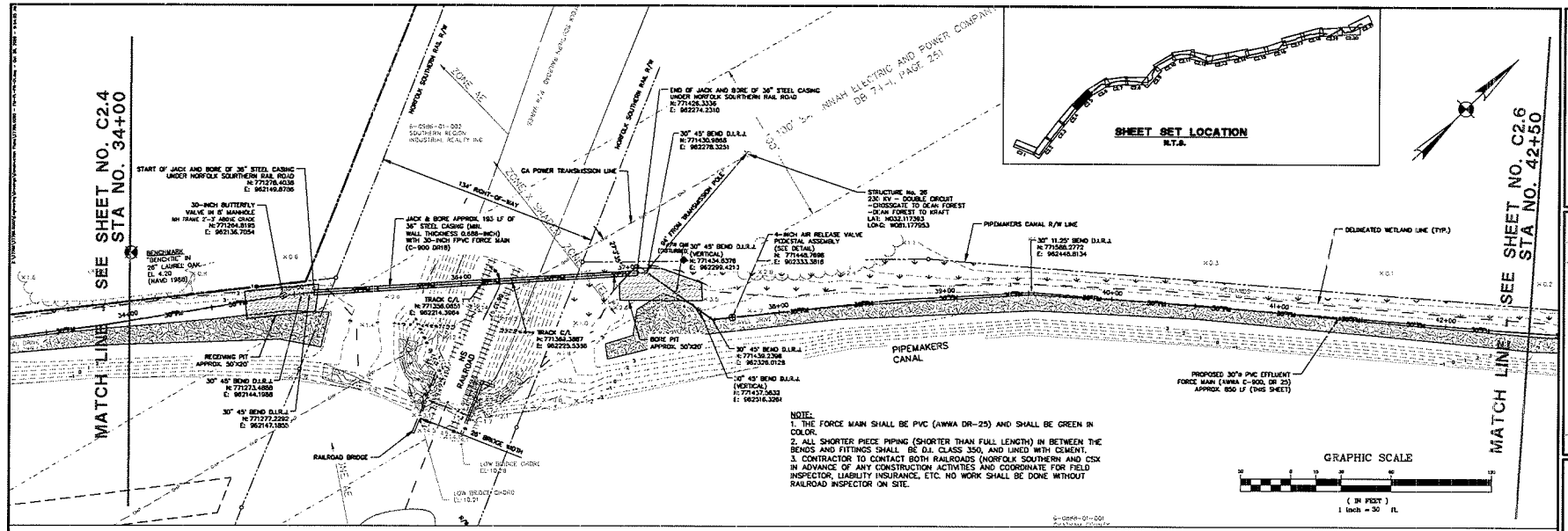
SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

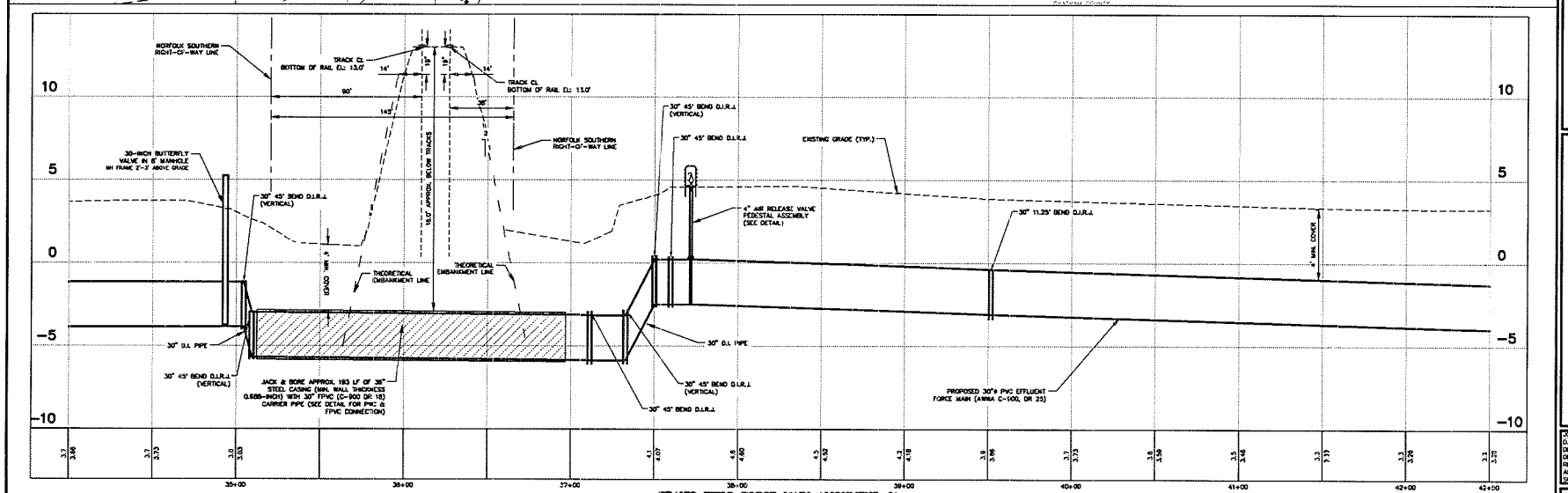
FORCE MAIN PLAN & PROFILE

JOB NO: J-27158.0000
DATE: 10-2-18
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.4



NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
3. CONTRACTOR TO CONTACT BOTH RAILROADS (NORFOLK SOUTHERN AND CSX IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES AND COORDINATE FOR FIELD INSPECTOR, LIABILITY INSURANCE, ETC. NO WORK SHALL BE DONE WITHOUT RAILROAD INSPECTOR ON SITE.



TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 34+00 - 42+50
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2020

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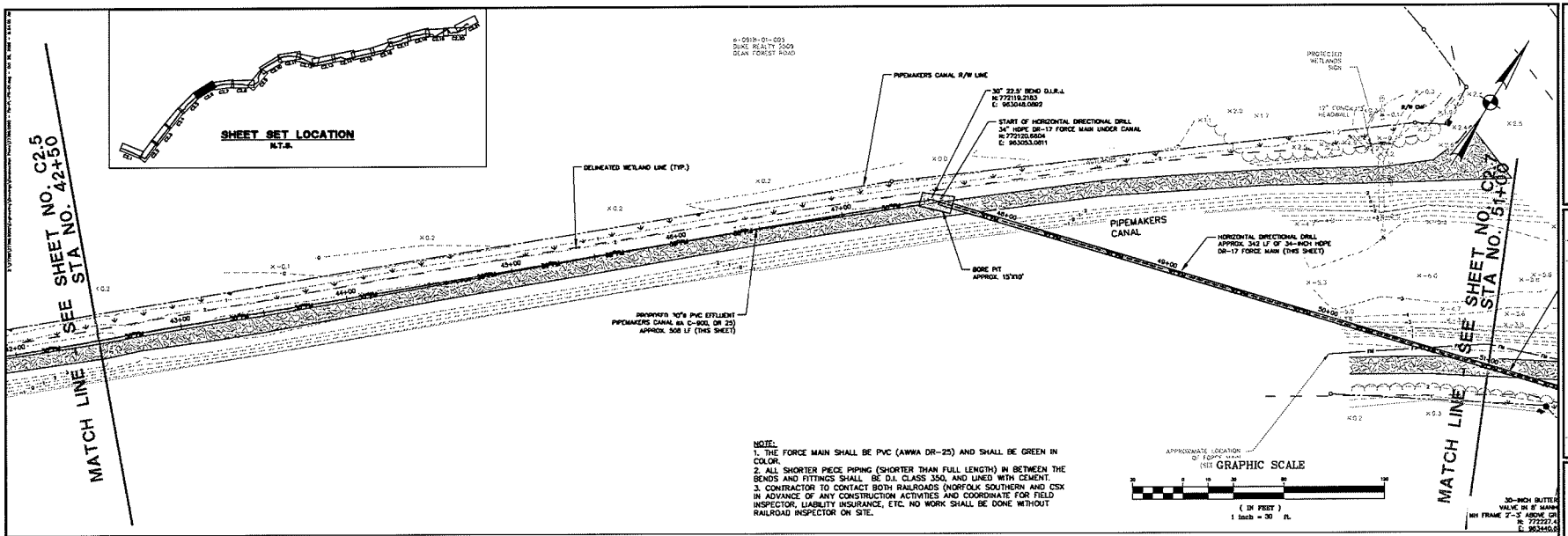
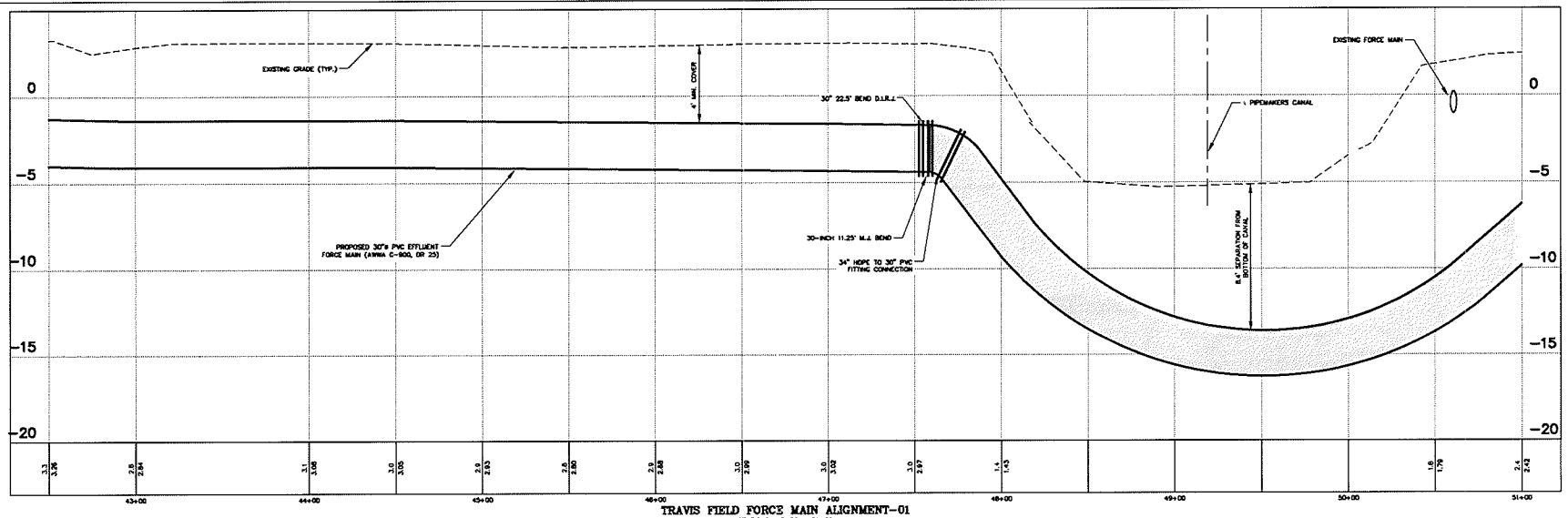
SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
FORCE MAIN PLAN & PROFILE

JOB NO.: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.5



NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
3. CONTRACTOR TO CONTACT BOTH RAILROADS (NORFOLK SOUTHERN AND CSX IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES AND COORDINATE FOR FIELD INSPECTOR, LIABILITY INSURANCE, ETC. NO WORK SHALL BE DONE WITHOUT RAILROAD INSPECTOR ON SITE.



TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 42+50 - 51+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 5'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	DPR	1-2-2020
	REVISIONS	BY	DATE

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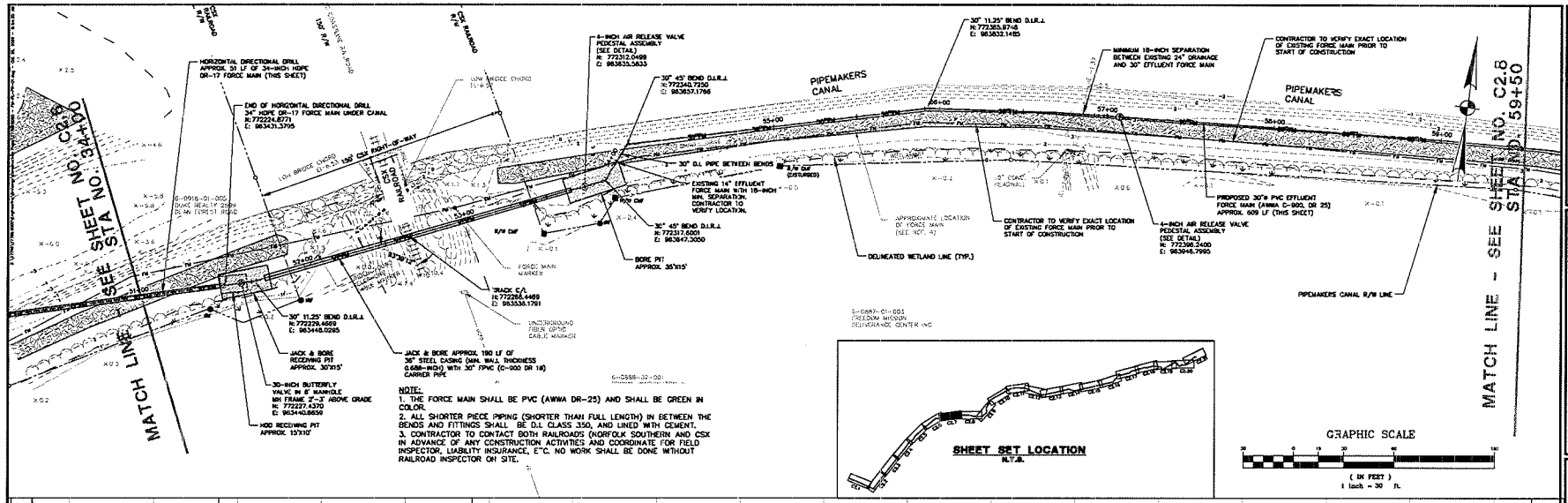
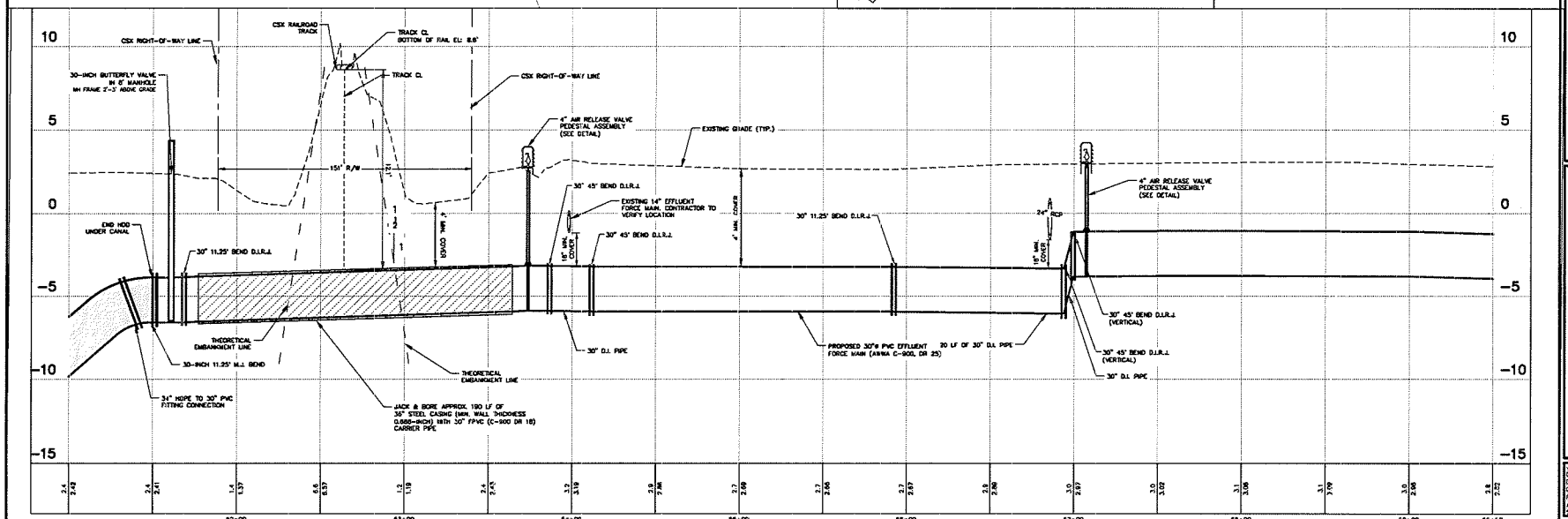
SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
FORCE MAIN PLAN & PROFILE

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.6





TRAVIS FIELD FORCE MAIN ALIGNMENT-01

STATIONS: 31+00 - 39+50
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2020

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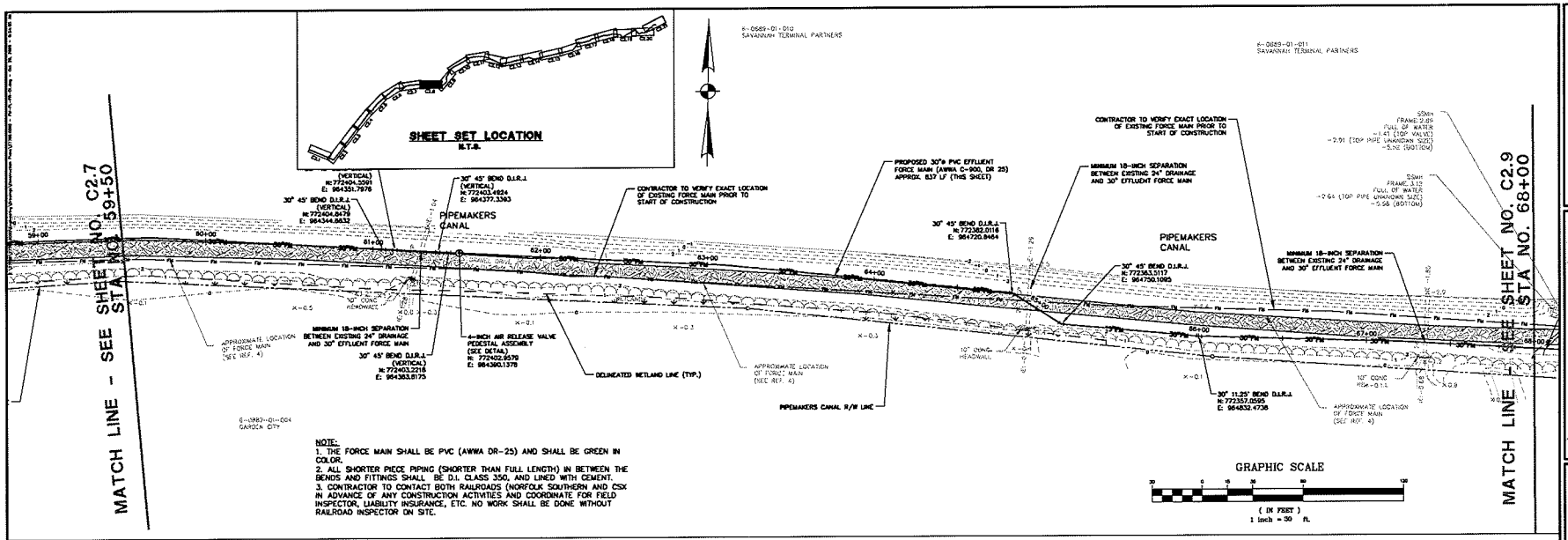
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

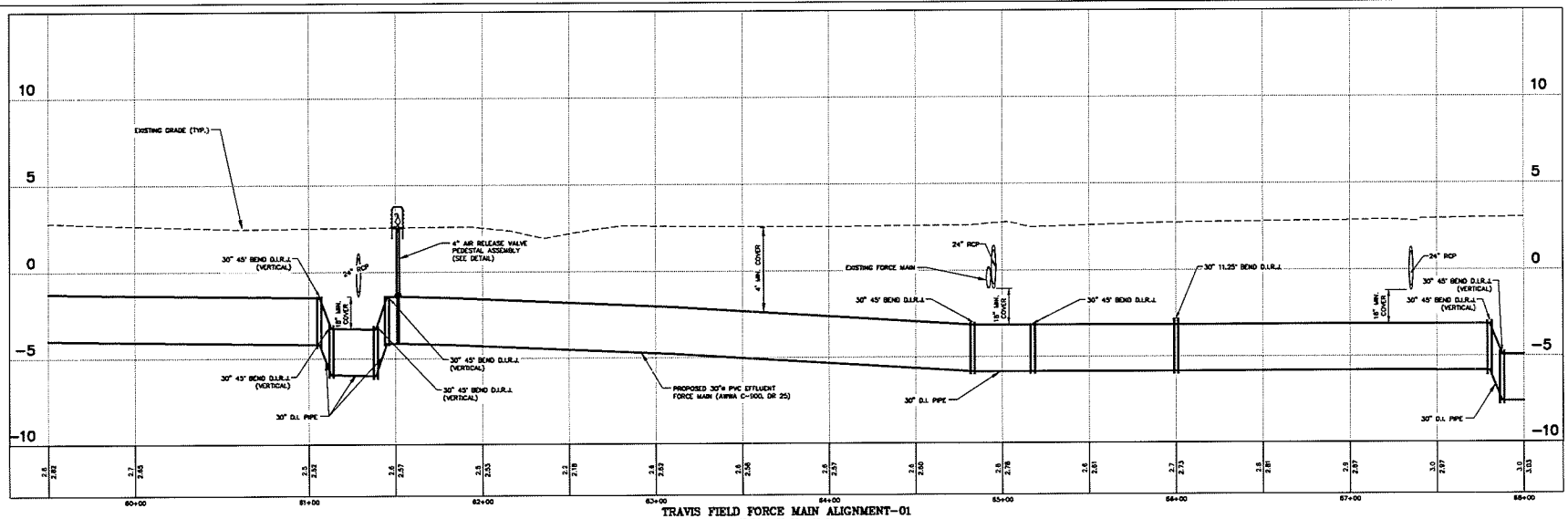
FORCE MAIN PLAN & PROFILE

JOB NO: J-27768.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.7



NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
3. CONTRACTOR TO CONTACT BOTH RAILROADS (NORFOLK SOUTHERN AND CSX IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES AND COORDINATE FOR FIELD INSPECTOR, LIABILITY INSURANCE, ETC. NO WORK SHALL BE DONE WITHOUT RAILROAD INSPECTOR ON SITE.



TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 59+50 - 68+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	BY	DATE
0		CDR	11-2020

REVISIONS

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TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.8

NOTES:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
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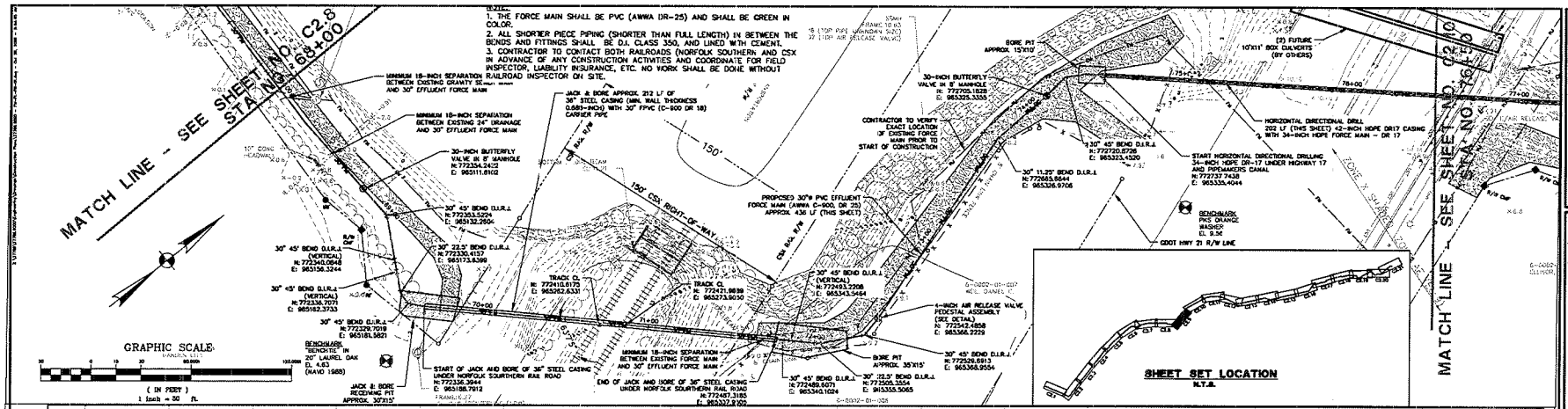

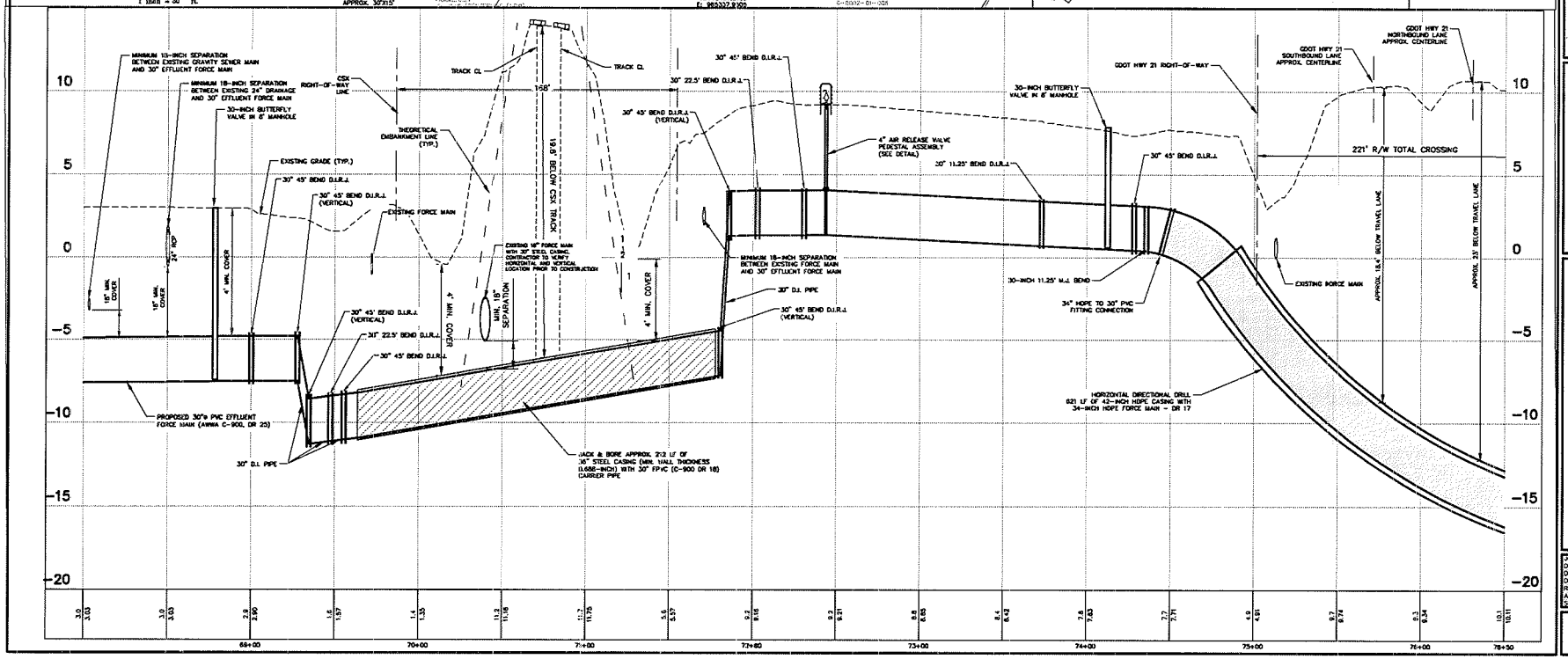

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2020

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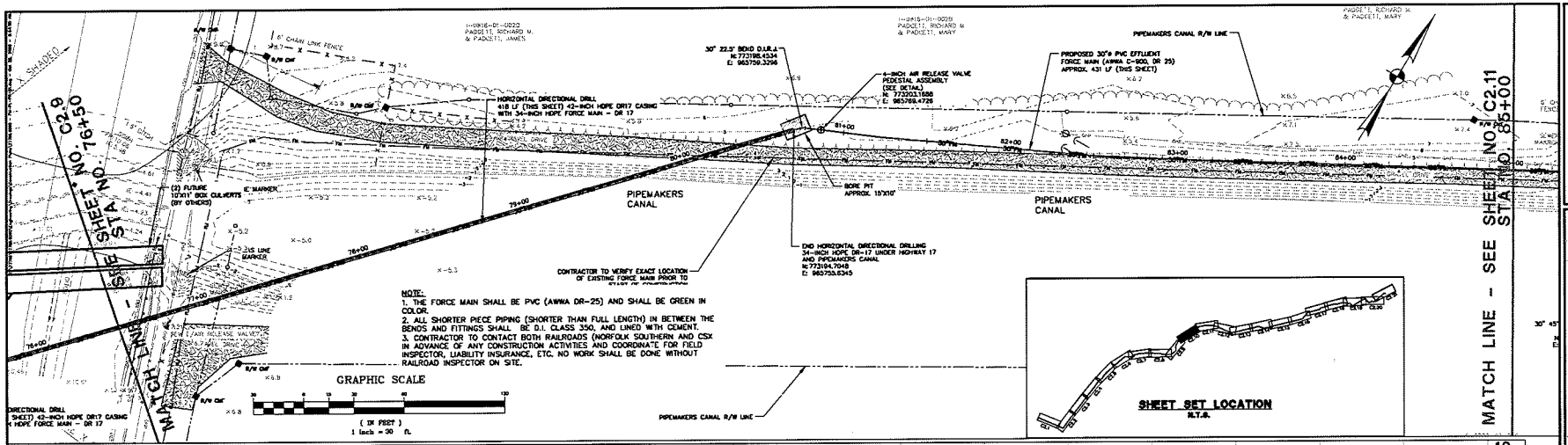
SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO: J-27758.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.9



NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
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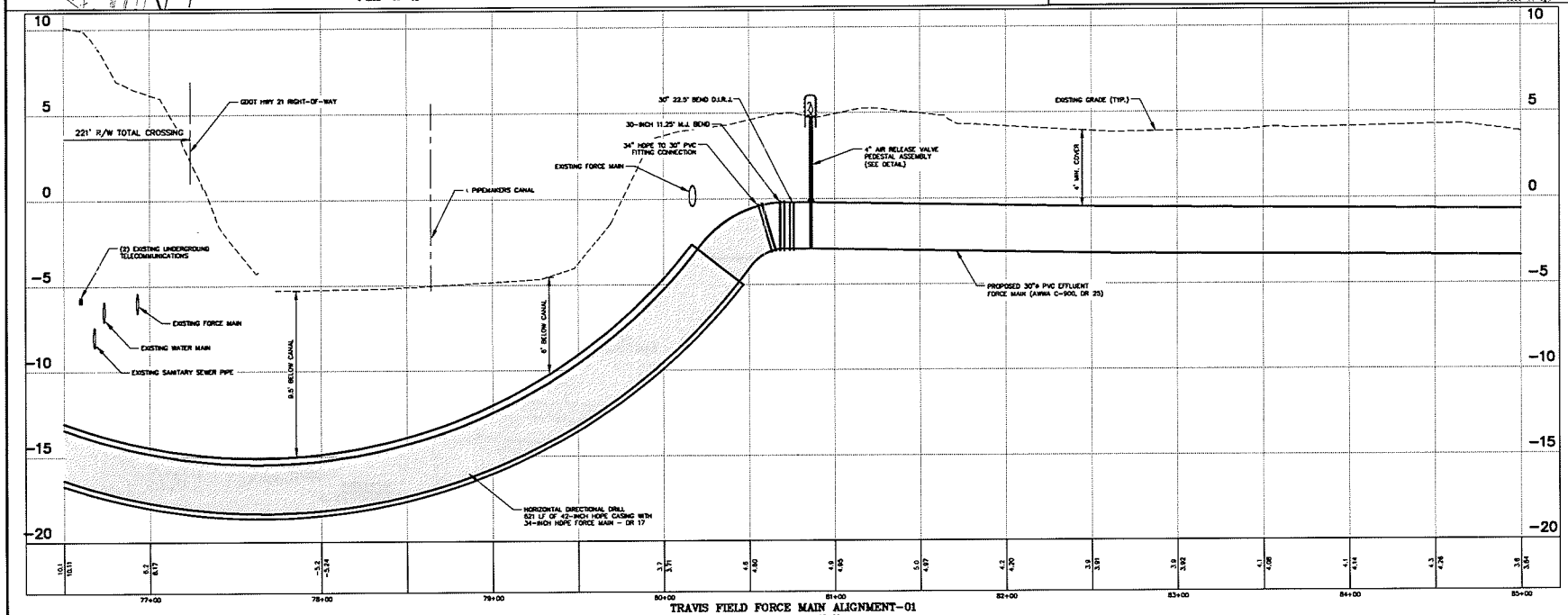

TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 76+50 - 85+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 5'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	REVISIONS	BY	DATE
0			CDR	11-2020

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SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
FORCE MAIN PLAN & PROFILE

JOB NO: J-2778A.0000
DATE: 10-2-18
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.10

NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
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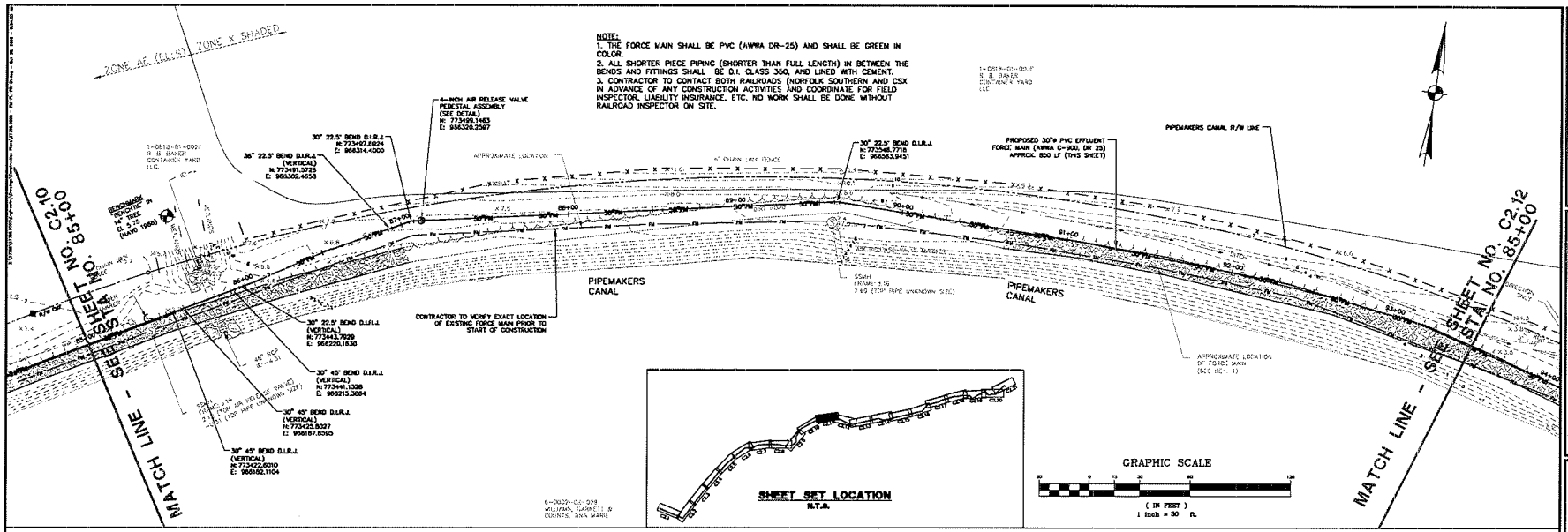

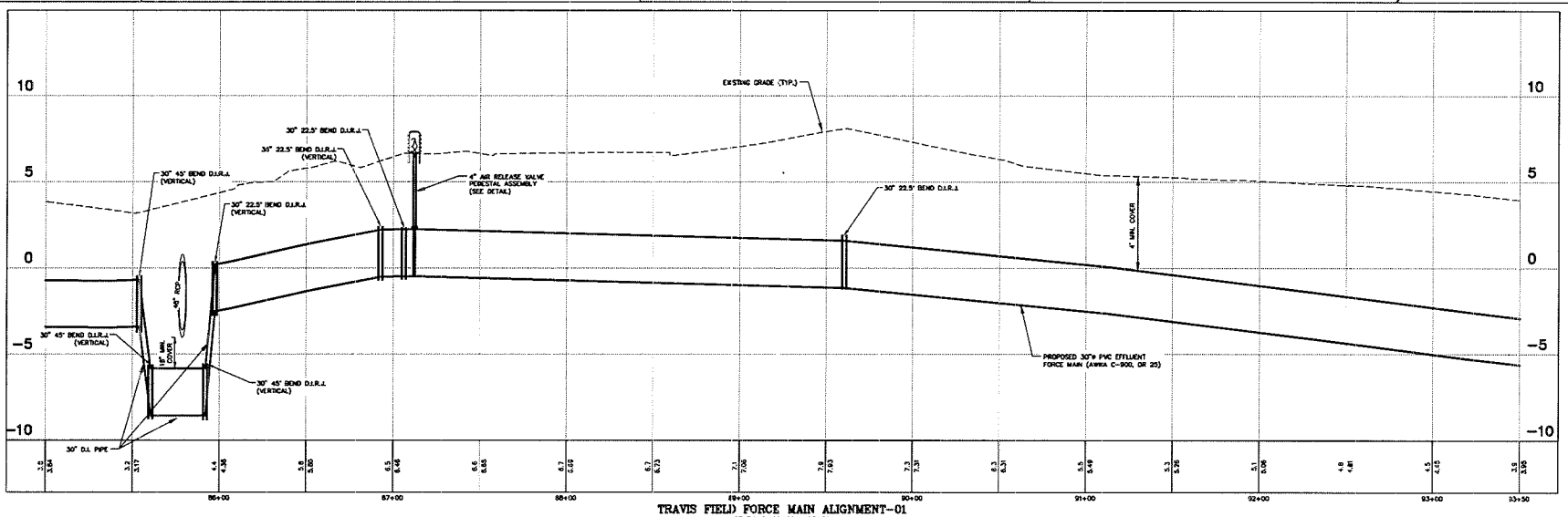

TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 85+00 - 93+50
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BID	CDR	11-2019

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SAVANNAH
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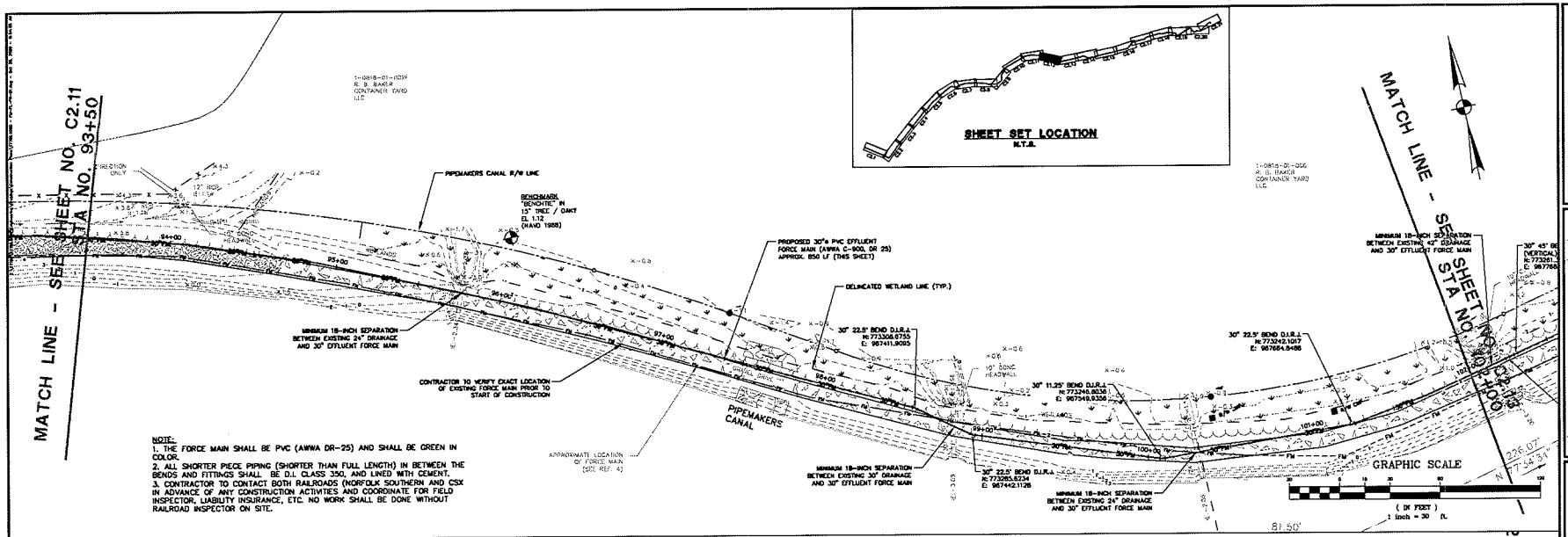
FORCE MAIN PLAN & PROFILE

JOB NO.: J-27R16.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.11



NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
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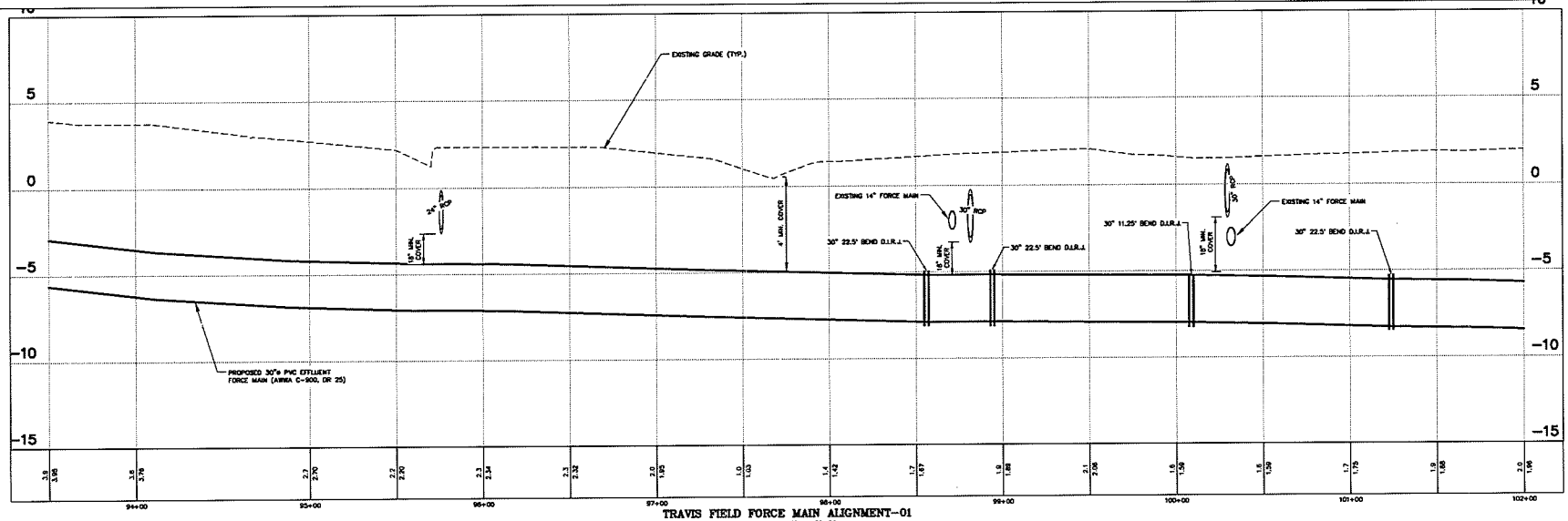

TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 93+50 - 102+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	BY	DATE
0		CDR	11-2020

REVISIONS

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TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO: J-27188.0000
DATE: 10-2-18
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.12

NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
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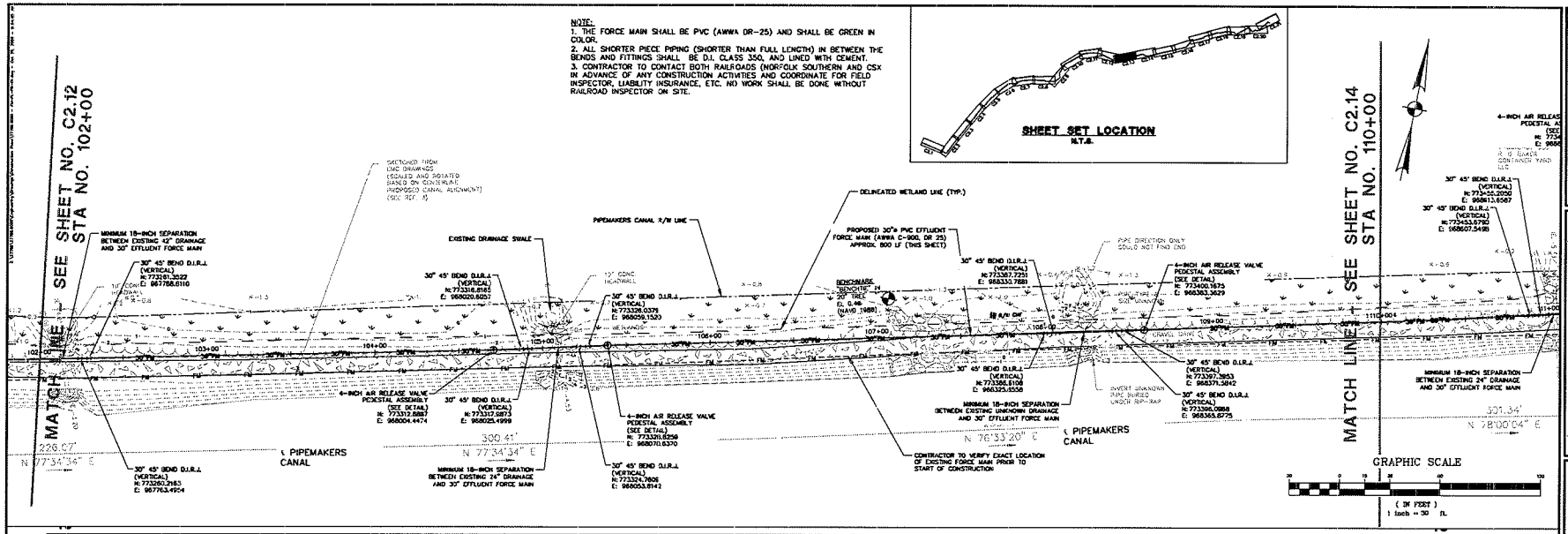

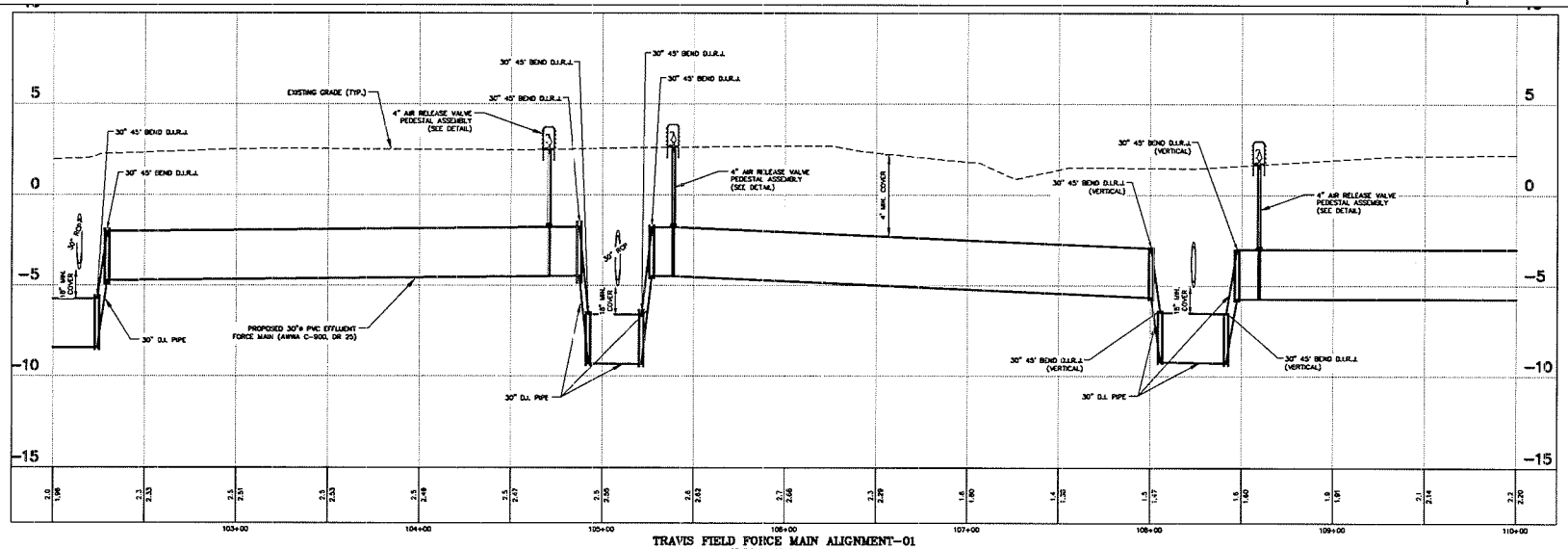

TRAVIS FIELD FORCE MAIN ALIGNMENT-01
STATIONS: 102+00 - 110+00
SCALE: HORIZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2000

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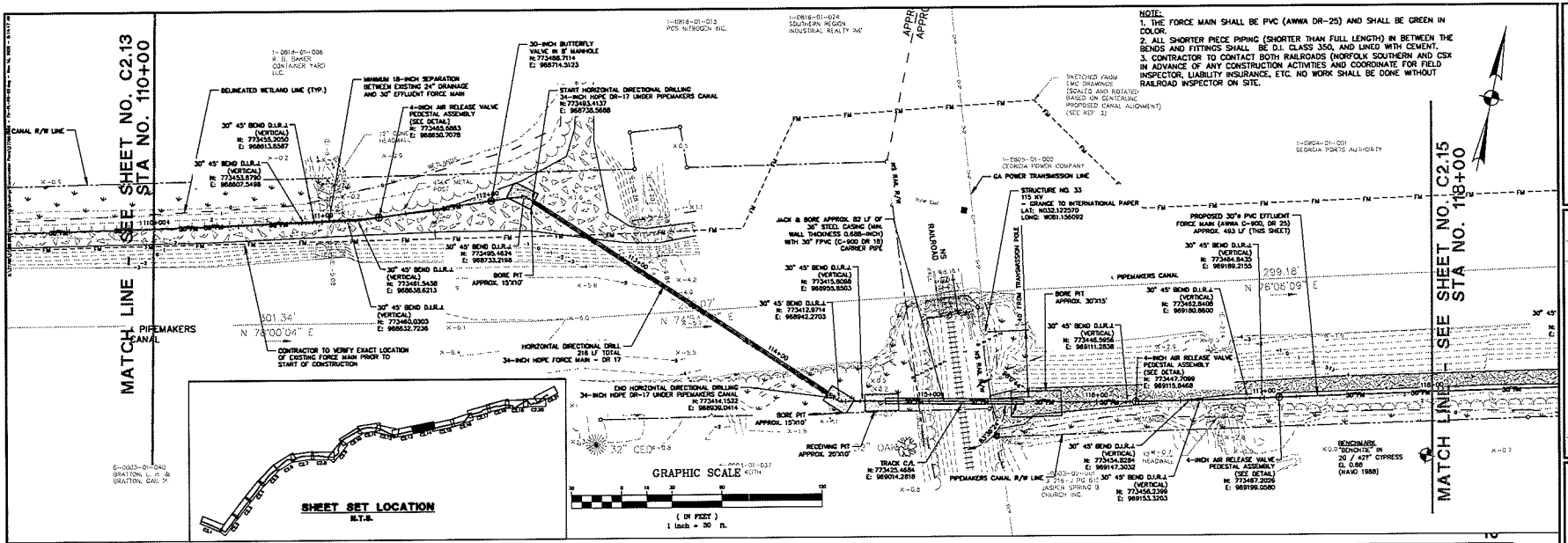
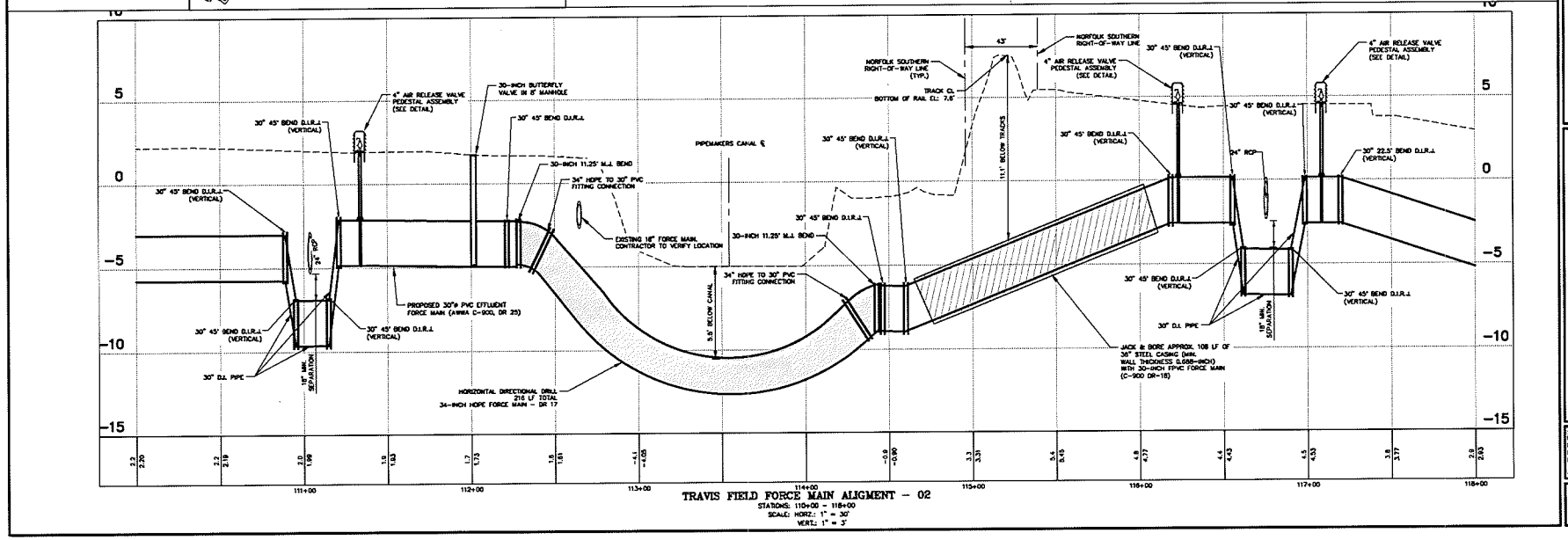
FORCE MAIN PLAN & PROFILE

JOB NO:	J-27738.0000
DATE:	10-2-19
DRAWN:	CDR
DESIGNED:	CDR
REVIEWED:	FS
APPROVED:	FS
SCALE:	AS NOTED

C2.13





BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	REVISIONS	BY	DATE

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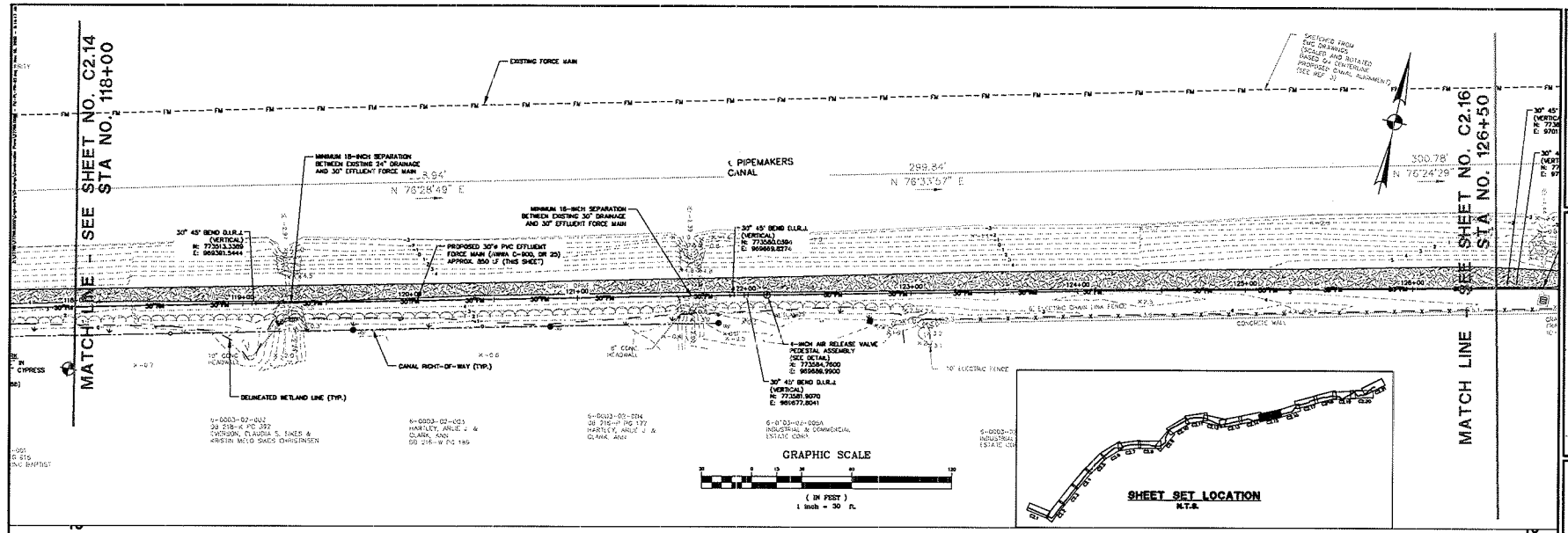
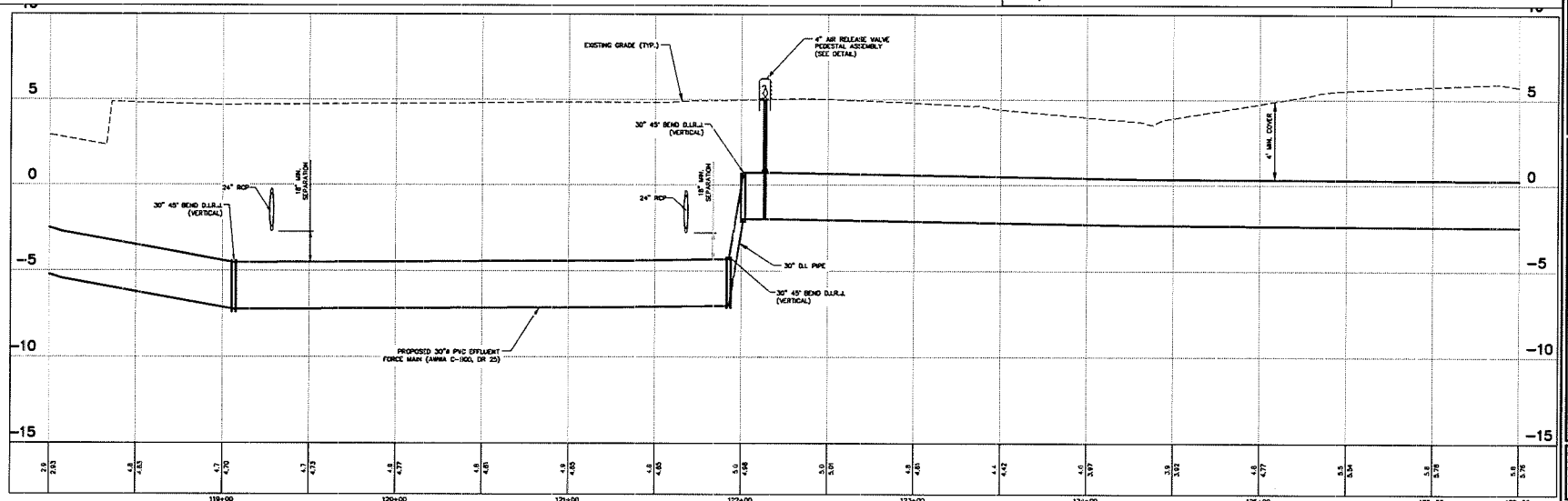
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB No: J-2778A.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.14





TRAVIS FIELD FORCE MAIN ALIGMENT - 02

STATIONS: 118+00 - 126+50

SCALE: HORZ.: 1" = 30'

VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	REVISIONS	BY	DATE
0			CDR	11-2020

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SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO: J-27728.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: TS
APPROVED: TS
SCALE: AS NOTED

C2.15

NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
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MATCH LINE - SEE SHEET NO. C2.15 STA NO. 126+50

MATCH LINE - SEE SHEET NO. C2.17 STA NO. 135+00

EXISTING FORCE MAIN

30" 45° BEND D.I.R.J. (VERTICAL) N: 773685.0748 E: 970121.2598

30" 45° BEND D.I.R.J. (VERTICAL) N: 773686.2932 E: 970126.4783

MINIMUM 18-INCH SEPARATION BETWEEN EXISTING 24" DRAINAGE AND 30" EFFLUENT FORCE MAIN

30" 45° BEND D.I.R.J. (VERTICAL) N: 773695.4025 E: 970185.9002

30" 45° BEND D.I.R.J. (VERTICAL) N: 773697.2688 E: 970174.0588

PROPOSED 30"ø PVC EFFLUENT FORCE MAIN (AWWA C-900, DR 25) APPROX. 1036 LF (THIS SHEET)

APPROX. 1,040 SY OF EXISTING ASPHALT DRIVE TO BE RESTORED TO EXISTING OR BETTER CONDITION AFTER EFFLUENT FORCE MAIN HAS BEEN INSTALLED

PIPEMAKERS CANAL

START HORIZONTAL DIRECTIONAL DRILLING 34-INCH HDPE DR-17 UNDER U.S. HWY 17 AND PIPEMAKERS CANAL N: 773769.7308 E: 970487.6713

30-INCH BUTTERFLY VALVE IN 8' MANHOLE N: 773764.4224 E: 970472.4250

4-INCH AIR RELEASE VALVE PEDESTAL ASSEMBLY (SEE DETAIL) N: 773762.3998 E: 970463.5537

30" 22.5° BEND D.I.R.J. N: 773767.1327 E: 970464.4024

BORE PIT APPROX. 15'X10'

STRUCTURE NO. 48 46 KV - KRAFT TO MILL HAVEN ANNEX LAT: N032.123469 LONG: W081.150952

GA POWER TRANSMISSION LINE

US HWY 17 - GDOT RIGHT-OF-WAY

US HWY 17

APPROXIMATE EXISTING ABANDONED TIMBER PILE

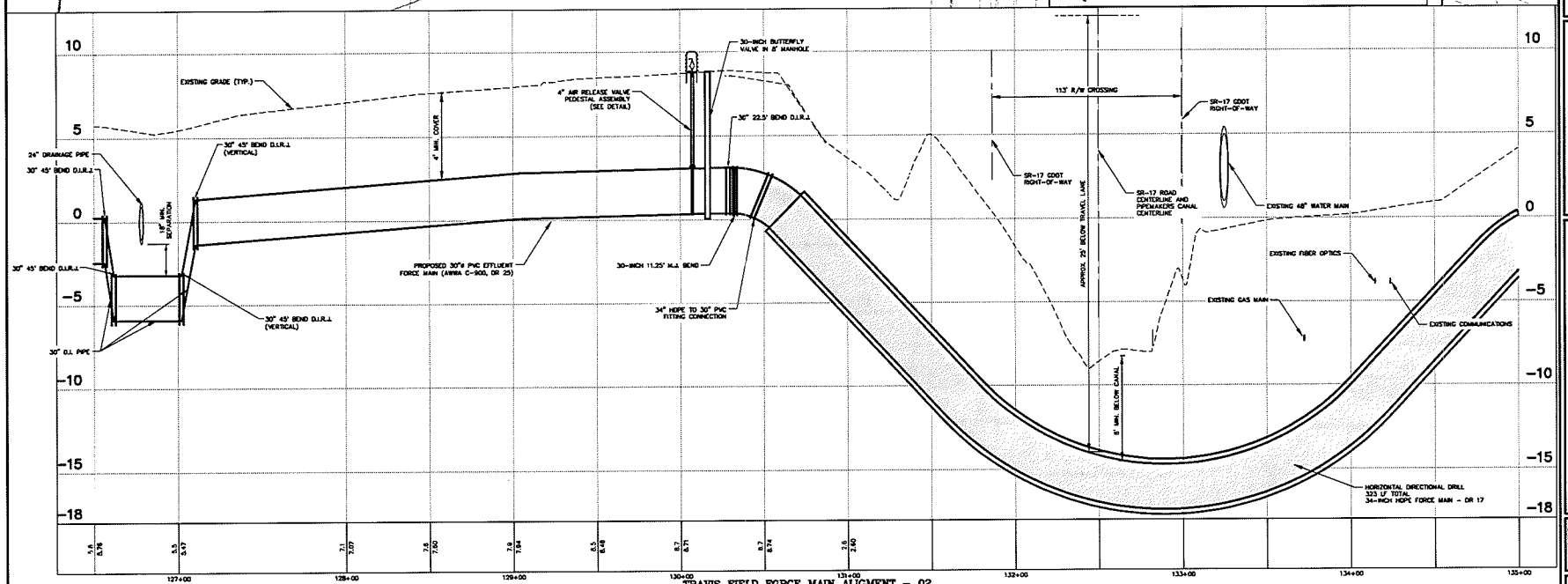
HORIZONTAL DIRECTIONAL DRILL 495 LF TOTAL of 42-INCH HDPE CASING SR-17 WITH 34-INCH HDPE FORCE MAIN - DR 17

30" 22.5° BEND D.I.R.J. N: 774089.[illegible] E: 970881.[illegible]

GRAPHIC SCALE

(IN FEET)
1 inch = 30 ft.

SHEET SET LOCATION
N.T.S.



TRAVIS FIELD FORCE MAIN ALIGMENT - 02
STATIONS: 126+50 - 135+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2-2020

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TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO: J-21788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.16

NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
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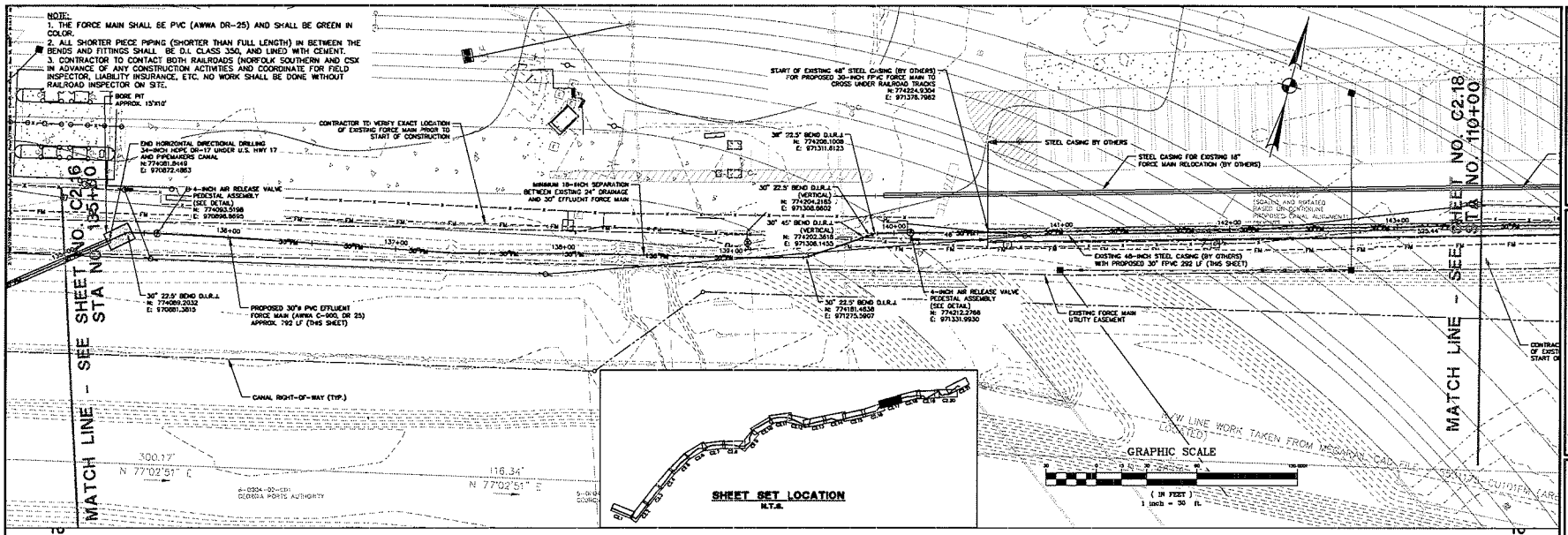
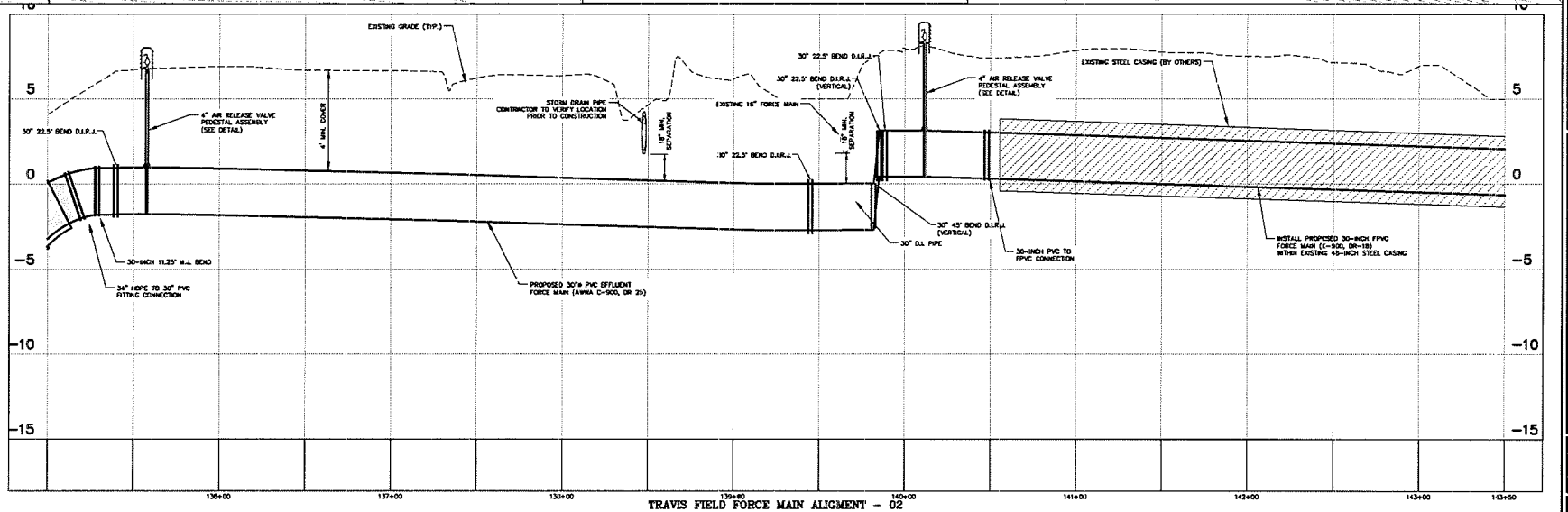
3. CONTRACTOR TO CONTACT BOTH RAILROADS (NORFOLK SOUTHERN AND CSX IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES AND COORDINATE FOR FIELD INSPECTOR, LIABILITY INSURANCE, ETC. NO WORK SHALL BE DONE WITHOUT RAILROAD INSPECTOR ON SITE.





TRAVIS FIELD FORCE MAIN ALIGMENT - 02
STATIONS: 135+00 - 143+50
SCALE: HORIZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2020

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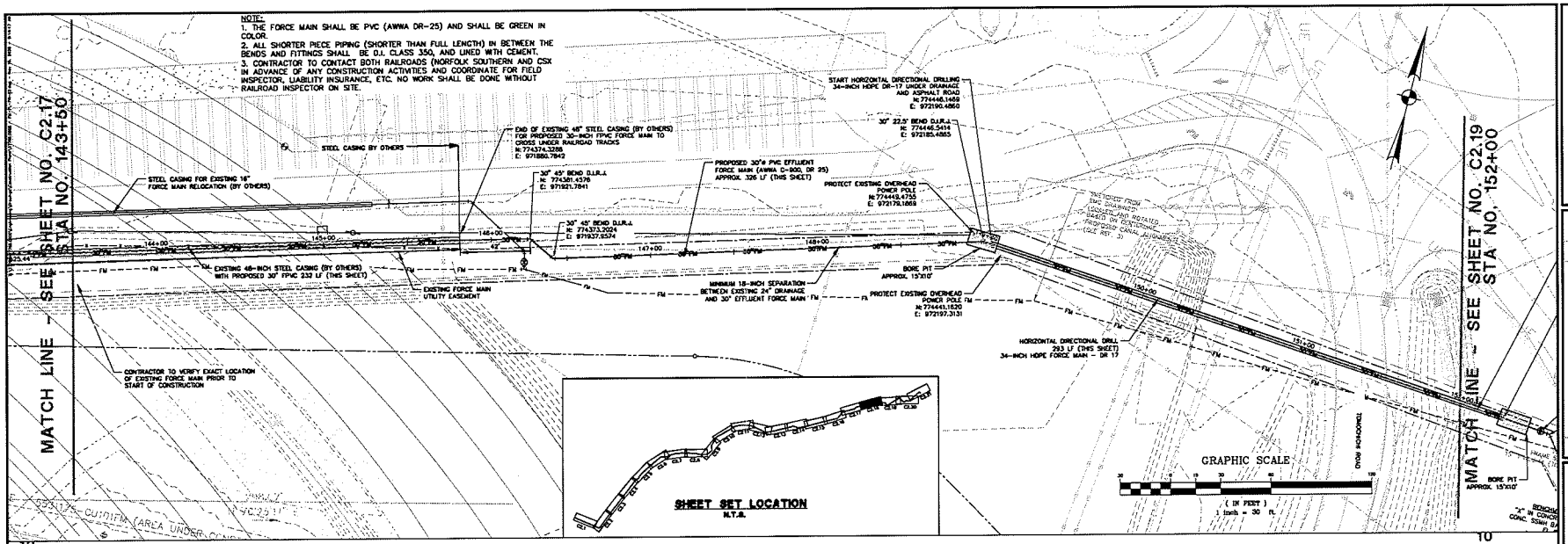
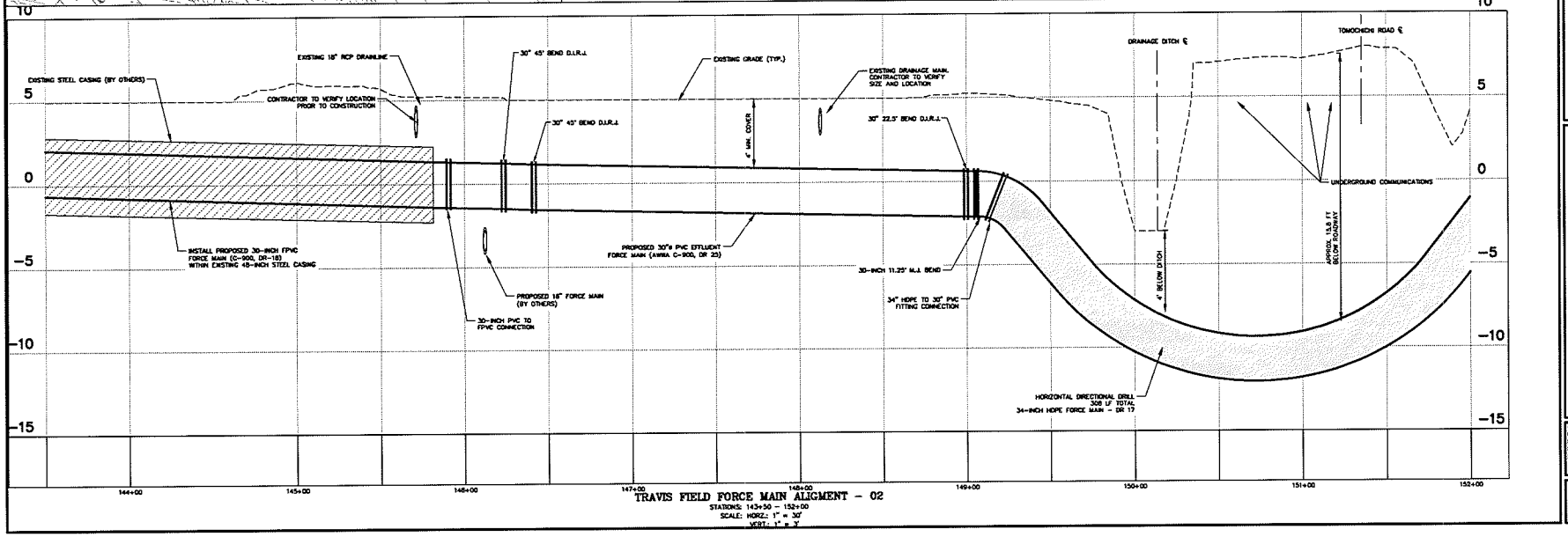
SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
FORCE MAIN PLAN & PROFILE

JOB NO: 27780.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.17

NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
3. CONTRACTOR TO CONTACT BOTH RAILROADS (NORFOLK SOUTHERN AND CSX IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES AND COORDINATE FOR FIELD INSPECTOR, LIABILITY INSURANCE, ETC. NO WORK SHALL BE DONE WITHOUT RAILROAD INSPECTOR ON SITE.





TRAVIS FIELD FORCE MAIN ALIGMENT - 02

STATIONS: 143+50 - 152+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	BY	DATE
0		CDR	11-2018

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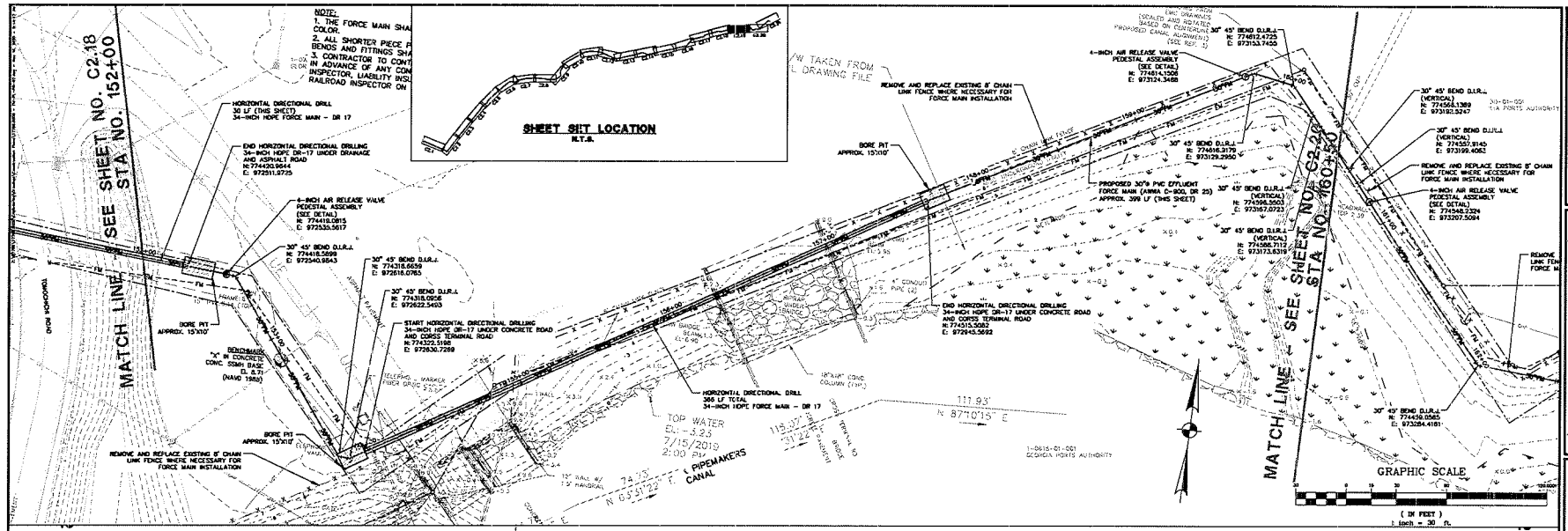
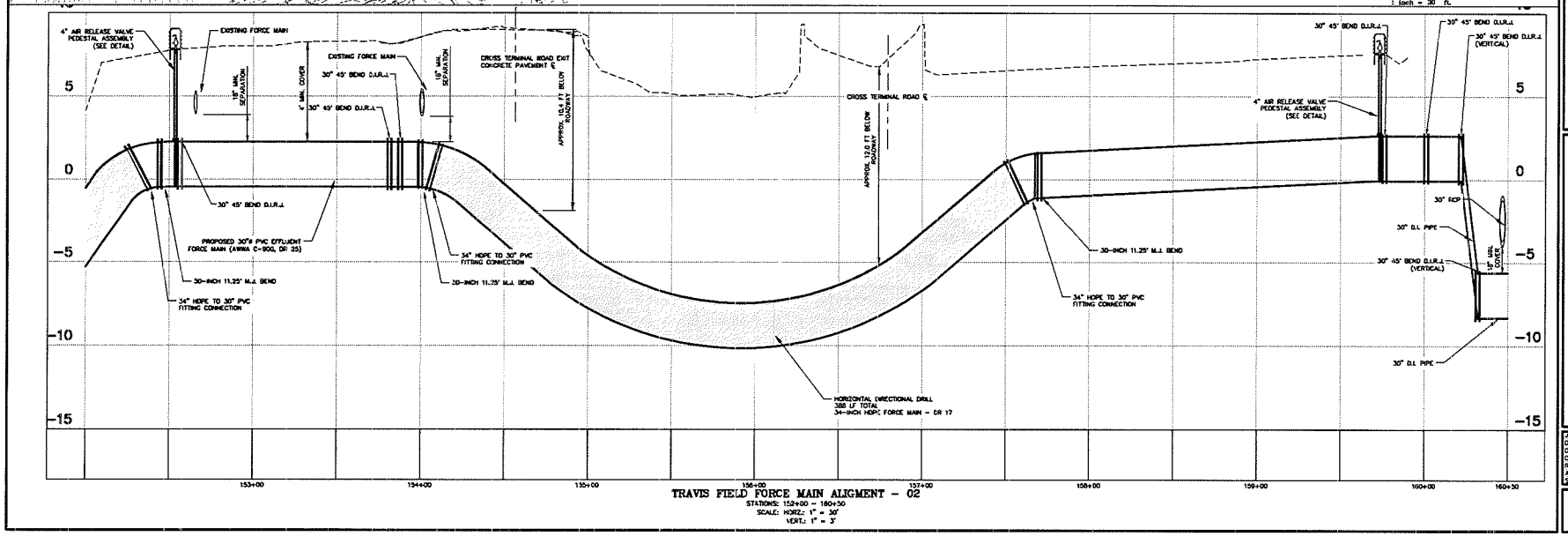
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO: J-27786.0000
DATE: 10-2-18
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.18





TRAVIS FIELD FORCE MAIN ALIGMENT - 02

STATIONS: 152+00 - 160+50
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	11-2020

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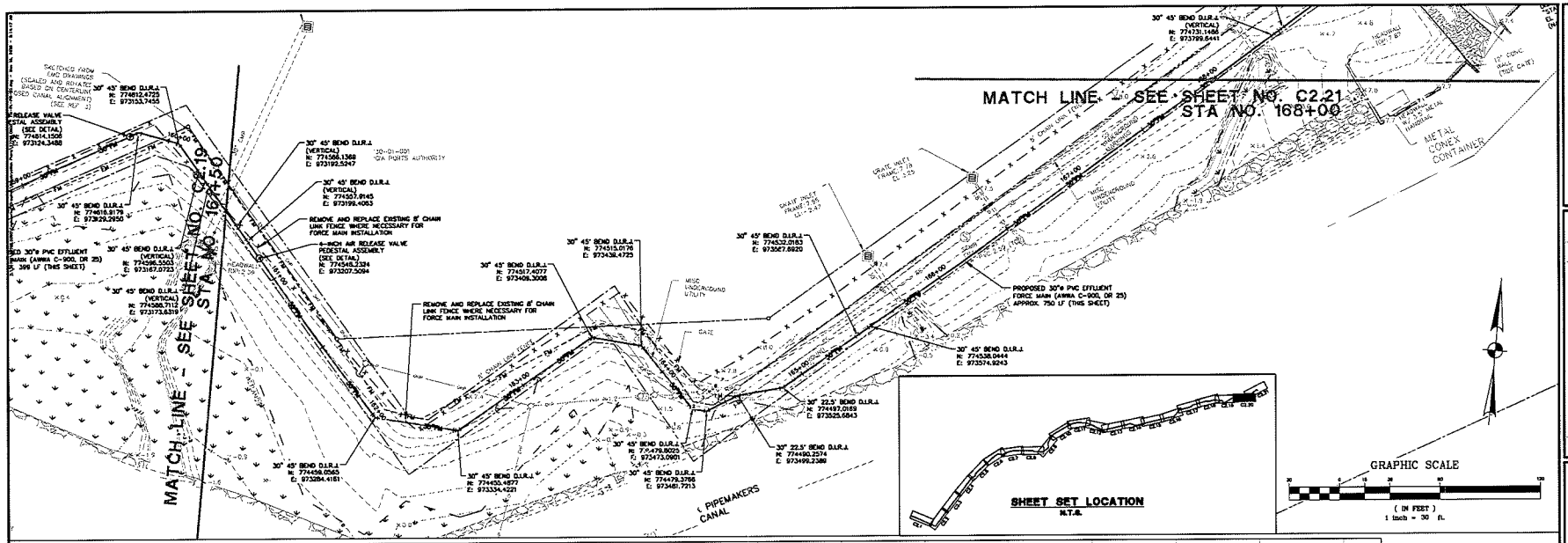
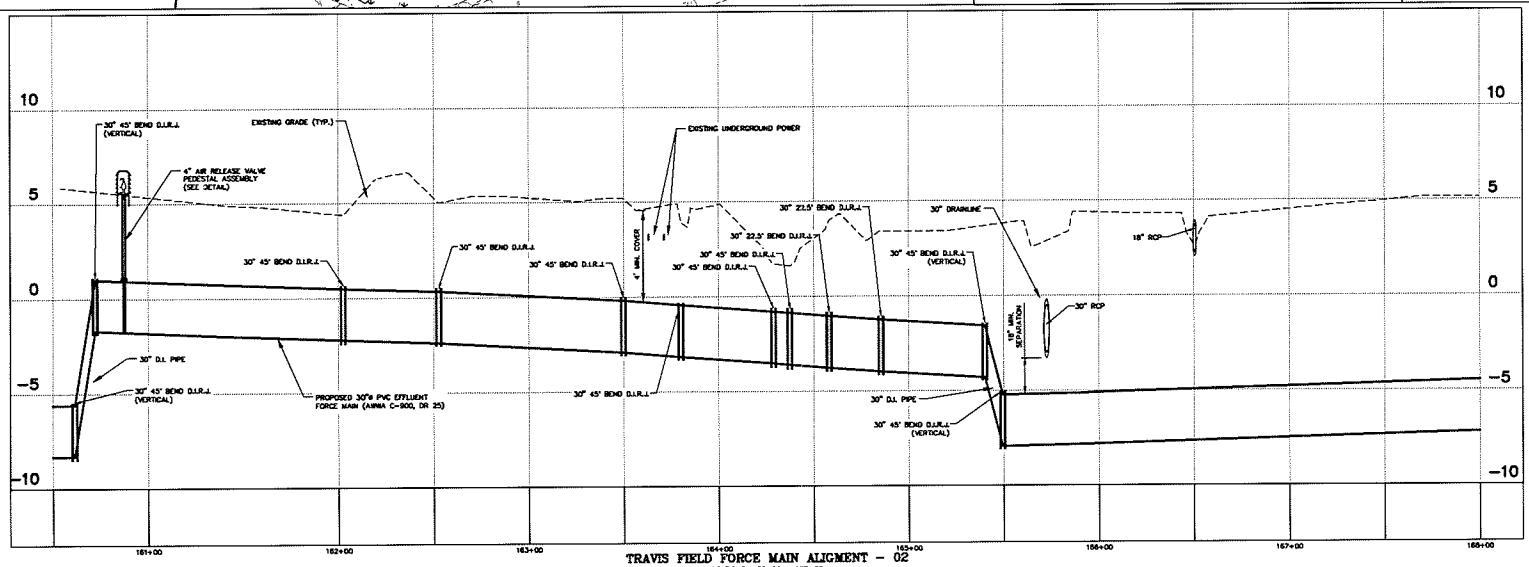
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

FORCE MAIN PLAN & PROFILE

JOB NO. 27.90.0000
DATE 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.19





TRAVIS FIELD FORCE MAIN ALIGMENT - 02

STATIONS: 160+50 - 168+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

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NO.	ISSUED FOR BIDS	REVISIONS	BY	DATE
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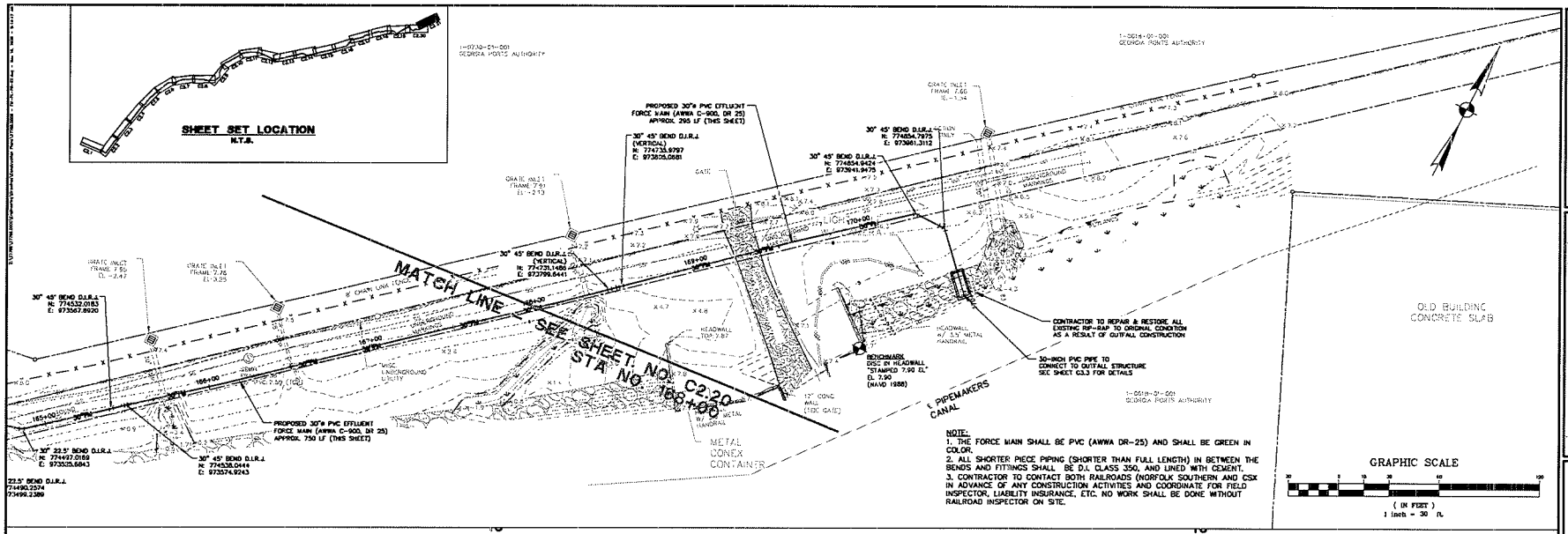
SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

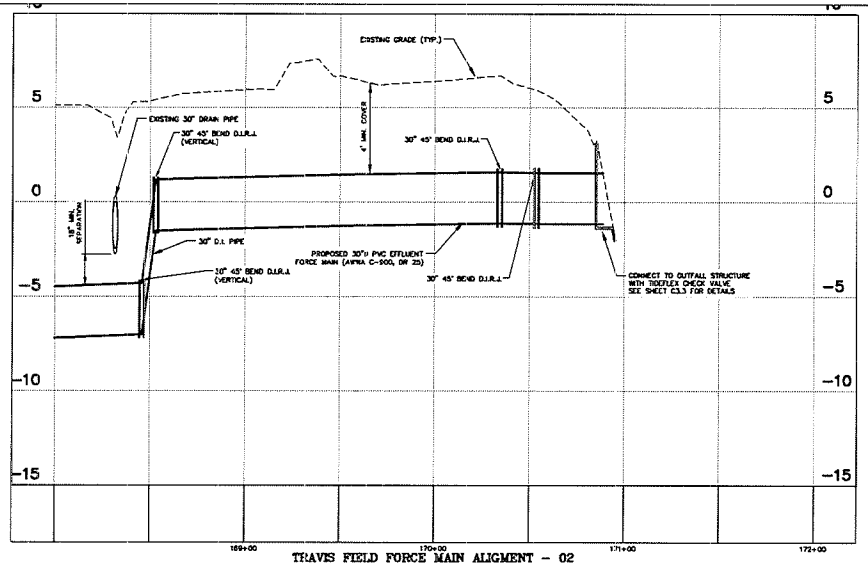
FORCE MAIN PLAN & PROFILE

JOB NO.: P-2778A.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.20



NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
3. CONTRACTOR TO CONTACT BOTH RAILROADS (NORFOLK SOUTHERN AND CSX IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES AND COORDINATE FOR FIELD INSPECTOR, LIABILITY INSURANCE, ETC. NO WORK SHALL BE DONE WITHOUT RAILROAD INSPECTOR ON SITE.



TRAVIS FIELD FORCE MAIN ALIGMENT - 02
STATIONS: 168+00 - 172+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	BY	DATE
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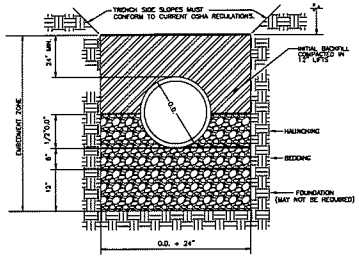
FORCE MAIN PLAN & PROFILE

JOB NO: J-27768.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C2.21

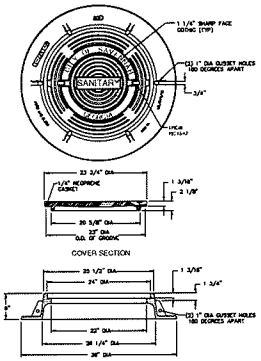


NOTES:

1. FOUNDATION, BEDDING AND HAUNCHING SHALL BE #57 STONE.
2. INITIAL BACKFILL FOR GRAVITY SEWER SHALL BE CLASS II OR BETTER SELECT COMMON FILL.
3. INITIAL BACKFILL FOR SANITARY FORCEMAIN SHALL BE CLASS III OR BETTER SELECT COMMON FILL.
4. FINAL BACKFILL SHALL BE CLASS III OR BETTER COMMON FILL.
5. SEE CITY OF SAVANNAH STANDARD SPECIFICATIONS SECTION 02554 PART 2.11 FOR MORE DETAILS.

STANDARD PIPE BEDDING

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S16

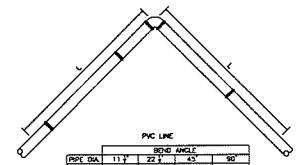


NOTE:

1. MANHOLE RING AND COVER SHALL BE IN COMPLIANCE TO CITY OF SAVANNAH SPECIFICATION 02534

SANITARY MANHOLE RING AND COVER

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S10



PVC LINE

PVC DESIGN: SOIL TYPE: SM TRENCH TYPE: 3 COVER: 3' ±12" DIA. 4' ±12" DIA. TEST PRESSURE: 150 PSI	BEND ANGLE			
PIPE DIA.	11 1/4°	22 1/2°	45°	90°
4	2	4	8	18
6	3	5	11	25
8	4	7	14	33
10	4	8	16	39
12	5	9	19	45
16	5	9	19	45
20	6	11	23	54
24	8	16	26	62
*30	10	20	41	99

POLYETHYLENE WRAPPED DUCTILE IRON LINE

PE WRAPPED DIP: SOIL TYPE: SM TRENCH TYPE: 3 COVER: 3' TEST PRESSURE: 150 PSI	BEND ANGLE			
PIPE DIA.	11 1/4°	22 1/2°	45°	90°
4	3	5	9	20
6	3	6	12	26
8	4	8	16	36
10	5	9	19	43
12	6	11	22	51
16	7	14	28	65
20	8	16	33	79
24	9	19	38	92
*30	10	20	42	100

* INDICATES INFORMATION ADDED TO STANDARD CITY OF SAVANNAH DETAIL

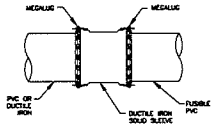
MINIMUM RESTRAINED LENGTH (L)

NOTES:

1. LENGTH OF RESTRAINT SHOWN IS IN FEET. PIPE DIAMETERS ARE IN INCHES.
2. WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
3. INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE ANCHORED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.

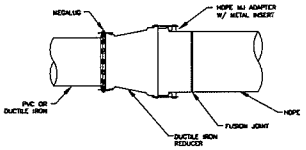
HORIZONTAL BEND RESTRAINT

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S4



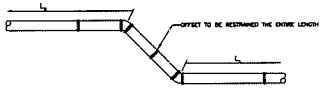
FPVC CONNECTION DETAIL

SCALE: NONE



HDPE CONNECTION DETAIL

SCALE: NONE



PVC LINE

PVC DESIGN: SOIL TYPE: SM TRENCH TYPE: 3 COVER: 3' ±12" DIA. 4' ±12" DIA. TEST PRESSURE: 150 PSI	BEND ANGLE					
PIPE DIA.	11 1/4°		22 1/2°		45°	
	L1	L2	L1	L2	L1	L2
4	4	1	8	2	17	3
6	6	1	11	2	23	4
8	8	2	15	3	30	6
10	9	2	18	4	36	7
12	11	2	21	4	43	8
16	10	3	21	5	42	10
20	13	3	25	6	51	12
24	15	4	29	7	60	15
*30	23	7	46	13	96	26

POLYETHELYNE WRAPPED DUCTILE IRON LINE

PE WRAPPED DIP: SOIL TYPE: SM TRENCH TYPE: 3 COVER: 3' TEST PRESSURE: 150 PSI	BEND ANGLE					
PIPE DIA.	11 1/4°		22 1/2°		45°	
	L1	L2	L1	L2	L1	L2
4	6	1	12	2	24	4
6	9	2	17	3	34	5
8	11	2	22	3	45	7
10	13	2	26	4	53	8
12	15	3	30	5	63	9
16	19	3	39	6	80	12
20	23	4	47	7	97	15
24	27	4	55	8	113	17
*30	19	5	38	10	78	21

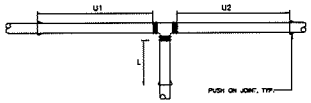
* INDICATES INFORMATION ADDED TO STANDARD CITY OF SAVANNAH DETAIL

NOTES:

1. LENGTH OF RESTRAINT SHOWN IS IN FEET. PIPE DIA. IS IN INCHES
2. WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
3. INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE ANCHORED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER

VERTICAL BEND RESTRAINT

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S5



POLYETHYLENE WRAPPED DUCTILE IRON PIPE

PE WRAPPED DIP: SOIL TYPE: SM TRENCH TYPE: 3 COVER: 3' ±12" DIA. 4' ±12" DIA. TEST PRESSURE=150 PSI											
PIPE SIZE	U1	U2		PIPE SIZE	U1	U2		PIPE SIZE	U1	U2	
4X4	1	-		16X16	20	-		30X8	-	-	
6X4	-	-		16X12	68	-		30X6	-	-	
6X6	27	-		16X16	135	18		30X10	-	-	
8X4	-	-		30X8	-	-		30X12	-	-	
8X6	5	-		30X6	-	-		30X16	43	-	
8X8	22	-		30X10	3	-		30X20	112	-	
12X4	-	-		30X12	43	-		30X24	180	80	
12X6	-	-		20X16	111	69		*30X30*	*244*	*150*	
12X8	20	-		30X20	175	114					
12X10	72	18		24X8	-	-					
12X8	-	24X10		24X6	-	-					
12X6	-	-		24X10	-	-					
12X8	20	-		24X12	18	-					
12X10	58	-		24X16	87	3					
12X12	94	38		24X20	151	63					
16X8	-	-		24X24	213	150					
16X6	-	-		*RESTRAIN AT TEE ONLY.							

MINIMUM RESTRAINED LENGTH (L)

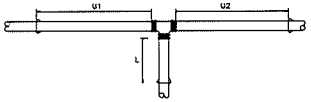
* INDICATES INFORMATION ADDED TO STANDARD CITY OF SAVANNAH DETAIL

NOTES:

1. LENGTH OF RESTRAINT SHOWN IS IN FEET. FITTING DIAMETERS ARE IN INCHES.
2. WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
3. U1 AND U2 = UNINTERRUPTED STRAIGHT RUNS OF RESTRAINED JOINT PIPE IN EACH DIRECTION.
4. U= = THE SMALLER OF U1 OR U2 (E.G., U1, IN THE ABOVE DIAGRAM).
5. L = MINIMUM RESTRAINED LENGTH ALONG THE BRANCH.
6. WHERE U= IS LESS THAN 3', RESTRAIN TEE AS A 90°, HORIZONTAL BEND.
7. INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE ANCHORED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.

TEE RESTRAINT (DUCTILE IRON PIPE)

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S7



PVC

PVC DESIGN: SOIL TYPE: SM TRENCH TYPE: 3 COVER: 3' ±12" DIA. 4' ±12" DIA. TEST PRESSURE: 150 PSI											
PIPE SIZE	U1	U2		PIPE SIZE	U1	U2		PIPE SIZE	U1	U2	
4X4	3	-		16X16	4	-		30X8	-	-	
6X4	-	-		16X12	21	-		30X6	-	-	
6X6	3	-		16X16	41	34		30X10	-	-	
8X4	-	-		30X8	-	-		30X12	-	-	
8X6	18	-		30X6	-	-		30X14	28	-	
8X8	-	-		30X10	-	-		30X20	90	-	
10X4	-	-		20X12	18	-		30X24	142	70	
10X6	-	-		20X16	52	2		*30X30*	195	124	
10X8	6	-		30X20	81	44					
10X10	38	11		24X8	-	-					
12X4	-	-		24X6	-	-					
12X6	-	-		24X10	-	-					
12X8	-	-		24X12	-	-					
12X10	29	-		24X16	35	-					
12X12	29	3		24X20	98	25					
16X8	-	-		24X24	151	63					
16X6	-	-		*RESTRAIN AT TEE ONLY.							

MINIMUM RESTRAINED LENGTH (L)

* INDICATES INFORMATION ADDED TO STANDARD CITY OF SAVANNAH DETAIL

NOTES:

1. LENGTH OF RESTRAINT SHOWN IS IN FEET. FITTING DIAMETERS ARE IN INCHES.
2. WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
3. U1 AND U2 = UNINTERRUPTED STRAIGHT RUNS OF PIPE IN EACH DIRECTION.
4. U= = THE SMALLER OF U1 OR U2.
5. L = MINIMUM RESTRAINED LENGTH ALONG THE BRANCH.
6. WHERE U= IS LESS THAN 3', RESTRAIN TEE AS A 90°, HORIZONTAL BEND.
7. INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE ANCHORED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.

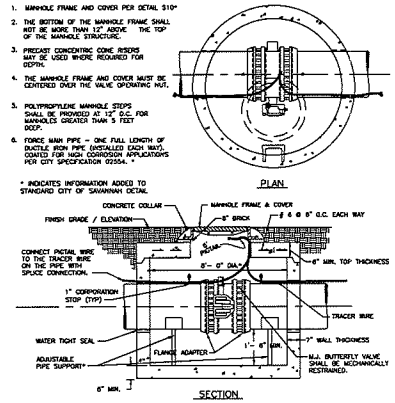
TEE RESTRAINT (PVC PIPE)

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S6

NOTES:

1. MANHOLE FRAME AND COVER PER DETAIL S10*
2. THE BOTTOM OF THE MANHOLE FRAME SHALL NOT BE MORE THAN 12" ABOVE THE TOP OF THE MANHOLE STRUCTURE.
3. PRECAST CONCENTRIC CONE RISERS MAY BE USED WHERE REQUIRED FOR DEPTH.
4. THE MANHOLE FRAME AND COVER MUST BE CENTERED OVER THE VALVE OPERATING NUT.
5. POLYPROPYLENE MANHOLE STEPS SHALL BE PROVIDED AT 12" O.C. FOR MANHOLES GREATER THAN 5 FEET DEEP.
6. FORCE MAIN PIPE - ONE FULL LENGTH OF DUCTILE IRON PIPE (INSTALLED EACH WAY), COATED FOR HIGH CORROSION APPLICATIONS PER CITY SPECIFICATION 02554. *

* INDICATES INFORMATION ADDED TO STANDARD CITY OF SAVANNAH DETAIL



VALVE MANHOLE FOR 30" BUTTERFLY VALVE*

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER W26

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	REVISIONS	BY	DATE
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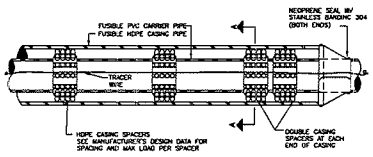
SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

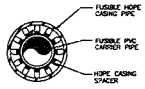
EFFLUENT FORCE MAIN DETAILS

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C3.1



PROFILE



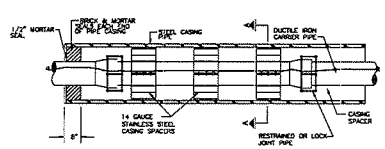
SECTION A-A

NOTES:

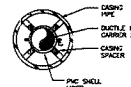
1. SEE MANUFACTURES DESIGN DATA FOR SPACING AND MAX LOAD PER SPACER.
2. ALL HIGHWAY CROSSINGS SHALL BE INSTALLED IN ACCORDANCE WITH GA. D.O.T. REGULATIONS & PERMIT REQUIREMENTS.
3. COPPER COATED STEEL TRACER WIRE MUST BE INSTALLED ON PIPE.
4. SEAL BOTH ENDS OF CASING PER SPEC.
5. FOR FORCEMAIN ONLY. DO NOT CASE GRAVITY LINES IN PLASTIC PIPE.

FUSIBLE PVC FORCEMAIN CASING INSTALLATION

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S9B



PROFILE



SECTION A-A

NOTES:

1. CASING SPACERS SHALL BE PLACED ON 6' CENTERS MAXIMUM.
2. ALL RAILROAD CROSSINGS SHALL BE INSTALLED IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION REGULATIONS, UNDER PART 5, PIPELINES (LATEST EDITION) AND PERMIT REQUIREMENTS.
3. ALL HIGHWAY CROSSINGS SHALL BE INSTALLED IN ACCORDANCE WITH GA. D.O.T. REGULATIONS & PERMIT REQUIREMENTS.
4. COPPER COATED STEEL TRACER WIRE MUST BE INSTALLED ON PIPE.

STEEL CASING INSTALLATION

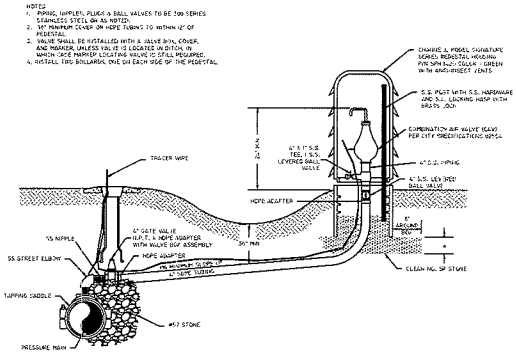
STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S9A

NOTES:

1. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CITY OF SAVANNAH'S LATEST CONSTRUCTION SPECIFICATIONS AND DETAILS. THE SYSTEM SHALL BE DESIGNED AND TESTED PER THE SPECIFICATIONS AND REQUIREMENTS MAINTAINED BY THE CITY ENGINEER.
2. AN APPROVED WATER SUPPLY FOR FIRE PROTECTION, EITHER TEMPORARY OR PERMANENT, SHALL BE MADE AVAILABLE AS SOON AS COMBUSTIBLE MATERIAL ARRIVES ON THE SITE.
3. ALL WATER USED FOR CONSTRUCTION SHALL BE METERED THROUGH AN APPROVED BACKFLOW-PREVENTION DEVICE AND FIRE HYDRANT METER OBTAINED FROM THE CONVEYANCE AND DISTRIBUTION DEPARTMENT.
4. ALL ABANDONED SANITARY SEWER LINES SHALL BE PLUGGED.
5. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE SEWER LINES ARE PLACED WITHIN THE EASEMENTS WITH A MINIMUM 7'-6" AVAILABLE FROM PIPE CENTERLINE TO EASEMENT LINE.
6. CONTACT THE UTILITIES PROTECTION CENTER (811 IN GEORGIA OR 1-800-282-7411) FOR LOCATION OF CITY SEWER LINES A MINIMUM OF SEVENTY-TWO (72) HOURS PRIOR TO DIGGING.
7. CONTRACTOR SHALL NOTIFY RESIDENTS A MINIMUM OF 24 HOURS IN ADVANCE OF ANY WORK THAT MAY IMPACT THEM, INCLUDING BUT NOT LIMITED TO: PARKING STALL IMPACT, LOSS OF SERVICE, DRIVEWAY CUTS, REMOVAL/RELOCATION OF FENCES AND MAIL BOXES, SIDEWALK IMPACTS, ETC.

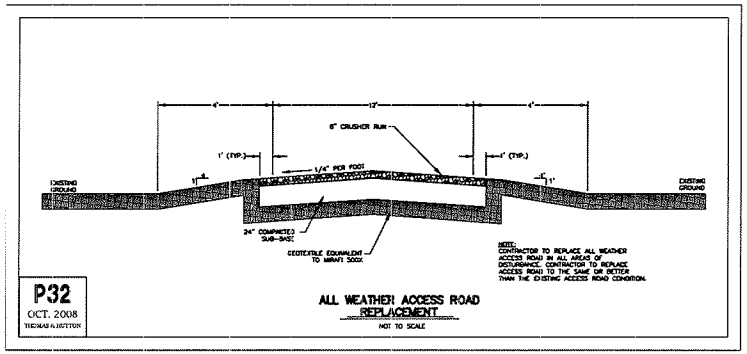
SANITARY SEWER GENERAL NOTES

STANDARD CONSTRUCTION DETAILS | CITY OF Savannah WATER RESOURCES AND PUBLIC WORKS BUREAU Planning & Engineering | SCALE: N.T.S. DATED: JAN 2017 PLATE NUMBER S17



SEWER AIR RELEASE PEDESTAL ASSEMBLY

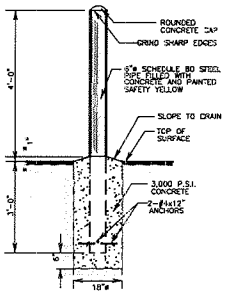
SCALE: NOT TO SCALE



P32
OCT. 2008
THOMAS & HUTTON

ALL WEATHER ACCESS ROAD REPLACEMENT

NOT TO SCALE



STEEL BOLLARD DETAIL

SCALE: NONE

BID SET - NOT FOR CONSTRUCTION

NO.	ISSUED FOR BIDS	REVISIONS	BY	DATE
0			CDR	11-2020

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

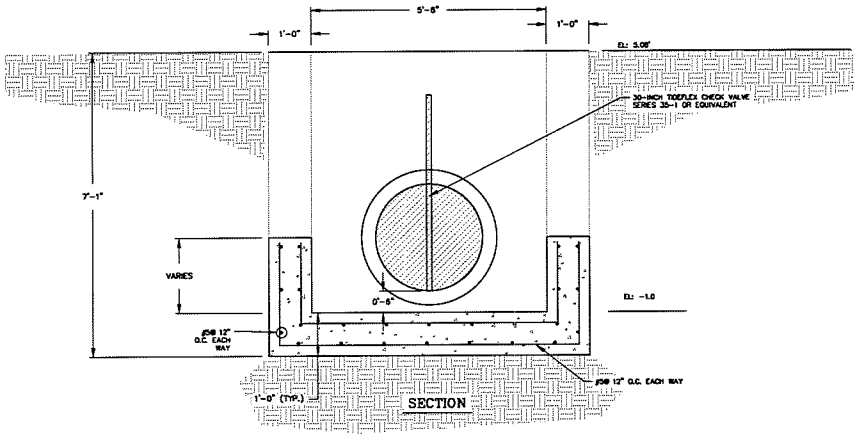
SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

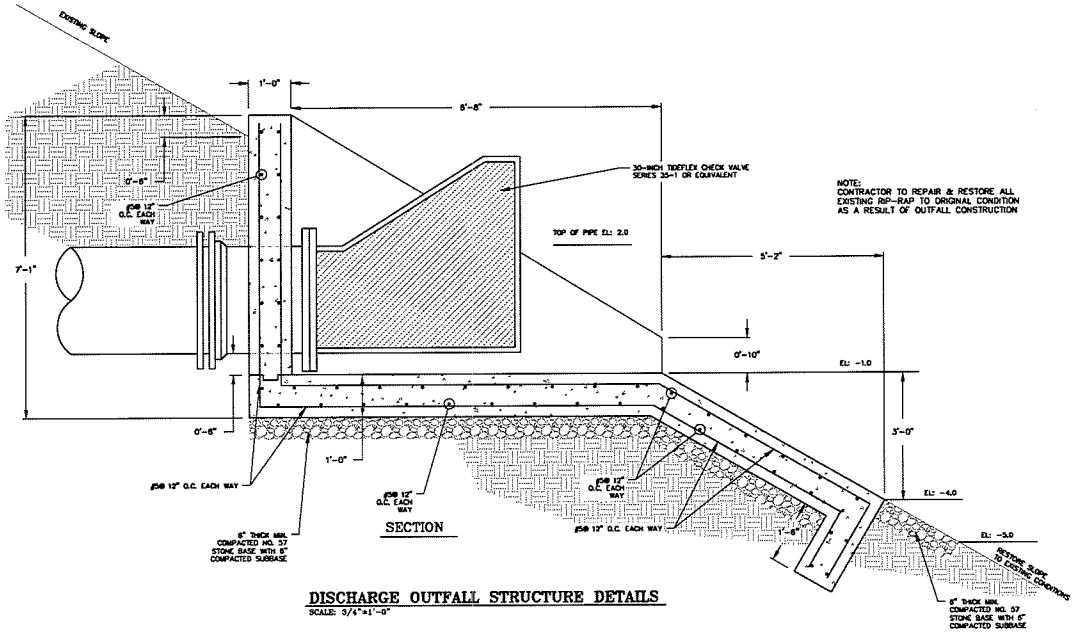
EFFLUENT FORCE MAIN DETAILS

JOB NO: J-217.00.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C3.2



SECTION



SECTION

NOTE:
CONTRACTOR TO REPAIR & RESTORE ALL EXISTING RIP-RAP TO ORIGINAL CONDITION AS A RESULT OF OUTFALL CONSTRUCTION

DISCHARGE OUTFALL STRUCTURE DETAILS

SCALE: 3/4"=1'-0"

BID SET - NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	10-29-20

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

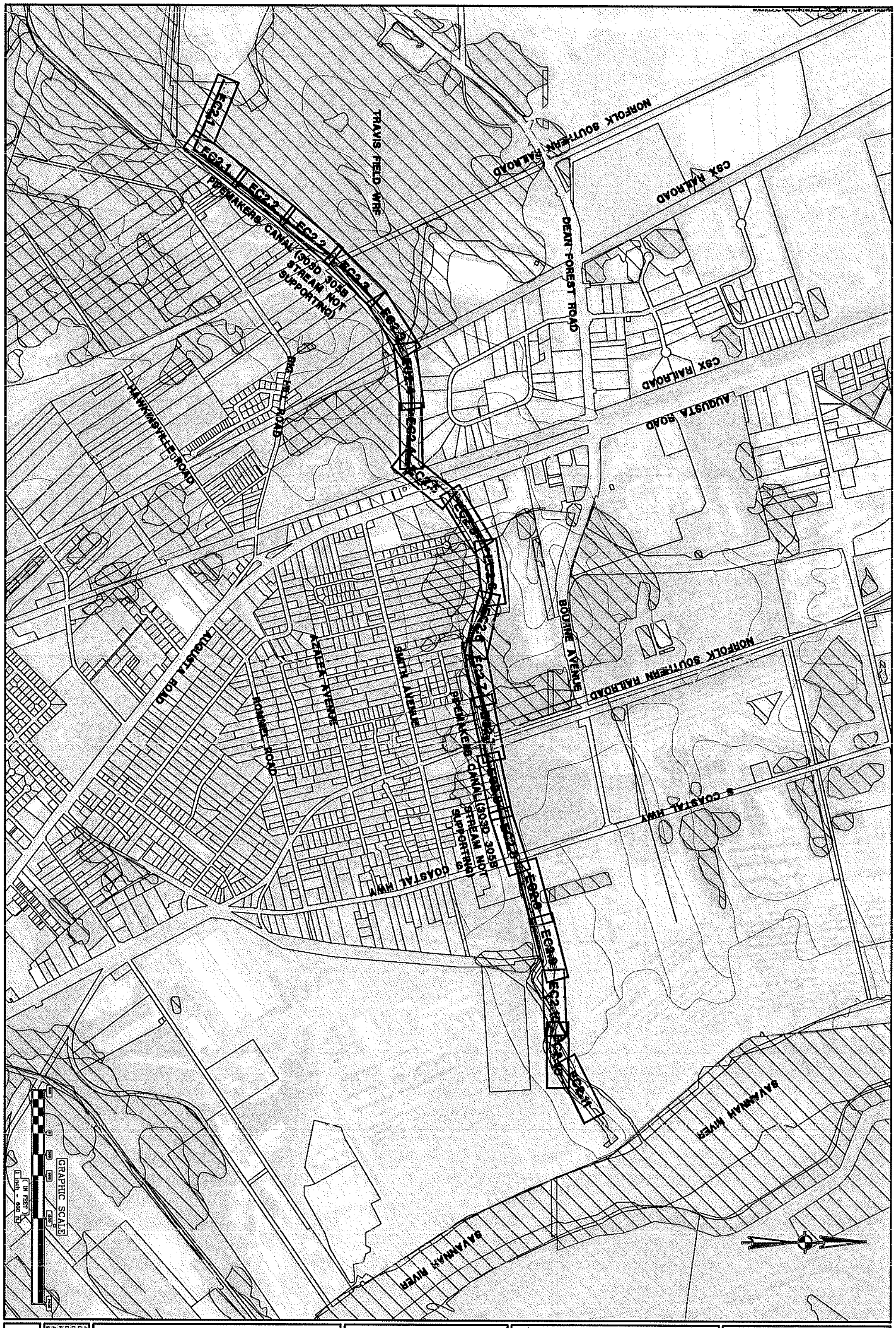
SAVANNAH
AIRPORT COMMISSION

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

DISCHARGE OUTFALL STRUCTURE

JOB NO: p-21788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

C3.3



JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: 1" = 600'

EC0.1

SAVANNAH
savannahga.gov

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ESPC OVERALL SITE LOCATION

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	8-2020

FRED SORORIAN
GSWCC LEVEL II
PLAN REVIEWER
CERTIFICATION #
0000012474

GEORGIA REGISTERED PROFESSIONAL ENGINEER
FRED SORORIAN

BID SET - NOT FOR CONSTRUCTION

EROSION, SEDIMENTATION & POLLUTION CONTROL NOTES

1. THIS PLAN WAS PREPARED AS REQUIRED BY NPDES GENERAL PERMIT No. 100002. THESE PLAN SHEETS AND ALL REQUIREMENTS OF THE GENERAL PERMIT AS WELL AS LOCAL, STATE AND FEDERAL REGULATIONS OR LAWS APPLY REGARDLESS OF SPECIFIC INCLUSIONS IN THIS PLAN.
2. THE CONTRACTOR SHALL VERIFY THE SIZE AND LOCATION OF ALL EXISTING UTILITIES. EXISTING UTILITIES ARE ALL UTILITIES ON THE PROJECT IN AN ORIGINAL, RELOCATED OR NEWLY INSTALLED POSITION. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE COST OF REPAIRS TO DAMAGED UNDERGROUND OR OVERHEAD FACILITIES, EVEN IF THE UTILITY IS NOT SHOWN ON THE SITE DEVELOPMENT PLANS. THE CONTRACTOR SHALL CONTACT THE UTILITIES PROTECTION CENTER AT 1-800-282-7411 TO COORDINATE THE MARKING OF EXISTING UTILITY LINES A MAXIMUM OF 72 HOURS PRIOR TO COMMENCEMENT OF ANY WORK.
3. CONTRACTOR SHALL FLUSH ALL INLETS AND PIPE AT THE COMPLETION OF CONSTRUCTION TO REMOVE SILT AND DEBRIS. THE CLEANING AND FLUSHING OF INLETS AND PIPE (EXISTING AND PROPOSED) SHALL BE CONSIDERED PART OF THE COST FOR PIPE ON THE PROJECT. SCHEDULE CONSTRUCTION ACTIVITIES TO MINIMIZE THE EXPOSED AREA AND DURATION OF EXPOSURE. IN SCHEDULING, TAKE INTO ACCOUNT THE SEASON AND THE WEATHER FORECAST.
4. EROSION CONTROL MEASURES ARE THE MINIMUM REQUIRED. THE CONTRACTOR SHALL PROVIDE ADDITIONAL CONTROL MEASURES AS DICTATED BY ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION IN ORDER TO PREVENT EROSION AND CONTROL SEDIMENT. THE CONTRACTOR SHALL BE FAMILIAR WITH THE "NARRATIVE DESCRIPTION: LAND DISTURBING ACTIVITIES" REPORT THAT ACCOMPANIES THIS PROJECT, AND HAVE A CLEAR UNDERSTANDING OF THE CONCEPTS, APPLICATIONS, STANDARDS AND SPECIFICATIONS OF THE BEST MANAGEMENT PRACTICES LISTED IN SAID DOCUMENT. EROSION AND SEDIMENT CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE ENTIRE PROJECT IS TERMINATED OR SUSPENDED FOR AN INDEFINITE LENGTH OF TIME. ALL DISTURBED AREA, ALL DISTURBED AREAS SHALL BE PLANTED WITH PERMANENT VEGETATION.
5. THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR IN ANY WAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, IS BASED UPON FIELD INVESTIGATIONS AND IS BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME IS SHOWN AS INFORMATION ONLY, IS NOT GUARANTEED AND DOES NOT BIND THOMAS & HUTTON, OR THE OWNER IN ANY WAY.
6. CONTRACTOR SHALL MAINTAIN SITE ON A DAILY BASIS TO PROVIDE FOR POSITIVE DRAINAGE. CONTRACTOR, AT HIS COST, SHALL GRADE SITE AND PROVIDE NECESSARY TEMPORARY DRAINAGE SWALES TO INSURE STORM WATER DOES NOT POND ON SITE.
7. SITE DRAINAGE SHALL BE ESTABLISHED TO PREVENT ANY PONDED WATER CONDITIONS WITHIN THE CONSTRUCTION AREA AND TO FACILITATE THE RAPID RUN-OFF OF STORM WATER.
8. NO ACTIVITIES SHALL BE CONDUCTED WITHIN THE 25 OR 50-FOOT STREAM BUFFER ALONG THE BANKS OF ALL STATE WATERS.
9. AMENDMENT/ REVISIONS TO THE ES&PC PLAN WHICH HAVE A SIGNIFICANT EFFECT ON BMPS WITH A HYDRAULIC COMPONENT MUST BE CERTIFIED BY THE DESIGN PROFESSIONAL. #17
10. WASTE MATERIALS SHALL NOT BE DISCHARGED TO WATERS OF THE STATE, EXCEPT AS AUTHORIZED BY A SECTION 404 PERMIT. #16
11. ANY CONSTRUCTION ACTIVITY WHICH DISCHARGES STORM WATER INTO AN IMPAIRED STREAM SEGMENT, OR WITHIN 1 LINEAR MILE UPSTREAM OF AND WITHIN THE SAME WATERSHED AS, ANY PORTION OF AN BIOTA IMPAIRED STREAM SEGMENT MUST COMPLY WITH PART III. C. OF THE PERMIT.
12. IF A TMDL IMPLEMENTATION PLAN FOR SEDIMENT HAS BEEN FINALIZED FOR THE IMPAIRED STREAM SEGMENT (IDENTIFIED IN ITEM 11 ABOVE) AT LEAST SIX MONTHS PRIOR TO SUBMITTAL OF NOI, THE ES&PC PLAN MUST ADDRESS ANY SITE-SPECIFIC CONDITIONS OR REQUIREMENTS INCLUDED IN THE TMDL IMPLEMENTATION PLAN.
13. EXCEPT AS REQUIRED TO INSTALL THE INITIAL SEDIMENT STORAGE REQUIREMENTS AND PERIMETER CONTROL BMPS AS DESCRIBED IN PART IV.D.3., THE INITIAL SEDIMENT STORAGE REQUIREMENTS AND PERIMETER CONTROL BMPS MUST BE INSTALLED AND IMPLEMENTED PRIOR TO CONDUCTING ANY OTHER CONSTRUCTIONS ACTIVITIES (E.G., CLEARING, GRUBBING AND GRADING) WITHIN THE CONSTRUCTION SITE OR WHEN APPLICABLE, WITHIN PHASED SUB-PARTS OR SEGMENTS OF THE CONSTRUCTION SITE. FAILURE TO COMPLY SHALL CONSTITUTE A VIOLATION OF THIS PERMIT FOR EACH DAY ON WHICH CONSTRUCTION ACTIVITIES OCCUR. THE DESIGN PROFESSIONAL WHO PREPARED THE PLAN MUST INSPECT THE INITIAL SEDIMENT STORAGE REQUIREMENTS AND PERIMETER CONTROL BMPS IN ACCORDANCE WITH PART IV.A.5. WITHIN SEVEN (7) DAYS AFTER INSTALLATION.

NOTE:
THERE ARE JURISDICTIONAL WETLANDS AND STATE WATERS WITHIN THE PROJECT AREA.

#10

NOTE:
NON-EXEMPT ACTIVITIES SHALL NOT BE CONDUCTED WITHIN THE 25 OR 50-FOOT UNDISTURBED STREAM BUFFERS AS MEASURED FROM THE POINT OF WRESTED VEGETATION OR WITHIN 25-FEET OF THE COASTAL MARSHLAND BUFFER AS MEASURED FROM THE JURISDICTIONAL DETERMINATION LINE WITHOUT FIRST ACQUIRING THE NECESSARY VARIANCES AND PERMITS.

#15

THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO LAND DISTURBING ACTIVITIES. #19

EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE. #20

ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 14 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING. #21

67 CY SEDIMENT STORAGE PER DISTURBED ACRE REQUIREMENT

TOTAL PROJECT ACREAGE = 8.9 #43

TOTAL DISTURBED ACREAGE = 8.9

TOTAL REQUIRED SEDIMENT STORAGE:
8.9 Ac. X 67 c.y./Ac. =596.3 c.y.

THIS PROJECT WILL UTILIZE SILT FENCE FOR THE SEDIMENT STORAGE REQUIREMENT. A SEDIMENT BASIN IS NOT PRACTICAL FOR THIS PROJECT. THE PROPOSED LAND DISTURBING ACTIVITIES FOR THIS PROJECT IS TO INSTALL A SANITARY SEWER WE DO NOT WISH TO DISTURB MORE LAND THAN NECESSARY TO PERFORM THE DESIRED TASK. DOUBLE ROW SENSITIVE TYPE SILT FENCE WILL BE INSTALLED WHERE CONSTRUCTION ACTIVITIES ARE ADJACENT TO WETLANDS AND STATE WATERS. IN THE BELOW CALCULATIONS WE ARE ONLY CONSIDERING 1 ROW OF SILT FENCE FOR THE SEDIMENT STORAGE REQUIREMENT.

SILT FENCE :
24,890 L.F. SILT FENCE
24,890 x 1.5' (HEIGHT ACCUMULATION) x4' (HORIZONTAL ACCUMULATION) x 1/2
= 74,670 C.F., 74,670/27= 2,765 C.Y.

2,765 CY EXCEEDS THE REQUIRED 596.3 CY OF SEDIMENT STORAGE

NOTE: THE MAXIMUM ALLOWABLE AREA TO CONTRIBUTE TO 100LF OF SILT FENCE IS 0.25 ACRES. FOR THIS PROJECT, 0.04 ACRES CONTRIBUTE TO 100 LF OF SILT FENCE.

SECONDARY PERMITTEES

NOTE: THIS MASTER LIST TO BE COMPLETED AND SIGNED AND KEPT IN THE "ON-SITE" CONSTRUCTION TRAILER.

SECONDARY PERMITTEES SIGN WHEN RECEIVING PLANS. ALL SECONDARY PERMITTEES MUST SUBMIT SECONDARY NOI AT LEAST 14 DAYS PRIOR TO BEGINNING CONSTRUCTION ACTIVITY.

NAME
COMPANY PHONE:
ADDRESS FAX:
ADDRESS
GSWCC LEVEL IA CERTIFICATION NO. ____________ ____________ SIGNATURE

NAME
COMPANY PHONE:
ADDRESS FAX:
ADDRESS
GSWCC LEVEL IA CERTIFICATION NO. ____________ ____________ SIGNATURE

NAME
COMPANY PHONE:
ADDRESS FAX:
ADDRESS
GSWCC LEVEL IA CERTIFICATION NO. ____________ ____________ SIGNATURE

NAME
COMPANY PHONE:
ADDRESS FAX:
ADDRESS
GSWCC LEVEL IA CERTIFICATION NO. ____________ ____________ SIGNATURE

DESIGN PROFESSIONAL 7-DAY VISIT CERTIFICATION

DATE OF INSPECTION ____________

I CERTIFY THE INITIAL SEDIMENT STORAGE AND PERIMETER CONTROL BMPS HAVE BEEN INSTALLED AND ARE BEING MAINTAINED AS DESIGNED AS OF 7 DAYS AFTER INSTALLATION.

FRED SORORIAN, P.E. 0000012474
GSWCC LEVEL II DESIGN PROFESSIONAL CERTIFICATION #

INSPECTION REVEALED THE FOLLOWING DISCREPANCIES FROM THE ES&PC PLAN

THESE DEFICIENCIES MUST BE ADDRESSED IMMEDIATELY AND A RE-INSPECTION SCHEDULED. WORK SHALL NOT PROCEED ON THE SITE UNTIL DESIGN PROFESSIONAL CERTIFICATION IS OBTAINED.

#14 **NOTE:**
THE DESIGN PROFESSIONAL WHO PREPARED THE ES&PC PLAN IS TO INSPECT THE INSTALLATION OF THE INITIAL SEDIMENT STORAGE REQUIREMENTS, PERIMETER CONTROL BMPS, AND SEDIMENT BASINS WITHIN 7 DAYS AFTER INSTALLATION.

TRAVIS FIELD WATER RECLAMATION FACILITY
30-INCH EFFLUENT FORCE MAIN
SAVANNAH, GEORGIA
PROJECT #J-27788.0000
DATE: 4/2/2020
TOTAL PROJECT ACREAGE: 8.9±
TOTAL DISTURBED ACREAGE: 8.9± #5

PROJECT DESCRIPTION - TRAVIS FIELD WATER RECLAMATION FACILITY 30-INCH EFFLUENT FORCE MAIN

#8 THE PROPOSED WORK CONSISTS OF APPROXIMATELY 17,300 LF OF 30-INCH EFFLUENT FORCE MAIN TO BE INSTALLED ALONG PIPEMAKERS CANAL FROM THE NEW TRAVIS FIELD WATER RECLAMATION FACILITY TO THE DISCHARGE LOCATION INTO THE SAVANNAH RIVER. THIS INSTALLATION CONSISTS OF MULTIPLE JACK & BORE AND HORIZONTAL DIRECTIONAL DRILLS ALONG PIPEMAKERS CANAL. THE INSTALLATION WILL TAKE PLACE WITHIN 25-FT OF THE CANAL AND WITHIN 25-FT OF THE WETLANDS. THE OUTFALL DISCHARGE LOCATION IS PERMITTED BY EPD UNDER THE NPDES PERMIT NUMBER GA0020-27.

1 ONLY 50% OF THE TOTAL PROJECT DISTURBED ACREAGE CAN BE DISTURBED AT ONE TIME, THEREFORE ONLY 4.45 ACRES OF AREA CAN BE DISTURBED AT ONE TIME. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE DISTURBED ACREAGE.

#45 THE ESTIMATE FOR RUNOFF COEFFICIENT PRIOR TO CONSTRUCTION ACTIVITIES IS 0.25. THE POST CONSTRUCTION RUNOFF COEFFICIENT IS 0.25, THERE WILL BE NO CHANGE. THEREFORE POST DEVELOPMENT RUNOFF FROM THE SITE WILL NOT AFFECT NEIGHBORING AREAS.

#44 ELEVATIONS ON THE SITE RANGE FROM ±7' TO ±10' NAVD88 DATUM.

ACCORDING TO THE FLOOD INSURANCE RATE MAP PANEL 13051C0276G, AS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY 8/3/2021. THE PROJECT AREA IS WITHIN FLOOD HAZARD ZONES AE AND X.

SURFACE RUNOFF FROM THE SITE DRAINS INITIALLY INTO SURROUNDING WETLANDS, PIPEMAKERS CANAL, AND ULTIMATELY TO THE SAVANNAH RIVER.

FOR THE CONSTRUCTION OF THIS PROJECT INSTALLATION AND MAINTENANCE OF SILT FENCE AS WELL AS TEMPORARY GRASSING WILL PROVIDE PROTECTION FROM STORM WATERS RUNOFF. AFTER COMPLETION PERMANENT GRASSING WILL CONTROL POLLUTANTS.
SOILS WITHIN THE PROJECT AREA CONSISTS OF THE FOLLOWING SERIES BASED ON USGS SOILS SURVEY DATA FOR CHATHAM COUNTY:

#47
Pn Pooler Fine Sandy Loam
Cc Cape Fear
Ma Made Land
W Water

#4 **DEVELOPER/OWNER**
CITY OF SAVANNAH
EMAIL: ctessmer@savannahga.gov
PHONE: 912-651-6573
702 STILES AVENUE
SAVANNAH, GA 31415

#3 **24 HOUR CONTACT PERSON RESPONSIBLE FOR EROSION, SEDIMENTATION AND POLLUTION CONTROLS**
MR. CHUCK TESSMER, P.E.
EMAIL: ctessmer@savannahga.gov
PHONE: 912-651-6573
702 STILES AVENUE
SAVANNAH, GA 31415

#29 **CONSTRUCTION**
CONSTRUCTION ACTIVITIES WILL INVOLVE NORMAL CONSTRUCTION ACTIVITIES ASSOCIATED WITH WATER MAIN UTILITY INSTALLATION. IT IS ANTICIPATED THAT CONSTRUCTION ACTIVITIES WILL BEGIN ON OR ABOUT NOVEMBER 2020, AND BE COMPLETED ON OR ABOUT NOVEMBER 2021. THE INSTALLATION OF EROSION CONTROL MEASURES AND PRACTICES SHALL BE INSTALLED PRIOR TO AND CONCURRENT WITH LAND DISTURBING ACTIVITIES.

PROCESSES AND PRINCIPLES OF EROSION, SEDIMENTATION AND POLLUTION

WHEN LAND IS DISTURBED AT A CONSTRUCTION SITE, THE EROSION RATE ACCELERATES DRAMATICALLY. SINCE GROUND COVER ON AN UNDISTURBED SITE PROTECTS THE SURFACE, REMOVAL OF THAT COVER INCREASES THE SITE'S SUSCEPTIBILITY TO EROSION. DISTURBED LAND MAY HAVE AN EROSION RATE 1,000 TIMES GREATER THAN THE PRE-CONSTRUCTION RATE. EVEN THOUGH CONSTRUCTION REQUIRES THAT LAND BE DISTURBED AND BE LEFT BARE FOR PERIODS OF TIME, PROPER PLANNING AND USE OF CONTROL MEASURES CAN REDUCE THE IMPACT OF MAN-INDUCED ACCELERATED EROSION.

EFFECTIVE EROSION, SEDIMENTATION AND POLLUTION CONTROL REQUIRES FIRST THAT THE SOIL SURFACE BE PROTECTED FROM THE EROSIVE FORCES OF WIND, RAIN, AND RUNOFF, AND SECOND THAT ERODED SOIL CAN BE CAPTURED ON-SITE.

#26 PERMANENT GRASSING SHALL REMAIN IN PLACE AFTER PROJECT IS COMPLETED TO CONTROL POLLUTANTS IN THE PROJECT'S STORM WATER.

#27 CONTRACTOR SHALL PROVIDE MEASURES TO COVER ALL BUILDING MATERIALS AND BUILDING PRODUCTS ON-SITE, INCLUDING BUT NOT LIMITED TO, PLASTIC SHEETING OR TEMPORARY ROOFING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MEASURES THAT HE DEEM NECESSARY TO MINIMIZE THE EXPOSURE TO PRECIPITATION AND STORMWATER FOR THE PROPOSED UTILITIES.

LAND DISTURBING ACTIVITIES PLAN

#32 **GENERAL DESIGN PRINCIPLES**

FOR AN EROSION, SEDIMENTATION AND POLLUTION CONTROL PROGRAM TO BE EFFECTIVE, IT IS IMPERATIVE THAT PROVISIONS FOR SEDIMENT CONTROL MEASURES BE MADE IN THE PLANNING STAGE. THESE PLANNED MEASURES WHEN CONSCIENTIOUSLY AND EXPEDITIOUSLY APPLIED DURING CONSTRUCTION, WILL RESULT IN ORDERLY DEVELOPMENT WITHOUT ADVERSE ENVIRONMENTAL DEGRADATION. THE FOLLOWING KEY PRINCIPALS SHALL BE UTILIZED, TO THE MAXIMUM EXTENT POSSIBLE, IN ALL PLANNING.

1. FIT THE ACTIVITY TO THE TOPOGRAPHY AND SOILS.

   DETAILED PLANNING SHOULD BE EMPLOYED TO ASSURE THE ROADWAYS, BUILDINGS AND OTHER PERMANENT FEATURES OF THE ACTIVITY CONFORM TO THE NATURAL CHARACTERISTICS OF THE SITE. LARGE GRADED AREAS SHOULD BE LOCATED ON THE MOST LEVEL PORTION OF THE SITE. AREAS SUBJECT TO FLOODING SHOULD BE AVOIDED. AREAS OF STEEP SLOPES, ERODIBLE SOILS, AND SOILS WITH SEVERE LIMITATIONS FOR THE INTENDED USES SHOULD NOT BE UTILIZED WITHOUT OVERCOMING THE LIMITATIONS THROUGH SOUND ENGINEERING PRACTICES. EROSION CONTROL, DEVELOPMENT AND MAINTENANCE COSTS CAN BE MINIMIZED IF A SITE IS SELECTED FOR A SPECIFIC ACTIVITY.

2. THE DISTURBED AREA AND DURATION OF EXPOSURE TO EROSION ELEMENTS SHOULD BE MINIMIZED.

   CLEARING OF NATURAL VEGETATION SHOULD BE LIMITED TO ONLY THOSE AREAS OF THE SITE TO BE DEVELOPED AT A GIVEN TIME. NATURAL VEGETATION SHOULD BE RETAINED, PROTECTED AND SUPPLEMENTED WITH CONSTRUCTION SCHEDULING EMPLOYED TO LIMIT THE DURATION OF SOIL EXPOSURE.

3. STABILIZE DISTURBED AREAS IMMEDIATELY.

   PERMANENT STRUCTURES, TEMPORARY OR PERMANENT VEGETATION, AND MULCH, OR A COMBINATION OF THESE MEASURES, SHOULD BE EMPLOYED AS QUICKLY AS POSSIBLE AFTER THE LAND IS DISTURBED. TEMPORARY VEGETATION AND MULCHES CAN BE MOST EFFECTIVE ON AREAS WHERE IT IS NOT PRACTICAL TO ESTABLISH PERMANENT VEGETATION. THESE TEMPORARY MEASURES SHOULD BE EMPLOYED IMMEDIATELY AFTER ROUGH GRADING IS COMPLETED IF A DELAY IS ANTICIPATED IN OBTAINING FINISHED GRADE. THE FINISHED SLOPE OF A CUT OR FILL SHOULD BE STABLE AND EASE OF MAINTENANCE CONSIDERED IN THE DESIGN. STABILIZE ALL ROADWAYS, PARKING AREAS, AND PAVED AREAS WITH THE GRAVEL SUBBASE, TEMPORARY VEGETATION OR MULCH.

4. RETAIN OR ACCOMMODATE RUNOFF.

   RUNOFF FROM THE DEVELOPMENT SHOULD BE SAFELY CONVEYED TO A STABLE OUTLET USING STORM DRAINS, DIVERSIONS, STABLE WATERWAYS OR SIMILAR CONSERVATION MEASURES. CONSIDERATION SHOULD ALSO BE GIVEN TO THE INSTALLATION OF STORM WATER RETENTION STRUCTURES TO PREVENT FLOODING AND DAMAGE TO DOWNSTREAM FACILITIES RESULTING FROM INCREASED RUNOFF FROM THE SITE. TEMPORARY OR PERMANENT FACILITIES FOR CONVEYANCE OF STORM WATER SHOULD BE DESIGNED TO WITHSTAND THE VELOCITIES OF PROJECTED PEAK DISCHARGES. THESE FACILITIES SHOULD BE IN OPERATION AS SOON AS POSSIBLE AFTER THE START OF CONSTRUCTION.

5. RETAIN SEDIMENT.

   SEDIMENT BASINS, SEDIMENT BARRIERS AND RELATED STRUCTURES SHOULD BE INSTALLED TO FILTER OR TRAP SEDIMENT ON THE SITE TO BE DISTURBED. THE MOST EFFECTIVE METHOD OF CONTROLLING SEDIMENT, HOWEVER, IS TO CONTROL EROSION AT ITS SOURCE. SEDIMENT RETENTION STRUCTURES SHOULD BE PLANNED TO RETAIN SEDIMENT WHEN EROSION CONTROL METHODS ARE NOT PRACTICAL, ARE INSUFFICIENT, OR IN THE PROCESS OF BEING INSTALLED, OR HAVE FAILED DUE TO SOME UNFORESEEN FACTOR.

6. DO NOT ENCROACH UPON WATERCOURSES

   PERMANENT BUILDINGS SHOULD NOT BE SUBJECTED TO FLOODING, SEDIMENT DAMAGE OR EROSION HAZARDS. EARTH FILLS SHOULD NOT BE CONSTRUCTED IN FLOOD-PRONE AREAS SO AS TO ADVERSELY OBSTRUCT WATER FLOWS. WHEN IT IS NECESSARY TO SPAN A FLOOD PRONE AREA OR WATERCOURSE, BRIDGE OR CULVERT OPENINGS SHOULD BE SIZED TO PERMIT PASSAGE OF PEAK DISCHARGES WITHOUT CAUSING UNDUE RESTRICTIONS IN WATER FLOWS OR WITHOUT CREATING EXCESSIVE DOWNSTREAM VELOCITIES. USES OF FLOOD PRONE AREAS SHOULD BE LIMITED TO ACTIVITIES WHICH WOULD NOT SUFFER EXCESSIVE DAMAGES FROM FLOODING, SCOUR, AND SEDIMENT DAMAGES. TEMPORARY BRIDGES OR CULVERTS SHOULD BE EMPLOYED WHEN CONSTRUCTION EQUIPMENT IS REQUIRED TO CROSS NATURAL OR CONSTRUCTED CHANNELS.

STANDARDS AND SPECIFICATIONS

ALL DESIGNS WILL CONFORM TO AND WORK WILL BE PERFORMED IN ACCORDANCE WITH THE PUBLICATION ENTITLED " MANUAL FOR EROSION AND SEDIMENT CONTROL IN GEORGIA", ISSUED 2016 AND THE ATTACHED DETAILS.

MAINTENANCE PROGRAM

EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE. ALL DRAINAGE SWALES, POCKETS, DEPRESSIONS, FLOW LINES, AND OUTLET DITCHES SHALL DRAIN EFFECTIVELY AT ALL TIMES. SETTLEMENT OR WASHING THAT MAY OCCUR SHALL BE REPAIRED BY THE CONTRACTOR. SEDIMENT SHALL BE REMOVED ONCE IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE BARRIER. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN AN EFFECTIVE BARRIER. MAINTAIN THE CONSTRUCTION EXIT IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. THIS MAY REQUIRE PERIODIC TOPDRESSING WITH 2-INCH STONE. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS. RESEED AND MULCH AREAS WHERE SEEDLING EMERGENCE IS POOR, OR WHERE EROSION OCCURS. PROTECT FROM TRAFFIC AS MUCH AS POSSIBLE. INSPECT ALL MULCHES PERIODICALLY, AND AFTER RAINSTORMS TO CHECK FOR RILL EROSION, DISLOCATION OR FAILURE. IF WASHOUT OCCURS REPAIR THE SLOPE GRADE, RESEED AND REINSTALL MULCH. INSPECT RIPRAP OUTLET STRUCTURES AFTER HEAVY RAINS ANY EROSION IN AND AROUND THE RIPRAP HAS TAKEN PLACE OR IF STONES HAVE BEEN DISLODGED.
FOLLOW THE CONSTRUCTION SEQUENCE THROUGHOUT THE PROJECT DEVELOPMENT. WHEN CHANGES IN CONSTRUCTION ACTIVITIES ARE NEEDED, AMEND THE SEQUENCE SCHEDULE IN ADVANCE TO MAINTAIN MANAGEMENT CONTROL. ORDERLY MODIFICATION ASSURES COORDINATION OF CONSTRUCTION AND EROSION CONTROL PRACTICES TO MINIMIZE EROSION AND SEDIMENTATION PROBLEMS. IF MAJOR CHANGES ARE NECESSARY, SEND A COPY OF THE MODIFIED SCHEDULE TO THE LOCAL SEDIMENT CONTROL AGENCY. SEDIMENT AND EROSION CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE DISTURBED AREAS ARE STABILIZED

EROSION, SEDIMENTATION AND POLLUTION CONTROL PRACTICES #36

STRUCTURAL PRACTICES

CONSTRUCTION EXIT - A STONE STABILIZED PAD LOCATED AT ANY POINT WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE TO A PUBLIC RIGHT-OF-WAY, STREET, ALLEY, SIDEWALK, OR PARKING AREA. THE PURPOSE OF THE MEASURE IS TO REDUCE OR ELIMINATE THE TRANSPORT OF MUD FROM THE CONSTRUCTION AREA BY MOTOR VEHICLES OR BY RUNOFF.

SEDIMENT BARRIER - TEMPORARY STRUCTURES TYPICALLY CONSTRUCTED OF SILT FENCE SUPPORTED BY STEEL OR WOOD POSTS. OTHER TYPES OF BARRIERS MAY INCLUDE SANDBAGS, STRAW BALES, BRUSH PILES AND OTHER FILTERING MATERIAL. THE PURPOSE OF THE MEASURE IS TO PREVENT SEDIMENT CARRIED BY SHEET FLOW FROM LEAVING THE SITE AND ENTERING NATURAL DRAINAGE WAYS OR STORM DRAINAGE SYSTEMS BY SLOWING STORM WATER RUNOFF AND CAUSING THE DEPOSITION AT THE STRUCTURE.

VEGETATIVE MEASURES #52

TREE PROTECTION - TREE PROTECTION ZONES SHALL BE ESTABLISHED AND MAINTAINED FOR EACH TREE PRESERVED ON THE SITE. THE MINIMUM TREE PROTECTION ZONE, EXCEPT FOR PALM-TYPE TREES, SHALL BE AN AREA CENTERED ON EACH TREE WITH A RADIUS IN FEET EQUIVALENT TO THE TREE DIAMETER IN INCHES MEASURED AT BREAST HEIGHT. PALM-TYPE TREES SHALL HAVE A MINIMUM TREE PROTECTION ZONE DIAMETER EQUAL TO THE DIAMETER OF THE LEAF CROWN. THE MINIMUM TREE PROTECTION DEVICE SHALL BE A FENCE CONSTRUCTED AT, AND AROUND, THE PERIMETER OF THE TREE PROTECTION ZONE AND CONSTRUCTED OF 2"x4"x6'-0" POSTS WITH ONE 2"x4"x12'-0" RAIL NAILED TO THE TOP OF EACH ADJACENT POST. THE MINIMUM RAIL HEIGHT SHALL BE FOUR (4) FEET. PREFABRICATED, REUSABLE FENCING MATERIALS MAY BE USED UPON APPROVAL OF THE BRYAN COUNTY.
TREE PROTECTION SHALL BEGIN AT THE START OF CONSTRUCTION AND AS ENCOUNTERED DURING THE CLEARING PROCESS AND SHALL REMAIN UNTIL FINAL INSPECTION OF THE CLEARING HAS BEEN SUCCESSFULLY COMPLETED. BROKEN OR DISLODGED TREE PROTECTION DEVICES SHALL BE IMMEDIATELY REPAIRED. NO VEHICLES SHALL BE PARKED, OR CONSTRUCTION MATERIAL STORED, OR SUBSTANCES SPILLED OR DISPOSED OF OR PLACED WITHIN THE TREE PROTECTION ZONE AT ANY TIME.

SMALLER TREES SHALL BE REMOVED FIRST TO ALLOW THE LARGER TREES TO BE FELLED WITH MORE CARE. TREES ARE TO BE FELLED IN A DIRECTION AWAY FROM TREES WHICH ARE TO REMAIN. CONSTRUCTION OPERATIONS SHALL BE CONDUCTED SO AS TO PREVENT DAMAGE BY FALLING TREES TO OTHER TREES, FOLIAGE, AND PLANT MATERIAL LEFT STANDING, TO EXISTING STRUCTURES AND INSTALLATIONS, AND TO THOSE UNDER CONSTRUCTION, TO PROPERTY EXISTING OUTSIDE THE AREAS TO BE CLEARED, AND SO AS TO PROVIDE FOR THE SAFETY OF EMPLOYEES AND OTHERS. ALL STUMP HOLES MUST BE FILLED USING CLEAN FILL DIRT, PLACED IN ONE FOOT LIFTS AND ADEQUATELY COMPACTED.

TREES DESIGNATED TO BE LEFT STANDING WITHIN THE CLEARED AREAS SHALL BE TRIMMED OF DEAD BRANCHES 1-1/2" 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 OF MORE THAN 1-1/2" IN DIAMETER THUS MADE SHALL BE PAINTED WITH AN APPROVED TREE WOUND PAINT MANUFACTURED FOR THIS SPECIFIC PURPOSE. IN THE CASE OF IMPORTANT LARGE TREES WHERE A SMALL AMOUNT OF CAVITY WORK WOULD PROLONG THE LIFE OF THE TREE, SUCH WORK SHALL BE DONE. THE SERVICES OF A QUALIFIED TREE SURGEON ARE RECOMMENDED FOR THIS PROCEDURE.

ALL CLEARED MATERIAL SHALL BE REMOVED FROM THE SITE OR BURNED. DISPOSAL BY BURNING MAY ONLY BE DONE WHEN APPROVED BY BRYAN COUNTY . MATERIAL DISPOSED OF BY BURNING SHALL BE BURNED IN A MANNER THAT WILL AVOID ALL HAZARDS, SUCH AS DAMAGE TO EXISTING STRUCTURES, CONSTRUCTION IN PROGRESS, TREES TO BE PRESERVED, AND EXISTING VEGETATION.

DISTURBED AREA STABILIZATION (WITH TEMPORARY SEEDING)- ESTABLISHING TEMPORARY VEGETATIVE COVER WITH FAST GROWING SEEDINGS FOR SEASONAL PROTECTION ON DISTURBED OR DENUDED AREAS. THE PURPOSE OF THE MEASURE IS TO:

- REDUCE EROSION, SEDIMENT AND RUNOFF DAMAGES TO DOWNSTREAM RESOURCES
- IMPROVE WILDLIFE HABITAT
- IMPROVE AESTHETICS
- PROTECT SOIL SURFACE FROM EROSION
- IMPROVE TILTH AND ADD ORGANIC MATTER FOR PERMANENT PLANTINGS

DISTURBED AREA STABILIZATION (WITH PERMANENT VEGETATION)- PLANTING PERENNIAL VEGETATION, SUCH AS TREES, SHRUBS, VINES, GRASSES, OR LEGUMES, ON EXPOSED AREAS FOR FINAL PERMANENT STABILIZATION. THE PURPOSE IS TO STABILIZE THE SOIL, REDUCE DAMAGE FROM SEDIMENT AND RUNOFF TO DOWNSTREAM AREAS, AND IMPROVE WILDLIFE HABITAT AND VISUAL RESOURCES.

TEMPORARY AND PERMANENT VEGETATIVE PRACTICE IS SHOWN ON DETAIL SHEET EC1.3

FERTILIZER SHALL BE APPLIED AT A RATE OF 1,300 LBS/AC. LIME SHALL BE APPLIED AT A RATE OF 1,500 LBS/AC. MULCHING SHALL BE SPREAD AT A RATE OF 2.0 TONS/AC.

WEEKLY INSPECTION OF THE GRASS COVER SHALL BE PERFORMED TO IDENTIFY AREAS REQUIRING REESTABLISHMENT OF GRASS.

DUST CONTROL ON DISTURBED AREAS - CONTROLLING SURFACE AND AIR MOVEMENT OF DUST ON CONSTRUCTION SITE AND HAUL ROUTES. THE PURPOSE OF THE MEASURE IS TO REDUCE THE PRESENCE OF AIRBORNE SUBSTANCES, WHICH MAY BE HARMFUL OR INJURIOUS TO HUMAN HEALTH, WELFARE OR SAFETY, OR TO ANIMALS OR PLANT LIFE.

CONSIDERATIONS FOR CONSTRUCTION SCHEDULING

A SPECIFIED WORK SCHEDULE IS NEEDED TO COORDINATE THE TIMING OF LAND DISTURBING ACTIVITIES WITH THE INSTALLATION OF EROSION AND SEDIMENTATION CONTROL MEASURES.

THE PURPOSE OF THE SCHEDULE IS TO REDUCE ON-SITE EROSION AND OFF-SITE SEDIMENTATION BY PERFORMING LAND DISTURBING ACTIVITIES AND INSTALLING EROSION AND SEDIMENTATION CONTROL PRACTICES IN ACCORDANCE WITH A PLANNED SCHEDULE.

IN PLANNING CONSTRUCTION WORK, IT MAY BE HELPFUL TO OUTLINE ALL LAND DISTURBING ACTIVITIES NECESSARY TO COMPLETE THE PROPOSED PROJECT. THEN LIST ALL PRACTICES NEEDED TO CONTROL EROSION AND SEDIMENTATION ON THE SITE. THESE TWO LISTS CAN THEN BE COMBINED IN LOGICAL ORDER TO PROVIDE A PRACTICAL AND EFFECTIVE CONSTRUCTION SEQUENCE SCHEDULE THAT BECOMES PART OF THE EROSION AND SEDIMENTATION CONTROL PLAN.

CONSTRUCTION ACTIVITY	SCHEDULE CONSIDERATION
1. OBTAIN ALL PLAN APPROVALS AND OTHER APPLICABLE PERMITS.	
2. FLAG THE WORK LIMITS AND MARK THE TREES AND BUFFER AREAS FOR PROTECTION.	
3. HOLD PRE CONSTRUCTION CONFERENCE AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION.	
4. CONSTRUCTION ACCESS - CONSTRUCTION ENTRANCE, CONSTRUCTION ROUTES, EQUIPMENT PARKING AREAS.	FIRST LAND DISTURBING ACTIVITY -- STABILIZE BARE AREAS IMMEDIATELY WITH GRAVEL AND TEMPORARY VEGETATION AS CONSTRUCTION TAKES PLACE.
5. SEDIMENT TRAPS AND BARRIERS - BASIN TRAPS, SEDIMENT FENCES, AND OUTLET PROTECTION.	INSTALL PRINCIPAL BASINS AFTER CONSTRUCTION SITE IS ACCESSED. INSTALL ADDITIONAL TRAPS AND BARRIERS AS NEEDED DURING GRADING.
6. RUNOFF CONTROL - DIVERSIONS, PERIMETER DIKES, WATER BARS, AND OUTLET PROTECTION.	INSTALL KEY PRACTICES AFTER PRINCIPAL SEDIMENT TRAPS AND BEFORE LAND GRADING. INSTALL ADDITIONAL RUNOFF-CONTROL MEASURES DURING GRADING.
7. RUNOFF CONVEYANCE SYSTEM- STABILIZE STREAM BANKS, STORM DRAINS, CHANNELS, INLET AND OUTLET PROTECTION, SLOPE DRAINS.	WHERE NECESSARY, STABILIZE STREAM BANKS AS EARLY AS POSSIBLE. INSTALL PRINCIPAL RUNOFF CONVEYANCE SYSTEM WITH RUNOFF-CONTROL MEASURES. INSTALL REMAINDER OF SYSTEM AFTER GRADING.
8. LAND CLEARING AND GRADING-SITE PREPARATION CUTTING, FILLING AND GRADING, SEDIMENTATION TRAPS, BARRIERS, DIVERSIONS, DRAINS, SURFACE ROUGHENING.	BEGIN MAJOR CLEARING AND GRADING AFTER PRINCIPAL SEDIMENT AND KEY RUNOFF-CONTROL MEASURES ARE INSTALLED. CLEAR BORROW AND DISPOSAL AREAS ONLY AS NEEDED. INSTALL ADDITIONAL CONTROL MEASURES AS GRADING PROGRESSES. MARK TREES AND BUFFER AREAS FOR PRESERVATION.
9. SURFACE STABILIZATION-TEMPORARY AND PERMANENT SEEDING, MULCHING, SODDING, RIPRAP.	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETE.
10. BUILDING CONSTRUCTION- BUILDINGS UTILITIES, PAVING.	INSTALL NECESSARY EROSION AND SEDIMENTATION CONTROL PRACTICES AS WORK TAKES PLACE.
11. LANDSCAPING AND FINAL STABILIZATION - TOPSOILING, TREES AND SHRUBS, PERMANENT SEEDING, MULCHING, SODDING RIPRAP.	LAST CONSTRUCTION PHASE--STABILIZE ALL OPEN AREAS, INCLUDING BORROW AND SPOIL AREAS. REMOVE AND STABILIZE ALL TEMPORARY CONTROL MEASURES.

#28

OWNER/OPERATOR'S CERTIFICATION:

1. *I CERTIFY THAT THE RECEIVING WATER(S) OR THE OUTFALL(S) OR A COMBINATION OF RECEIVING WATER(S) AND OUTFALL(S) WILL BE MONITORED IN ACCORDANCE WITH THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN.*
2. *I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THAT THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN (PLAN) WAS PREPARED BY A DESIGN PROFESSIONAL, AS DEFINED BY THIS PERMIT, THAT HAS COMPLETED THE APPROPRIATE CERTIFICATION COURSE APPROVED BY THE GEORGIA SOIL AND WATER CONSERVATION COMMISSION IN ACCORDANCE WITH THE PROVISIONS OF O.C.G.A. 12-7-19 AND THAT I WILL ADHERE TO THE PLAN AND COMPLY WITH ALL APPLICABLE REQUIREMENTS OF THIS PERMIT.*

OWNERS PRINTED NAME *TITLE*

SIGNATURE *DATE*

DESIGN PROFESSIONAL CERTIFICATION:

1. "I CERTIFY UNDER PENALTY OF LAW THAT THIS PLAN WAS PREPARED AFTER A SITE VISIT TO THE LOCATIONS DESCRIBED HEREIN BY MYSELF OR MY AUTHORIZED AGENT, UNDER MY SUPERVISION." #1
2. "I CERTIFY THAT THE PERMITTEE'S EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN PROVIDES FOR AN APPROPRIATE AND COMPREHENSIVE SYSTEM OF BEST MANAGEMENT PRACTICES REQUIRED BY THE GEORGIA WATER QUALITY CONTROL ACT AND THE DOCUMENT "MANUAL FOR EROSION AND SEDIMENT CONTROL IN GEORGIA " (MANUAL) PUBLISHED BY THE GEORGIA SOIL AND WATER CONSERVATION COMMISSION AS OF JANUARY 1 OF THE YEAR IN WHICH LAND DISTURBING ACTIVITY WAS PERMITTED, PROVIDES FOR THE SAMPLING OF THE RECEIVING WATER (S) OR THE SAMPLING OF THE STORM WATER OUTFALLS AND THAT THE DESIGNED SYSTEM OF BEST MANAGEMENT PRACTICES AND SAMPLING METHODS IS EXPECTED TO MEET THE REQUIREMENTS CONTAINED IN THE GENERAL NPDES No. GAR 100002. #12
3. "I CERTIFY THAT THE PERMITTEE'S EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN PROVIDES FOR THE MONITORING OF: (A) ALL PERENNIAL AND INTERMITTENT STREAMS AND OTHER WATER BODIES SHOWN ON THE USGS TOPOGRAPHIC MAP AND ALL OTHER FIELD VERIFIED PERENNIAL AND INTERMITTENT STREAMS AND OTHER WATER BODIES, OR (B) WHERE ANY SUCH SPECIFIC IDENTIFIED PERENNIAL OR INTERMITTENT STREAM AND OTHER WATER BODY IS NOT PROPOSED TO BE SAMPLED, I HAVE DETERMINED IN MY PROFESSIONAL JUDGMENT, UTILIZING THE FACTORS REQUIRED IN THE GENERAL NPDES PERMIT NO. GAR 100002, THAT THE INCREASE IN TURBIDITY OF EACH SPECIFIC IDENTIFIED SAMPLED RECEIVING WATER WILL BE REPRESENTATIVE OF THE INCREASE IN THE TURBIDITY OF A SPECIFIC IDENTIFIED UN-SAMPLED RECEIVING WATER." #13

Fred

GSWCC LEVEL II DESIGN PROFESSIONAL- FRED SORORIAN, PE

0000012474 *01/20/2022*
CERTIFICATION # *EXPIRATION DATE*

ENGINEER'S NAME (PRINTED): FRED SORORIAN, P.E.
GA PE NUMBER: 26741
GSWCC LEVEL II CERTIFICATION NUMBER: 0000012474
CERTIFICATION NUMBER EXPIRATION DATE: 01/20/2022

FRED SORORIAN
GSWCC LEVEL II
PLAN REVIEWER
CERTIFICATION #
0000012474

BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	8-2020

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ESPC NOTES

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: 1" = 1'

EC1.1

OTHER CONTROLS

NO WASTE WILL BE DISPOSED OF INTO STORM WATER INLETS OR WATERS OF THE STATE.

WASTE MATERIALS

ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. THE DUMPSTER WILL MEET ALL SOLID WASTE MANAGEMENT REGULATIONS. SELECT A DESIGNATED WASTE COLLECTION AREA. WHEN POSSIBLE LOCATE CONTAINERS IN A COVERED AREA. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED A MINIMUM OF ONCE PER WEEK OR MORE OFTEN IF NECESSARY AND TRASH WILL BE HAULED AS REQUIRED BY LOCAL REGULATIONS. NO CONSTRUCTION WASTE WILL BE BURIED ONSITE.

ALL PERSONNEL WILL BE INSTRUCTED ON PROPER PROCEDURES FOR WASTE DISPOSAL. A NOTICE STATING THESE PRACTICES WILL BE POSTED AT THE JOBSITE AND THE CONTRACTOR WILL BE RESPONSIBLE FOR SEEING THAT THESE PROCEDURES ARE FOLLOWED.

HAZARDOUS WASTES

ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL, STATE, AND/OR FEDERAL REGULATIONS AND BY THE MANUFACTURER OF SUCH PRODUCTS. THE JOB SITE SUPERINTENDENT, WHO WILL ALSO BE RESPONSIBLE FOR SEEING THAT THESE PRACTICES ARE FOLLOWED, WILL INSTRUCT SITE PERSONNEL IN THESE PRACTICES. MATERIAL SAFETY DATA SHEETS (MSDS's) FOR EACH SUBSTANCE WITH HAZARDOUS PROPERTIES THAT IS USED ON THE JOB SITE WILL BE OBTAINED AND USED FOR THE PROPER MANAGEMENT OF POTENTIAL WASTES THAT MAY RESULT FROM THESE PRODUCTS. AN MSDS WILL BE POSTED IN THE IMMEDIATE AREA WHERE SUCH PRODUCT IS STORED AND/OR USED AND ANOTHER COPY OF EACH MSDS WILL BE MAINTAINED IN THE ESPCP FILE AT THE JOB SITE CONSTRUCTION TRAILER OFFICE. EACH EMPLOYEE WHO MUST HANDLE A SUBSTANCE WITH HAZARDOUS PROPERTIES WILL BE INSTRUCTED ON THE USE OF MSDS AND THE SPECIFIC INFORMATION IN THE APPLICABLE MSDS FOR THE PRODUCT HE/SHE IS USING, PARTICULARLY REGARDING SPILL CONTROL TECHNIQUES.

THE CONTRACTOR WILL IMPLEMENT THE SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC) PLAN FOUND WITHIN THE ESPCP AND WILL TRAIN ALL PERSONNEL IN THE PROPER CLEANUP AND HANDLING OF SPILLED MATERIALS. NO SPILLED HAZARDOUS MATERIAL OR HAZARDOUS WASTES WILL BE ALLOWED TO COME IN CONTACT WITH STORM WATER DISCHARGES. IF SUCH CONTACT OCCURS, THE STORM WATER DISCHARGE WILL BE CONTAINED ON SITE UNTIL APPROPRIATE MEASURES IN COMPLIANCE WITH STATE AND FEDERAL REGULATIONS ARE TAKEN TO DISPOSE OF SUCH CONTAMINATED STORM WATER. IF SHALL BE THE RESPONSIBILITY OF THE JOB SITE SUPERINTENDENT TO PROPERLY TRAIN ALL PERSONNEL IN THE USE OF THE SPCC PLAN.

SANITARY WASTES

A MINIMUM OF ONE PORTABLE SANITARY UNIT WILL BE PROVIDED FOR EVERY TEN (10) WORKERS ON THE SITE. ALL SANITARY WASTE WILL BE DISPOSED BY THE PORTABLE FACILITY PROVIDER IN COMPLETE COMPLIANCE WITH LOCAL AND STATE REGULATIONS. PROVIDE REGULAR SERVICING BY A QUALIFIED DOMESTIC WASTE HAULER TO PREVENT OVER-FILLING.

ALL SANITARY WASTE UNITS WILL BE LOCATED IN AN AREA WHERE THE LIKELIHOOD OF THE UNIT CONTRIBUTING TO STORM WATER DISCHARGE IS NEGLIGIBLE. PLACEMENT OF FACILITIES SHOULD BE OUT OF HIGH FLOW AREAS AND IN ACCORDANCE WITH ALL STATE AND LOCAL REGULATIONS. ADDITIONAL CONTAINMENT BMP'S MUST BE IMPLEMENTED, SUCH AS GRAVEL BAGS OR SPECIALLY DESIGNED PLASTIC SKID CONTAINERS AROUND THE BASE, TO PREVENT WASTES FROM CONTRIBUTING TO STORM WATER DISCHARGES. THE LOCATION OF SANITARY WASTE UNITS MUST BE IDENTIFIED ON THE EROSION CONTROL PHASE SHEETS BY THE CONTRACTOR ONCE THE LOCATIONS HAVE BEEN DETERMINED. REGULARLY INSPECT FOR CRACKS OR LEAKAGE IN CONTAINERS/TANKS.

SANITARY SEWER WILL BE PROVIDED BY MUNICIPAL AUTHORITY/SEPTIC SYSTEM AFTER COMPLETION OF THIS PROJECT.

OFFSITE VEHICLE TRACKING

A STABILIZED CONSTRUCTION EXIT HAS BEEN PROVIDED TO HELP REDUCE VEHICLE TRACKING OF SEDIMENT. SEE SHEETS EC1.1 AND EC1.3 FOR CONSTRUCTION EXIT LOCATIONS AND SHEET EC2.3 FOR DETAILS. THE PAVED STREET ADJACENT TO THE CONSTRUCTION SITE EXIT WILL BE KEPT CLEAN AT ALL TIMES. VEHICLES LEAVING THE SITE MUST TRAVERSE CONSTRUCTION EXITS TO REMOVE MUD FROM TIRES.

INVENTORY FOR POLLUTION PREVENTION PLAN THE FOLLOWING MATERIALS ARE EXPECTED ONSITE DURING CONSTRUCTION: PETROLEUM BASED FUELS AND LUBRICANTS FOR EQUIPMENT, ADDITIVES FOR SOIL STABILIZATION, PESTICIDES, FERTILIZERS, HERBICIDES, CRUSHED STONE, CONCRETE PRODUCTS, ASPHALT, TAR, METAL BUILDING MATERIALS, LUMBER, SHEET ROCK, FLOOR COVERINGS, ELECTRICAL WIRE AND FIXTURES, PAINTS/STAINS/FINISHING TREATMENTS, SOAPS, PAINT SOLVENTS, CLEANING SOLVENTS, PLASTICS AND METAL PIPES.

SPILL PREVENTION

PRACTICES SUCH AS GOOD HOUSEKEEPING, PROPER HANDLING OF HAZARDOUS PRODUCTS AND PROPER SPILL CONTROL PRACTICES WILL BE FOLLOWED TO REDUCE THE RISK OF SPILLS FROM DISCHARGING INTO STORM WATER RUNOFF.

GOOD HOUSEKEEPING

1. QUANTITIES ONSITE WILL BE LIMITED TO THE AMOUNT NEEDED FOR THE JOB.
2. PRODUCTS AND MATERIALS WILL BE STORED IN A NEAT, ORDERLY MANNER IN APPROPRIATE CONTAINERS PROTECTED FROM RAINFALL, WHERE POSSIBLE.
3. PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH MANUFACTURER'S LABELS LEGIBLE AND VISIBLE.
4. PRODUCT MIXING, DISPOSAL, AND DISPOSAL OF PRODUCT CONTAINERS WILL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
5. THE CONTRACTOR WILL INSPECT SUCH MATERIALS TO ENSURE PROPER USE, STORAGE AND DISPOSAL.
6. THIS PERMIT DOES NOT AUTHORIZE THE DISCHARGE OF SOAPS OR SOLVENTS USED IN VEHICLE AND EQUIPMENT WASHING.
7. THIS PERMIT DOES NOT AUTHORIZE THE DISCHARGE OF WASTEWATER FROM WASHOUT AND CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTIONS MATERIALS.

PRODUCT SPECIFIC PRACTICES

PETROLEUM BASED PRODUCTS- CONTAINERS FOR PRODUCTS SUCH AS FUELS, LUBRICANTS AND TARS WILL BE INSPECTED DAILY FOR LEAKS AND SPILLS. THIS INCLUDES ON-SITE VEHICLE AND MACHINERY INSPECTIONS AND REGULAR PREVENTATIVE MAINTENANCE FOR SUCH EQUIPMENT. EQUIPMENT MAINTENANCE AREAS WILL BE LOCATED AWAY FROM STATE WATER, NATURAL DRAINS AND STORM WATER DRAINAGE INLETS. IN ADDITION, TEMPORARY FUELING TANKS SHALL HAVE A SECONDARY CONTAINMENT LINER TO PREVENT/MINIMIZE SITE CONTAMINATION. DISCHARGE OF OILS, FUELS AND LUBRICANTS IS PROHIBITED. PROPER DISPOSAL METHODS WILL INCLUDE COLLECTION IN A SUITABLE CONTAINER AND DISPOSAL AS REQUIRED BY LOCAL AND STATE REGULATIONS. HAVE EQUIPMENT TO CONTAIN AND CLEAN UP PETROLEUM SPILLS IN FUEL STORAGE AREAS OR ON MAINTENANCE AND FUELING VEHICLES. STORE IN COVERED AREAS PROTECTED WITH DIKES. REGULARLY INSPECT FOR CRACKS OR LEAKAGE IN CONTAINERS/TANKS.

FERTILIZER/HERBICIDES/PESTICIDES/DETERGENTS- THESE WILL BE APPLIED AT RATES THAT DO NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS OR ABOVE THE GUIDELINES SET FORTH IN THE CROP ESTABLISHMENT OR IN THE GSWCC MANUAL FOR EROSION AND SEDIMENTATION CONTROL IN GEORGIA. ANY STORAGE OF THESE MATERIALS WILL BE UNDER ROOF IN SEALED CONTAINERS. DO NOT DISCHARGE WASH WATER INTO STORM WATER SYSTEM. INSTALL CURBS OR DIKES AROUND STORAGE AREA TO PROTECT AGAINST SPILLS. LIMIT USE OF DETERGENTS ON-SITE.

PAINTS/FINISHES/SOLVENTS- ALL PRODUCTS WILL BE STORED IN TIGHTLY SEALED ORIGINAL CONTAINERS WHEN NOT IN USE. EXCESS PRODUCT WILL NOT BE DISCHARGED TO THE STORM WATER COLLECTION SYSTEM. EXCESS PRODUCT, MATERIALS USED WITH THESE PRODUCTS AND PRODUCT CONTAINERS WILL BE DISPOSED OF ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

#24

CONCRETE TRUCK WASHING- BMP'S FOR CONCRETE WASHDOWN OF TOOLS, CONCRETE MIXER CHUTES, HOPPERS AND THE REAR OF THE VEHICALS. WASHOUT OF THE DRUM AT THE CONSTRUCTION SITE IS PROHIBITED.

BUILDING MATERIALS- NO BUILDING OR CONSTRUCTION MATERIALS WILL BE BURIED OR DISPOSED OF ONSITE. ALL SUCH MATERIAL WILL BE DISPOSED OF IN PROPER WASTE DISPOSAL PROCEDURES.

SPILL CLEANUP AND CONTROL PRACTICES

#25

1. LOCAL, STATE AND MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND PROCEDURES WILL BE MADE AVAILABLE TO SITE PERSONNEL.
2. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREAS. TYPICAL MATERIALS AND EQUIPMENT INCLUDES, BUT IS NOT LIMITED TO, BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, CAT LITTER, SAND, SAWDUST, AND PROPERLY LABELED PLASTIC AND MEAL WASTE CONTAINERS.
3. SPILL PREVENTION PRACTICES AND PROCEDURES WILL BE REVIEWED AFTER A SPILL AND ADJUSTED AS NECESSARY TO PREVENT FUTURE SPILLS.
4. FOR SPILLS THAT IMPACT SURFACE WATER (LEAVE A SHEEN ON SURFACE WATER), THE NATIONAL RESPONSE CENTER (NRC) WILL BE CONTACTED WITHIN 24 HOURS AT 800-424-8802.
5. FOR SPILLS OF AN UNKNOWN AMOUNT, THE NATIONAL CENTER (NRC) WILL BE CONTACTED WITHIN 24 HOURS
6. FOR SPILLS GREATER THAN 25 GALLONS AND NO SURFACE WATER IMPACTS, THE GEORGIA EPD WILL BE CONTACTED WITHIN 24 HOURS.
7. FOR SPILLS LESS THAN 25 GALLONS AND NO SURFACE WATER IMPACTS, THE SPILL WILL BE CLEANED UP AND LOCAL AGENCIES WILL BE CONTACTED AS REQUIRED.

INSPECTIONS

#30

PRIMARY PERMITTEE

1. EACH DAY WHEN ANY TYPE OF CONSTRUCTION ACTIVITY HAS TAKEN PLACE AT A PRIMARY PERMITTEE'S SITE, CERTIFIED PERSONNEL PROVIDED BY THE PRIMARY PERMITTEE SHALL INSPECT: (A) ALL AREAS AT THE PRIMARY PERMITTEE'S SITE WHERE PETROLEUM PRODUCTS ARE STORED, USED, OR HANDLED FOR SPILLS AND LEAKS FROM VEHICLES AND EQUIPMENT AND (B) ALL LOCATIONS AT THE PRIMARY PERMITTEE'S SITE WHERE VEHICLES ENTER OR EXIT THE SITE FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING. THESE INSPECTIONS MUST BE CONDUCTED UNTIL A NOTICE OF TERMINATION IS SUBMITTED.
2. MEASURE AND RECORD RAINFALL WITHIN DISTURBED AREAS OF THE SITE THAT HAVE NOT MET FINAL STABILIZATION ONCE EVERY 24 HOURS EXCEPT ANY NON-WORKING SATURDAY, NON-WORKING SUNDAY AND NON-WORKING FEDERAL HOLIDAY. THE DATA COLLECTED FOR THE PURPOSE OF COMPLIANCE WITH THIS PERMIT SHALL BE REPRESENTATIVE OF THE MONITORED ACTIVITY. MEASUREMENT OF RAINFALL MAY BE SUSPENDED IF ALL AREAS OF THE SITE HAVE UNDERGONE FINAL STABILIZATION OR ESTABLISHED A CROP OF ANNUAL VEGETATION AND A SEEDING OF TARGET PERENNIALS APPROPRIATE FOR THE REGION.
3. CERTIFIED PERSONNEL (PROVIDED BY THE PRIMARY PERMITTEE) SHALL INSPECT THE FOLLOWING AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM THAT IS 0.5 INCHES RAINFALL OR GREATER (UNLESS SUCH STORM ENDS AFTER 5:00 PM ON ANY FRIDAY OR ON ANY NON-WORKING SATURDAY, NON-WORKING SUNDAY OR ANY NON-WORKING FEDERAL HOLIDAY IN WHICH CASE THE INSPECTION SHALL BE COMPLETED BY THE END OF THE NEXT BUSINESS DAY AND/OR WORKING DAY, WHICHEVER OCCURS FIRST): (A) DISTURBED AREAS OF THE PRIMARY PERMITTEE'S CONSTRUCTION SITE; (B) AREAS USED BY THE PRIMARY PERMITTEE FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION; AND (C) STRUCTURAL CONTROL MEASURES. EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN APPLICABLE TOTHE PRIMARY PERMITTEE'S SITE SHALL BE OBSERVED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATER(S). FOR AREAS OF A SITE THAT HAVE UNDERGONE FINAL STABILIZATION OR ESTABLISHED A CROP OF ANNUAL VEGETATION AND A SEEDING OF TARGET PERENNIALS APPROPRIATE FOR THE REGION, THE PERMITTEE MUST COMPLY WITH PART IV.D.4.a.(4). THESE INSPECTIONS MUST BE CONDUCTED UNTIL A NOTICE OF TERMINATION IS SUBMITTED.
4. CERTIFIED PERSONNEL (PROVIDED BY PRIMARY PERMITTEE) SHALL INSPECT AT LEAST ONCE PER MONTH DURING THE TERM OF THIS PERMIT (i.e. UNTIL A NOTICE OF TERMINATION IS SUBMITTED TO EPD) THE AREAS OF THE SITE THAT HAVE UNDERGONE FINAL STABILIZATION OR ESTABLISHED A CROP OF ANNUAL VEGETATION AND A SEEDING OF TARGET PERENNIALS APPROPRIATE FOR THE REGION. THESE AREAS SHALL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM AND THE RECEIVING WATER(S). EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN SHALL BE OBSERVED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATER(S).
5. BASED ON THE RESULTS OF EACH INSPECTION, THE SITE DESCRIPTION AND THE POLLUTION PREVENTION AND CONTROL MEASURES IDENTIFIED IN THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN, THE PLAN SHALL BE REVISED AS APPROPRIATE NOT LATER THAN SEVEN (7) CALENDAR DAYS FOLLOWING EACH INSPECTION. IMPLEMENTATION OF SUCH CHANGES SHALL BE MADE AS SOON AS PRACTICAL BUT IN NO CASE LATER THAN SEVEN (7) CALENDAR DAYS FOLLOWING EACH INSPECTION.
6. A REPORT OF EACH INSPECTION THAT INCLUDES THE NAME(S) OF CERTIFIED PERSONNEL MAKING EACH INSPECTION, THE DATE(S) OF EACH INSPECTION, CONSTRUCTION PHASE (i.e., INITIAL, INTERMEDIATE OR FINAL), MAJOR OBSERVATIONS RELATING TO THE IMPLEMENTATION OF THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN, AND ACTIONS TAKEN IN ACCORDANCE WITH PART IV.D.4.a.(5). OF THE PERMIT SHALL BE MADE AND RETAINED AT THE SITE OR BE READILY AVAILABLE AT A DESIGNATED ALTERNATE LOCATION UNTIL THE ENTIRE SITE OR THAT PORTION OF A CONSTRUCTION SITE THAT HAS BEEN PHASED HAS UNDERGONE FINAL STABILIZATION AND A NOTICE OF TERMINATION IS SUBMITTED TO EPD. SUCH REPORTS SHALL BE READILY AVAILABLE BY END OF THE SECOND BUSINESS DAY AND/OR WORKING DAY AND SHALL IDENTIFY ALL INCIDENTS OF BEST MANAGEMENT PRACTICES THAT HAVE NOT BEEN PROPERLY INSTALLED AND/OR MAINTAINED AS DESCRIBED IN THE PLAN. WHERE THE REPORT DOES NOT IDENTIFY ANY INCIDENTS THE INSPECTION REPORT SHALL CONTAIN A STATEMENT THAT THE BEST MANAGEMENT PRACTICES ARE IN COMPLIANCE WITH THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN. THE REPORT SHALL BE SIGNED IN ACCORDANCE WITH PART V.G.2. OF THIS PERMIT.

AN "EROSION & SEDIMENTATION INSPECTION AND MAINTENANCE REPORT" SHEET IS ATTACHED. SHOULD THE INSPECTION REVEAL ANY DEFICIENCIES, A COPY SHALL BE SENT TO:

ATTN.: CHUCK TESSMER
CITY OF SAVANNAH
702 STILES AVENUE
SAVANNAH, GA 31415
(912) 651-6573
EMAIL: ctessmer@savannahga.gov

ATTN.: KEITH STRONG
50 PARK OF COMMERCE WAY
SAVANNAH, GA 31405
DAY (912) 721-4103
NIGHT (912) 667-9793
EMAIL: strongk@tandh.com

STORM WATER SAMPLING

#33

SAMPLE ANALYSIS

STORM WATER SAMPLES ARE TO BE ANALYZED IN ACCORDANCE WITH METHODOLOGY AND TEST PROCEDURES ESTABLISHED BY 40 CFR PART 136 AND THE GUIDANCE DOCUMENT TITLED "NPDES STORM WATER SAMPLING GUIDANCE DOCUMENT EPA 833-8-92-001"

APPENDIX B IN PERMIT NO. GAR 100002 WAS USED TO DETERMINE THE NTU ALLOWABLE AND UPSTREAM AND DOWNSTREAM SAMPLING WILL BE PERFORMED FOR THIS PROJECT (SEE LOCATION ON THE PLAN). STORM WATER IS TO BE SAMPLED FOR NEPHELOMETRIC TURBIDITY UNITS (NTU) AT THE UPSTREAM AND DOWNSTREAM LOCATIONS. A DISCHARGE OF STORM WATER RUNOFF FROM DISTURBED AREAS WHERE BEST MANAGEMENT PRACTICES HAVE NOT BEEN PROPERLY DESIGNED, INSTALLED, AND MAINTAINED SHALL CONSTITUTE A SEPARATE VIOLATION FOR EACH DAY ON WHICH SUCH CONDITION RESULTS IN THE TURBIDITY OF THE DISCHARGE EXCEEDS 25 NTU. THERE SHALL BE A MAXIMUM 25 NTU VALUE DIFFERENCE BETWEEN UPSTREAM AND DOWNSTREAM SAMPLING POINTS. PER NPDES PERMIT GAR 100002, FOR CONSTRUCTION ACTIVITIES, THE PRIMARY PERMITTEE MUST COMPLETE ALL SAMPLING.

SAMPLE TYPE

ALL SAMPLING SHALL BE COLLECTED BY "GRAB SAMPLES" AND THE ANALYSIS OF THESE SAMPLES MUST BE CONDUCTED IN ACCORDANCE WITH METHODOLOGY AND TEST PROCEDURES ESTABLISHED BY 40 CFR PART 136 (UNLESS OTHER TEST PROCEDURES HAVE BEEN APPROVED); THE GUIDANCE DOCUMENT TITLED "NPDES STORM WATER SAMPLING GUIDANCE DOCUMENT, EPA 833-8-92-001" AND GUIDANCE DOCUMENTS PREPARED BY THE EPD.

PER NPDES PERMIT, GAR 100002. "SAMPLE CONTAINERS SHOULD BE LABELED PRIOR TO COLLECTING THE SAMPLES. SAMPLES SHOULD BE WELL MIXED BEFORE TRANSFERRING TO A SECONDARY CONTAINER. LARGE-MOUTH, WELL CLEANED AND RINSED GLASS OR PLASTIC JARS SHOULD BE USED FOR COLLECTING SAMPLES. THE JARS SHOULD BE CLEANSED THOROUGHLY TO AVOID CONTAMINATION. MANUAL, AUTOMATIC AND RISING STAGE SAMPLING MAY BE UTILIZED. IF AUTOMATIC SAMPLING IS USED AND NOT ACTIVATED DURING QUALIFYING EVENT, THE PERMITTEE MUST USE MANUAL SAMPLING OR RINSING STAGE SAMPLING DURING THE NEXT QUALIFYING EVENT.

SAMPLING POINTS

#34

THERE WILL BE 2 STORM WATER SAMPLING LOCATION. SAMPLING LOCATION 1 WILL BE UPSTREAM OF THE FORCE MAIN INSTALLATION AT PIPEMAKERS CANAL. SAMPLING LOCATION 2 WILL BE DOWNSTREAM OF SAMPLING LOCATION 1 JUST BEYOND THE END OF CONSTRUCTION. UPSTREAM-DOWNSTREAM SAMPLING HAS BEEN SELECTED FOR THIS PROJECT DUE TO CONSTRUCTION OCCURING WITHOUT ANY OUTFALLS. THERE SHALL BE A 25 NTU VALUE DIFFERENCE BETWEEN UPSTREAM AND DOWNSTREAM SAMPLING POINTS. PER NPDES PERMIT GAR 100002, FOR CONSTRUCTION ACTIVITIES, THE PRIMARY PERMITTEE MUST COMPLETE ALL SAMPLING.

- THE UPSTREAM SAMPLE FOR EACH RECEIVING WATER(S) MUST BE TAKEN IMMEDIATELY UPSTREAM OF THE CONFLUENCE OF THE FIRST STORMWATER DISCHARGE FROM THE PERMITTED ACTIVITY (I.E., THE DISCHARGE FARTHEST UPSTREAM AT THE SITE) BUT DOWNSTREAM OF ANY OTHER STORMWATER DISCHARGES NOT ASSOCIATED WITH THE PERMITTED ACTIVITY. WHERE APPROPRIATE, SEVERAL UPSTREAM SAMPLES FROM ACROSS THE RECEIVING WATER(S) MAY NEED TO BE TAKEN AND THE ARITHMETIC AVERAGE OF THE TURBIDITY OF THESE SAMPLES USED FOR THE UPSTREAM TURBIDITY VALUE.
- THE DOWNSTREAM SAMPLE FOR EACH RECEIVING WATER(S) MUST BE TAKEN DOWNSTREAM OF THE CONFLUENCE OF THE LAST STORMWATER DISCHARGE FROM THE PERMITTED ACTIVITY (I.E., THE DISCHARGE FARTHEST DOWNSTREAM AT THE SITE) BUT UPSTREAM OF ANY OTHER STORMWATER DISCHARGE NOT ASSOCIATED WITH THE PERMITTED ACTIVITY. WHERE APPROPRIATE, SEVERAL DOWNSTREAM SAMPLES FROM ACROSS THE RECEIVING WATER(S) MAY NEED TO BE TAKEN AND THE ARITHMETIC AVERAGE OF THE TURBIDITY OF THESE SAMPLES USED FOR THE DOWNSTREAM TURBIDITY VALUE.
- IDEALLY THE SAMPLES SHOULD BE TAKEN FROM THE HORIZONTAL AND VERTICAL CENTER OF THE RECEIVING WATER(S) OR THE STORMWATER OUTFALL CHANNEL(S).
- CARE SHOULD BE TAKEN TO AVOID STIRRING THE BOTTOM SEDIMENTS IN THE RECEIVING WATER(S) OR IN THE OUTFALL STORMWATER CHANNEL.
- THE SAMPLING CONTAINER SHOULD BE HELD SO THAT THE OPENING FACES UPSTREAM.
- THE SAMPLES SHOULD BE KEPT FREE FROM FLOATING DEBRIS.
- PERMITTEES DO NOT HAVE TO SAMPLE SHEET FLOW THAT FLOWS ONTO UNDISTURBED NATURAL AREAS OR AREAS STABILIZED BY THE PROJECT. REFER TO PERMIT GAR100002 FOR DEFINITION OF STABILIZED AREAS. FOR INFRASTRUCTURE CONSTRUCTION PROJECTS ON LAND USED FOR AGRICULTURAL OR SILVICULTURAL PURPOSES, FINAL STABILIZATION MAY BE ACCOMPLISHED BY STABILIZING THE DISTURBED LAND FOR ITS AGRICULTURAL OR SILVICULTURAL USE.
- ALL SAMPLING PURSUANT TO THIS PERMIT MUST BE DONE IN SUCH A WAY (INCLUDING GENERALLY ACCEPTED SAMPLING METHODS, LOCATIONS, TIMING, AND FREQUENCY) AS TO ACCURATELY REFLECT WHETHER STORMWATER RUNOFF FROM THE CONSTRUCTION SITE IS IN COMPLIANCE WITH THE STANDARD SET FORTH IN PARTS III.D.3 OR III.D.4 OF GAR 100002.

#31

SAMPLING FREQUENCY

1. THE PRIMARY PERMITTEE MUST SAMPLE IN ACCORDANCE WITH THE PLAN AT LEAST ONCE FOR EACH RAINFALL EVENT DESCRIBED BELOW. FOR QUALIFYING EVENT, THE PERMITTEE SHALL SAMPLE AT THE BEGINNING OF ANY STORM WATER DISCHARGE TO A MONITORED RECEIVING WATER AND/OR FROM A MONITORED OUTFALL LOCATION WITHIN FORTY-FIVE (45) MINUTES OR AS SOON AS POSSIBLE.
2. HOWEVER, WHERE MANUAL AUTOMATIC SAMPLING ARE IMPOSSIBLE (AS DEFINED IN THE PERMIT), OR ARE BEYOND THE PERMITTEE'S CONTROL, THE PERMITTEE SHALL TAKE SAMPLES AS SOON AS POSSIBLE, BUT IN NO CASE MORE THAN TWELVE (12) HOURS AFTER THE BEGINNING OF THE STORM WATER DISCHARGE.
3. SAMPLING BY THE PERMITTEE SHALL OCCUR FOR THE FOLLOWING QUALIFYING EVENTS:

A. FOR EACH AREA OF THE SITE THAT DISCHARGES TO A RECEIVING WATER OR FROM AN OUTFALL, THE FIRST EVENT THAT REACHES OR EXCEEDS 0.5 INCH WITH A STORM WATER DISCHARGE THAT OCCURS DURING NORMAL BUSINESS HOURS AS DEFINED IN THIS PERMIT AFTER ALL CLEARING AND GRUBBING OPERATIONS HAVE BEEN COMPLETED, BUT PRIOR TO COMPLETION OF MASS GRADING OPERATIONS, IN THE DRAINAGE AREA OF THE LOCATION SELECTED AS THE SAMPLING LOCATION;

B. IN ADDITION TO (A) ABOVE, FOR EACH AREA OF THE SITE THAT DISCHARGES TO A RECEIVING WATER OR FROM AN OUTFALL, THE FIRST RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH WITH A STORM WATER DISCHARGE THAT OCCURS DURING NORMAL BUSINESS HOURS AS DEFINED IN THIS PERMIT EITHER 90 DAYS AFTER THE FIRST SAMPLING EVENT OR AFTER ALL MASS GRADING OPERATIONS HAVE BEEN COMPLETED, BUT PRIOR TO SUBMITTAL OF A N.O.T., IN THE DRAINAGE AREA OF THE LOCATION SELECTED AS THE SAMPLING LOCATION, WHICHEVER COMES FIRST;

C. AT THE TIME OF SAMPLING PERFORMED PURSUANT TO (A) AND (B) ABOVE, IF BMPS IN ANY AREA OF THE SITE THAT DISCHARGES TO A RECEIVING WATER OR FROM AN OUTFALL ARE NOT PROPERLY DESIGNED, INSTALLED AND MAINTAINED, CORRECTIVE ACTION SHALL BE DEFINED AND IMPLEMENTED WITHIN TWO (2) BUSINESS DAYS, AND TURBIDITY SAMPLES SHALL BE TAKEN FROM DISCHARGES FROM THAT AREA OF THE SITE FOR EACH SUBSEQUENT RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH DURING NORMAL BUSINESS HOURS UNTIL THE SELECTED TURBIDITY STANDARD IS ATTAINED, OR UNTIL POST-STORM EVENT INSPECTIONS DETERMINE THAT BMPS ARE PROPERLY DESIGNED, INSTALLED AND MAINTAINED;

D. WHERE SAMPLING PURSUANT TO (A), (B) OR (C) ABOVE IS REQUIRED BUT NOT POSSIBLE (OR NOT REQUIRED BECAUSE THERE WAS NO DISCHARGE), THE PERMITTEE, IN ACCORDANCE WITH PART IV.D.4.A.(6), MUST INCLUDE A WRITTEN JUSTIFICATION IN THE INSPECTION REPORT OF WHY SAMPLING WAS NOT PERFORMED. PROVIDING THIS JUSTIFICATION DOES NOT RELIEVE THE PERMITTEE OF ANY SUBSEQUENT OBLIGATIONS UNDER (A), (B) OR (C) ABOVE.

- NOTE THAT THE PERMITTEE MAY CHOOSE TO MEET THE REQUIREMENTS OF (A) AND (B) ABOVE BY COLLECTING TURBIDITY SAMPLES FROM ANY RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH AND ALLOWS FOR SAMPLING AT ANY TIME OF THE DAY OR WEEK.

REPORTING

1. THE APPLICABLE PERMITTEES ARE REQUIRED TO SUBMIT THE SAMPLING RESULTS TO THE EPD BY THE FIFTEENTH DAY OF THE MONTH FOLLOWING THE REPORTING PERIOD. REPORTING PERIODS ARE MONTHS DURING WHICH SAMPLES ARE TAKEN IN ACCORDANCE WITH THIS PERMIT. SAMPLING RESULTS SHALL BE IN A CLEARLY LEGIBLE FORMAT. UPON WRITTEN NOTIFICATION, EPD MAY REQUIRE THE APPLICABLE PERMITTEE TO SUBMIT THE SAMPLING RESULTS ON A MORE FREQUENT BASIS. SAMPLING AND ANALYSIS OF ANY STORMWATER DISCHARGE(S) OR THE RECEIVING WATER(S) BEYOND THE MINIMUM FREQUENCY STATED IN THIS PERMIT MUST BE REPORTED IN A SIMILAR MANNER TO THE EPD. SAMPLING REPORTS MUST BE SUBMITTED TO EPD USING THE ELECTRONIC SUBMITTAL SERVICE PROVIDED BY EPD. SAMPLING REPORTS MUST BE SUBMITTED UNTIL SUCH TIME AS A NOT IS SUBMITTED IN ACCORDANCE WITH PART VI.
2. ALL SAMPLING REPORTS SHALL INCLUDE THE FOLLOWING INFORMATION:

A. THE RAINFALL AMOUNT, DATE, EXACT PLACE AND TIME OF SAMPLING OR MEASUREMENTS;
B. THE NAME(S) OF THE CERTIFIED PERSONNEL WHO PERFORMED THE SAMPLING AND MEASUREMENTS;
C. THE DATE(S) ANALYSES WERE PERFORMED;
D. THE TIME(S) ANALYSES WERE INITIATED;
E. THE NAME(S) OF THE CERTIFIED PERSONNEL WHO PERFORMED THE ANALYSES;
F. REFERENCES AND WRITTEN PROCEDURES, WHEN AVAILABLE, FOR THE ANALYTICAL TECHNIQUES OR METHODS USED;
G. THE RESULTS OF SUCH ANALYSES, INCLUDING THE BENCH SHEETS, INSTRUMENT READOUTS, COMPUTER DISKS OR TAPES, ETC., USED TO DETERMINE THESE RESULTS;
H. RESULTS WHICH EXCEED 1000 NTU SHALL BE REPORTED AS "EXCEEDS 1000 NTU;" AND
I. CERTIFICATION STATEMENT THAT SAMPLING WAS CONDUCTED AS PER THE PLAN.

GOVERNING AGENCY: CITY OF SAVANNAH
702 STILES AVENUE
SAVANNAH GA, 31415

ATTN.: CHUCK TESSMER
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(912) 651-6573
EMAIL: ctessmer@savannahga.gov

ATTN.: KEITH STRONG
THOMAS & HUTTON
50 PARK OF COMMERCE WAY
SAVANNAH, GA 31405
DAY (912) 721-4103
NIGHT (912) 667-9793
EMAIL: strongk@tandh.com

3. ALL WRITTEN CORRESPONDENCE REQUIRED BY THIS PERMIT SHALL BE SUBMITTED BY RETURN RECEIPT CERTIFIED MAIL (OR SIMILAR SERVICE) TO THE APPROPRIATE DISTRICT OFFICE OF THE EPD ACCORDING TO THE SCHEDULE IN APPENDIX A OF THIS PERMIT. THE PERMITTEE SHALL RETAIN A COPY OF THE PROOF OF SUBMITTAL AT THE CONSTRUCTION SITE OR THE PROOF OF SUBMITTAL SHALL BE READILY AVAILABLE AT A DESIGNATED LOCATION FROM COMMENCEMENT OF CONSTRUCTION UNTIL SUCH TIME AS A NOT IS SUBMITTED IN ACCORDANCE WITH PART VI.

COMPLIANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS

THE CONTRACTOR WILL OBTAIN COPIES OF ANY AND ALL LOCAL AND STATE REGULATIONS THAT ARE APPLICABLE TO STORM WATER MANAGEMENT, EROSION CONTROL, AND POLLUTION MINIMIZATION AT THIS JOB SITE AND WILL COMPLY FULLY WITH SUCH REGULATIONS. THE CONTRACTOR WILL SUBMIT WRITTEN EVIDENCE OF SUCH COMPLIANCE IF REQUESTED BY THE OWNER OR ANY AGENCY OF A REGULATORY BODY. THE CONTRACTOR WILL COMPLY WITH ALL CONDITIONS OF ANY AND ALL LOCAL, STATE AND FEDERAL AGENCIES THAT HAVE GOVERNING AUTHORITY, INCLUDING THE CONDITIONS RELATED TO MAINTAINING THE ESPCP AND EVIDENCE OF COMPLIANCE WITH THE ESPCP AT THE JOB SITE AND ALLOWING REGULATORY PERSONNEL ACCESS TO THE JOB SITE AND TO RECORDS IN ORDER TO DETERMINE COMPLIANCE.

RETENTION OF RECORDS

#32

1. THE PRIMARY PERMITEE SHALL RETAIN THE FOLLOWING RECORDS AT THE CONSTRUCTION SITE OR THE RECORDS SHALL BE READILY AVAILABLE AT A DESIGNATED ALTERNATE LOCATION FROM COMMENCEMENT OF CONSTRUCTION UNTIL SUCH TIME AS A N.O.T. IS SUBMITTED IN ACCORDANCE WITH PART VI:

A. A COPY OF ALL NOTICES OF INTENT SUBMITTED TO EPD;
B. A COPY OF THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN REQUIRED BY THIS PERMIT;
C. THE DESIGN PROFESSIONAL'S REPORT OF THE RESULTS OF THE INSPECTION CONDUCTED IN ACCORDANCE WITH PART IV.A.5. OF THIS PERMIT;
D. A COPY OF ALL SAMPLING INFORMATION, RESULTS, AND REPORTS REQUIRED BY THIS PERMIT;
E. A COPY OF ALL INSPECTION REPORTS GENERATED IN ACCORDANCE WITH PART IV.D.4.A OF THIS PERMIT;
F. A COPY OF ALL VIOLATION SUMMARIES AND VIOLATION SUMMARY REPORTS GENERATED IN ACCORDANCE WITH PART III.D.2. OF THIS PERMIT; AND
G. DAILY RAINFALL INFORMATION COLLECTED IN ACCORDANCE WITH PART IV.D.4.A.(2). OF THIS PERMIT.

2. COPIES OF ALL NOTICES OF INTENT, NOTICES OF TERMINATION, INSPECTION REPORTS, SAMPLING REPORTS (INCLUDING ALL CALIBRATION AND MAINTENANCE RECORDS AND ALL ORIGINALS STRIP CHART RECORDINGS FOR CONTINUOUS MONITORING INSTRUMENTATION) OR REPORTS REQUESTED BY THE EPD, EROSION, SEDIMENTATION AND POLLUTION CONTROL PLANS, RECORDS OF ALL DATA USED TO COMPLETE THE NOTICE OF INTENT TO BE COVERED BY THIS PERMIT AND ALL OTHER RECORDS REQUIRED BY THIS PERMIT SHALL BE RETAINED BY THE PERMITTEE WHO EITHER PRODUCED OR USED IT FOR A PERIOD OF AT LEAST THREE YEARS FROM THE DATE THAT THE N.O.T. IS SUBMITTED IN ACCORDANCE WITH PART VI. OF THIS PERMIT. THESE RECORDS MUST BE MAINTAINED AT THE PERMITTEE'S PRIMARY PLACE OF BUSINESS OR AT A DESIGNATED ALTERNATIVE LOCATION ONCE THE CONSTRUCTION ACTIVITY HAS CEASED AT THE PERMITTED SITE. THIS PERIOD MAY BE EXTENDED BY REQUEST OF THE EPD AT ANY TIME UPON WRITTEN NOTIFICATION TO THE PERMITTEE.

LIME RATES AND ANALYSIS

- AGRICULTURAL LIME SHALL BE APPLIED AT THE RATE OF ONE TO TWO TONS PER ACRE UNLESS SOIL TESTS INDICATE OTHERWISE. GRADED AREAS REQUIRE LIME APPLICATION. IF LIME IS APPLIED WITHIN SIX MONTHS OF PLANTING PERMANENT PERENNIAL VEGETATION, ADDITIONAL LIME IS NOT REQUIRED. AGRICULTURAL LIME SHALL BE WITHIN THE SPECIFICATIONS OF THE GEORGIA DEPARTMENT OF AGRICULTURE.

MULCHING (MULCHING IS REQUIRED FOR ALL PERMANENT VEGETATION APPLICATIONS. MULCH APPLIED TO SEEDED AREAS SHALL ACHIEVE 75% SOIL COVER. SELECT THE MULCHING MATERIAL FROM THE FOLLOWING AND APPLY AS INDICATED:

- DRY STRAW OR DRY HAY OF GOOD QUALITY AND FREE OF WEED SEEDS CAN BE USED DRY STRAW SHALL BE APPLIED AT THE RATE OF TWO TONS PER ACRE. DRY HAY SHALL BE APPLIED AT THE RATE OF 2 1/2 TONS PER ACRE.
- WOOD CELLULOSE MULCH OR WOOD PULP FIBER SHALL BE USED WITH HYDRAULIC SEEDING. IT SHALL BE APPLIED AT A RATE OF 500 POUNDS PER ACRE. DRY STRAW OR DRY HAY SHALL BE APPLIED (AT THE RATE INDICATED BELOW) AFTER HYDRAULIC SEEDING.
- ONE THOUSAND POUNDS OF WOOD CELLULOSE OR WOOD PULP FIBER, WHICH INCLUDES TACKIFIER, SHALL BE USED WITH HYDRAULIC SEEDING ON SLOPES 4:1 OR STEEPER
- SERICEA LESPEDEZA HAY CONTAINING MATURE SEED SHALL BE APPLIED AT A RATE O 3 TONS PER ACRE.
- PINE STRAW OR PINE BARK SHALL BE APPLIED AT A THICKNESS OF 3 INCHES FOR BEDDING PURPOSES. OTHER SUITABLE MATERIALS IN SUFFICIENT QUANTITY MAY BE USED WHERE ORNAMENTALS OR OTHER GROUND COVERS ARE PLANTED. THIS IS NOT APPROPRIATE FOR SEEDED AREAS.
- WHEN USING TEMPORARY EROSION CONTROL BLANKETS OR BLACK SOD, MULCH IS NO REQUIRED.

FRED SORORIAN
GSWCC LEVEL II
PLAN REVIEWER
CERTIFICATION #
0000012374

FRED SORORIAN
26741

BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	8-2020

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

SAVANNAH
savannahga.gov

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

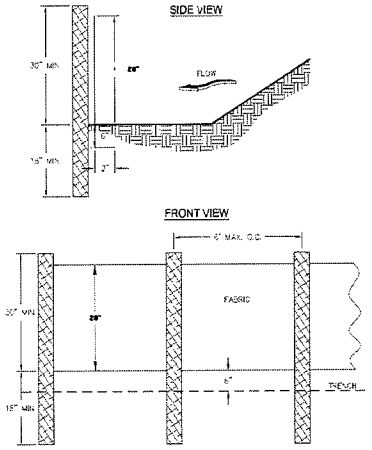
ESPC NOTES

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: 1" = 1'

EC1.2

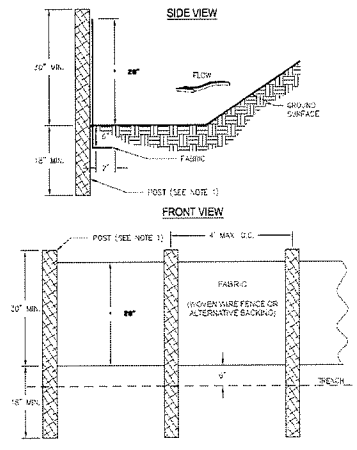
SILT FENCE - TYPE NON-SENSITIVE

#34



NOTES:
1. USE STEEL OR WOOD POSTS OR AS SPECIFIED BY THE EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN.
2. HEIGHT (*) IS TO BE SHOWN ON THE EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN.

SILT FENCE - TYPE SENSITIVE



NOTES:
1. USE STEEL OR WOOD POSTS OR AS SPECIFIED BY THE EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN.
2. HEIGHT (*) IS TO BE SHOWN ON THE EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN.

SEEDING RATES FOR TEMPORARY & PERMANENT COVER

#32

MONTH	TEMPORARY COVER	RATE PER ACRE: SEEDED ALONE	RATE PER ACRE: ADDED TO MIX	PERMANENT COVER	RATE PER ACRE: SEEDED ALONE	RATE PER ACRE: ADDED TO MIX
JANUARY	*LESPEDEZA, ANNUAL *RYE *RYEGRASS, ANNUAL *WHEAT	40 lbs. 3 lbs. 40 lbs. 3 lbs.	10 lbs. .5 lbs. - .5 lbs.	*BAHIA, PENSACOLA BERMUDA, UNHULLED CENTIPEDE, 300 LESPEDEZA, SERICEA /	50 lbs. 10 lbs. - 75 lbs.	30 lbs. 6 lbs. - -
FEBRUARY	LESPEDEZA, ANNUAL *LOVEGRASS, WEEPING *RYE *RYEGRASS, ANNUAL	40 lbs. 4 lbs. 3 lbs. 40 lbs.	10 lbs. 2 lbs. .5 lbs. -	*BAHIA, PENSACOLA CENTIPEDE, 300 LESPEDEZA, SERICEA / *LESPEDEZA, SERICEA / *LOVEGRASS, WEEPING	50 lbs. 75 lbs. 75 lbs. 4 lbs.	30 lbs. - - 2 lbs.
MARCH	*LESPEDEZA, ANNUAL LOVEGRASS, WEEPING *RYEGRASS, ANNUAL *SUDANGRASS	40 lbs. 4 lbs. 40 lbs. 60 lbs.	10 lbs. 2 lbs. - -	BAHIA, PENSACOLA *BERMUDA, HULLED CENTIPEDE, 300 *LESPEDEZA, SERICEA / LESPEDEZA, SERICEA / LOVEGRASS, WEEPING	50 lbs. 10 lbs. 75 lbs. 75 lbs. 4 lbs.	30 lbs. 6 lbs. - - 2 lbs.
APRIL	LOVEGRASS, WEEPING MILLET, BROWNTOP *MILLET, PEARL SUDANGRASS	4 lbs. 40 lbs. 30 lbs. 60 lbs.	2 lbs. 10 lbs. - -	BAHIA, PENSACOLA BERMUDA, HULLED CENTIPEDE, 300 *LESPEDEZA, SERICEA / LESPEDEZA, SERICEA / LOVEGRASS, WEEPING	50 lbs. 10 lbs. 75 lbs. 75 lbs. 4 lbs.	30 lbs. 6 lbs. - - 2 lbs.
MAY	LOVEGRASS, WEEPING MILLET, BROWNTOP MILLET, PEARL SUDANGRASS	4 lbs. 40 lbs. 30 lbs. 60 lbs.	2 lbs. 10 lbs. - -	BAHIA, PENSACOLA BERMUDA, HULLED CENTIPEDE, 300 *LESPEDEZA, SERICEA / LESPEDEZA, SERICEA / LOVEGRASS, WEEPING	50 lbs. 10 lbs. 75 lbs. 75 lbs. 4 lbs.	30 lbs. 6 lbs. - - 2 lbs.
JUNE	*LOVEGRASS, WEEPING MILLET, BROWNTOP MILLET, PEARL SUDANGRASS	4 lbs. 40 lbs. 30 lbs. 60 lbs.	2 lbs. 10 lbs. - -	BAHIA, PENSACOLA *BERMUDA, HULLED *LESPEDEZA, SERICEA / *LESPEDEZA, SERICEA / *LOVEGRASS, WEEPING	50 lbs. 10 lbs. 75 lbs. 75 lbs. 4 lbs.	30 lbs. 6 lbs. - - 2 lbs.

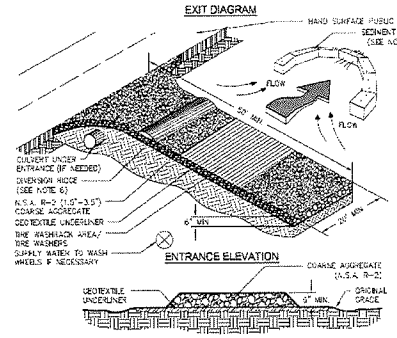
SEEDING RATES FOR TEMPORARY & PERMANENT COVER

MONTH	TEMPORARY COVER	RATE PER ACRE: SEEDED ALONE	RATE PER ACRE: ADDED TO MIX	PERMANENT COVER	RATE PER ACRE: SEEDED ALONE	RATE PER ACRE: ADDED TO MIX
JULY	*MILLET, BROWNTOP MILLET, PEARL SUDANGRASS	40 lbs. 50 lbs. 60 lbs.	10 lbs. - -	*BAHIA, PENSACOLA *LESPEDEZA, SERICEA /	50 lbs. 75 lbs.	30 lbs. -
AUGUST	*MILLET, PEARL *RYEGRASS, ANNUAL	50 lbs. 40 lbs.	- -	*BAHIA, PENSACOLA *LESPEDEZA, SERICEA /	50 lbs. 75 lbs.	30 lbs. -
SEPTEMBER	*BARLEY *OATS *RYE RYEGRASS, ANNUAL *WHEAT	3 lbs. 4 lbs. 3 lbs. 40 lbs. 3 lbs.	.5 lbs. 1 lbs. .5 lbs. - .5 lbs.	*BAHIA, PENSACOLA LESPEDEZA, SERICEA /	50 lbs. 75 lbs.	30 lbs. -
OCTOBER	BARLEY OATS RYE RYEGRASS, ANNUAL WHEAT	3 lbs. 4 lbs. 3 lbs. 40 lbs. 3 lbs.	.5 lbs. 1 lbs. .5 lbs. - .5 lbs.	*BAHIA, PENSACOLA LESPEDEZA, SERICEA /	50 lbs. 75 lbs.	30 lbs. -
NOVEMBER	BARLEY OATS RYE RYEGRASS, ANNUAL WHEAT	3 lbs. 4 lbs. 3 lbs. 40 lbs. 3 lbs.	.5 lbs. 1 lbs. .5 lbs. - .5 lbs.	*BAHIA, PENSACOLA BERMUDA, UNHULLED CENTIPEDE, 300 LESPEDEZA, SERICEA /	50 lbs. 10 lbs. - 75 lbs.	30 lbs. 6 lbs. - -
DECEMBER	BARLEY OATS RYE RYEGRASS, ANNUAL WHEAT	3 lbs. 4 lbs. 3 lbs. 40 lbs. 3 lbs.	.5 lbs. 1 lbs. .5 lbs. - .5 lbs.	*BAHIA, PENSACOLA BERMUDA, UNHULLED CENTIPEDE, 300 LESPEDEZA, SERICEA /	50 lbs. 10 lbs. - 75 lbs.	30 lbs. 6 lbs. - -

NOTES
ALL PERMANENT GRASS PLANTINGS SHALL BE MULCHED
** INDICATES MARGINAL (BUT PERMISSIBLE) PLANTING DATE*
1. UNSCARIFIED
2. SCARIFIED
3. CENTIPEDE SOD CAN BE USED AS PERMANENT COVER ANYTIME EXCEPT TIME THRU OCTOBER.

CRUSHED STONE CONSTRUCTION EXIT

EXIT DIAGRAM

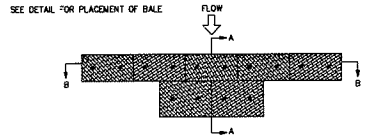


ENTRANCE ELEVATION

NOTES:
1. AVOID LOCATING ON STEEP SLOPES OR AT CURVES ON PUBLIC ROADS.
2. REMOVE ALL VEGETATION AND OTHER UNSUITABLE MATERIAL FROM THE FOUNDATION AREA, GRADE, AND CROWN FOR POSITIVE DRAINAGE.
3. AGGREGATE SIZE SHALL BE IN ACCORDANCE WITH NATIONAL STONE ASSOCIATION R-2 (1.0"-3.5" STONE).
4. GRAVEL PAD SHALL HAVE A MINIMUM THICKNESS OF 6".
5. PAD WIDTH SHALL BE EQUAL FULL WIDTH AT ALL POINTS OF VEHICULAR EGRESS, BUT NO LESS THAN 20'.
6. A DIVERSION RIDGE SHOULD BE CONSTRUCTED WHEN GRADE TOWARD PAVED AREA IS GREATER THAN 2%.
7. INSTALL PIPE UNDER THE ENTRANCE IF NEEDED TO MAINTAIN DRAINAGE DITCHES.
8. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. (CULVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE ENTRANCE TO A SEDIMENT CONTROL DEVICE).
9. WASHRACKS AND/OR TIRE WASHERS MAY BE REQUIRED DEPENDING ON SCALE AND DRIVE-AWAY DISTANCE. IF NECESSARY, WASHRACK DESIGN MAY CONSIST OF ANY MATERIAL SUITABLE FOR TRUCK TRAFFIC THAT REMOVES MUD AND DIRT.
10. MAINTAIN AREA IN A WAY THAT PREVENTS TRACKING AND/OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN-OUT OF ANY MEASURES USED TO TRAP SEDIMENT.

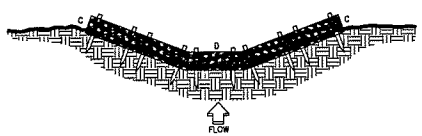
TYPICAL STRAW BALE CHECK DAM

PLAN



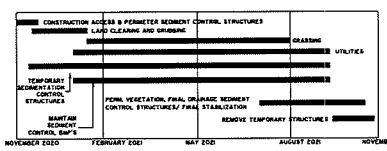
SECTION A-A

SECTION B-B



NOTES:
1. BALES SHOULD BE BOUND WITH WIRE OR NYLON STRING AND SHOULD BE PLACED IN ROWS WITH BALE ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. REMOVE #4 REBAR AFTER STRAW BALES ARE NO LONGER IN PLACE.
3. POINT C OF SECTION B-B SHOULD ALWAYS BE HIGHER THAN POINT D.

#29



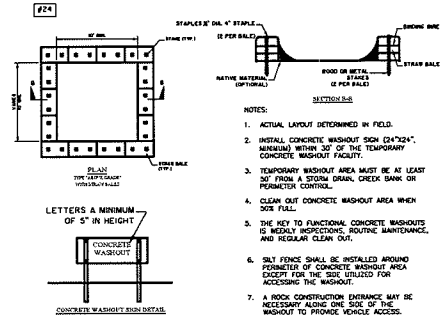
FERTILIZER REQUIREMENTS

#32

TYPE OF SPECIES	YEAR	ANALYSIS OR EQUIVALENT N-P-K	RATE	N TOP DRESSING RATE
1. COOL SEASON GRASSES	FIRST SECOND MAINTENANCE	6-10-10 6-10-10 10-10-10	1500lbs./ac. 900lbs./ac. 400 lbs./ac.	50-100 lbs./ac. * 1 & 2 30
2. COOL SEASON GRASSES AND LEGUMES	FIRST SECOND MAINTENANCE	6-10-10 0-10-10 0-10-10	1500lbs./ac. 1000lbs./ac. 400 lbs./ac.	50-100 lbs./ac. * 1 -
3. GROUND COVERS	FIRST SECOND MAINTENANCE	10-10-10 10-10-10 10-10-10	1300lbs./ac. * 3 1300lbs./ac. * 3 400 lbs./ac.	- - -
4. PINE SEEDLINGS	FIRST	20-10-5	ONE 21-GRAM PELLET PER SEEDLING PLACED IN THE CLOSING HOLE	-
5. SHRUB LESPEDEZA	FIRST MAINTENANCE	0-10-10 0-10-10	700lbs./ac. 700lbs./ac. * 4	-
6. TEMPORARY COVER CROPS SEEDED ALONE	FIRST	10-10-10	500lbs./ac.	30 lbs./ac. * 5
7. WARM SEASON GRASSES	FIRST SECOND MAINTENANCE	6-10-10 6-10-10 10-10-10	1500lbs./ac. 800lbs./ac. 400 lbs./ac.	50-100 lbs./ac. * 2 & 6 50-100 lbs./ac. 30 lbs./ac. * 2
8. WARM SEASON GRASSES AND LEGUMES	FIRST SECOND MAINTENANCE	6-10-10 0-10-10 0-10-10	1300lbs./ac. 1000lbs./ac. 400 lbs./ac.	50-100 lbs./ac. * 6

** 1. APPLY IN SPRING FOLLOWING SEEDING.*
** 2. APPLY IN SPLIT APPLICATIONS WHEN HIGH RATES ARE USED.*
** 3. APPLY IN 3 SPLIT APPLICATIONS.*
** 4. APPLY WHEN PLANTS ARE PRUNED.*
** 5. APPLY TO GRASS SPECIES ONLY.*
** 6. APPLY WHEN PLANTS GROW TO A HEIGHT OF 2 TO 4 INCHES.*

#24



NOTES:
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. INSTALL CONCRETE WASHOUT SIGN (24"X24", MINIMUM) WITHIN 30' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.
3. TEMPORARY WASHOUT AREA MUST BE AT LEAST 50' FROM A STORM DRAIN, CREEK BANK OR PERIMETER CONTROL.
4. CLEAN OUT CONCRETE WASHOUT AREA WHEN 50% FULL.
5. THE KEY TO FUNCTIONAL CONCRETE WASHOUTS IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR CLEAN OUT.
6. SILT FENCE SHALL BE INSTALLED AROUND PERIMETER OF CONCRETE WASHOUT AREA EXCEPT FOR THE SIDE UTILIZED FOR ACCESSING THE WASHOUT.
7. A ROCK CONSTRUCTION ENTRANCE MAY BE NECESSARY ALONG ONE SIDE OF THE WASHOUT TO PROVIDE VEHICLE ACCESS.

STRAW BALE BARRIER CONCRETE WASHOUT

GEORGE FRITZHUGH FRED LORGERAY EXPIRATION DATE 6/30/2021

BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	8-27-2020

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 P: 912.234.5300
www.thomasandhutton.com

SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
ESPC NOTES

JOB NO:	J-27788.0000
DATE:	10-2-19
DRAWN:	CDR
DESIGNED:	CDR
REVIEWED:	FS
APPROVED:	FS
SCALE:	1" = 1'

EC1.3

#1

EROSION, SEDIMENTATION & POLLUTION CONTROL PLAN CHECKLIST
INFRASTRUCTURE CONSTRUCTION PROJECTS

SWCD: _____

Project Name: TRAVIS FIELD WTP 30-INCH EFFLUENT FORCE MAIN Address: Pipemakers Canal Access Road

City/County: Savannah, GA/Chatham County Date on Plans: 10-29-19

Name & email of person filling out checklist: Christina Richard; richard.c@thsmith.com

Plan Page #	Included Y/N	TO BE SHOWN ON ESAPC PLAN
EC1.4	Y	1 The applicable Erosion, Sedimentation and Pollution Control Plan Checklist established by the Commission as of January 1 of the year in which the land-disturbing activity was permitted. (The completed Checklist must be submitted with the ESAPC Plan or the Plan will not be reviewed)
EC1.1	Y	2 Level III certification number issued by the Commission, signature and seal of the certified design professional. (Signature, seal and Level III number must be on each sheet pertaining to ESAPC Plan or the Plan will not be reviewed)
EC1.1	Y	3 The name and phone number of the 24-hour local contact responsible for erosion, sedimentation and pollution controls.
EC1.1	Y	4 Provide the name, address, [illegible], and phone number of primary permittee
EC1.1	Y	5 Note total and disturbed acreage of the project or phase under construction.
EC1.1, EC2.11	Y	6 Provide the GPS locations of the beginning and end of the infrastructure project. Give the Latitude and Longitude in decimal degrees.
EC1.1	Y	7 Initial date of the Plan and the dates of any revisions made to the Plan including the entity who requested the revisions.
EC1.1	Y	8 Description of the nature of construction activity.
EC0.1	Y	9 Provide vicinity map showing site's relation to surrounding areas. Include designation of specific phase, if necessary.
EC0.1, EC2.1-EC2.11	Y	10 Identify the project receiving waters and describe all sensitive adjacent areas including streams, lakes, residential areas, wetlands, marshlands, etc. which may be affected.
EC1.1	Y	11 Design professional's certification statement and signature that the site was visited prior to development of the ESAPC Plan as stated on [illegible] of the permit.
EC1.1	Y	12 Design professional's certification statement and signature that the permittee's ESAPC Plan provides for an appropriate and comprehensive system of BMPs and sampling to meet permit requirements as stated on [illegible] of the permit. *
EC1.1	Y	13 Design professional certification statement and signature that the permittee's ESAPC Plan provides for representative sampling as stated on [illegible] of the permit as applicable. *
EC1.1	Y	14 Clearly note the statement that "The design professional who prepared the ESAPC Plan is to inspect the installation of the initial sediment storage requirements, perimeter control BMPs, and sediment basins within 7 days after installation," in accordance with [illegible] of the permit. *
EC1.1	Y	15 Clearly note the statement that "Non-exempt activities shall not be conducted within the 25 or 50-foot undisturbed stream buffers as measured from the point of wrested vegetation or within 25-feet of the coastal marshland buffer as measured from the Jurisdictional Determination Line without first acquiring the necessary variances and permits."
EC2.1	Y	16 Provide a description of any buffer encroachments and indicate whether a buffer variance is required.
EC1.1	Y	17 Clearly note the statement that "Amendments/revisions to the ESAPC Plan which have a significant effect on BMPs with a hydraulic component must be certified by the design professional." *
EC1.1	Y	18 Clearly note the statement that "Waste materials shall not be discharged to waters of the State, except as authorized by a Section 404 permit." *
EC1.1	Y	19 Clearly note statement that "The escape of sediment from the site shall be prevented by the installation of erosion and sediment control measures and practices prior to land disturbing activities."
EC1.1	Y	20 Clearly note statement that "Erosion control measures will be maintained at all times. If full implementation of the approved Plan does not provide for effective erosion control, additional erosion and sediment control measures shall be implemented to control or treat the sediment source."
EC1.1	Y	21 Clearly note the statement "Any disturbed area left exposed for a period greater than 14 days shall be stabilized with mulch or temporary seeding."
EC1.4	Y	22 Any construction activity which discharges storm water into an Impaired Stream Segment, or within 1 linear mile upstream of and within the same watershed as, any portion of an Biota Impaired Stream Segment must comply with Part IV. C. of the permit. Include the completed Appendix 1 listing of the BMPs that will be used for those areas of the site which discharge to the Impaired Stream Segment. *
	N/A	23 If a TMDL Implementation Plan for sediment has been finalized for the Impaired Stream Segment (identified in Item 22 above) at least six months prior to submittal of NOI, the ESAPC Plan must address any site-specific conditions or requirements included in the TMDL Implementation Plan. *
EC1.4	Y	24 BMPs for concrete washdown of trucks, concrete mixer chutes, hoppers and the rear of the vehicles. Washout of the drum at the construction site is prohibited. *
EC1.2	Y	25 Provide BMPs for the remediation of all petroleum spills and leaks.
EC1.2	Y	26 Description of the measures that will be installed during the construction process to control pollutants in storm water that will occur after construction operations have been completed. *
EC1.1	Y	27 Description of practices to provide cover for building materials and building products on site. *
EC1.1	Y	28 Description of the practices that will be used to remove the pollutants in storm water discharges. *
EC1.4	Y	29 Description and chart or timeline of the intended sequence of major activities which disturb soils for the major portions of the site (i.e., initial perimeter and sediment storage BMPs, clearing and grubbing activities, excavation activities, utility sidewalks, temporary and final stabilization).
EC1.2	Y	30 Provide complete requirements of inspections and record keeping by the primary permittee. *
EC1.2	Y	31 Provide complete requirements of sampling frequency and reporting of sampling results. *
EC1.2	Y	32 Provide complete details for retention of records as per Part IV.F. of the permit. *
EC1.2	Y	33 Description of analytical methods to be used to collect and analyze the samples from each location. *
	N/A	34 Appendix B rationale for NTU values at all outfall sampling points where applicable. *
EC1.1, EC2.11	Y	35 Delineate all sampling locations, perennial and intermittent streams and other water bodies into which storm water is discharged also provide a summary chart of the jurisdiction and analysis for the representative sampling as applicable. *
EC1.1	Y	36 A description of appropriate controls and measures that will be implemented at the construction site including: (1) initial sediment storage requirements and perimeter control BMPs, (2) intermediate grading and drainage BMPs, and (3) final BMPs. For construction sites where there will be no mass grading and the initial perimeter control BMPs, intermediate grading and drainage BMPs, and final BMPs are the same, the Plan may combine all of the BMPs into a single phase. *
EC1.1, EC2.11	Y	37 Graphic scale and North arrow.
EC1.1, EC2.11	Y	38 Existing and proposed contour lines with contour lines drawn at an interval in accordance with the following:

Existing Contours	USGS 1": 2000' Topographical Sheets
Proposed Contours	1": 400' Contoured Profile

	N/A	39 Use of alternative BMPs whose performance has been documented to be equivalent to or superior to conventional BMPs as certified by a Design Professional (unless disapproved by EPD or the Georgia Soil and Water Conservation Commission). Please refer to the Alternative BMP Guidance Document found at www.gaswcc.org
	N/A	40 Use of alternative BMP for application to the Equivalent BMP List. Please refer to Appendix A-2 of the Manual for Erosion & Sediment Control in Georgia 2016 Edition. *
EC1.1, EC2.11	N/A	41 Delineation of the applicable 25-foot or 50 foot undisturbed buffers adjacent to State waters and any additional buffers required by the Local Issuing Authority. Clearly note and delineate all areas of impact
EC1.1, EC2.11	Y	42 Delineation of on-site wetlands and all State waters located on and within 200 feet of the project site.
	EXHIBIT	43 Delineation and acreage of contributing drainage basins on the project site.
	EXHIBIT	44 Delineate on-site drainage and off-site watersheds using USGS 1": 2000' topographical sheets.
EC1.1	Y	45 An estimate of the runoff coefficient or peak discharge flow of the site prior to and after construction activities are completed.
	N/A	46 Storm-drain pipe and weir velocities with appropriate outlet protection to accommodate discharges without erosion. Identify/Delineate all storm water discharge points.
EC1.1, EC2.11	Y	47 Soil series for the project site and their delineation
EC1.1, EC2.11	Y	48 The limits of disturbance for each phase or construction.
EC1.1	Y	49 Provide a minimum of 67 cubic yards of sediment storage per acre drained using a temporary sediment basin, retrofitted detention pond, and/or excavated inlet sediment traps for each common drainage location. Sediment storage volume must be in place prior to and during all land disturbance activities until final stabilization of the site has been achieved. A written justification explaining the decision to use equivalent controls when a sediment basin is not attainable must be included in the Plan for each common drainage location in which a sediment basin is not provided. A written justification as to why 67 cubic yards of storage is not attainable must also be given. Worksheets from the Manual must be included for structural BMPs and all calculations used by the design professional to obtain the required sediment storage when using equivalent controls. When discharging from sediment basins and impoundments, permittees are required to utilize outlet structures that withdraw water from the surface, unless infeasible. If outlet structures that withdraw water from the surface are not feasible, a written justification explaining this decision must be included in the Plan
EC1.1, EC2.11	Y	50 Location of Best Management Practices that are consistent with and no less stringent than the Manual for Erosion and Sediment Control in Georgia. Use uniform coding symbols from the Manual, Chapter 6, with legend.
EC1.3	Y	51 Provide detailed drawings for all structural practices. Specifications must, at a minimum, meet the guidelines set forth in the Manual for Erosion and Sediment Control in Georgia.
EC1.3	Y	52 Provide vegetative plan, noting all temporary and permanent vegetative practices. Include species, planting dates and seeding, fertilizer, lime and mulching rates. Vegetative plan shall be site specific for appropriate time of year that seeding will take place and for the appropriate geographic region of Georgia.

* If using this checklist for a project that is less than 1 acre and not part of a common development but within 200 ft of a perennial stream, the * checklist items would be N/A.

Effective January 1, 2020

#22

APPENDIX 1 SELECTED BMP'S
(SEE APPENDIX 1 ON THIS SHEET)

#0

CONSTRUCTION SITE

PRIMARY PERMITTEE

CONTACT PERSON

TELEPHONE NUMBER

PREMITTEE WEBSITE FOR ESPC PLAN

INSTALL SIGN (MIN. 4'X8') BY START DATE OF CONSTRUCTION VISIBLE FROM PUBLIC ROADWAY
(SEE APPENDIX 1 ON SHEET EC2.4)

#1

CONDUCT TURBIDITY SAMPLING AFTER EVERY RAIN EVENT OF 0.5 INCH OR GREATER WITHIN ANY 24-HOUR PERIOD, RECOGNIZING THE EXCEPTIONS SPECIFIED IN SECTION IV.D.6.D. OF NPEDS PERMITS

#1

ONLY 50% OF THE TOTAL PROJECT DISTURBED ACREAGE CAN BE DISTURBED AT ONE TIME, THEREFORE ONLY 4.45 ACRES OF AREA CAN BE DISTURBED AT ONE TIME. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE DISTURBED ACREAGE.

#1

CONDUCT SOIL TESTS TO IDENTIFY AND TO IMPLEMENT SITE-SPECIFIC FERTILIZER NEEDS.

#22

APPENDIX 1

THE ESAPC PLAN MUST INCLUDE AT LEAST FOUR (4) OF THE FOLLOWING BMPS FOR THOSE AREAS OF THE SITE WHICH DISCHARGE TO A IMPAIRED STREAM SEGMENT AND FOR SITES WHICH EPD HAS APPROVED IN WRITING A REQUEST TO DISTURB 50 ACRES OR MORE AT ANY ONE TIME.

The four items chosen must be appropriate for the site conditions.

Plan Page #	Included Y/N	
		a. During construction activities, double the width of the 25 foot undisturbed vegetated buffer along all State waters requiring a buffer and the 50 foot undisturbed vegetated buffer along all State waters classified as "trout streams" requiring a buffer. During construction activities, EPD will not grant variances to any such buffers that are increased in width.
		b. Increase all temporary sediment basins and retrofitted storm water management basins to provide sediment storage of at least 3600 cubic feet (134 cubic yards) per acre drained
		c. Use baffles in all temporary sediment basins and retrofitted storm water management basins to at least double the conventional flow path length to the outlet structure.
EC0.9 & EC1.4	Y	d. [illegible]
		e. [illegible]
	Y	f. Conduct turbidity sampling after every rain event of 0.5 inch or greater within any 24 hour period, recognizing the exceptions specified in Section IV.D.6.d. of the NPDES Permits.
		g. Comply with the applicable end-of-pipe turbidity effluent limit, without the "BMP defense" as provided for in O.C.G.A. 12-7-6 (a)(1).
		h. Reduce the total planned site disturbance to less than 50% impervious surfaces (excluding any State-mandated buffer areas from such calculations). All calculations must be included on the Plan.
EC1.1 & EC1.4	Y	i. Limit the amount of disturbed area at any one time to no greater than 25 acres or 50% of the total planned site, whichever is less. All calculations must be included on the Plan.
		j. [illegible]
		k. Add appropriate organic soil amendments (e.g., compost) and conduct pre- and post-construction soil sampling to a depth of six (6) inches to document improved levels of soil carbon after final stabilization of the construction site.
		l. Use mulch filter berms, in addition to a silt fence, on the site perimeter wherever construction storm water (including sheet flow) may be discharged. Mulch filter berms cannot be placed in waterways or areas of concentrated flow.
		m. [illegible]
		n. [illegible]
		o. Install sod for a minimum 20 foot width (in lieu of seeding) after final grade has been achieved, along the site perimeter wherever storm water (including sheet flow) may be discharged.
EC1.4	Y	p. Conduct soil tests to identify and to implement site-specific fertilizer needs.
		q. Certified personnel for primary permittees shall conduct inspections at least twice every seven (7) calendar days and within 24 hours of the end of the storm that is 0.5 inches rainfall or greater in accordance with Section IV.D.4.a.(3)(a) – (c); secondary permittees, Section IV.D.4.b.(3)(c) – (c); and tertiary permittees Section IV.D.4.c.(3)(a) – (c) *
		r. Apply the appropriate compost blankets (minimum depth 1.5 inches) to protect soil surfaces until vegetation is established during the final stabilization phase of the construction activity.
		s. Use alternative BMPs whose performance has been documented to be superior to conventional BMPs as certified by a Design Professional (unless disapproved by EPD or the Georgia Soil and Water Conservation Commission). (If using this item please refer to the Alternative BMP guidance document found at www.gaswcc.georgia.gov)
		t. Limit the total planned site disturbance to less than 15% impervious surfaces (excluding any state mandated buffer areas from such calculations). All calculations must be included in the Plan.
		u. [illegible] The Plan must include a statement that the primary permittee must retain the design professional who prepared the Plan to conduct inspections during the intermediate grading and drainage BMP phase and during the final BMP phase
		v. [illegible]

Effective January 1, 2019

* This requirement is different for infrastructure projects:
Certified personnel for primary permittees shall conduct inspections at least once every seven (7) calendar days and within 24 hours of the end of the storm that is 0.5 inches rainfall or greater in accordance with Section IV.D.4.a.(3)(a)– (c) of the permit.

BID SET - NOT FOR CONSTRUCTION

FRED FORCHRAY JR. ELECTRICAL CONSULTANT GA LICENSE #0000012474

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	9/27/20

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
ESPC NOTES

JOB NO. J-27798.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: N/A

EC1.4

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Pn	Pamlico Fine Sandy Loam
Cc	Cape Fear
Mm	Made Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

—x— SILT FENCE

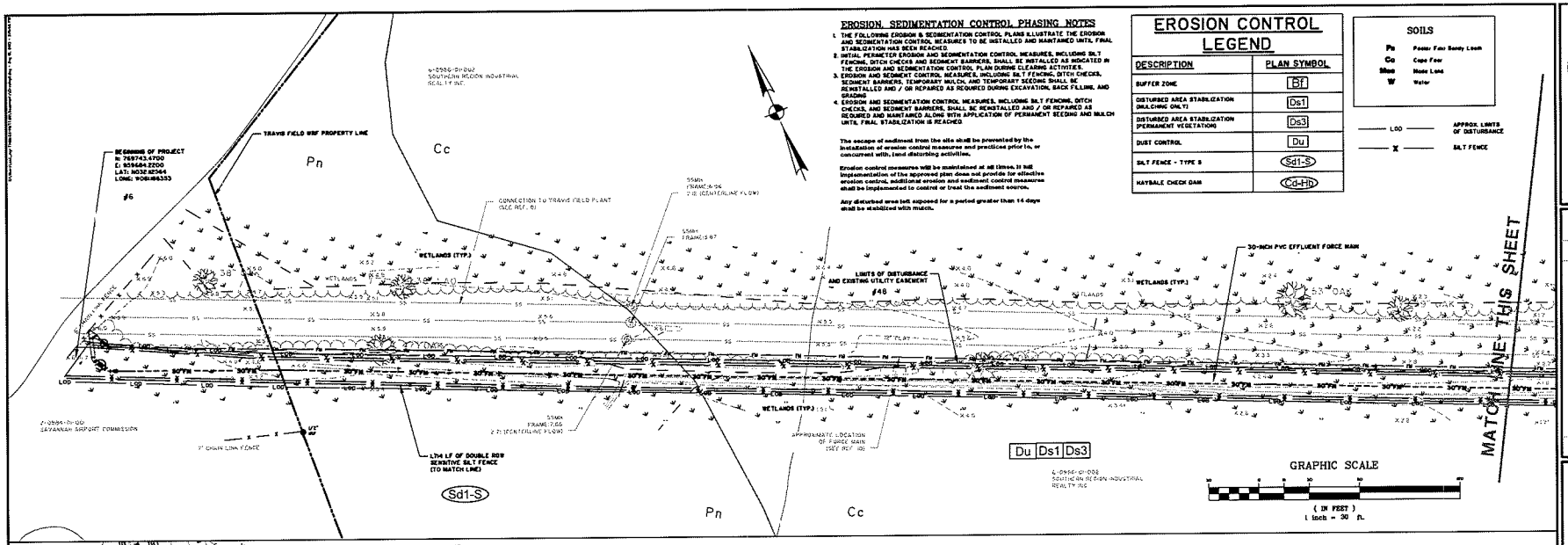
EROSION, SEDIMENTATION CONTROL PHASING NOTES

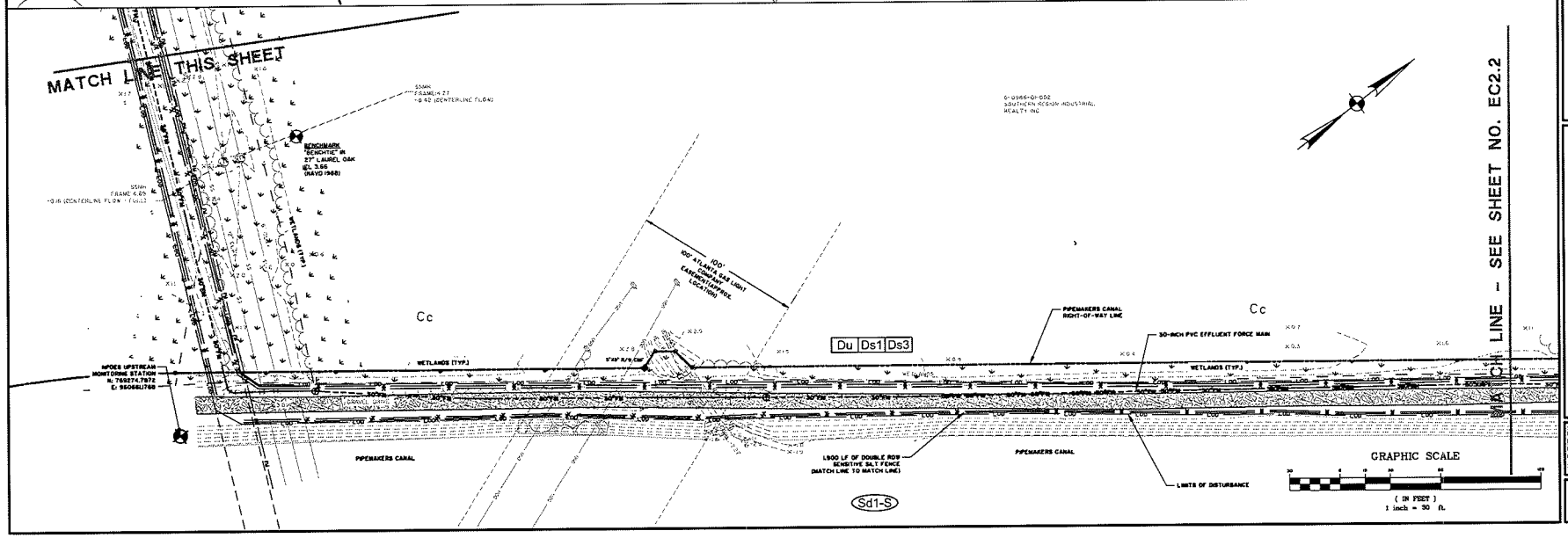
1. THE FOLLOWING EROSION & SEDIMENTATION CONTROL PLANS ILLUSTRATE THE EROSION AND SEDIMENTATION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED UNTIL FINAL STABILIZATION HAS BEEN REACHED.
2. INITIAL PERIMETER EROSION AND SEDIMENTATION CONTROL MEASURES, INCLUDING SILT FENCING, DITCH CHECKS AND SEDIMENT BARRIERS, SHALL BE INSTALLED AS INDICATED IN THE EROSION AND SEDIMENTATION CONTROL PLAN DURING CLEARING ACTIVITIES.
3. EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING SILT FENCING, DITCH CHECKS, SEDIMENT BARRIERS, TEMPORARY MULCH, AND TEMPORARY SEEDING SHALL BE REINSTALLED AND / OR REPAIRED AS REQUIRED DURING EXCAVATION, BACK FILLING, AND GRADING
4. EROSION AND SEDIMENTATION CONTROL MEASURES, INCLUDING SILT FENCING, DITCH CHECKS, AND SEDIMENT BARRIERS, SHALL BE REINSTALLED AND / OR REPAIRED AS REQUIRED AND MAINTAINED ALONG WITH APPLICATION OF PERMANENT SEEDING AND MULCH UNTIL FINAL STABILIZATION IS REACHED

The escape of sediment from the site shall be prevented by the installation of erosion control measures and practices prior to, or concurrent with, land disturbing activities.

Erosion control measures will be maintained at all times. If full implementation of the approved plan does not provide for effective erosion control, additional erosion and sediment control measures shall be implemented to control or treat the sediment source.

Any disturbed area left exposed for a period greater than 14 days shall be stabilized with mulch.





BID SET - NOT FOR CONSTRUCTION

NO	ISSUED FOR BIDS	BY	DATE
0		CDR	9-12-2020

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SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ES&PC PLAN

JOB NO:	J-22788.0000
DATE:	10-2-19
DRAWN:	CDR
DESIGNED:	CDR
REVIEWED:	PS
APPROVED:	PS
SCALE:	AS NOTED

EC2.1

EROSION SEDIMENTATION CONTROL PHASING NOTES

1. THE FOLLOWING EROSION & SEDIMENTATION CONTROL PLANS ILLUSTRATE THE EROSION AND SEDIMENTATION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED UNTIL FINAL STABILIZATION HAS BEEN REACHED.
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EROSION CONTROL LEGEND

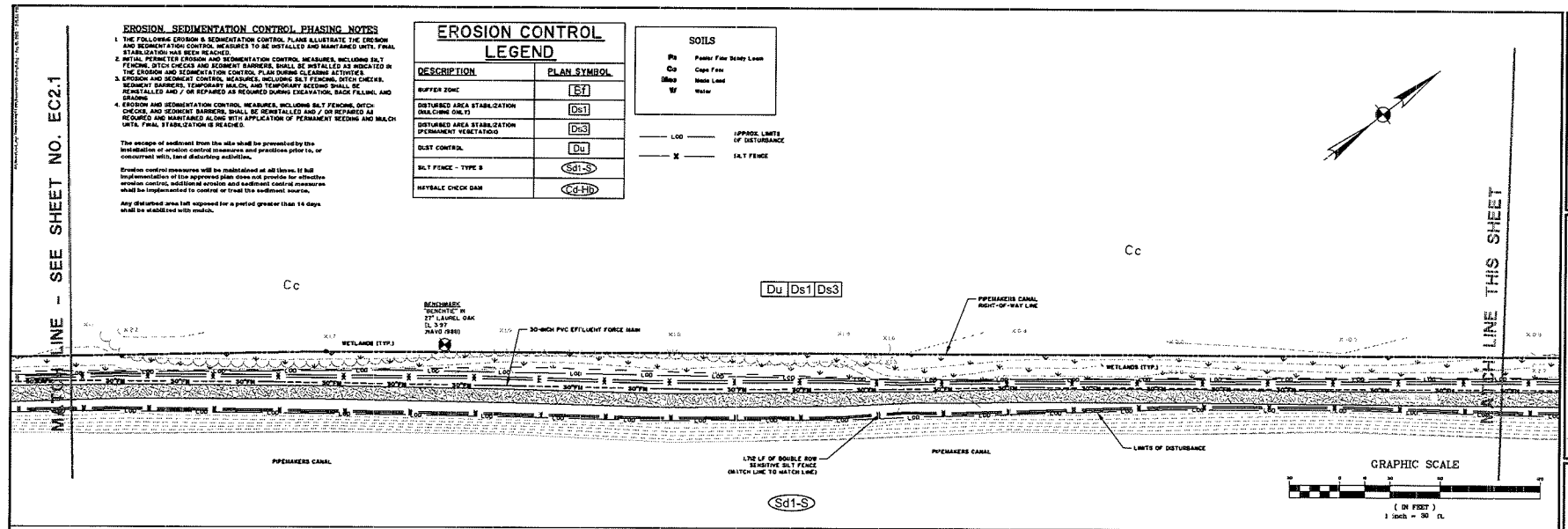
DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Ef
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE B	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

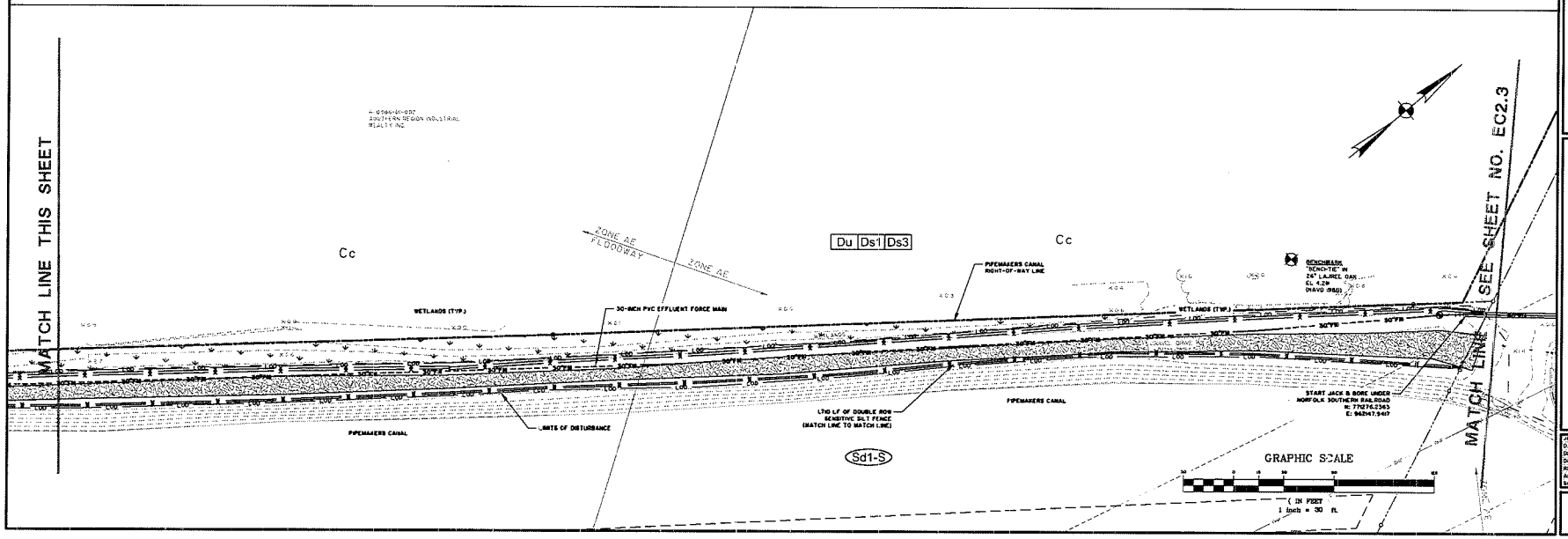
SOILS

Pa	Pamlico Fine Sandy Loam
Co	Cape Fear
Mac	Mocie Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE





BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	9/2020

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SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ESBPC PLAN

JOB NO: J-27718.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

EC2.2

EROSION, SEDIMENTATION CONTROL PHASING NOTES

1. THE FOLLOWING EROSION & SEDIMENTATION CONTROL PLANS ILLUSTRATE THE EROSION AND SEDIMENTATION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED UNTIL FINAL STABILIZATION HAS BEEN REACHED.
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EROSION CONTROL LEGEND

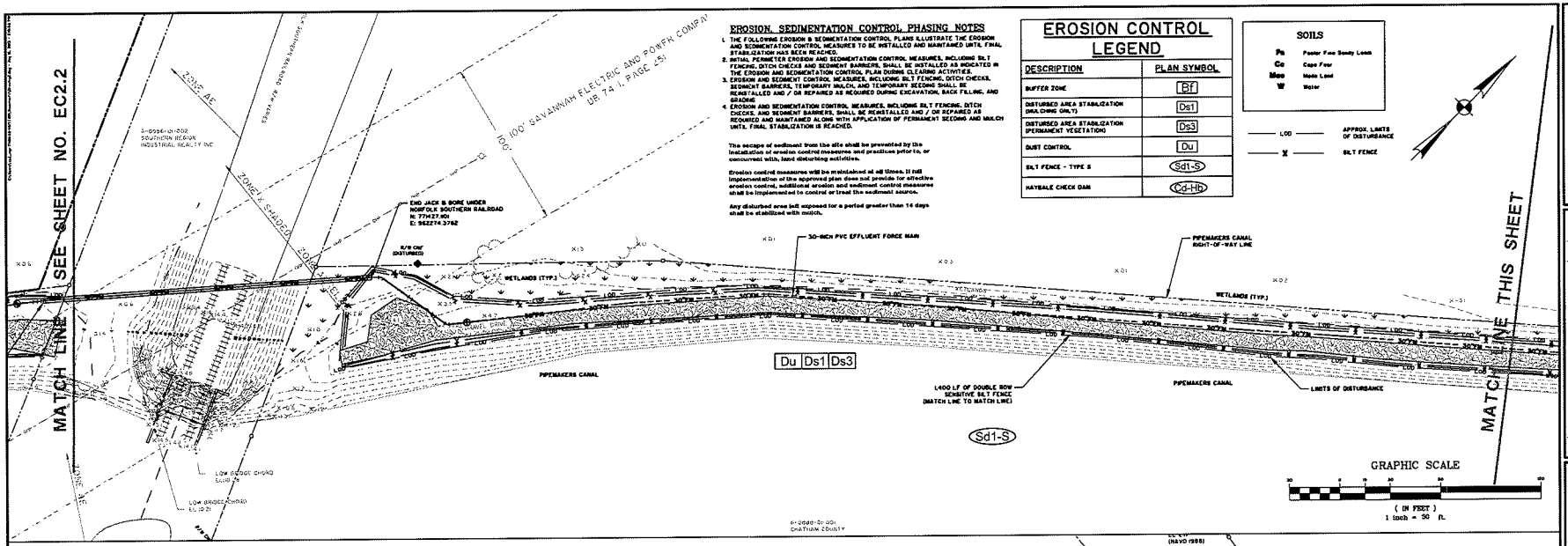
DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

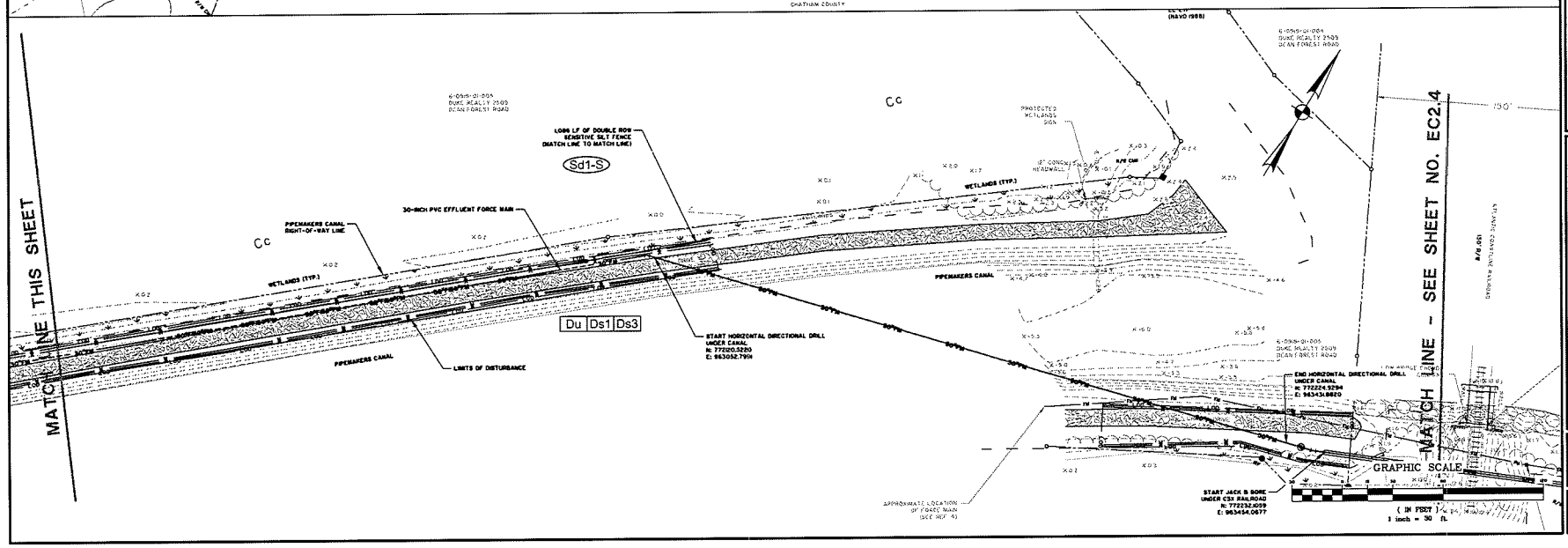
SOILS

Pa	Pooler Fine Sandy Loam
Co	Cape Fear
Mpo	Made Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE





FRED SORORIAN REGISTERED PLAN REVIEWER CERTIFICATION # 0000012274

BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	4/28/10

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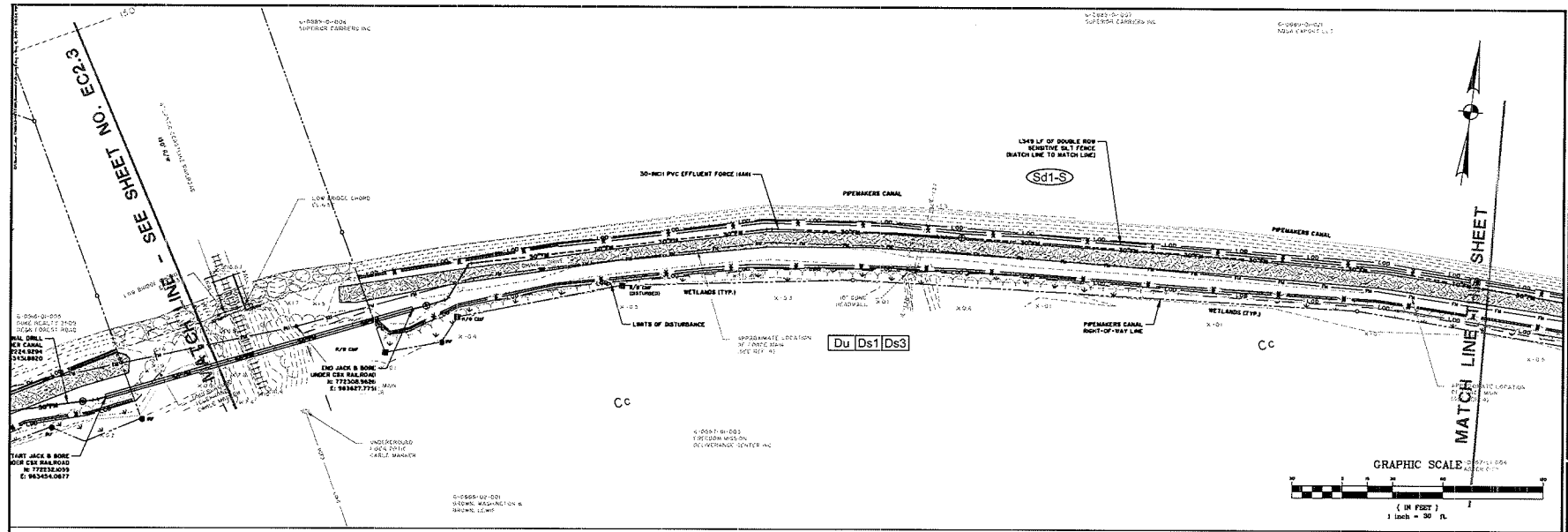
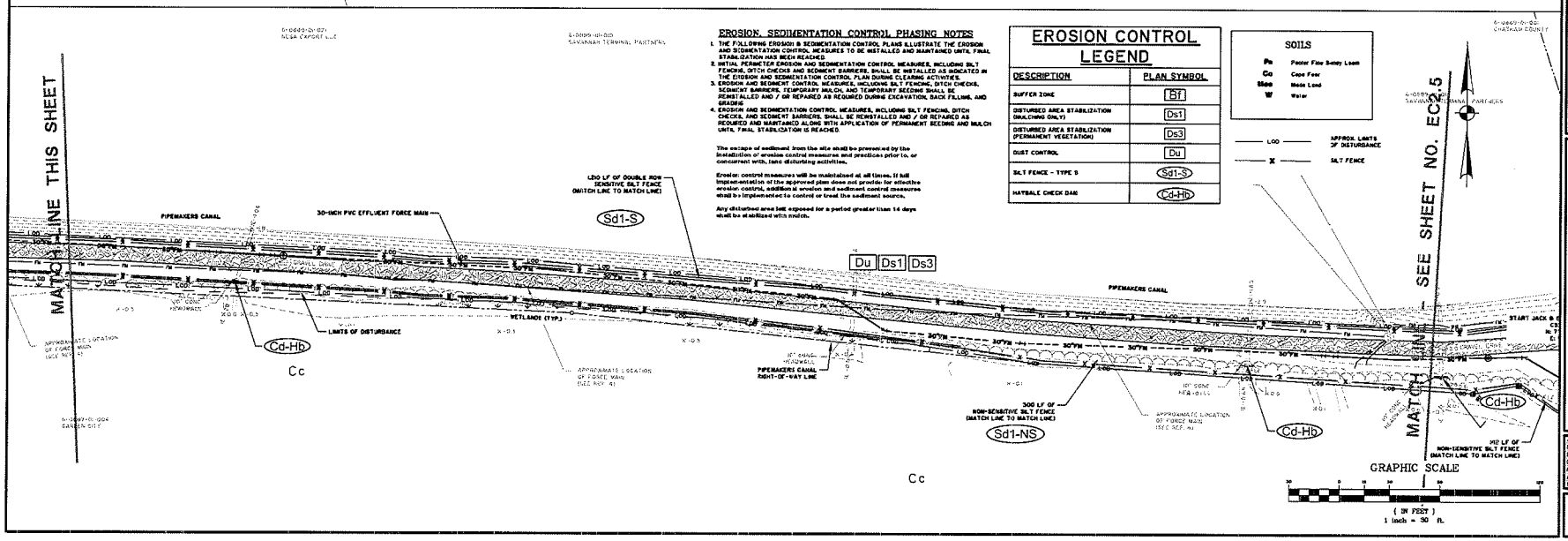
SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
ESBPC PLAN

JOB NO:	J-27788.0000
DATE:	10-2-09
DRAWN:	CDR
DESIGNED:	CDR
REVIEWED:	FS
APPROVED:	FS
SCALE:	AS NOTED

EC2.3





EROSION, SEDIMENTATION CONTROL PHASING NOTES

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EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Pm	Pooler Fine Sandy Loam
Co	Cape Fear
Bsm	Mein Loid
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE

BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	8/2020

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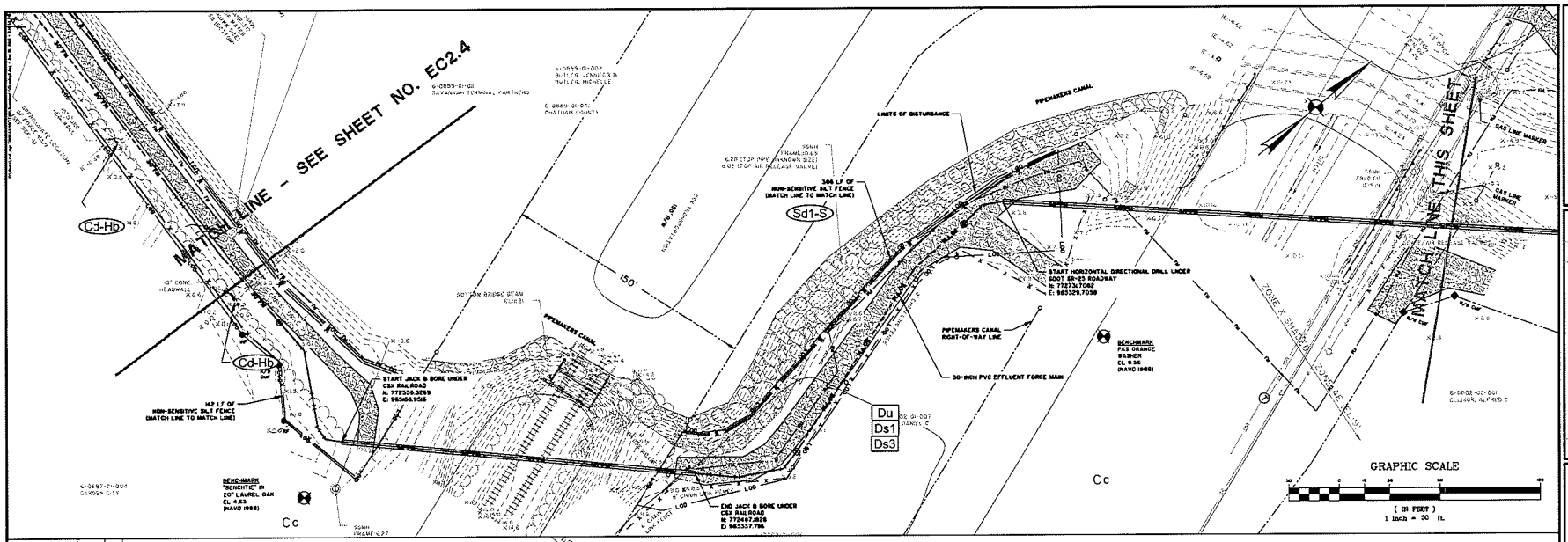
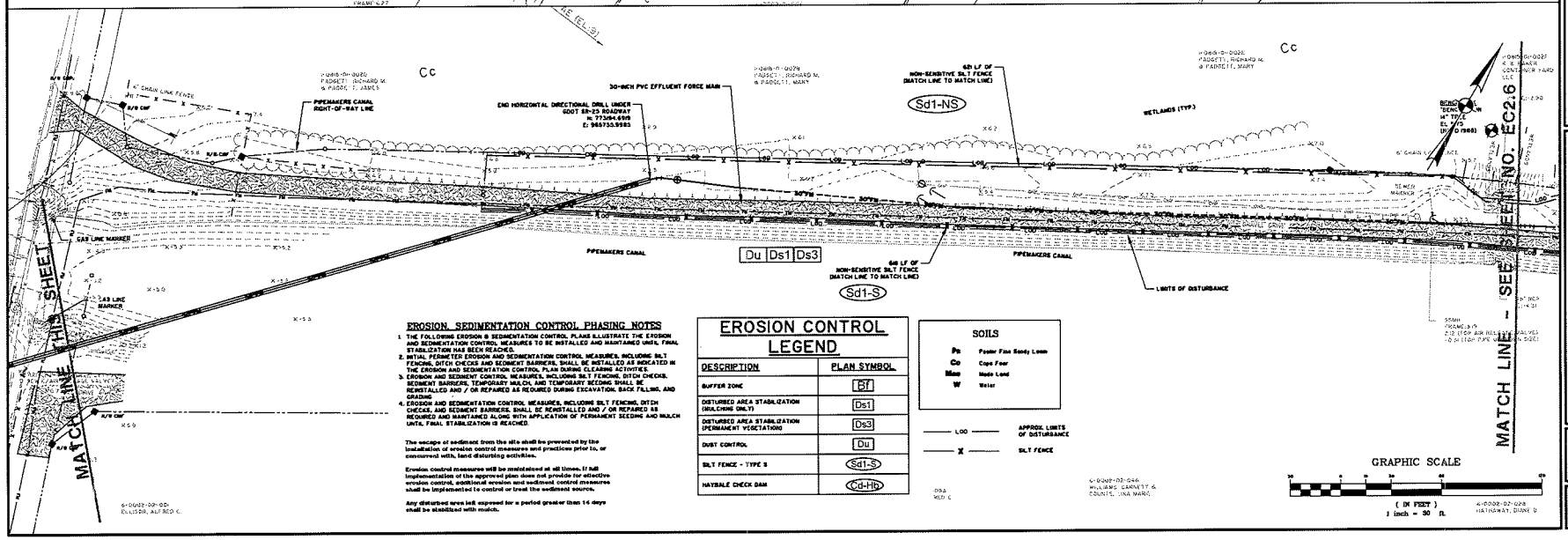
SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
ESBPC PLAN

JOB NO:	P-2774.0000
DATE:	10-2-19
DRAWN:	CDR
DESIGNED:	CDR
REVIEWED:	FS
APPROVED:	FS
SCALE:	AS NOTED

EC2.4





EROSION, SEDIMENTATION CONTROL PHASING NOTES

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EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Ps	Pooler Fine Sandy Loam
Co	Cape Fear
Mme	Made Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE

BID SET - NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER FRED SOROKRAY

NO	ISSUED FOR BIDS	BY	DATE
0		CDR	8-22-22

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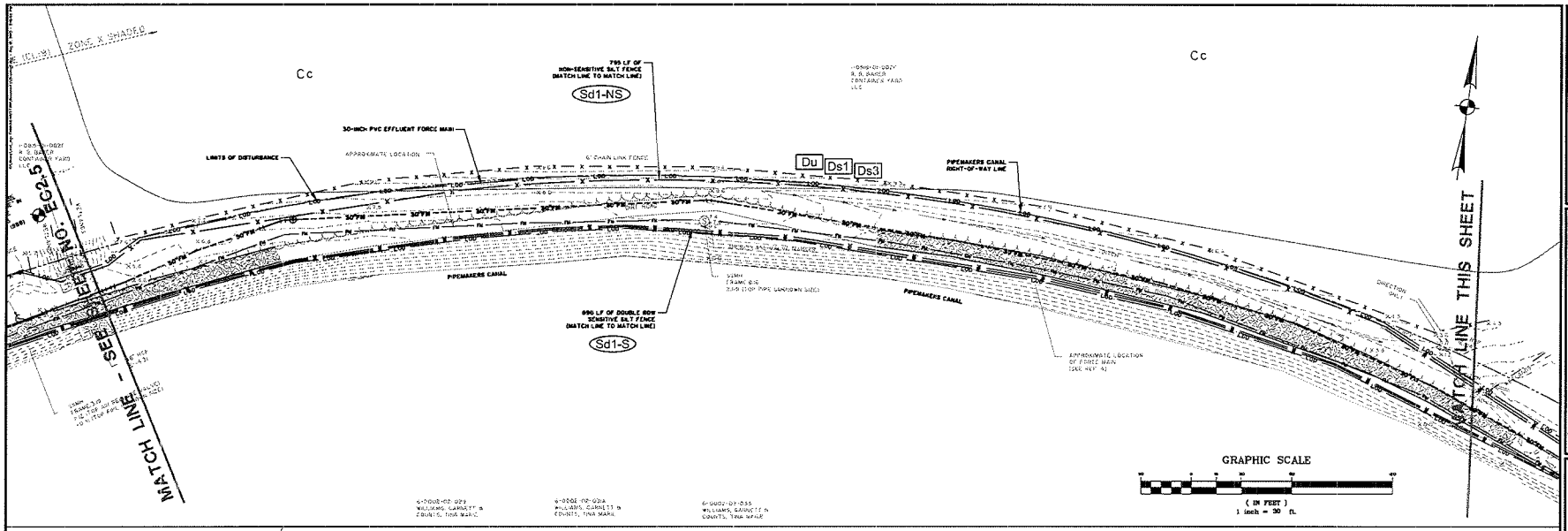
SAVANNAH

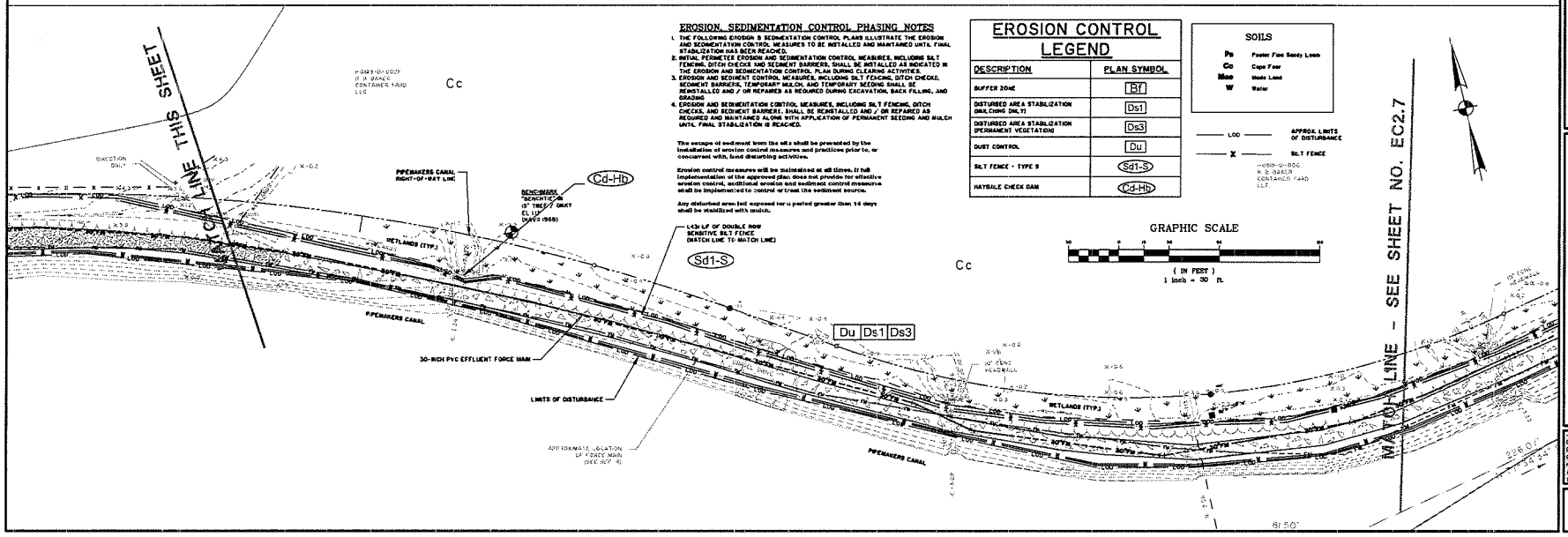
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ES&PC PLAN

JOB NO:	J-27788.0000
DATE:	10-2-19
DRAWN:	CDR
DESIGNED:	CDR
REVIEWED:	FS
APPROVED:	FS
SCALE:	AS NOTED

EC2.5





EROSION, SEDIMENTATION CONTROL PHASING NOTES

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EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Pa	Pooler Fine Sandy Loam
Cc	Cape Fear
Mae	Made Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE

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SAVANNAH

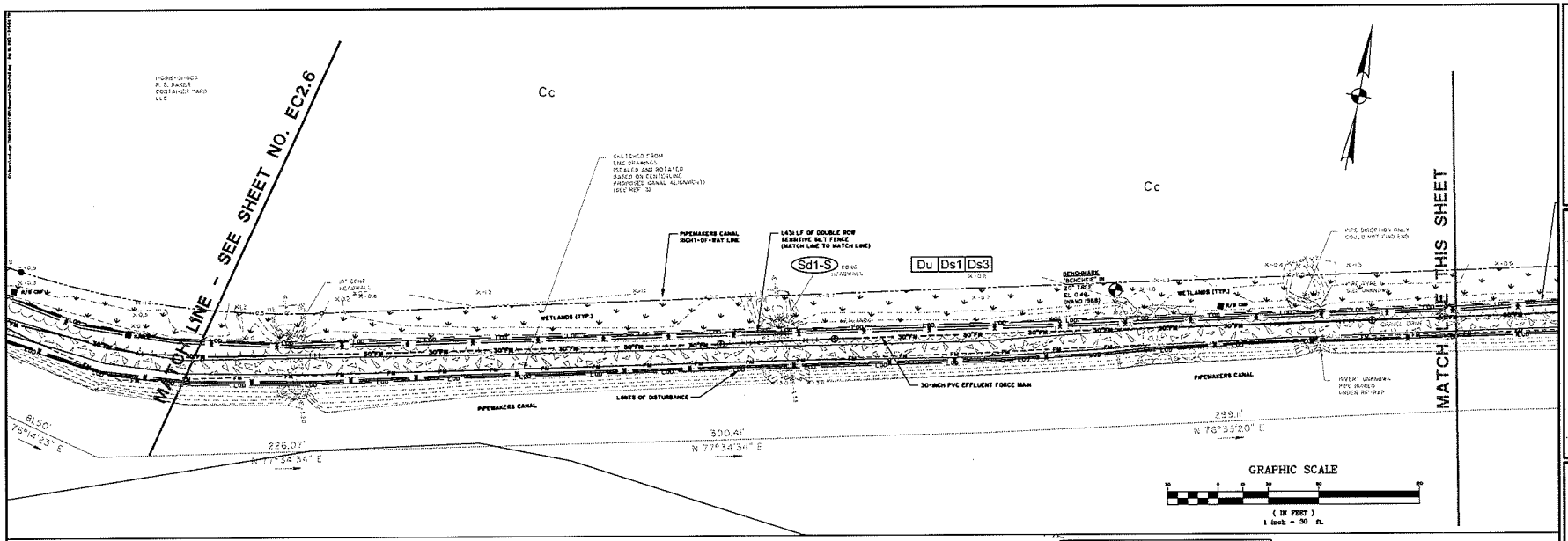
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

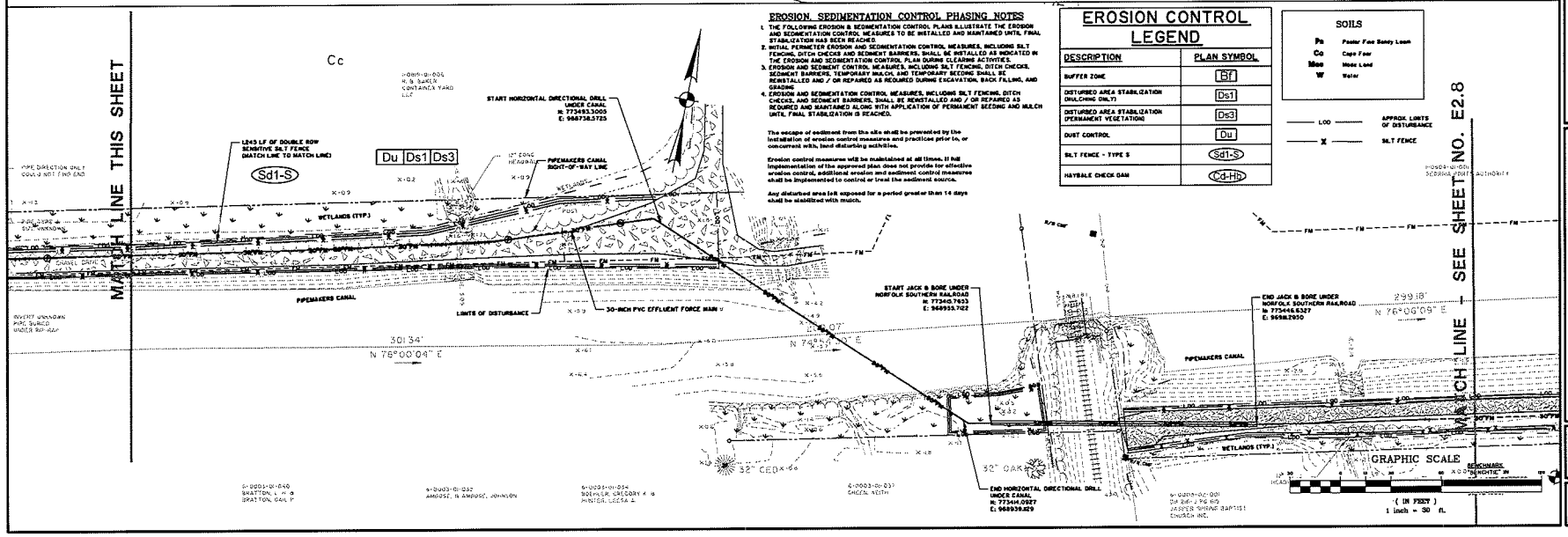
ES&PC PLAN

JOB NO:	J-27788.0000
DATE:	10-2-19
DRAWN:	CDR
DESIGNED:	CDR
REVIEWED:	FS
APPROVED:	FS
SCALE:	AS NOTED

EC2.6

BID SET - NOT FOR CONSTRUCTION





EROSION, SEDIMENTATION CONTROL PHASING NOTES

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EROSION CONTROL LEGEND

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BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Pa	Pooler Fine Sandy Loam
Co	Cape Fear
Mee	Mee Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE

GEORGE H. SCHEFFLER, JR. REGISTERED PROFESSIONAL ENGINEER

FRED SORORIAN CONSULTING ENGINEERS CERTIFICATION # 000012747

BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	5-2-2005

THOMAS & HUTTON

50 Park of Commerce Way
Savannah, GA 31405 · P 912.234.5300
www.thomasandhutton.com

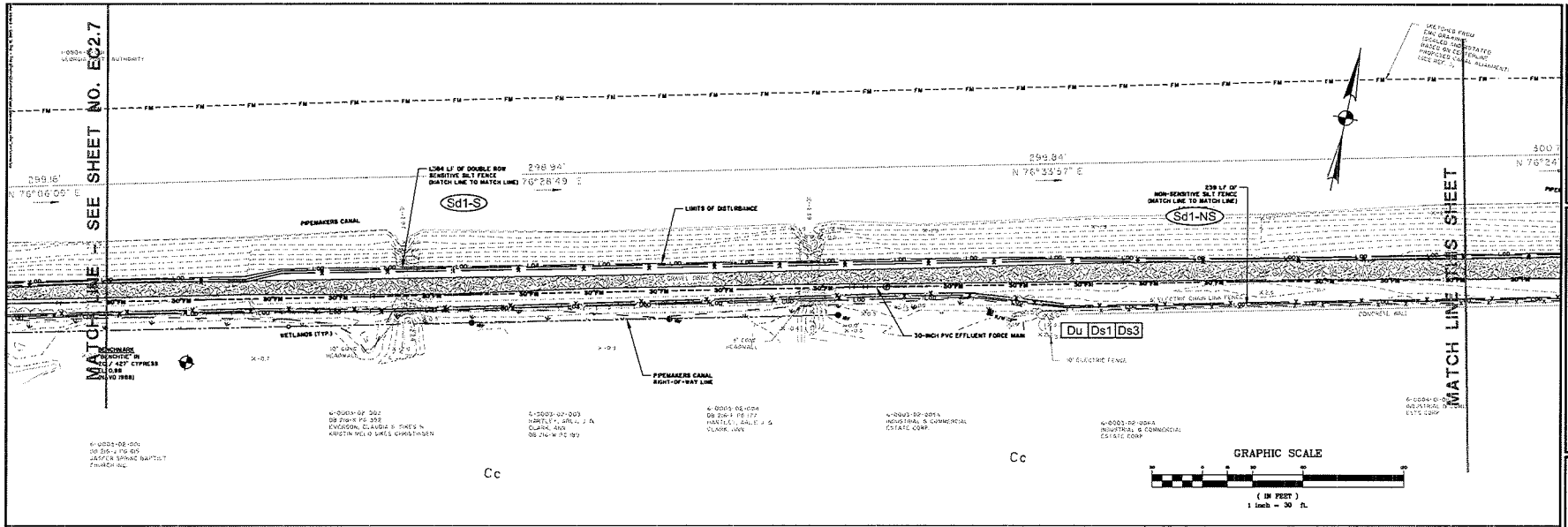
SAVANNAH

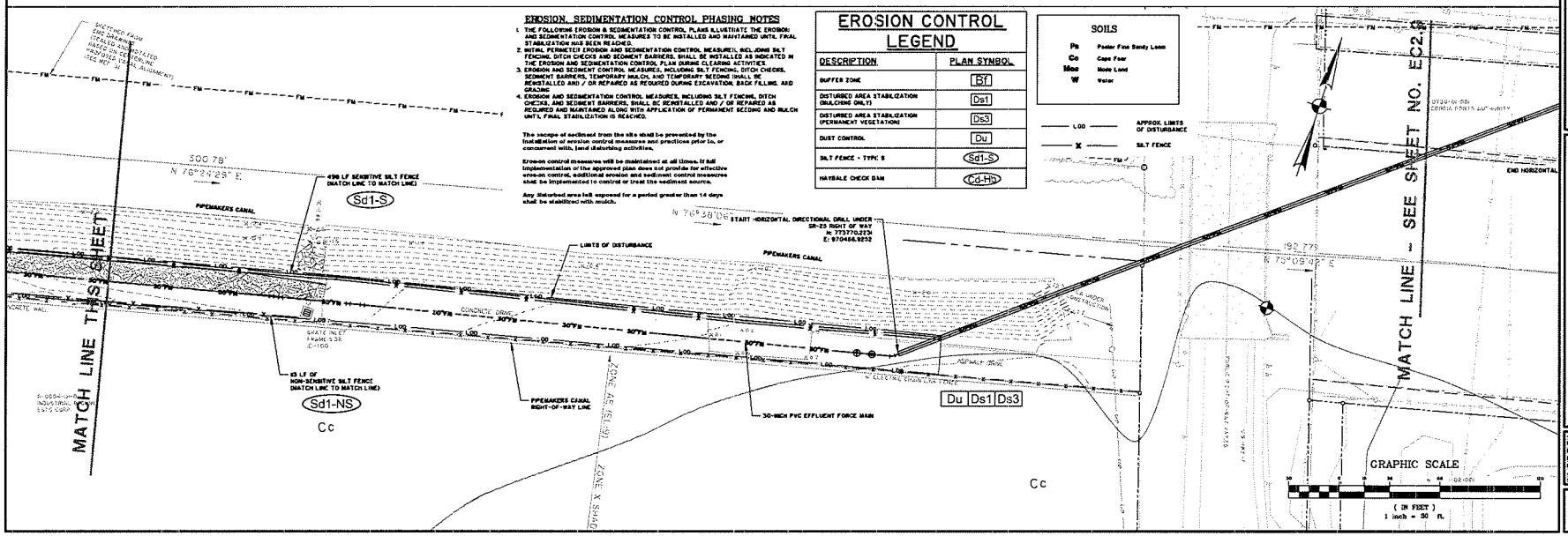
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ES&PC PLAN

JOB NO: J-27188.0000
DATE: 10-2-09
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

EC2.7





EROSION, SEDIMENTATION CONTROL PHASING NOTES

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4. EROSION AND SEDIMENTATION CONTROL MEASURES, INCLUDING SILT FENCING, DITCH CHECKS, AND SEDIMENT BARRIERS, SHALL BE REINSTALLED AND / OR REPAIRED AS REQUIRED AND MAINTAINED ALONG WITH APPLICATION OF PERMANENT SEEDING AND MULCH UNTIL FINAL STABILIZATION IS REACHED.

The escape of sediment from the site shall be prevented by the installation of erosion control measures and practices prior to, or concurrent with, land disturbing activities.

Erosion control measures will be maintained at all times. If full implementation of the approved plan does not provide for effective erosion control, additional erosion and sediment control measures shall be implemented to control or treat the sediment source.

Any disturbed area left exposed for a period greater than 14 days shall be stabilized with mulch.

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Ps	Pooler Fine Sandy Loam
Co	Cape Fear
Mne	Made Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE

BID SET - NOT FOR CONSTRUCTION

FRED SONGEAN
GEORGIA REGISTERED PROFESSIONAL ENGINEER
000001474

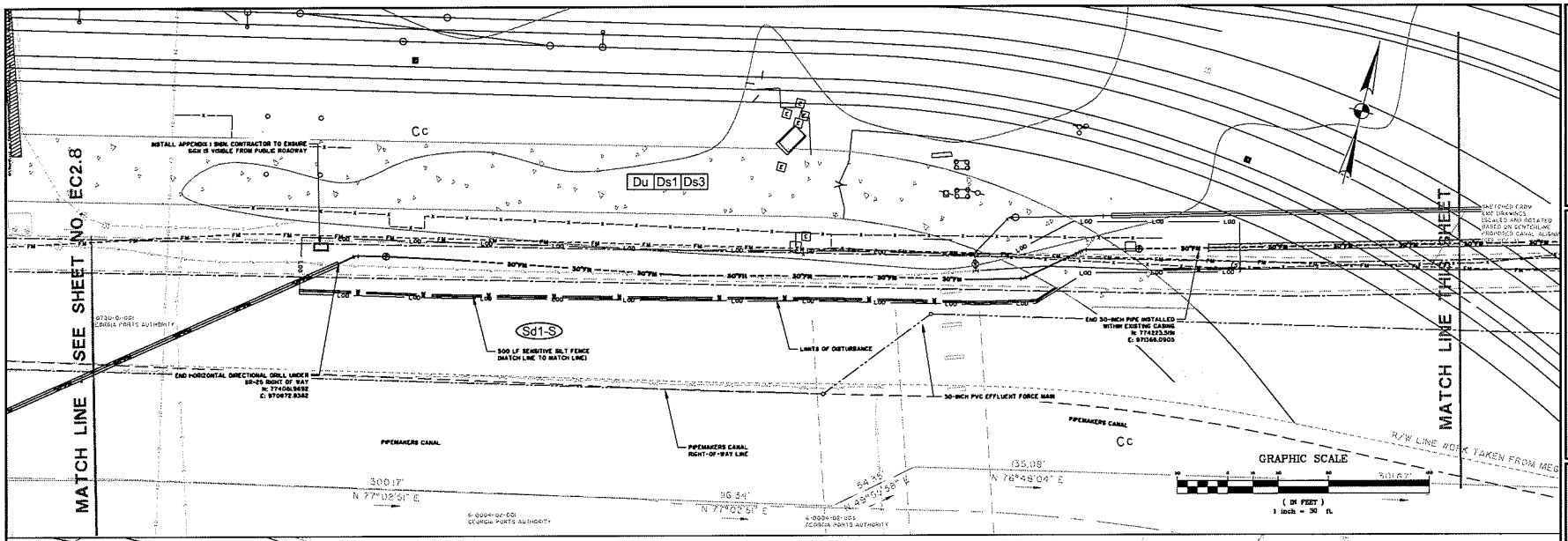
NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	9.2020

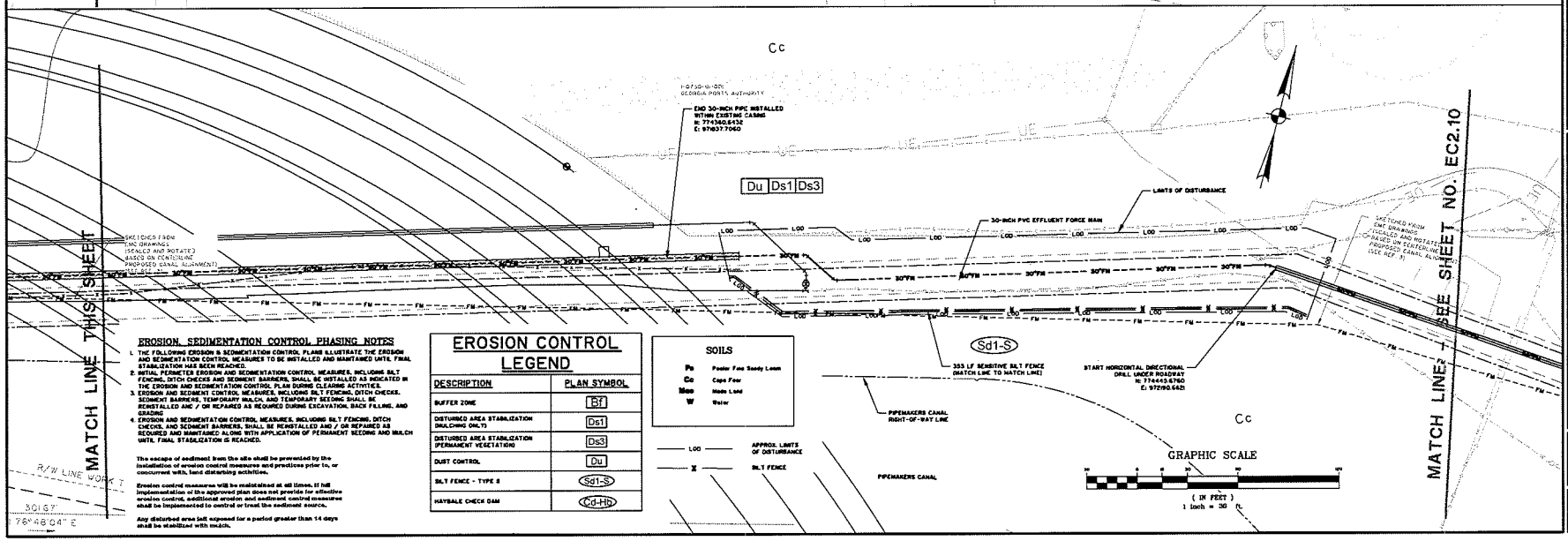
THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
ES&PC PLAN

JOB NO: P-2788.0000
DATE: 10-2019
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

EC2.8





EROSION, SEDIMENTATION CONTROL PHASING NOTES

1. THE FOLLOWING EROSION & SEDIMENTATION CONTROL PLANS ILLUSTRATE THE EROSION AND SEDIMENTATION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED UNTIL FINAL STABILIZATION HAS BEEN REACHED.
2. INITIAL PERIMETER EROSION AND SEDIMENTATION CONTROL MEASURES, INCLUDING SILT FENCING, DITCH CHECKS AND SEDIMENT BARRIERS, SHALL BE INSTALLED AS INDICATED IN THE EROSION AND SEDIMENTATION CONTROL PLAN DURING CLEARING ACTIVITIES.
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Any disturbed area left exposed for a period greater than 14 days shall be stabilized with mulch.

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE II	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Pa	Pooler Fine Sandy Loam
Cc	Cape Fear
Mm	Made Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE

FRED FORDHAM
GEORGIA REGISTERED PROFESSIONAL ENGINEER
CERTIFICATION #
000001978

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	CDR	9-2020

BID SET - NOT FOR CONSTRUCTION

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

SAVANNAH
www.savannahga.gov

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ES&PC PLAN

JOB NO. P-27785.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

EC2.9

EROSION, SEDIMENTATION CONTROL PHASING NOTES

1. THE FOLLOWING EROSION & SEDIMENTATION CONTROL PLANS ILLUSTRATE THE EROSION AND SEDIMENTATION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED UNTIL FINAL STABILIZATION HAS BEEN REACHED.
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EROSION CONTROL LEGEND

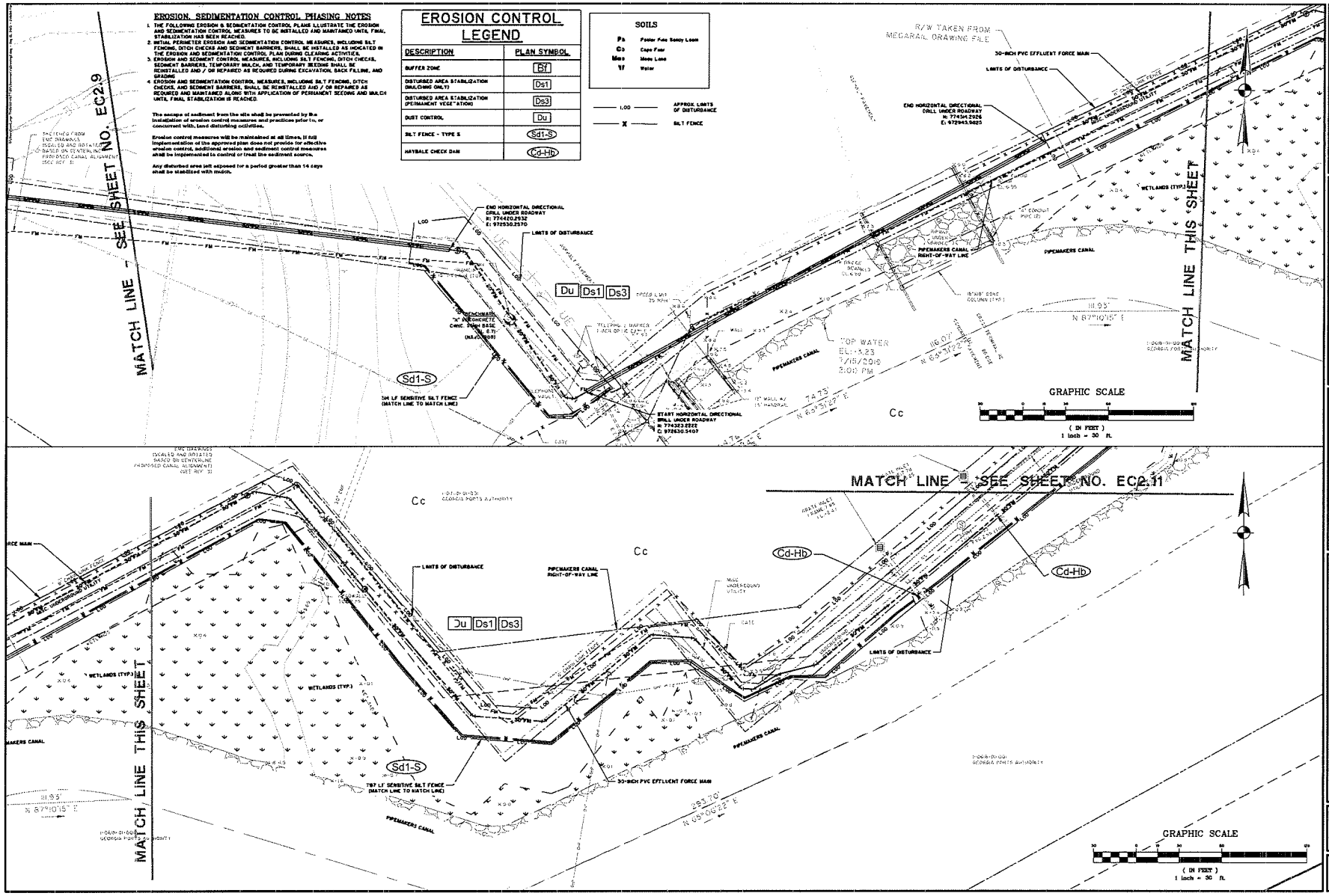
DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Pa	Pelzer Fine Sandy Loam
Cc	Cape Fear
Mes	Mesic Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE



BID SET - NOT FOR CONSTRUCTION

NO	REVISIONS	BY	DATE
0	ISSUED FOR BIDS	COR	5-12-2020

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50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

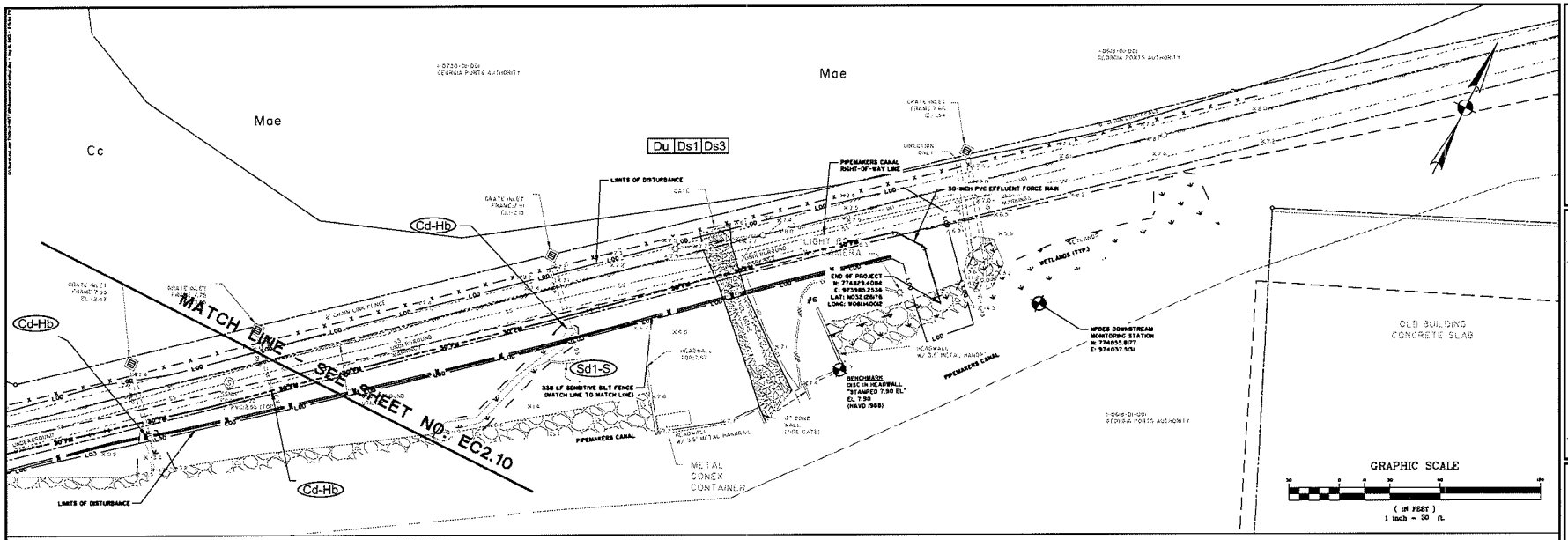
SAVANNAH

TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN

ESC&PC PLAN

JOB NO: C-27108.0000
DATE: 10-2019
DRAWN: COR
DESIGNED: COR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

EC2.10



EROSION SEDIMENTATION CONTROL PHASING NOTES

1. THE FOLLOWING EROSION & SEDIMENTATION CONTROL PLANS ILLUSTRATE THE EROSION AND SEDIMENTATION CONTROL MEASURES TO BE INSTALLED AND MAINTAINED UNTIL FINAL STABILIZATION HAS BEEN REACHED.
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EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
BUFFER ZONE	Bf
DISTURBED AREA STABILIZATION (MULCHING ONLY)	Ds1
DISTURBED AREA STABILIZATION (PERMANENT VEGETATION)	Ds3
DUST CONTROL	Du
SILT FENCE - TYPE S	Sd1-S
HAYBALE CHECK DAM	Cd-Hb

SOILS

Pe	Pelzer Fine Sandy Loam
Co	Cape Fear
Mae	Made Land
W	Water

LOD — APPROX. LIMITS OF DISTURBANCE

X — SILT FENCE

BID SET - NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER
FRED SOROKIAN
GEORGIA REGISTERED PROFESSIONAL ENGINEER
CERTIFICATION # PE013.0014

NO	REVISIONS	BY	DATE
0	ISSUED FOR BID	CDR	8-12-22

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50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

SAVANNAH
TRAVIS FIELD WATER RECLAMATION FACILITY FORCE MAIN
ES&PC PLAN

JOB NO: J-27788.0000
DATE: 10-2-19
DRAWN: CDR
DESIGNED: CDR
REVIEWED: FS
APPROVED: FS
SCALE: AS NOTED

EC2.11

PROJECT MANUAL FOR

PROJECT: TRAVIS FIELD WATER RECLAMATION FACILITY FORCEMAIN
PROJECT NO: SW-534-19

TABLE OF CONTENTS

DIVISION 00 – BIDDING AND CONTRACTUAL REQUIREMENTS

SECTION 00 1050
BIDDER'S CHECKLIST

THIS CHECKLIST **MUST** BE ATTACHED AS THE COVER SHEET TO YOUR BID PRIOR TO SEALING BIDS AND SUBMITTING IT TO THE OFFICE OF THE PURCHASING DIRECTOR. IF THIS CHECKLIST IS NOT ATTACHED, YOUR BID WILL BE DISQUALIFIED. IF THIS CHECKLIST IS INCOMPLETE, OR IF ANY ITEM CANNOT BE VERIFIED AS BEING INCLUDED WITH YOUR BID, YOUR BID WILL BE DISQUALIFIED.

NAME AND ADDRESS _____

_____

EVENT NUMBER **8192**

PROJECT NUMBER **SW-534-19**

INSTRUCTIONS TO BIDDERS

The contents of your bid package must be clearly marked and submitted **IN THE FOLLOWING ORDER:** 1) Acknowledgment of Addendum, 2) Bid Bond (Section 00 1137), 3) Bid Proposal page (Section 00 1130), 4) Bidder's Qualifications (Section 00 1135), 5) Contractor Affidavit and Agreement (Section 00 1138), 6) Affidavit Verifying Residency Status for City of Savannah Benefit Application (Section 00 1139), 7) Certification Regarding Debarment, Suspension, etc. (Section 00 1150) and 8) Hire Savannah Agreement (Section 00 1305). In addition, a separate sealed envelope must be submitted with your bid which contains the Disadvantaged Business Enterprise Provisions (Section 00 1310). A second sealed envelope marked "Bidder's Qualifications" must also be submitted. Please place a check mark in the appropriate spaces.

1) Addenda received and included in bid price? ___ Yes ___ No

   Indicate number of addenda received: _____

2) Executed Bid Bond enclosed? ___ Yes ___ No

   Form of bid bond: ____Surety Company ____ Cashier's Check ____ Certified Check

3) Are all signature pages of the Bid Proposal signed?

   __ Yes __ No

4) Are all signature pages of the Bidder's Qualifications signed?

   ___ Yes ___ No

5) For Projects under $100,000, are all pages of the Bidder's Questionnaire executed?

   ___ Yes ___ No

6) The contractor, or any subcontractor, submitting a bid for utility contracting, as defined in O.C.G.A. Section 43-14-2 to a utility system as defined in said section, shall conform to O.C.G.A. Section 43-14-8.2 et seq. with reference to Utility Contractor's Licenses. Utility contracting means a proposal to perform utility work, to a utility system as defined in O.C.G.A. Section 43-14-2(17).

7) The contractor shall submit with their bid, in a separate sealed envelope, documents required in Sections 00 1310 Disadvantaged Business Enterprises Provisions. Such envelope shall be clearly marked with the bid number, project name and number and marked "Section 00 1310 Disadvantaged Business Enterprise Provisions."

8) Debarment and Suspension Requirements: The Contractor agrees to provide certification that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded by any Federal department or agency pursuant to the regulations implementing Executive Order 12549, 29 CFR Part 98, Section 98.510. The contractor shall submit with their bid the certification in Section 00 1150, Debarment and Suspension Requirements.

I certify that the above items were included with the attached bid at the time submitted to the Purchasing Director.

_____ _____

Signature of Contractor Date

_____

Title

Section 00 1100

INVITATION TO BID

Sealed proposals for **Travis Field Water Reclamation Facility Force Main (SW-534-19)** will be received by the City of Savannah in the office of the Purchasing Director, Coastal Georgia Center, 305 Fahm Street, Savannah, GA 31401, until 1:30PM EST on Tuesday, **December 22, 2020**. The names of the respondents will be read aloud at 1:30PM EST of the same day and no further bids will be accepted. The Disadvantaged Business Enterprises Provisions will be evaluated, and those bids found to be in compliance with the DBE Provisions shall be opened and read aloud at 1:30 PM on Tuesday, December 29, 2020. Bidders' attention is directed to Section 00 1110, paragraph 8, Receipt of Bids, which describes this process in detail.

The work to be done consists of the following generally described items:

> Construction of approximately 17,000 L.F. of 30" effluent force main to include approximately 2,400 L.F. of directional drill, 400 L.F. of jack & bore, erosion control, outfall structure, air release valves, erosion control ,as well as pipe line testing, and other related ancillary work to complete the construction

Plans, specifications and contract documents are available from the designated reprographic company at contractor's expense. Contractors may request to purchase those documents by visiting the City's website at http://www.savannahga.gov/index.aspx?NID=592 and clicking on Construction Bids and Plan holder's List tab to enter the reprographics company's website. You must register on the reprographics company's website to view plans, specs and plan holder's list.

In an effort to ensure that all segments of the business community have access to information, a Contractor's Drawing Room has been established. Plans and specifications are on file and may be examined at the Savannah Entrepreneurial Center, 801 E. Gwinnett Street (corner of Paulsen and Gwinnett) (912) 652-3582.

All bidders are encouraged to attend a **pre-bid teleconference** which will be held at **10:00 AM EST** on Tuesday, December 1, 2020 please use the call in number, 720-740-9665 enter access code 8250082, if you would like to attend this meeting. Project scheduling, coordination requirements, minority participation, and questions of interpretation will be addressed at this time.

Bids must be accompanied by a Bid Bond on the form included hereto and shall be secured by a surety company, certified check or cashier's check in an amount equal to at least 5% of the amount of the bid. A contract performance and payment bond each in the amount of 100% of the contract amount will be required of the successful bidder.

PAYMENT AND PERFORMANCE BONDS MAY BE WAIVED FOR A CONTRACT AWARDED UNDER $100,000.

THE BID BOND FOR THIS CONTRACT WILL NOT BE WAIVED.

All bids must be made and all work performed as provided in Section 00 1300, City Labor Standards, and Section 00 1330 of the Federal Labor Standards Provisions as to employment of Savannah labor.

This is a bid for construction and therefore the City's local vendor preference ordinance will not apply.

Contractors and subcontractors shall have all necessary licenses and shall furnish such license numbers before entering into contracts with the Mayor and Aldermen of the City of Savannah.

The City of Savannah reserves the right to reject any and all bids and to waive any informalities in the bidding.

Bidders must comply with the President's Executive Order Nos. 11246 and 11375 which prohibit discrimination in employment regarding race, creed, color, sex or national origin.

Bidders must comply with Section 2-4078 of the City Code regarding wage rates, Title VI of the Civil Rights Act of

1964, the **Davis-Bacon Act**, the Anti-Kickback Act, and the Contract Work Hours Standard Act.

Bidders are cautioned as follows: By signing this bid or offer, the Bidder will be deemed to have signed and agreed to the provisions of the "Certification of Non-Segregated Facilities" in this solicitation. The "Certification" provides that the bidder does not maintain or provide for his employee's facilities which are segregated on a basis of race, creed, color, or national origin, whether such facilities are segregated by directive or on a defacto basis. The Certification also provides that he will not maintain such segregated facilities. Failure of a bidder to agree to the Certification of Non-Segregated Facilities will render his bid or offer non-responsive to the terms of solicitations.

The City of Savannah actively encourages minority employment and minority participation in all its capital improvement projects. The Bidder shall comply with Section 00 1310, Disadvantaged Business Enterprises Provisions, which requires the Bidder to submit documentation of compliance with these provisions in a separate sealed envelope with their bid. Further attention is called to contract conditions contained herein pertaining to non-discrimination, equal employment opportunity, subcontract and opportunities for project area residents.

The City of Savannah has established a 20% DBE goal for this project of which at least half (10%) should be met by a Local DBE. A good faith effort must be made to achieve both goals.

The contractor, or any subcontractor, submitting a bid for utility contracting, as defined in O.C.G.A. Section 43-14-2 to a utility system as defined in said section, shall conform to O.C.G.A. Section 43-14-8.2 et seq. with reference to Utility Contractor's Licenses and shall submit the bid with the license numbers, as issued by the Division of Utility Contractors, affixed on the outside of the bid envelope as provided by O.C.G.A. Section 43-14-8.2(h). Utility contracting means a proposal to perform utility work, the cost of which exceeds $100,000.00, to a utility system as defined in O.C.G.A. Section 43-14-2(17).

A Utility Contractor's License will be required for this project.

Bids shall be submitted in three (3) separate sealed envelopes. The first envelope shall contain the Disadvantaged Business Enterprises Provisions and shall be clearly marked with the Project Name, Event Number and Section 00 1310 Disadvantaged Business Enterprises Provisions. The second envelope shall contain the Bidder's Qualifications and shall be clearly marked with the Project Name, Event Number and Section 00 1135 Bidder's Qualifications. The third sealed envelope shall contain all other bid requirements and shall be clearly marked with the Project Name and Event Number and Utility Contractor's License Number (when required). The envelopes containing the Disadvantaged Business Enterprises provisions and Bidder's Qualifications shall be attached to the outside of the bid envelope and delivered to:

PURCHASING DIRECTOR
305 Fahm Street
Savannah, GA 31401

Mark the outside of the bid envelope as follows:

PROJECT NAME: **Travis Field Water Reclamation Facility Force Main**
CIP NUMBER: **SW-534-19**
EVENT NUMBER: **8192**

SECTION 00 1110
INSTRUCTION TO BIDDERS

1. EXPLANATION TO BIDDERS - Any explanation regarding the meaning or interpretation of contract documents must be requested in writing, with sufficient allowance of time for receipt of reply before the time of the bid opening. Any such explanations or interpretations shall be made in the form of addenda to the documents and shall be furnished to all bidders, who shall acknowledge receipt of all addenda with their bids. Oral explanations and interpretations made prior to the bid opening shall not be binding.

2. BIDDERS' UNDERSTANDING - Bidders should visit the work site to ascertain by inspection pertinent local conditions such as location, character and accessibility of the site, availability of facilities, location and character of existing work within or adjacent thereto and labor conditions. The Owner shall make available to all prospective bidders, previous to the receipt of bids, information that it may have as to sub-soil conditions and surface topography at the work site. Such information shall be given as the best factual information available without being considered as a representation of the Owner.

3. PRE-BID CONFERENCE - In order to assist bidders in the preparation of their bids, a pre-bid conference will be held December 1, 2020 via teleconference at the date and time specified in the Invitation to Bid. During this conference, the meaning and intent of the Contract Documents will be discussed and any new information that may change the scope of the contract or add clarification to the contract will be answered by Addenda, mailed or delivered to all parties recorded as having received the Bidding Documents.

4. BID REQUIREMENTS - Security, equal to 5% of the amount bid, shall be submitted with the Proposal. Failure to submit same shall be cause for rejection. Only the form provided herein will be accepted. NO OTHER FORM WILL BE ACCEPTED. The bidder, at his option, shall furnish either a certified check, cashier's check or bid bond as security. Bid bonds shall be issued from a company licensed to do business in Georgia and shall be signed or countersigned by a Georgia resident agent and shall have a proper Power of Attorney evidencing the authority of the individual signing the bond. Security deposited by unsuccessful bidders will be returned as soon as practical after the bid opening.

5. PREPARATION OF BIDS:
   A. Bids shall be submitted on the forms provided herein. NO OTHER FORM WILL BE ACCEPTED. These forms must be signed by the bidder or his authorized representative. Any corrections to entries made on bid forms should be initialized by the person signing the bid. Bidders must complete and submit the Bidder's Qualification Sheet and Bidder's Questionnaire.
   B. The bid response must include the following documents in this order:
      - Bid Proposal Form (as a cover sheet)
      - Exception Sheet
      - Other submittals as stated

      All referenced documents must be completed and returned in their entirety to constitute a complete bid.
   C. Bidders must quote on all items appearing on bid forms, unless specific directions in the advertisement, on the bid form, or in the special specifications allow for partial bids. Failure to quote on all items may disqualify the bid at election of the Owner. When quotations on all items are not required, bidders shall insert the words "no bid" where appropriate.
   D. Alternative bids will not be considered unless specifically called for.
   E. Unless otherwise specified, facsimile bids will not be considered. Modifications to bids already submitted will be allowed if submitted and received prior to the time fixed in the Invitation to Bid. Modifications shall be submitted as such, and shall not reveal the total amount of either the original or revised bids. Bid bonds will not be accepted via facsimile.
   F. Bidders are advised that the City of Savannah is intent on completing the construction of this project

in a timely and orderly manner to minimize inconvenience to the public and to reduce the cost to the City for inspection and administrative expense. The provisions of Section 00 1500-79 of the General Conditions pertaining to the completion of the work and liquidated damages will be strictly enforced.

G. To submit pricing electronically for this event, enter pricing for each line item shown under the lines tab on the event summary. To enter pricing manually, complete the bid proposal form. Bids must be submitted on the bid proposal forms in order to be considered.

H. The vendor is responsible for determining and acknowledging any addenda issued in connection with this bid solicitation. All addenda issued for this event must be acknowledged in order for a bid to be considered.

I. To be awarded bids, vendors must be registered as suppliers on the City of Savannah's website at www.savannahga.gov.

J. This contract will be awarded to the vendor offering the lowest net price to the City, and meeting or exceeding all specifications herein.

6. INTERPRETATIONS:

A. Each Bidder shall carefully examine the Contract Documents and all addenda or other revisions and thoroughly familiarize themselves with the detailed requirements prior to submitting a Proposal. Should a Bidder find discrepancies or ambiguities in, or omissions from Bidding Documents, or should the Bidder be in doubt as to their meaning, the Bidder shall at once, and, in any event not later than four (4) days prior to bid date, notify the Project Manager/Project Engineer who will send written addenda to all Bidders. The Project Manager/Project Engineer will not be responsible for any oral instructions. All addenda sent to Bidders will become a part of the Contract Documents. No allowance will be made after bids are received for oversight by the Bidder.

B. Where a discrepancy occurs between the prices quoted in words and/or numbers, the lowest figure quoted shall take precedence and govern in determining final costs or award of contract.

7. SUBMISSION OF BIDS - Bids must be submitted as directed in the Invitation to Bid.

8. RECEIPT OF BIDS – Bids shall be submitted in two separate sealed envelopes. One envelope shall contain the Disadvantaged Business Enterprises Provisions and shall be clearly marked with the Project Name, Bid Number and "Section 00 1310 Disadvantaged Business Enterprises Provisions." The other sealed envelope shall contain all other bid requirements and shall be clearly marked with the Project Name and Bid Number. The envelope containing the Disadvantaged Business Enterprises Provisions shall be attached to the outside of the bid envelope. Bids received after the time so indicated shall be returned unopened.

Only the names of the respondents shall be read aloud at the time indicated for receipt of bids in the Invitation to Bid. Prior to the public opening and reading of bids, the Disadvantaged Business Enterprises Provisions shall be opened and evaluated. Bids shall be retained unopened in the Purchasing Department until the Disadvantaged Business Enterprises Provisions have been evaluated. Bidders deemed to not have met the requirements of the Disadvantaged Business Enterprises shall be notified twenty-four hours prior to bid opening that their documentation has not been accepted. Should the Bidder believe that this determination has been made in error, he should appeal the ruling in writing the City's Purchasing Director. The documentation shall then be reviewed by the City Manager or his designee and a final determination made. No appeals shall be considered after the date and time specified for the public opening and reading of the bids.

Those bids meeting the requirements of the Disadvantaged Business Enterprises Provisions shall be publicly opened and read aloud on the date specified in the Invitation to Bid.

9. WITHDRAWAL OF BIDS - Bids may be withdrawn at any time prior to opening upon written or

facsimile request of the Bidder. Withdrawal of bids shall be in accordance with Section 2-4061 of the Code of the City of Savannah. Negligence on the part of the Bidder in the preparation of their proposal shall not be grounds for modification or withdrawal of a proposal after the time set for bid opening.

10. PRESENCE OF BIDDERS AT OPENINGS - At the time and place fixed for opening bids, the content of all bids will be made public for the information of all bidders and other interested parties, who may be present in person or by representative.

11. BIDDERS INTERESTED IN MORE THAN ONE BID - If more than one bid is offered by one party, or by a person or persons representing a party, all such bids shall be rejected. A party who has quoted prices to a Bidder is not thereby disqualified from quoting prices to other Bidders, or from submitting a direct bid on their behalf.

12. ONE BID RECEIVED - In the event only one bid is received, the bid will be kept by the Owner. The contract or commodity will then be re-advertised and additional bids will be solicited. Under no circumstances shall a Bidder who has filed a request to withdraw a bid be permitted to resubmit a bid for the work. If on the new bid date, again only one bid is received, it will be opened, analyzed, and, if approved by the Mayor and Aldermen, awarded.

13. REJECTION OF BIDS - The Owner reserves the right to reject any and all bids.

14. AWARD OF CONTRACT:
    A. If a contract is to be awarded, it will be awarded to the lowest responsible bidder whose evaluation by Owner indicates to the Owner that the award will be in the best interest of the City. This is a bid for construction and, therefore, the City's local vendor preference ordinance will not apply.
    B. The City reserves the right to award separate contracts based on cost savings as reflected in the bid prices for various divisions of the work.
    C. In case of error in the extension of prices, the unit bid prices shall govern. The Owner reserves the right to waive any informality in evaluating bids.
    D. Business Opportunities: All factors being equal, including price, it is the City's policy to give preference in awarding contracts in the following order or priority:
        1) Business concerns located in or owned in substantial part by residents of the <u>target</u> area. The definition of target area is the planning unit in which the work is being performed.
        2) Business concerns located in or owned in substantial part by residents of the <u>project</u> area. Project area is defined as the corporate limits of the City of Savannah.
    E. For Federally Funded Projects, the Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs and the Contract Analyst of the City of Savannah within ten (10) working days of awards of any construction subcontract in excess of $10,000 at any time for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor, employer identification number, estimated dollar amount of the subcontract, estimated starting and completion dates of the subcontract, and the geographical area in which the contract is to be performed.
    F. The award of the contract will be made by the Mayor and Aldermen of the City of Savannah. Following such approval, the contractor will be issued a Notice of Acceptance of the Bid Proposal.

15. CONTRACT, BONDS, AND INSURANCE:
    A. The bidder(s) to whom award is made shall enter into a written contract with the Owner within the time specified in the Proposal.
    B. Performance and payment bonds shall be furnished at the time of signing the formal agreement. These bonds must be in the form provided herein. NO OTHER FORM WILL BE ACCEPTED. These bonds shall be issued from a company licensed to do business in Georgia and shall be signed

or countersigned by a Georgia agent and shall have a proper Power of Attorney evidencing the authority of the individual signing the bond. These bonds shall each be in an amount equal to the Contract amount.

C. The Contractor shall secure and maintain such insurance policies as are required. Insurance shall be in accordance with the General Conditions attached hereto.

16. PROPOSALS:
    A. Proposals containing reservations, conditions, omissions, unexplained erasures or alterations, items not required in the Bid, or irregularities of any kind, may be rejected by the Owner as being incomplete and not qualified for consideration.
    B. Each Proposal shall indicate the full business name and address of the Bidder, and shall be signed by the Bidder with the usual signature. It shall also set forth the type of business organization, i.e., corporation, partnership, individual owner.
    C. A Proposal submitted by a partnership shall list the names of all partners and shall be signed in the partnership name by one or more members of the partnership. If there is no partner who is a Georgia resident, the name and address of an entity designated to receive service of process for the partnership in Georgia must be provided.
    D. A Proposal submitted by a Corporation shall be signed by the legal name of the Corporation, followed by the state of incorporation and the title designation of the Corporation in legal matters. The name of each person signing the Proposal shall be typed or printed below the signature. If not a Georgia Corporation, there must also be evidence that the corporation is licensed to do business in Georgia.
    E. A Proposal from an individual who is not a Georgia resident shall provide the name and address of an entity in Georgia with the authority to accept service of process for the individual.

17. POWER OF ATTORNEY - A Power of Attorney, or other satisfactory evidence of the authority of the officer signing in behalf of the Corporation, shall be furnished for the Owner's records.

18. EMPLOYMENT ELIGIBITY VERIFICATION - Pursuant to the "Georgia Security and Immigration Compliance Act of 2006," O.C.G.A. Section 13-10-91, public employers and their contractors and subcontractors are required to verify the work eligibility of all newly hired employees through an electronic federal work authorization program. The Georgia Department of Labor has added a new Chapter 300-10-1, entitled "Public Employers, Their Contractors and Subcontractors Required to Verify New Employee Work Eligibility Through a Federal Work Authorization Program," to the Rules and Regulations of the State of Georgia. (See website: http://www.dol.state.ga.us/pdf/rules/300101.pdf.) The new rules designate the "Employment Eligibility Verification (EEV) Basic Pilot Program" operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security as the electronic federal work authorization program to be utilized for these purposes. The EEV/Basic Pilot Program can be accessed at: https://e-verify.uscis.gov/enroll/. Bidders shall comply with this new rule, and must submit with their bid Section 00 1138 "Contractor Affidavit and Agreement." After the contract has been awarded, the Contractor shall secure from all subcontractors Section 00 1231 "Subcontractor Affidavit and Agreement" which must be submitted to the Contract Analyst of the City of Savannah prior to the subcontractor beginning work at the site.

19. SYSTEMATIC ALIEN VERIFICATION FOR ENTITLEMENTS (SAVE) PROGRAM - O.C.G.A. § 50-36-1, et seq., requires Georgia's cities 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 City are considered "public benefits." Bidders must comply with this new rule and therefore will be required to provide Section 00 1139 "Affidavit Verifying Residency Status for City of Savannah Benefit Application" with their bid.

Note that bidders who are not citizens of the United States will be required to provide their Alien Registration Number on the Section 00 1139 Affidavit.

20. DISADVANTAGED EMPLOYMENT - The City of Savannah actively encourages disadvantaged business enterprises (DBEs) in all of its capital improvement projects. It is the policy of the City of Savannah that DBEs have the maximum feasible opportunity to participate in the performance of construction contracts and that City construction contractors utilize DBE subcontractors to the fullest extent consistent with the efficient performance of the contract.

    Bidders shall comply with Section 00 1310, Disadvantaged Business Enterprises Provisions, which requires the Bidder to submit documentation of compliance with these provisions in a separate sealed envelope with their bid.

    Further Bidder's attention is called to contract conditions contained herein pertaining to non-discrimination, equal employment opportunity, subcontractors and opportunities for project area residents.

21. WAGE RATE - Wage Decision No **GA20200077** is assigned to this project. The wage rates included in this project manual shall apply for all construction under this contract.

    (The following contains the wage rates applicable to this project.)

TRAVIS FIELD WATER RECLAMATION FACILTY FORCE MAIN
SW-534-19

"General Decision Number: GA20200077 01/03/2020

Superseded General Decision Number: GA20190077

State: Georgia

Construction Type: Heavy
Heavy Construction, Includes Water and Sewer Lines, and Heavy
Construction on Treatment Plant Sites and Industrial Sites (Refineries, Power Plants, Chemical and Manufacturing Plants,
Paper Mills, Etc.)

Counties: Bryan, Chatham and Effingham Counties in Georgia.

Note: Under Executive Order (EO) 13658, an hourly minimum wage
of $10.80 for calendar year 2020 applies to all contracts
subject to the Davis-Bacon Act for which the contract is awarded
(and any solicitation was issued) on or after January 1, 2015.
If this contract is covered by the EO, the contractor must pay
all workers in any classification listed on this wage
determination at least $10.80 per hour (or the applicable
wage rate listed on this wage determination, if it is higher)
for all hours spent performing on the contract in calendar
year 2020. If this contract is covered by the EO and a
classification considered necessary for performance of work on
the contract does not appear on this wage determination, the
contractor must pay workers in that classification at least
the wage rate determined through the conformance process set
forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,
if it is higher than the conformed wage rate). The EO minimum
wage rate will be adjusted annually. Please note that
this EO applies to the above-mentioned types of contracts
entered into by the federal government that are subject
to the Davis-Bacon Act itself, but it does not apply
to contracts subject only to the Davis-Bacon Related Acts,
including those set forth at 29 CFR 5.1(a)(2)-(60). Additional
information on contractor requirements and worker protections
under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

* ELEC0508-002 09/01/2019

	Rates	Fringes

ELECTRICIAN.....$ 26.55 4.8%+10.38

ENGI0474-025 07/01/2017

	Rates	Fringes
POWER EQUIPMENT OPERATOR: Mechanic.....	$ 26.85	13.83

PLUM0188-006 08/01/2018

	Rates	Fringes
PIPEFITTER.....	$ 27.75	12.95

SUGA2012-107 08/11/2012

	Rates	Fringes
CARPENTER (Form Work Only).....	$ 15.44	0.00
CARPENTER, Excludes Form Work....	$ 14.76	0.00
CEMENT MASON/CONCRETE FINISHER...	$ 16.96	0.00
IRONWORKER, REINFORCING.....	$ 13.30	1.66
LABORER: Common or General.....	$ 11.96	1.16
LABORER: Pipelayer.....	$ 15.50	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	$ 16.88	1.30
OPERATOR: Bulldozer.....	$ 18.36	4.57
OPERATOR: Crane.....	$ 20.29	1.60
OPERATOR: Grader/Blade.....	$ 20.24	0.00

OPERATOR: Loader.....$ 13.21 0.00

OPERATOR: Piledriver.....$ 18.72 2.06

OPERATOR: Roller.....$ 12.04 0.69

PILEDRIVERMAN.....$ 18.50 0.78

TRUCK DRIVER: Dump Truck.....$ 12.79 0.00

TRUCK DRIVER: Lowboy Truck.....$ 17.28 1.84

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic

violence, sexual assault, or stalking. Additional information
on contractor requirements and worker protections under the EO
is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification
and wage rates that have been found to be prevailing for the
cited type(s) of construction in the area covered by the wage
determination. The classifications are listed in alphabetical
order of ""identifiers"" that indicate whether the particular
rate is a union rate (current union negotiated rate for local),
a survey rate (weighted average rate) or a union average rate
(weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed
in dotted lines beginning with characters other than ""SU"" or
""UAVG"" denotes that the union classification and rate were
prevailing for that classification in the survey. Example:

PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion

date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination

* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an
interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION
"

Section 00 1120

EXECUTION OF CONTRACT DOCUMENTS

To: All Bidders

Having to return contract documents to consultants/contractors due to errors or missing information, results in additional staff time and delays in initiating projects. To eliminate these problems, we have prepared the following checklist:

Bid Proposal

1. Complete the Bidder's Checklist, Section 00 1050; Bid Proposal, Section 00 1130; Bidders Qualifications, Section 00 1135; Form of Bid Bond, Section 00 1137; Contractor Affidavit and Agreement, Section 00 1138; Affidavit Verifying Residency Status for City of Savannah Benefit Application, Section 00 1139, Debarment and Suspension Requirements, Section 00 1150; Hire Savannah Agreement, Section 00 1305, and Disadvantaged Business Employment Provisions, Section 00 1310. Note: No page is to be left blank. Use forms enclosed only.

Contract Documents

2. Execute, (**but do not date**) the Agreement, Section 00 1200.

3. Execute, (**but do not date**) the Performance and Payment Bonds, Sections 00 1205 and 00 1210. Execute Section 00 1215, Bond Affidavit. Please note that the Bonds and Affidavit must be signed by an agent registered in the State of Georgia and Agent's license number must be provided. Use forms enclosed only. The AIA Form is not acceptable.

4. Provide a Certificate of Insurance, Section 00 1220, in accordance with the limits of insurance contained in the General Conditions, Section 00 1500-8. The Certificate should refer to a specific project, including project number, and should make reference to the owner, Mayor and Aldermen of the City of Savannah.

5. Complete the Contractor's and Subcontractor's Certificate concerning Labor Standards and Prevailing Wage Requirements, Section 00 1225 and 00 1230, as appropriate and return to the City's Contract Analyst. Complete the Subcontractor's Affidavit and Agreement, Section 00 1231, as appropriate and return to the City's Contract Analyst.

General

6. Throughout the documents, the Contractor's name and the Surety's name must be written exactly as they appear on the corporate seal, if any.

7. The Contractor shall return all sets of the executed contracts to the City's Contract Analyst for review and processing.

Section 00 1130

BID PROPOSAL

MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH
POST OFFICE BOX 1027
SAVANNAH, GA 31402

PROJECT TITLE: Travis Field Water Reclamation Facility Force Main

PROJECT NUMBER: SW-534-19

DATE SUBMITTED:_____

Gentlemen:

Having carefully examined the Plans, Specifications, and other Contract Documents relating to **Travis Field Water Reclamation Facility Force Main (SW534-19)** dated November 2020 and Addendum No.(s) _____, and also having carefully inspected the premises and the conditions affecting the work, the undersigned hereby proposes and agrees to furnish all materials, labor, skill, equipment, tools, and other items of every kind and description specified, needed or used for the complete execution of all work covered by and in conformity with the aforesaid Plans, Specifications, and other Contract Documents prepared by Thomas & Hutton Engineering Co. and the City of Savannah and all Amendments and Addenda thereto, for the sums hereinafter stated.

In the event only one bid is received, the bid will be kept by the Owner. The contract, or commodity, will then be re–advertised and additional bids will be solicited, and the new bid date will be TBD, 2020. If on the new bid date, again only one bid is received, it will be opened, analyzed and, if approved by the Mayor and Aldermen, awarded.

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

BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

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

a. BIDDER has examined and carefully studied the Plans and Specifications for the work and contractual documents relative thereto, and has read all Technical Provisions, Supplementary Conditions, and General Conditions, furnished prior to the opening of Bids and can fulfill the requirements of the work to be performed.

b. BIDDER further acknowledges hereby receipt of the following Addenda:

ADDENDUM NO.	DATE

c. BIDDER has visited the site and become familiar with and is satisfied as to the general, local and site conditions possibly affecting cost, progress, performance and furnishing of the Work.

d. BIDDER is familiar with and is satisfied as to all federal, state, and local Laws and Regulations possibly affecting cost, progress, performance and furnishing of the Work.

e. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions, at or contiguous to the site, and all drawings of physical conditions in or relating to existing surface or subsurface structure, at or contiguous to the site (except underground Facilities), have been identified in the Supplementary Conditions. BIDDER acknowledges such reports and drawings are not Contract Documents and may not be complete for BIDDER's purposes.

   BIDDER acknowledges OWNER and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to Underground Facilities, at or contiguous to the site. BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities), at or contiguous to the site or otherwise, or which relate any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including those identified in the bidding documents, associated safety precautions and programs incident thereto.

   BIDDER does not consider any additional examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the times, price and other terms and conditions of the Bidding Documents.

f. BIDDER is aware of the general nature of Work to be performed by Owner and others at the site relating to Work for which this Bid is submitted as indicated in the Bidding Documents.

g. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

h. BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies BIDDER has discovered in the Bidding Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER. The Bidding

Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

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

j. Bidder has fully coordinated with the railroads, Atlanta Gas Company, Georgia DOT and has included in the base bid price all the insurance fees, coordination, materials, labor, and all other related work to complete the work.

BIDDER will complete the Work in accordance with the Plans & Contract Documents for the prices as shown in Schedule of Bid Proposal. The total contract price shall include the allowances specified and shall include all lump sum costs related to the construction of the force main and related equipment. The lump sum costs shall also include all Taxes, insurances, bonds, permits, fees, overhead & profit, mobilization/demobilization, start-up & commissioning, and project administration.

The City of Savannah will pay for the followings:

a- Land Disturbing Activity Permit
b- EPD N.O.I
c- Third party laboratory testing (retesting of failed test shall be paid by the General Contractor)

Mobilization/Demobilization <u>shall not exceed 1.25%</u> of total contract amount.

SCHEDULE OF BID PROPOSAL

1. 30" Diameter Direct Bury Force Main

For construction, installation, testing, start-up and commissioning of the 30" force main. The lump sum price shall include pipe, valves, manholes, air relief valves, access road improvement, erosion control, and all other Misc. items to include mobilization, insurance, permit fees, overhead & profits, etc.

Total Amount for Item No. 1 _____

_____

Dollars ($_____)

2. Directional Drill Pipe Installation

For construction & installation, and necessary equipment to install casing, force main piping, testing, start-up, and commissioning.

Total Amount of Item No. 2: _____ Dollars

($_____)

3. Jack & Bore Pipe Installation

For construction & installation and necessary equipment to install casing, force main piping, testing, start-up, and commissioning.

Total Amount of Item No. 3: _____Dollars

($_____)

4. Outfall Structure

For Construction of the outfall structure as shown on plans to include erosion protection, riprap, and all other Misc. items to complete a functional structure.

Total Amount of Item No. 4: _____Dollars

($_____)

5. Crushed Stone Bedding Allowance

For 2,000 CY of Crushed Stone Bedding.

Unit price per cubic yard,_____ Dollars ($_____ / CY)

Total amount of Item No. 5 _____ Dollars

($_____)

6. Remove and Replace Unsuitable Material

For removal of 5,000 CY of unsuitable material and replacement with approved offsite borrow material for construction of the wastewater treatment plant.

Unit price per cubic yard _____ Dollars ($_____ / CY)

Total amount of Item No. 6 _____ Dollars

($_____)

TOTAL AMOUNT OF BID - Items 1, 2, 3, 4, 5, and 6 inclusive:

_____

_____ Dollars

($_____)

The undersigned agrees that this Proposal may not be revoked or withdrawn after the time is set for the opening of bids but shall remain open for acceptance for a period of sixty (60) calendar days following such time.

Upon receipt by mail or by hand delivery of the Notice of Acceptance of the Bid Proposal and Project Manual within sixty (60) calendar days after the time for the opening of bids, the undersigned agrees to execute within ten (10) calendar days a Contract (Form of Agreement between Contractor and Owner) for the work for the above–stated compensation and at the same time to furnish and deliver to the Owner a Performance Bond, Payment Bond, Certificate of Insurance, and Contractor Certification forms in accordance with the instructions found in the Project Manual.

The undersigned agrees to commence actual physical work on the site with an adequate force and equipment within ten (10) calendar days from the date to be specified in the Notice to Proceed from the Owner and to complete fully all work within **400** calendar days. It is also agreed that **40** days are included in the specific contract time for this portion of the project for adverse weather days per Article II of the agreement.

Enclosed herewith is a Bid Bond in the amount of _____DOLLARS ($_____) being not less than 5% of the Total Bid. The Bid Bond must be submitted on the required form provided with the Invitation to Bid.

If this Proposal is accepted within sixty (60) days after the date set for the opening of bids and the undersigned fails to execute the Contract within ten (10) calendar days after receipt from the OWNER/Engineer, or if the bidder fails to furnish both a Performance Bond and Payment Bond, the obligation of the Bid Bond will remain in full force and effect and the money payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure; otherwise the obligation of the Bid Bond will be null and void.

This Bid Proposal is respectfully submitted by:

Bidder (Print Name)	GA Business Tax Certificate No.
Signature (Owner, Partner or Corp. Officer)	
	Address
Title	Telephone Number
	If Corporation, affix seal here (SEAL)

Section 00 1135

BIDDER'S QUALIFICATIONS

LEGAL NAME OF BIDDER:_____

STREET ADDRESS:_____

CITY, STATE, ZIP CODE_____

WHEN ORGANIZED:_____

WHEN AND WHERE INCORPORATED:_____

LICENSED OR REGISTERED TO DO BUSINESS IN STATE OF GEORGIA: __ YES __ NO

LICENSED TO DO BUSINESS IN CITY OF SAVANNAH: ___ YES ___ NO

CITY OF SAVANNAH BUSINESS LICENSE NUMBER:_____

IF NO, IN WHAT GEORGIA MUNICIPALITY DOES YOUR COMPANY HAVE A BUSINESS LICENSE:_____

BUSINESS LICENSE NUMBER FOR SAID GEORGIA MUNICIPALITY:_____

FEDERAL I.D. NUMBER: _____

If Partnership, list all partners and their addresses:

_____ _____
_____ _____
_____ _____
_____ _____

If there is no Georgia Partner, give name and address of agent for service of process in Georgia.

_____ _____
_____ _____
_____ _____
_____ _____

If an individual owner is not a Georgia resident, give name and address of agent for service of process in Georgia.

_____ _____
_____ _____
_____ _____
_____ _____

Bidder's Minimum Qualifications

Bidder shall demonstrate a minimum of 10 years of firm and 10 years of key team member experience in construction of large diameter water and/or force mains in construction for municipal, public, or private agencies.

The Bidder shall also spotlight three (3) relevant water and/or force main projects larger than 24" in diameter, and length of 12,000 L.F or more, constructed within the past ten (10) years. At least two (2) projects must include horizontal directional drill. At least two (2) projects must include jack & bore.

Descriptions of the three (3) relevant projects shall contain the following information:

- Project Name and Owner
- Owner contact information (including email address)
- Description of procurement method
- Contract value
- Year completed
- Description of the project demonstrating relevance to the City's needs
- Percentage of your firm's self-performance
- Percentage of Sub-Contractors' utilization
- Final construction cost at completion.

Include resumes for key team members (project manager, superintendent) in the bid package. Resumes should be two (2)-page maximum length per key team member.

Include Bidder's experience modification rate (EMR) calculated by the National Council on Compensation Insurance or similar rating bureau for the last five (5) years.

Documentation of the Bidder's Minimum Qualifications shall be provided in a separate sealed envelope, marked as "Bidder's Qualifications", and included with the Bid Proposal.

The foregoing statement of qualifications is submitted under oath:

Should the work require compliance with the Georgia State Construction Industry Licensing Board Rules and Regulations, the Contractor and any Subcontractor shall list the appropriate License number(s):

Main Contractor's License Number: _____

Main Contractor's DUNS Number: _____

Subcontractor #1 License Number: _____

Subcontractor #1 Name: _____

Subcontractor #2 License Number: _____

Subcontractor #2 Name: _____

Subcontractor #3 License Number: _____

Subcontractor #3 Name: _____

(List additional if appropriate)

Respectfully submitted,

Company Name:_____

Street Address:_____

City, State, Zip Code:_____

By:_____

Title:_____

Attach satisfactory evidence of the authority of the officer, or officers, signing on behalf of a corporation.

Section 00 1137

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____ as Principal, and _____, a surety company duly qualified and authorized under the laws of the State of Georgia to act as Surety on bonds, as Surety, are held firmly bound unto **THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH,** as Obligee, in the sum of: _____DOLLARS ($ _____), lawful money of the United States of America, for the payment of which, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assignees, jointly and severally, firmly by these presents,

SIGNED, SEALED AND DATED this _____day of _____, 2019.

WHEREAS, Principal is herewith submitting its Proposal to **THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH,** a municipal corporation of the State of Georgia, for the **Travis Field Water Reclamation Facility Force Main (SW-534-19)**.

The condition of this obligation is such that if the Principal shall permit said Proposal to remain in full force and effect for a period of sixty (60) calendar days following the opening of the bids for such work, and if within said period the Principal shall, within ten (10) days after receipt of contract documents, enter into a contract and furnish a Performance Bond and Payment Bond in accordance with terms of said Proposal then this obligation shall be null and void; but if the Principal shall fail to do any one or more of such things, this obligation shall be in force and effect, and the Principal and Surety shall promptly pay to the Obligee, as agreed liquidated damages, the full sum above stated.

SIGNED, SEALED AND DELIVERED this ____ day of _____, 2019.
(Principal must indicate whether corporation, partnership or individual.)

_____
Principal (Seal)

Witnessed:

_____

_____

BY:_____

TITLE:_____
(If a corporation, a raised corporate seal must be affixed)

_____
Surety

Attach Copy of Power of Attorney

BY:_____(Seal)
Its Attorney in Fact

_____
As to the Surety

BY:_____
Attorney in Fact/Georgia Agent

Section 00 1138

CONTRACTOR AFFIDAVIT AND AGREEMENT

Employment Eligibility Verification

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 the City of Savannah 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 the City of Savannah, 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 Section 00 12 31 of this Contract. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the City of Savannah at the time the subcontractor(s) is retained to perform such service.

_____

EEV / Basic Pilot Program* User Identification Number

BY:

_____	_____
Contractor Name	Date
_____	_____
Signature of Authorized Officer or Agent	Printed Name of Authorized Officer or Agent

_____

Title of Authorized Officer or Agent of Contractor

SUBSCRIBED AND SWORN BEFORE ME ON THIS THE

_____ DAY OF _____, 20___

_____

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).

Section 00 1139
Affidavit Verifying Residency Status for City of Savannah Benefit Application

By executing this affidavit, I, _____ [Name of natural person applying on behalf of individual, business, corporation, partnership, or other private entity], as a bidder for **Travis Field Water Reclamation Facility Force Main (SW-534-19)** or other public benefit as reference in O.C.G.A. Section 50-36-1, aver, represent and state under oath my residency status with respect to my bid for the referenced City of Savannah contract, as follows:

(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.*

I make the above representation under oath understanding 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, and that such false, fictitious, or fraudulent statement or representation may also violate federal law.

_____ _____
Signature of Applicant: Date

_____
Printed Name

*_____
Alien Registration Number for Non-Citizens

SUBSCRIBED AND SWORN BEFORE ME ON THIS THE

_____DAY OF _____, 20__

_____
Notary Public

My Commission Expires: _____

Section 00 1140

NOTICE OF ACCEPTANCE OF THE BID PROPOSAL

TO:

PROJECT DESCRIPTION: **Travis Field Water Reclamation Facility Force Main**
PROJECT NUMBER: **SW-534-19**

The Mayor and Aldermen of the City of Savannah have considered the Bid submitted by your firm for the above described PROJECT in response to our Invitation to Bid dated _____. On _____, your bid, amounting to $_____ was approved by the Mayor and Aldermen. You are hereby notified that your BID has been accepted and that your firm has been awarded a contract for referenced project.

Upon receipt of the contract documents, please execute the Agreement and the Performance and Payment Bonds, but do not date them. Also provide Certificate of Insurance and all other required contract documents which shall be returned to the City Project Manager/Project Engineer no later than ten (10) calendar days after receipt. Performance and Payment Bonds may be waived for contracts awarded under $100,000.00.

You are required to return an acknowledged copy of this NOTICE OF ACCEPTANCE OF THE BID PROPOSAL to the Contract Analyst.

Dated this _____ day of _____, 2020.

FOR THE CITY OF SAVANNAH

By:_____
Heath Lloyd
Assistant City Manager

Acceptance of Notice

Receipt of the above Notice of Acceptance of the Bid Proposal is hereby acknowledged.

BY:_____ Contractor_____

_____
Title

THIS THE _____ DAY OF _____, 20_____

Section 00 1150

DEBARMENT AND SUSPENSION REQUIREMENTS

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS PRIMARY COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 29 CFR Part 98, Section 98.510, Participants' Responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211).

The prospective primary participant certifies that it and its principals:

a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency;

b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with the commission of any of the offenses enumerated in paragraph (b) of this certification; and

d) Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e) Contractor will be verified against the General Service Administration (GSA) debarred list at GSA's website https://www.sam.gov/SAM/pages/public/searchRecords/search.jsf

Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participants shall attach an explanation to this proposal.

_____

Name and Title of Authorized Representative

_____ _____

Signature Date

CONTRACT AND PAYMENT FORMS

CONTRACT FORMS

00 1200	Agreement
00 1205	Performance Bond
00 1210	Payment Bond
00 1215	Bond Affidavit
00 1220	Certificate of Insurance
00 1225	Contractor's Certification
00 1230	Subcontractor's Certification
00 1231	Subcontractor Affidavit & Agreement Employee Eligibility Verification

Section 00 1200

AGREEMENT

THIS AGREEMENT, made on the _____ day of _____, 20___, by and between **THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH,** party of the first part, hereinafter called the OWNER, and_____., party of the second part, hereinafter called the CONTRACTOR.

WITNESSETH: that the Contractor and the Owner, for the considerations hereinafter named, agree as follows:

ARTICLE I - Scope of Work

The Contractor hereby agrees to furnish all of the materials and all of the equipment and labor necessary, and to perform all of the work shown on the plans and described in the Project Manual for the project entitled: **Travis Field Water Reclamation Facility Force Main (SW-534-19)**, all in accordance with the requirements and provisions of the Contract documents and the Contractor's Proposal submitted _____, 2020, as defined in the General Conditions all of which are hereby made a part of this Agreement.

ARTICLE II - Time Completion

(a) The work to be performed under this Contract shall be commenced within ten (10) calendar days after the date of the Notice to Proceed. Contract time shall be determined on the calendar day basis. The work shall be substantially complete within **400** calendar days after the date of such Notice with such extensions of time as are provided for in the General Conditions. It is agreed that **40** days have been included in the contract time for delays due to adverse weather conditions based on National Oceanographic and Atmospheric Administration (NOAA) historical data.

ARTICLE III - Contract Price

The Owner shall pay the Contractor as just compensation for the performance of this contract, subject to any additions or deductions as provided in the Contract Documents, the unit or lump sum price as contained in the Bid Schedule attached hereto.

The Contract Amount is _____ Dollars **($_____)** based upon unit and lump sum prices extended as herein contained.

THIS AGREEMENT SHALL BE BINDING UPON ALL PARTIES HERETO AND THEIR RESPECTIVE HEIRS, EXECUTORS, ADMINISTRATORS, SUCCESSORS, AND ASSIGNS.

THE BID SCHEDULE OF THE SUCCESSFUL BIDDER

SHALL BE CONFORMED AND INSERTED HEREIN

TO BECOME A PART OF THE COMPLETED CONTRACT

DOCUMENT

ARTICLE IV - Acceptance and Final Payment

(a) Upon receipt of written notice from the City Project Manager/Project Engineer that the work is ready for final inspection and acceptance, the Owner shall within 1 week make such inspection, and when the Owner finds the work complete under the Contract and the Contract fully performed the Owner will promptly issue a final certificate, over the owner's signature, stating that the work required by this contract has been completed and is accepted by him under the terms and conditions thereof, and the entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the Owner within thirty (30) days after the date of final certificate and receipt of record drawings.

(b) Before final payment is made, the Contractor shall submit evidence satisfactory to the City Project Manager/Project Engineer that all payrolls, material bills, and other indebtedness connected with work have been paid, except that in case of disputed indebtedness or liens, the Contractor may submit in lieu of evidence of payment a surety bond satisfactory to the Owner guaranteeing payment of all such disputed amounts when adjudicated in cases where such payment has not already been guaranteed by surety bond.

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

ARTICLE V - Component Parts of the Contract

This Contract consists of the following component parts, all of which are hereby made a part hereof as if herein set out in full:

1. Invitation to Bids
2. Instruction to Bidders
3. Bid Proposal
4. Bid Bond
5. Agreement
6. Payment and Performance Bonds
7. Certificate of Insurance
8. Contractor's Certification
9. Notice of Acceptance of Bid Proposal
10. General Conditions
11. Supplemental General Conditions, if required
12. City/Federal Labor Standards Provisions/Equal Opportunity Provisions
13. Contract Administrative Forms
14. Technical Provisions
15. Other Documents as may be required by law or appended hereto.
16. Plans and Drawings: as prepared by: Thomas & Hutton Engineering Co. dated November 2020. Specifications prepared or issued by: Thomas & Hutton Engineering Co. and The City of Savannah and dated November 2020.

ADDENDA:

No. __, dated _____, 2020

No. __, dated _____, 2020

No. __, dated _____, 2020

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed as of the day and year first above written in seven (7) counterparts, each of which shall for all purposes be deemed an original.

OWNER:
THE MAYOR AND ALDERMEN
OF THE CITY OF SAVANNAH

_____

BY: Michael Brown
CITY MANAGER

ATTEST:

(SEAL)

_____

BY: Mark Massey
CLERK OF COUNCIL

Contractor must indicate whether corporation, partnership, or individual.

ATTEST:

_____
NAME

_____
TITLE

_____
CONTRACTOR

_____
BY

_____
TITLE:

(SEAL)

(If a corporation, a raised corporate seal must be affixed)

CONTRACTOR'S ADDRESS:

_____ (P.O. Box)
_____ (Physical Address)
_____ (City, State, Zip)

CONTRACTOR'S FEDERAL I.D. NO._____

Section 00 1205

CONTRACT BOND
PERFORMANCE

KNOW ALL MEN BY THESE PRESENTS, that we, _____, (hereinafter called Principal), and _____,a surety company duly qualified and authorized under the laws of the State of Georgia to act as Surety on bonds (hereinafter called the Surety) are held and firmly bound unto THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, a municipal corporation created and existing under the laws of the State of Georgia (hereinafter called the Owner) in the penal sum of _____Dollars **($_____)** lawful money of the United States of America, to be paid to THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, a municipal corporation as aforesaid, for the payment whereof well and truly to be made we do bind ourselves, our respective executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED, SEALED AND DELIVERED this _____ day of _____ 20__, A.D.

NOW THEREFORE, the condition of this obligation is such that whereas the said PRINCIPAL _____ has entered into that certain contract with THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH for the **Travis Field Water Reclamation Facility Force Main (SW-534-19)**, a copy of said contract being attached hereto and made a part hereof the same as if set forth fully herein.

NOW THEREFORE, if the above bonded Principal and the said SURETY, _____, shall in all respects faithfully and fully perform the terms and conditions of the said contract on their part and shall pay to THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, all costs, expenses, damages, and injuries sustained by said Owner by reason of any failure on the part of the said Principal to fully perform said contract and shall indemnify and save harmless the Owner from any and all liability of any nature, kind and character which may be incurred in the performance or fulfillment of such contract or other such liability resulting from negligence or otherwise on the part of such kind, character and description which may be incurred by the Owner in making good any and every default which may exist on the part of the Principal in connection with the performance of said contract, and further shall promptly make payments to all persons supplying the said Principal or any subcontractor labor, materials and supplies used directly or indirectly by said Principal or any subcontractors in the prosecution of the work provided for in said contract; then this obligation shall become null and void; else to remain in full force and effect.

Any failure or default on the part of the Principal in the payment of any lawful claim or any person supplying the said Principal or any subcontractor with labor, material and supplies used directly or indirectly as aforesaid in the prosecution of the work provided for in said contract, shall give such person a direct right of action against the Principal and Surety under this obligation; provided, however, that no suit, action or proceeding by reason of any default whatever shall be brought on this bond after one year from the date on which final payment under the contract falls due.

It is further covenanted and agreed that any alterations or additions made under said contract or in the work to be performed thereunder or the granting of any extension of time for the performance of the contract or any other forbearance by or on the part of either the Owner or the Principal shall not in any way release the Principal and Surety, or either of them, their executors, administrators, successors, or assigns, from any liability hereunder. Notice to the Surety of such alterations, extensions, or forbearance is hereby expressly waived. This obligation shall remain in full force and effect until the full performance of all covenants, terms and conditions herein stipulated.

IN WITNESS WHEREOF, the said _____ , as Principal, has caused these presents to be executed by its proper offices and its corporate seal hereunto affixed, and the said _____, as Surety, has caused these presents to be signed in its name by its attorney in fact, under its corporate seal, this ____ day of _____, 20__.

SIGNED, SEALED AND DELIVERED
In the presence of:

_____ (SEAL)
PRINCIPAL

BY:_____

ATTEST:_____

_____
As to the Principal

_____
Surety

BY:_____(SEAL)
It's Attorney in Fact

_____
As to the Surety

BY:_____
Attorney in Fact/Georgia Agent

(If a corporation, a raised corporate seal must be affixed.)

Section 00 1210

CONTRACT BOND
PAYMENT

KNOW ALL MEN BY THESE PRESENTS, that we, _____, (hereinafter called Principal), and _____,a surety company duly qualified and authorized under the laws of the State of Georgia to act as Surety on bonds (hereinafter called the Surety) are held and firmly bound unto THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, a municipal corporation created and existing under the laws of the State of Georgia (hereinafter called the Owner) in the penal sum of _____Dollars **($_____)** lawful money of the United States of America, to be paid to THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, a municipal corporation as aforesaid, for the payment whereof well and truly to be made we do bind ourselves, our respective executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED, SEALED AND DELIVERED this _____ day of _____ 20__, A.D.

NOW THEREFORE, the condition of this obligation is such that whereas the said PRINCIPAL _____has entered into that certain contract with THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH for the **Travis Field Water Reclamation Facility Force Main (SW-534-19)**, a copy of said contract being attached hereto and made a part hereof the same as if set forth fully herein.

NOW THEREFORE, if the above bonded Principal and the said SURETY, _____, shall in all respects faithfully and fully perform the terms and conditions of the said contract on their part and shall pay to THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, all costs, expenses, damages, and injuries sustained by said Owner by reason of any failure on the part of the said Principal to fully perform said contract and shall indemnify and save harmless the Owner from any and all liability of any nature, kind and character which may be incurred in the performance or fulfillment of such contract or other such liability resulting from negligence or otherwise on the part of such kind, character and description which may be incurred by the Owner in making good any and every default which may exist on the part of the Principal in connection with the performance of said contract, and further shall promptly make payments to all persons supplying the said Principal or any subcontractor labor, materials and supplies used directly or indirectly by said Principal or any subcontractors in the prosecution of the work provided for in said contract; then this obligation shall become null and void; else to remain in full force and effect.

Any failure or default on the part of the Principal in the payment of any lawful claim or any person supplying the said Principal or any subcontractor with labor, material and supplies used directly or indirectly as aforesaid in the prosecution of the work provided for in said contract, shall give such person a direct right of action against the Principal and Surety under this obligation; provided, however, that no suit, action or proceeding by reason of any default whatever shall be brought on this bond after one year from the date on which final payment under the contract falls due.

It is further covenanted and agreed that any alterations or additions made under said contract or in the work to be performed thereunder or the granting of any extension of time for the performance of the contract or any other forbearance by or on the part of either the Owner or the Principal shall not in any way release the Principal and Surety, or either of them, their executors, administrators, successors, or assigns, from any liability hereunder. Notice to the Surety of such alterations, extensions, or forbearance is hereby expressly waived. This obligation shall remain in full force and effect until the full performance of all covenants, terms and conditions herein stipulated.

IN WITNESS WHEREOF, the said_____, as Principal, has caused these presents to be executed by its proper offices and its corporate seal hereunto affixed, and the said _____, as Surety, has caused these presents to be signed in its name by its attorney in fact, under its corporate seal, this ____ day of _____, 20__.

SIGNED, SEALED AND DELIVERED
In the presence of:

_____ (SEAL)
PRINCIPAL

BY:_____

ATTEST:_____

_____
As to the Principal

_____
Surety

BY:_____(SEAL)
It's Attorney in Fact

_____
As to the Surety

BY:_____
Attorney in Fact/Georgia Agent

(If a corporation, a raised corporate seal must be affixed.)

Section 00 1215

BOND AFFIDAVIT

State of _____

County of _____

Before me, the undersigned authority, personally appeared _____, who, being duly sworn, deposes and says that he /she is a duly authorized insurance agent, properly licensed under the laws of the State of _____, to represent _____of _____, a company authorized to make corporate surety bonds under the laws of the State of Georgia.

Said agent further certifies that as Attorney-in-fact for the said _____ has signed the attached bond in the sum of _____ (U.S. $ _____) on behalf of the contractor, _____ covering the Project, **Travis Field Water Reclamation Facility Force Main (SW-534-19),**

Said agent further certifies that the premium on the said bond is _____which will be paid in full direct to him/her as Agent, and included in his/her regular accounts to the said surety, _____and that he/she will receive the regular commission of _____ percent as Agent for the execution of said Bond and that his commission will not be divided with anyone except as follows: _____ percent to _____, who is duly authorized resident insurance agent and properly licensed under the laws of the State of Georgia.

_____ (Georgia agent) who, being duly sworn, deposes and says that he/she is a duly authorized insurance agent properly licensed under the laws of the State of Georgia.

Countersigned:

_____ _____

Agent and Attorney In Fact Georgia Agent/License No.

Sworn to and subscribed before me
This _____ day of _____, 20____.

_____

Notary Public

My commission expires:

_____

Section 00 1220

CERTIFICATE OF INSURANCE

The City requires in addition to the Certificate of Insurance, endorsements to each policy to include a 30-day cancellation notice and a waiver of subrogation in favor of Mayor and Aldermen of the City of Savannah, its agents and / or employees.

NOTE: Please attach Certificate of Insurance and Endorsements to this page.

Section 00 1225

CONTRACTOR'S CERTIFICATION
CONCERNING LABOR STANDARDS & PREVAILING WAGE REQUIREMENTS

Project Name: Travis Field Water Reclamation Facility Force Main
Project Number: SW-534-19

1. The undersigned having executed a contract with The Mayor and Aldermen of the City of Savannah for the construction of the above identified project acknowledges that:

   (a) The Labor Standards Provisions are included in the aforesaid contract;

   (b) Correction of any infractions of the aforesaid conditions, including infractions by any of his subcontractors and any low tier subcontractor, is his responsibility;

2. Contractor certified that:

   (a) Neither the contractor nor any firm, partnership or association in which the contractor has substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6 (b) of the Regulations of the Secretary of Labor, Part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act, as amended [10 U.S.C. 176a - 2(a)].

   (b) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if said subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

3. The contractor agrees to obtain and forward to the aforementioned recipient within ten days after the execution of a subcontract, including those executed by his subcontractors and any lower tier subcontractors, a Subcontractor's Certificate Concerning Labor Standards and Prevailing Wage Requirements executed by the subcontractors.

4. The contractor certifies that:

   (a) The legal name and business address of the undersigned are:

   _____
   _____
   _____
   _____

(b) The undersigned is:

1. ____ Single Proprietorship
2. ____ Partnership
3. ____ Corporation Organized
4. ____ Other Organization (Describe)

(c) The name, title, and address of the owner, partners or officers of the undersigned are:

Name	Title	Address

(d) The name and address of all other persons both natural and corporate having substantial interest in the undersigned and the nature of the interest are: (If none so state.)

Name	Title	Address

(e) The name, address and trade classification of all other building construction contractors in which the undersigned has a substantial interest are: (If none so state.)

Name	Title	Trade Classification

Date: _____ By: _____
Contractor

WARNING

U. S. Criminal Code, Section 1010, Title 18, U.S.C., provides in part: "Whoever...makes, passes, utters or publishes any statement, knowing the same to be false...shall be fined not more than $5,000 or imprisoned not more than two years, or both."

Section 00 1230

SUBCONTRACTORS CERTIFICATIONS CONCERNING LABOR STANDARDS & PREVAILING WAGE REQUIREMENTS

Project Name: Travis Field Water Reclamation Facility Force Main
Project Number: SW-534-19

1. The undersigned having executed a contract with _____ (Contractor) for construction of the above identified project acknowledges that:

(a) The Labor Standard Provisions are included in the aforesaid contract;

(b) Neither the subcontractor or any firm, partnership or association in which the subcontractor has substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6(b) of the Regulations of the Secretary of Labor, Part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act, as amended [40 U.S.C. 176 a - 2(a)].

(c) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if said subcontractor or any firm, corporation, partnership or association in which subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

2. The subcontractor agrees to obtain and forward to the aforementioned recipient within ten days after the execution of a subcontract, including those executed by his subcontractors and any lower tier subcontractors, a Subcontractor's Certificate Concerning Labor Standards and Prevailing Wage Requirements executed by the lower tier subcontractors.

(a) The workmen will report for duty on or about _____.

3. The subcontractor certifies that:

(a) The legal name and business address of the undersigned are:

_____

_____

_____

_____

_____

_____

The undersigned is:

1. ____ A Single Proprietorship
2. ____ A Partnership
3. ____ A Corporation Organized in the State of _____
4. ____ Other Organization (Describe)

(b) The name, title, and address of the owner, partners or officers of the undersigned are:

Name	Title	Address

(c) The name and address of all other persons both natural and corporate having substantial interest in the undersigned and the nature of the interest are: (If none so state.)

Name	Title	Address

(d) The name, address and trade classification of all other building construction contractors in which the undersigned has a substantial interest are: (If none so state.)

Name	Title	Trade Classification

Date: _____ By: _____
Subcontractor

WARNING

U. S. Criminal Code, Section 1010, Title 18, U.S.C., provides in part: "Whoever...makes, passes, utters or publishes any statement, knowing the same to be false...shall be fined not more than $5,000 or imprisoned not more than two years, or both."

Section 00 1231

SUBCONTRACTOR AFFIDAVIT AND AGREEMENT

Employment Eligibility Verification

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 _____
(Contractor)
on behalf of the City of Savannah 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:

_____ _____
Subcontractor Name Date

_____ _____
Signature of Authorized Officer or Agent of Subcontractor Printed Name of Authorized Officer or Agent

_____
Title of Authorized Officer or Agent of Subcontractor

SUBSCRIBED AND SWORN BEFORE ME ON THIS THE

_____DAY OF_____,20____

_____
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).

LABOR STANDARDS/EQUAL OPPORTUNITY PROVISIONS

Section 00 1300

CITY LABOR STANDARDS / E.E.O. PROVISIONS

01 - LABOR STANDARDS PROVISIONS: The attached Labor Standards Provisions are a part of the contract documents and shall be complied with on the project. Conduct of the work shall conform to the following Payment of the Prevailing Rate of Wages and Decision Number GA180089 and GA180129.

Payment of the Prevailing Rate of Wages

1. All construction contracts to be let by the City of Savannah shall include a wage determination for each classification of employees based on the rate of wages which have been approved by the Department of Labor pursuant to the Davis-Bacon Act for Chatham County.

2. A copy of the wage determination must be posted by the successful contractor and maintained where it can easily be seen by all employees.

3. Rates of pay for each classification of employees shall be at least the minimum shown on the wage determination for each classification.

4. No classification of employee shall be employed on a project unless either the classification appears on the wage determination as set forth in the contract or the classification and rate have been approved by the City of Savannah.

5. Each week as work progresses, the Contractor must submit to the City of Savannah within seven (7) days, a copy of all payroll records with an affidavit that the weekly wages paid are not less than the applicable wage rates contained in the wage determination incorporated into the contract and the classification set forth therein for each laborer or mechanic conforms with the work he performed.

6. All prime contractors shall include the wage determination and all provisions specified herein in all subcontracts.

7. The contractors shall make employment records available for inspection by authorized representatives of the City of Savannah and will permit employees to be interviewed during working hours by these representatives to determine compliance with provisions of the standards set forth herein.

8. In the event of a violation of these provisions, the City of Savannah may, after notice of the contractor, terminate the contract for failure to comply with these provisions.

02 - DISCRIMINATION PROHIBITED:

(a) In all hiring or employment made possible by or resulting from this contract, there (1) shall not be any discrimination against any employee or origin, and (2) affirmative action shall be taken to ensure that applicants are employed, and that employees are treated during employment without regard to race, color, religion, sex, or national origin. This requirement shall apply to, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. There shall be posted in conspicuous places, available to employees and applicants for employment, notices to be provided by HUD setting forth the provisions of this clause. All solicitations or advertisements for employees shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

(b) No person in the United States shall, on the ground of race, color, religion or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity made possible by or resulting from this Contract. The Contractor and each employer will comply with all requirements imposed by or pursuant to the regulations of HUD effectuation Title VI of the Civil Rights Act of 1964.

(c) The Contractor hereby agrees that he will incorporate into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained pursuant to the Contract, the equal opportunity clause which is a part of the labor standard provision attached hereto.

The Contractor further agrees that he will be bound by the equal opportunity clause and other provisions of 41 CFR Chapter 60 with respect to its own employment practices when it participates in federally assisted construction work.

The Contractor agrees that he will assist and cooperate actively with HUD and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clauses and the rules, regulations, and relevant orders of the Secretary of Labor, that he will furnish HUD and the Secretary of Labor such information as they may require for the supervision of such compliance, and that he will otherwise assist HUD in the discharge of its primary responsibility for securing compliance.

The Contractor further agrees that it will refrain from entering into any contract or contract modification subject to Execution Order 11246 of September 24, 1965, with a contractor debarred from or who has not

demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order. In addition, the Contractor agrees that if he fails or refuses to comply with these undertakings, the City Manager may take any or all of the following actions:

Terminate or suspend in whole or in part this contract; refrain from extending any further payment to the Contractor under the contract with respect to which the failure or refusal occurred until satisfactory assurance of future compliance has been received from such Contractor; and refer the case to the Department of Justice for appropriate legal proceedings.

(d) The Contractor further agrees to establish and execute personnel policies in compliance with City and HUD guidelines.

03 - EQUAL OPPORTUNITY:

A. The Contractor/Subcontractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or natural origin. The Contractor/Subcontractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex, or age or national origin. As used herein, the work "treated" shall include, without limitation, the following: recruited, whether by advertising or other means; compensated, whether in the forms of rates of pay or other forms of compensation; selected for training, including apprenticeship; promoted, upgraded; demoted; downgraded; transferred, laid off; and terminated. The Contractor/Subcontractor agrees to and shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officers setting forth the provisions of the non-discrimination clause.

Contractor's/Subcontractor's affirmative action plan should provide at least the following elements:

1. Company's Equal Employment Opportunity Policy:

   A statement which clearly states the company's policy of non-discrimination in employment because of race, color, religion, age or national origin.

2. Coordination and Administration of Program:

   Designate a person of responsibility and authority in the company and the address and telephone number of that person who will be responsible for coordination of the company's equal employment opportunity program. Also, specify procedures by which policy and affirmative action program will be disseminated to all employees.

3. Analysis of:

   a. Recruitment and Employment Practices:
   Evaluate the extent to which present practices and policies, including recruitment sources, act to exclude minorities from becoming applicants for employment with your company.

   b. Work Force:
   Evaluate the current extent of minority group employment in management, clerical, skilled, and semi-skilled categories with the company during the period in which the HUD assisted work is being done.

4. Establishment of Goals and Timetables:

   Based on the analysis done in the preceding section, develop numerical goals (in numbers or percentage man-hours) to work toward within a given time period (time period with which HUD assisted work will be done) in placing minorities in management, clerical, skilled, semi-skilled, or unskilled positions or trainee positions for your company.

5. Specified Affirmative Action Steps:

   Develop specific affirmative action steps which the company will make in efforts to reach goals and thus provide equal employment opportunity.

6. A prospective Contractor/Subcontractor for work in connection with Community Development project shall provide the City with a preliminary statement of work force needs (management, clerical, skilled, semi-skilled, unskilled labor and trainees by category) to accompany the contractor's bid proposal.

7. The Contractor shall provide the City with the Contractor's and Subcontractor's Affirmative Action Plans to accompany the Contractor's bid proposal.

B. The Contractor/Subcontractor shall, in all solicitation or advertisements for applicants for employees placed by or on behalf of the Contractor/Subcontractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, age, or national origin.

C. The Contractor/Subcontractor shall send to each labor union or representative of workers with which collective bargaining agreement or

other contractor or understanding has been reached, if any, a notice advertising the labor union or worker's representative of the Contractor commitments under the Equal Employment Opportunity of the City of Savannah, and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.

D. The Contractor/Subcontractor shall furnish all information and reports required by the City or its representative, and shall permit access to any books, records, and accounts for purposes of investigation to ascertain compliance with the program.

E. The Contractor shall take such action with respect to any Subcontractors as the City may direct as a means of enforcing the provisions of paragraphs (a) through (i) herein, including penalties and sanctions for noncompliance, provided however, that in the event the Contractor becomes involved in or is threatened with litigation as the result of such direction by the City, the City will enter into such litigation as is necessary to protect the interests of the City and to effectuate the City's Equal Employment Opportunity Program and in the case of contracts receiving Federal assistance, the Contractor or the City may request the United States to enter into such litigation to protect the interests of the United States.

F. The Contractor shall cause each Subcontractor, if any, to file compliance reports with the City in the form and to the extent prescribed by the City or its representative. Compliance reports filed at such time as directed shall contain information as to the employment practices, policies, programs and statistics of the Contractor and any Subcontractor.

G. The Contractor shall include the provisions of paragraphs (a) through (h) of this Equal Employment Opportunity Policy in every subcontract or purchase order of $10,000 or more so that such provisions will be binding upon each Subcontractor or vendor.

H. Refusal or failure of a prospective Contractor to comply with the provisions of this section as applicable at the time of bidding, as to the Contractor or a prospective Subcontractor, shall result in that Contractor not being considered a responsible bidder and may result in the rejection of the bid, or if such failure or refusal is discovered after award of the contract, the Contractor or Subcontractor shall be subject to the provisions of subsection (i) below.

I. Refusal by the Contractor or Subcontractor to comply with any part on or of this program as herein stated and described will subject the offending party to any or all of the following penalties:

1. Withholding all future payments under the involved public contract to the party in violation until it is determined that the party is in compliance with the provisions of the contract.

2. Refusal of all future bids where a party is a Contractor or Subcontractor under any public contract with the City of Savannah or any of its departments or divisions until such time as the Contractor or Subcontractor demonstrates that the policy herein outlined shall be complied with by each party.

3. Suspension or termination of the public contract and declaration of forfeiture of the performance bonds as the Contractor or suspension or termination as to the rights of payment to the Subcontractor.

4. In cases in which there is substantial or material violation or the threat of substantial or material violation of the compliance procedure, or as may be provided for by contract, appropriate proceedings may be brought to enforce those provisions, including the enjoining, within applicable laws, of Contractors, Subcontractors, or other organizations, individuals or groups who prevent directly, indirectly, or seek to prevent directly or indirectly compliance with the policy, as herein outlined.

J. As used herein, the term "Subcontractor" shall be used as the singular or plural and refer to any party with whom a Contractor or prospective Contractor shall perform work or provide supplies or materials of $10,000 or more under the proposed or actual contract.

04 - SUBCONTRACTS:

None of the work or services covered by this contract shall be subcontracted hereunder after the award of a contract without the prior written approval of the City. Any work or services subcontracted hereunder shall be specified by written contract or agreement and shall be subject to each provision of this contract. Contractors are encouraged to hire local Subcontractors and procure from local suppliers as provided in paragraph 05, Opportunities for Residents.

05 - OPPORTUNITIES FOR RESIDENTS:

A. Employment: In all work made possible by or resulting from this contract, affirmative action will be taken to insure that residents of the Community Development Project Area are given maximum opportunities for training and employment. The project area is defined as the corporate limits of the City of Savannah.

B. Procedures for Recruiting Low Income Residents Under Section 3 Covered Projects: Each Contractor and Subcontractor must employ the following procedures for seeking low income area residents for employment

in entry level and vacant positions:

1. Advertisements in local newspapers, including minority owned newspapers, and through signs placed at the proposed project site.

2. Solicit applicants through the Savannah Area Minority Contractors Association and the CETA Unit of the Georgia State Employment Service.

3. Maintain a list of all low income area residents who have applied on their own or on referral from any source and employ such persons if otherwise eligible and if a vacancy exists.

4. Any Contractor or Subcontractor who fills vacant positions at any time after award of the contract to the party (Contractor/Subcontractor) who will undertake work pursuant to this contract shall set forth evidence acceptable to the City that its actions were not an attempt to circumvent these regulations.

C. Business Opportunities: All factors being equal, including price, it is the City's policy to give preference in awarding contracts in the following order of priority:

1. Business concerns located in or owned in substantial part by residents of the target area. The definition of target area is those planning units in which Community Development work is being performed.

2. Business concerns located in or owned in substantial part by residents of the project area. Project area is defined as the corporate limits of the City of Savannah.

The exception to the above is in the case of an urban renewal area whereby the project area is defined as the boundaries of the urban renewal area.

06 - SAFETY AND HEALTH REGULATIONS:

The Contractor shall comply with the Department of Labor and Safety and Health Regulations for construction promulgated under Occupational Safety and Health Act of 1970 (PL-91-5996) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL-91-54). The regulations are administered by the Department of Labor and the Contractor shall allow access to the project to personnel from that Department.

07 - ACCESS TO ALL RECORDS:

The Contractor must guarantee to the Department of H.U.D., the Comptroller General of the United States, the City of Savannah, or any authorized representative access to any books, documents, papers and records of the Contractor and Subcontractor which are pertinent to the Project.

08 - NON-SEGREGATED FACILITIES:

A. A Certification of Non-Segregated Facilities, as required by the May 19, 1987 order, on elimination of segregated facilities by the Secretary of Labor must be submitted by the Contractor prior to the award of this contract.

B. A Certification of Non-Segregated Facilities, as required by the May 19, 1967 order (32 F.R. 7439, May 1967), on elimination of segregated facilities, by the Secretary of Labor must be submitted prior to the award of the subcontract exceeding $10,000 Clause.

C. Contractors receiving subcontract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the Notice to Prospective Subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause.

SECTION 00 1305

Hire Savannah Program Participation

a. The City of Savannah seeks to increase the utilization of the local workforce to the greatest extent possible on City contracts. To achieve this priority, the City of Savannah Mayor and Aldermen endorse efforts to establish hiring agreements with businesses benefitting from municipal contracts with the City to hire local workers residing in the city of Savannah, Georgia.
b. To the extent otherwise permitted by law, the requirements of the Hire Savannah Program shall be included in all bid awards of $100,000 or more for covered services and $250,000 or more for construction-related services as a method of inducing contractors to hire qualified workers who reside in Savannah, Georgia.
c. To assist contractors in maximizing local labor use, the City of Savannah has partnered with WorkSource Coastal (WSC). WSC assists employers and job seekers in meeting job training and employment needs throughout the ten-county coastal region including Savannah and Chatham County. WSC will post contractor job openings, coordinate recruitment among partner agencies, and refer qualified candidates to contractors for hiring consideration. Additional employer services are also available through WSC, including federally-subsidized training and/or wages for eligible activities.
d. The Contractor is fully responsible for the work performed under the contract, and this responsibility is not in any way diminished by the use of labor supplied by WSC, nor is the City of Savannah or WSC accepting any responsibility for non-compliance with the contract due to the performance, or lack thereof, on part of labor supplied by WSC.
e. The Contractor is responsible for the compliance of all contractors providing services under the Covered Contract, including subcontractors and lower-tier subcontractors but excluding material manufacturers and suppliers, with the requirements of the Hire Savannah Policy.
f. In responding to this solicitation, the bidder/proposer shall complete a Hire Savannah Agreement, indicating that it agrees to be bound to contractual obligations to use good faith efforts to meet Hire Savannah Program requirements and hire Qualifying Workers residing in Savannah, Georgia.
g. If the bidder or proposer fails to respond affirmatively, it shall be deemed non-responsive to the solicitation.

HIRE SAVANNAH AGREEMENT

Event #:		Event Name:	
Bidder/Proposer Name:			

The City of Savannah Mayor and Aldermen have established a priority to increase the utilization of the local workforce to the greatest extent possible on City contracts. To achieve this goal, the City has established the Hire Savannah Policy and Program which shall be included in all eligible bid awards of $100,000 or more for covered services and $250,000 or more for construction-related services as a method of inducing contractors to hire qualified workers who reside in Savannah Georgia.

Contractors responding to this solicitation are required, as an issue of responsibility, to indicate that it agrees, if awarded a Covered Contract, to be bound to contractual obligations requiring it to use good faith efforts to meet the Hire Savannah Program requirements. If the bidder or proposer fails to respond affirmatively, it shall be deemed non-responsive to the solicitation.

A "Covered Contract" is a City-awarded contract that: (a) is not subject to state or federal requirements that prohibit or pre-empt the application of this Program to the contract; and (b) pays the Contractor $100,000 or more for covered services or $250,000 or more for construction-related services. "Construction-related Services" means services purchased by the City that involve construction, demolition, alteration and/or repair of city buildings, city public works or other city facilities.

Covered Services include the following services purchased by the City: food preparation or distribution; security services; routine maintenance services, such as janitorial, cleaning, refuse removal, recycling collections, and other similar services for normal upkeep of facilities; repair or refinishing services for furniture, fixtures, vehicles, machinery, or equipment, including preventative maintenance replacement of parts, and other activities needed to preserve the asset; clerical or other nonsupervisory office work, whether by temporary or permanent personnel; printing and reproduction services; and landscaping, lawn, or agricultural services. Covered Services does not include professional services, which are those technical services provided by an individual licensed Georgia professional or a registered professional consultant, including but not limited to lawyers, architects, engineers, and other design consultants.

The City of Savannah Hire Savannah Policy is posted on the City of Savannah website. By signing below, the Bidder/Proposer affirms that it has read, understands and agrees to be bound by the terms and conditions of the Hire Savannah Policy.

The undersigned hereby agrees to the terms and conditions set forth in this agreement.

Company Name:_____

Company Address:_____

Company Official/Representative:_____

Position Title:_____

Authorizing Signature:_____

Date:_____

SECTION 00 1310
DISADVANTAGED BUSINESS EMPLOYMENT PROVISIONS

The City of Savannah actively encourages employment and participation of small and disadvantaged businesses in all City contracts. Attention of the bidders is called to contract conditions contained herein pertaining to non-discrimination, equal employment opportunity, subcontracts, and opportunities for project area residents.

It is the policy of the City of Savannah that disadvantaged business enterprises (DBEs) be given fair opportunity to participate in the performance of services for the City, and that prime contractors utilize DBE subcontractors and suppliers to the fullest extent possible consistent with the efficient performance of the contract. The City of Savannah has established a 20% DBE goal for this project with a 10% local DBE.

In order to determine compliance, bidders shall **submit the following completed documents in a separate sealed envelope** clearly marked with the bid number, project name and number and **marked (Section 00 1310 Disadvantaged Business Employment Provisions)** with their bid:

1. Non-discrimination statement (Sec. 00 1310-3) and;
2. Proposed schedule of disadvantaged business enterprise participation (Sec. 00 1310-4) and;
3. Documentation of Good Faith Efforts **[Submit only if the goals are not met.]**

Failure to submit the required documents shall result in the bid not being read or considered.

Suggestions to help meet the goal:

- ✓ Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation of DBEs.
- ✓ Advertising in general circulation media, trade association publications, or disadvantaged business enterprise media to solicit bids from DBE subcontractors or suppliers. **[Advertisement should appear at least 10 days prior to bid due date, unless the City's solicitation period is shortened.]**
- ✓ Designating portions of the work for DBE subcontracting in trades with established availability of DBE subcontractors.
- ✓ Providing a minimum of 10 days notice prior to the Bid due date to DBEs when requesting bids or proposals for furnishing material or services as a subcontractor or supplier.

Any attempt to submit false information, will result in a recommendation that the bidder be debarred from participating in future City contracts.

The contractor is required to fulfill any DBE utilization commitments made unless good cause is demonstrated for any failure to fulfill such commitment. **Written approval is required prior to**

any substitution.

The contractor will maintain records and information necessary to document compliance with Good Faith Effort requirements, and the City shall have the right to inspect such records.

Any DBE listed in the completed form entitled "Proposed Schedule of DBE Participation" (Section 00 1310-4) must be certified by an approved agency such as USDOT, GDOT, or SBA 8(a) prior to the due date of this bid. Proof of DBE certification such as a certificate or letter from the certifying agency is required to accompany the bid. A firm that has submitted an application for DBE certification or an application for DBE certification under review but has not been certified is not qualified as a certified DBE and will not be recognized as such during the City's evaluation process.

No bidder shall enter into an agreement with any DBE that would in any way limit the DBE's opportunities to sell to, or act as subcontractor for, any other party. Violation of this requirement would be grounds to deem the bidder non-responsive to this bid solicitation.

The following resources are available to aid bidders in complying with this section:

The State of Georgia Department of Transportation maintains a website listing of Disadvantaged Business Enterprises located at www.dot.ga.gov/PS/Business/DBE

Chatham County Purchasing Department maintains a listing of Disadvantaged Business Enterprises to include Contractors, Consultants and Suppliers. Contact (912) 652-7860.

GA Tech Procurement Assistance Center maintains a listing of Disadvantaged Business Enterprises to include Contractors, Consultants and Suppliers. Contact (912) 963-2524.

Savannah/Hilton Head International Airport Commission maintains a listing of Disadvantaged Business Enterprises to include Contractors, Consultants and Suppliers. Contact (912) 964-0514 or visit the website at www.savannahairport.com

Small Business Assistance Corporation maintains a listing of Disadvantaged Business Enterprises to include Contractors, Consultants and Suppliers. Contact (912) 232-4700 or visit the website at www.sbacsav.com.

NON-DISCRIMINATION STATEMENT

The prime contractor / bidder certifies that:

(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 any bid submitted to the City of Savannah or the performance of any 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 in contracting with this Company, including those companies owned and controlled by racial minorities, cultural minorities, women, and individuals belonging to other socially and economically disadvantaged groups;

(3) In connection herewith, we acknowledge and warrant that this Company has been made aware of, understands and agrees to take affirmative action to provide such companies with the maximum practicable opportunities to do business with this Company;

(4) That this promise of non-discrimination as made and set forth herein shall be continuing in nature and shall remain in full force and effect without interruption;

(5) That the promises of non-discrimination as made and set forth herein shall be and are hereby deemed to be made as part of and incorporated by reference into any contract or portion thereof which this Company may hereafter obtain and;

(6) That the failure of this Company to satisfactorily discharge any of the promises of non-discrimination as made and set forth herein shall constitute a material breach of contract entitling the City of Savannah to declare the contract in default and to exercise any and all applicable rights and remedies including but not limited to cancellation of the contract, termination of the contract, suspension and debarment from future contracting opportunities, and withholding and or forfeiture of compensation due and owing on a contract.

_____ _____

Signature Title

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PROPOSED SCHEDULE OF DBE PARTICIPATION

Any DBE listed in this completed form must be certified by an approved agency such as USDOT, GDOT, or SBA 8(a) prior to the due date of this bid. Proof of DBE certification such as a certificate or letter from the certifying agency is required to accompany the bid. A firm that has submitted an application for DBE certification or an application for DBE certification under review but has not been certified is not qualified as a certified DBE and will not be recognized as such during the City's evaluation process.

Name of Bidder/Proposer:_____ Bid No. _____

Project Title: Travis Field Water Reclamation Facility Force Main (SW-534-19)

NOTE: Proof of DBE certification must be attached to this completed form for all firms listed in the table below.

Name of DBE Participant	Telephone	Email	Address (City, State)	DBE? (Y/N)	Type of Work Sub-Contracted	Sub-contract Value (%)	Sub-contract Value ($)
						%	
						%	
						%	
						%	
						%	
						%	
						Total Base Bid	$
						Total Proposed DBE Subcontracts	$
						Bidder's Proposed DBE Participation	%

The undersigned will enter into a formal agreement with the DBE Subcontractors/Proposers identified herein for work listed in this schedule conditioned upon executing of a contract with the Mayor and Aldermen of the City of Savannah. The Prime's subcontractors' subcontractors must enter into a formal agreement with the tier subcontractor identified herein for work listed in this schedule. It is the responsibility of the Prime contractor to ensure compliance by all subcontractors.

Joint Venture Disclosure

If the prime bidder is a joint venture, please describe below the nature of the joint venture and level of work and financial participation to be provided by the disadvantaged joint venture firm.

Joint Venture Firms	Level of Work	Financial Participation

Printed name (company officer or representative): _____

Signature: _____

Title: _____ Email: _____

Telephone: _____ Fax: _____

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Disadvantaged Business Enterprise

GOOD FAITH EFFORT

_____ _____
Prime Company Name Bid Date

Travis Field Water Reclamation Facility Force Main
(SW-534-19)
Project Name _____
Event Number

If you have failed to secure DBE participation or if your DBE participation is less than the City's project goal, you MUST complete this form.

If the bidder's method of compliance with the DBE goal is based upon demonstration of a good faith effort, the bidder will have the burden of correctly and accurately preparing and submitting the documentation required by the City. Compliance with each item, 1 through 4 below, shall satisfy the Good Faith Effort requirement absent proof of fraud, intentional and/or knowing misrepresentation of the facts or intentional discrimination by the bidder.

This form must be submitted in its entirety with supporting documentation in a separate sealed envelope with your bid prior to the time of bid opening. Failure to comply will result in the bid being considered non-responsive and the bid will not be read or considered.

1.) Please list each and every subcontracting and/or supplier opportunity (DO NOT LIST NAMES OF FIRMS) which will be used in completion of this project, regardless of whether it is to be provided by a DBE or non DBE.

(Use additional sheets, if necessary)

List of: Subcontracting Opportunities	List of: Supplier Opportunities

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2.) Did you obtain a current list of DBE firms?

_____ Yes Date of Listing _____/_____/_____.

_____ No Source_____

3.) Please indicate subcontract or supplier list categories for which potential DBE bidder lists were provided? Provide detail of how these DBEs were solicited.

_____ _____

_____ _____

_____ _____

4.) **Please attach the following:**

(1) Completed Good Faith Effort Log see: 00 1310-7 Log

(2) Evidence of solicitation to prospective DBE firms, such as advertisements, copies of solicitation letters, faxes, emails and other to substantiate efforts.

DEMONSTRATION OF GOOD FAITH EFFORTS MUST INCLUDE ALL ITEMS OUTLINED IN THIS SECTION.

FEDERAL EQUAL OPPORTUNITY PROVISIONS

106 FC-2 THRU 106 FC-9

Section 00 1320

Section 00 1320
Federal Equal Opportunity Provisions
106 FC-2 thru106 FC-9

106- FC-2 DISCRIMINATION PROHIBITED

a. In all hiring or employment made possible by or resulting from this contract, there (1) will not be any discrimination against any employee or applicant for employment because of race, color, sex or national origin, and (2) affirmative action will be taken to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex or national origin. This requirement shall apply to, but not to be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. There shall be posted in conspicuous places available to employees and applicants for employment notices to be provided by HUD setting forth the provisions of this clause. All solicitations or advertisements for employees shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

b. No person in the United States shall, on the ground of race, color, or religion, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity made possible by or resulting from this Contract. The Contractor and each employer will comply with all requirements imposed by or pursuant to the regulations effectuating Title VI of the Civil Rights Act of 1964.

FC-3 EQUAL EMPLOYMENT OPPORTUNITY

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations form which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the plan area (including goals and timetables) shall be in accordance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standard provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U. S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all **sites,** and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel meet the Contractor's obligation to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contract or its union have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source of community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs

funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the source compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees who have any responsibility for hiring, assignment, layoff, termination or other employment, including specific review of these items with on site supervisory personnel such as Superintendents, General Foremen, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, person attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to anyone discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. No later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority: Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially desperate manner (for example, even though the Contractor has achieved its goals for women generally, the contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11245, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs.

Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246 as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that the existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

16. The Contractor shall furnish all information and reports required by the City or its representative, and shall permit access to any books, records, and accounts for purposes of investigation to ascertain compliance with the program.

17. The Contractor shall take such action with respect to any Subcontractor as the City may direct as a means of enforcing the provisions of paragraphs 1

through 20 herein, including penalties and sanctions for non-compliance, provided, however, in the event the Contractor becomes involved or threatened with litigation as the result of such direction by the City, the City will enter into such litigation as is necessary to protect the interests of the City and to effectuate the City's Equal Employment Opportunity Program and in the case of contracts receiving Federal assistance, the Contractor or the City may request the United States to enter into such litigation to protect the interests of the United States.

18. The Contractor shall and cause each Subcontractor, if any, to file compliance reports with the City in the form and to the extent prescribed by the City or its representative. Compliance reports filed at such time as directed shall contain information as to the employment practices, policies, programs and statistics of the Contractor and any Subcontractor.

19. Refusal or failure of a prospective Contractor to comply with the provisions of this selection as applicable at the time of bidding as to the Contractor or a prospective Subcontractor, shall result in that Contractor not being considered a responsible bidder and may result in the rejection of the bid, or if such failure or refusal is discovered after award of the contract, the Contractor or Subcontractor shall be subject to the provisions of Subsection 20 below.

20. Refusal by the Contractor or Subcontractor to comply with any part on or of this program as herein stated and described will subject the offending party to any or all of the following penalties:

a. Withholding all future payments under the involved public contract to the party in violation until it is determined that the party is in compliance with the provisions of the contract.

b. Refusal of all future bids where a party is a Contractor or Subcontractor under any public contract with the City of Savannah or any of its departments or divisions until such time as the Contractor demonstrates that the policy outlines shall be complied with by each party.

c. In cases in which there is substantial or material violation or the threat of substantial or material violation of the compliance procedure, or as may be provided for by contract, appropriate proceedings may be brought to enforce those provisions, including the enjoining, within applicable laws, of Contractors, Subcontractor, or other organizations, individuals or groups who prevent directly, indirectly, or seek to prevent directly or indirectly compliance with the policy, as herein outlined.

21. As used herein, the term "Subcontractor" shall be used as the singular or plural and refer to any party who provides the Contractor with supplies, materials or workmanship of $10,000 or more under the contract.

FC-4 SUBCONTRACT

None of the work or services covered by this contract shall be subcontracted hereunder after the award of a contract without the prior written approval of the City. Any work or services subcontracted hereunder shall be specified by written contract or agreement and shall be subject to each provision of this contract. Contractors are encouraged to hire local Subcontractors and procure from local suppliers as provided in chapter 11-102 of the City Code.

FC-5 OPPORTUNITIES FOR RESIDENTS (SECTION 3 OF HUD ACT OF 1968)

A. The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 170lu. Section 3 requires that to the greatest extent feasible opportunities for training and employment be given lower income residents of the project area and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the project.

B. The parties to this contract will comply with the provisions of said Section 3 and the regulations issued pursuant thereto by the Secretary and applicable rules and orders of the Department issued thereunder prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability which would prevent them from complying with these requirements.

C. The contractor will send to each labor organization or representative of works with whom he has a collective bargain-agreement or other contract or understanding, if any, a notice advising the said labor organization or workers' representative of his commitments under this Section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.

D. The contractor will include this Section 3 clause in every subcontract for work in connection with the project and will, at the direction of the applicant for or recipient of Federal financial assistance, take appropriate action pursuant to the subcontract upon a finding that the subcontractor is in violation of regulations issued by the Secretary of Housing and Urban Development, 24 CFR Part 135. The contractor will not subcontract with any subcontractor where it has notice or knowledge that the letter has been found in violation of regulations under 24 CFR Part 135 and will not let any subcontract unless the subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.

E. Compliance with the provisions of Section 3, the regulations set forth in 24 CFR Part 135, and all applicable rules and orders of the Department issued

thereunder prior to the execution of the contract, shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient for such assistance, its successors, and assigns. **Failure to fulfill these requirements shall subject the applicant or recipient, its contractors and subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract** through which Federal assistance is provided, and to such sanctions as are specified by 24 CFR Part 135.

FC-6 COMPLIANCE WITH AIR AND WATER ACTS

This contract is subject to the requirements of the Clean Act, as amended, 42 USC 1857 et seq., The Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq., and the regulations of the Environmental Protection Agency with respect thereto, at 40 CRF Part 15, as amended from time to time.

In compliance with said regulations:

1. The Contractor shall require of subcontractors that any facility to be utilized in the performance of any nonexempt contract or subcontract is not listed on the List of Violating Facilities issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20.

2. The Contractor will comply with all the requirements of Section 114 of the Clean Air Act, as amended, (330 USC 1318) relating to inspection, monitoring, entry, reports, and information as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.

3. The Contractor will provide prompt notice of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized or to be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. The Contractor will include, or cause to be included, the criteria and requirements to paragraphs (1) through (4) of this section in every nonexempt subcontract and take action as the Government will direct as a means of enforcing such provisions.

FC-7 NON-SEGREGATED FACILITIES:

A. Certification of Non-Segregated Facilities, as required by the May 8, 1967 order (32 F.R. 7439, May 19 1967), on elimination of Segregated Facilities, by the Secretary of Labor must be submitted prior to the award of this subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause.

B. A Certification of Non-Segregated Facilities, as required by the May 19,

1967 order (32 F.R., 7439, May 1967), on elimination of Segregated Facilities, by the Secretary of Labor must be submitted by the Contractor prior to the award of this contract.

C. Contractor's receiving subcontract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of this Notice to Prospective Subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause.

FC-8 INTEREST OF CERTAIN FEDERAL OFFICIALS

No member of or Delegate to the Congress of the United States, and no resident commissioner, shall be admitted to any share or part of this contract or any benefit to arise therefore, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

INTEREST OF MEMBERS, OFFICERS, OR EMPLOYEES OF THE CITY, MEMBERS OF LOCAL GOVERNING BODY OR OTHER PUBLIC OFFICIALS

No member, officers, or employee of the City of Savannah or its designees or agents, no member of the governing body of the locality in which the program is situated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the program during his tenure or for one year thereafter, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds thereof, for work to be performed in connection with the program.

FC-9 LEAD-BASED PAINT PROHIBITED

The use of lead-based paint on any surface of any residential structure is prohibited. Residential structure means any house, apartment or structure where persons reside, including a day care center, senior citizens center, community facility, etc., ". . . with respect to paint which is manufactured after June 22, 1977. Lead-based paint means any paint containing more than six one-hundredths of one percent lead by weight (calculated as lead metal) in the total non-volatile content of the paint, or the equivalent measure of lead in the dried film of paint already applied."

SECTION 00 1330

FEDERAL LABOR STANDARDS PROVISIONS

Section 00 1330
FEDERAL LABOR STANDARDS PROVISIONS

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section I(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where
Federal Labor Standards Provisions
U.S. Department of Housing and Urban Development Office of Labor Relations
appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions,
including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonable anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same

prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section l(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section l(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all

subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 29 CFR 5.5 (a)(3)(i) and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3,(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State

Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not

less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 of this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than $5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable only where the amount of the prime contract exceeds $100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to

satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable only where the amount of the prime contract exceeds $100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, 40 USC 3701 et seq.

(3) The Contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

ATTACHMENT TO FEDERAL LABOR STANDARDS PROVISIONS

3.1 THROUGH 3.11

Section 00 1340

Section 00 1340

ATTACHMENT TO FEDERAL LABOR STANDARDS PROVISIONS

SO-CALLED "ANTI-KICKBACK ACT" AND REGULATIONS PROMULGATED PURSUANT THERETO BY THE SECRETARY OF LABOR, UNITED STATES DEPARTMENT OF LABOR

TITLE 18, U.S.C., SECTION 874

(Replaces section 1 of the Act of June 13, 1934)
(48 Stat. 948, 40 U.S.C., sec 276b)
pursuant to the Act of June 25, 1948, 62 Stat. 862)

KICKBACKS FROM PUBLIC WORKS EMPLOYEES

Whoever, by force, intimidation, or threat of procuring dismissal from employment, or by any other manner whatsoever induces any person employed in the construction, prosecution, completion or repair of any public building, public work, or building or work financed in whole or in part by loans or grants from the United States, to give up any part of the compensation to which he is entitled under his contract of employment, shall be fined not more than $5,000 or imprisoned not more than five years, or both.

SECTION 2 OF THE ACT OF JUNE 13, 1934, AS AMENDED
(48 Stat. 948, 62 Stat. 862, 63 Stat. 108)
(72 Stat. 967, 40 U.S.C., sec 276c)

The Secretary of Labor shall make reasonable regulations for contractors and subcontractors engaged in the construction, prosecution, completion or repair of public buildings, public works or buildings or works financed in whole or in part by loans or grants from the United States, including a provision that each contractor and subcontractor shall furnish weekly a statement with respect to the wages paid each employee during the preceding week. Section 1001 of Title 18 (United States Code) shall comply to such statements.

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Pursuant to the aforesaid Anti-Kickback Act, the Secretary of Labor, United States Department of Labor, has promulgated the regulations hereinafter set forth, which regulations are found in Title 29, Subtitle A, Code of Federal Regulations, Part 3. The term "this part", as used in the regulations hereinafter set forth, refers to Part 3 last above mentioned. Said regulations are as follows:

SECTION 3.3 WEEKLY STATEMENT WITH RESPECT TO PAYMENT OF WAGES

(a) As used in this section, the term "employees" shall not apply to persons in classifications higher than that of laborer or mechanic and those who are the immediate supervisors of such employees.

(b) Each contractor or subcontractor engaged in the construction, prosecution, completion, or repair of any public building or public work, or building or work financed in whole or in part by loans or grants from the United States, shall furnish each week a statement with respect to the wages paid each of its employees engaged on work covered by 29 CFR Parts 3 and 5 during the preceding weekly payroll period. This statement shall be executed by the contractor or subcontractor who supervises the payment of wages, and shall be on form WH 348, "Statement of Compliance", or on an identical form on the back of WH 347, "Payroll (For Contractors Optional Use)" or on any form with identical wording. Sample copies of WH 347 and WH 348 may be obtained from the Government contracting or sponsoring agency, and copies of these forms may be purchased at the Government Printing Office.

(c) The requirement of this section shall not apply to any contract of $2,000 or less.

(d) Upon a written finding by the head of a Federal agency, the Secretary of Labor may provide reasonable limitation, variations, tolerances, and exemptions from the requirements of this section subject to such conditions as the Secretary of Labor may specify.

(29 F.R. 95, Jan. 4, 1964, AS AMENDED AT 33 F.R. 10186, JULY 17, 1968)

SECTION 3.4 SUBMISSION OF WEEKLY STATEMENTS AND THE PRESERVATION AND INSPECTION OF WEEKLY PAYROLL RECORDS

(a) Each weekly statement required under 3.3 shall be delivered by the contractor or subcontractor, within seven days after the regular payment date of the payroll period, to a representative of a Federal or State agency in charge at the site of the building or work, or, if there is no representative of a Federal or State agency at the site of the building or work, the statement shall be mailed by the contractor or subcontractor, within such time, to a Federal or State agency contracting for or financing statement, or a copy thereof, shall be kept available, or shall be transmitted together with a report of any violation, in accordance with applicable procedures prescribed by the United States Department of Labor.

(b) Each contractor or subcontractor shall preserve his weekly payroll records for a period of three years from date of completion of the contract. The payroll records shall set out accurately and completely the name and address of each laborer and mechanic, his correct classification, rate of pay, daily and weekly number of hours worked, deductions made, and actual wage paid. Such payroll records shall be made available at all times for inspection by the contracting officer of his authorized representative and by the authorized representatives of the Department of Labor.

SECTION 3.5 PAYROLL DEDUCTIONS PERMISSIBLE WITHOUT APPLICATION TO OR APPROVAL OF THE SECRETARY OF LABOR

Deductions made under the circumstances or in the situations described in the paragraphs of this section may be made without application to and approval of the Secretary of Labor.

(a) Any deduction made in compliance with the requirements of Federal, State, or local law, such as Federal or State withholding income taxes and Federal Social Security taxes.

(b) Any deduction of sums previously paid to the employee as a bona fide prepayment of wages when such repayment is made without discount or interest. A "bona fide prepayment of wages" is considered to have been made only when cash or its equivalent has been advanced to the person employed in such manner as to give him complete freedom of disposition of the advanced funds.

(c) Any deduction of amounts required by court proceed to be paid to another unless the deduction is in favor of the contractor, subcontractor or any affiliated person, or when collusion or collaboration exists.

(d) Any deduction constituting a contribution on behalf of the person employed to funds established by the employer or representatives of employees, or both, for the purpose of providing either from principal or income, or both, medical or hospital care, pensions or annuities on retirement, death benefits, compensation for injuries, illness, accidents, or unemployment benefits, vacation pay, saving accounts, or similar payments for the benefit of employees, their families and dependents: Provided, however, that the following standards are met: (1) the deduction is not otherwise prohibited by law; (2) it is either: (i) voluntarily consented to be done and such consent is not a condition either for the obtaining of or for the continuation of employment, or (ii) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees; (3) no profit or other benefit is otherwise obtained, directly or indirectly, by the contractor or subcontractor or any affiliated person in the form of commission, dividend, or otherwise; and (4) the deductions shall serve the convenience and interest of the employee.

(e) Any deduction contributing toward the purchase of United States Defense Stamps and Bonds when voluntarily authorized by the employee.

(f) Any deduction requested by the employee to enable him to repay loans to or to purchase shares in credit unions organized and operated in accordance with Federal and State credit unions statutes.

(g) Any deduction voluntarily authorized by the employee for the making of contributions to governmental or quasi-governmental agencies, such as the American Red Cross.

(h) Any deduction voluntarily authorized by the employee for the making of contributions to Community Chests, United Givers Funds, and similar charitable organizations.

(i) Any deductions to pay regular union initiation fees and membership dues, not including fines or special assessments: Provided, however, that a collective bargaining agreement between the contractor or subcontractor and representatives of its employees provides for such deductions and the deductions are not otherwise prohibited by law.

(j) Any deduction not more than for the "reasonable cost" of board, lodging, or other facilities meeting the requirements of section 3(m) of the Fair Labor Standards Act of 1938, as amended, and Part 531 of this title. When such a deduction is made the additional records required under 526.27(a) of this title shall be kept.

SECTION 3.6 PAYROLL DEDUCTIONS PERMISSIBLE WITH THE APPROVAL OF THE SECRETARY OF LABOR

Any contractor or subcontractor may apply to the Secretary of Labor for permission to make any deduction not permitted under 3.5. The Secretary may grant permission whenever he finds:

(a) The contractor, subcontractor, or any affiliated person does not make a profit or benefit directly or indirectly from the deduction either in the form of a commission, dividend, or otherwise;

(b) The deduction is not otherwise prohibited by law;

(c) The deduction is either (1) voluntarily consented to by the employee in writing and in advance of the period in which the work is to be done and such consent is not a condition either for the obtaining of employment or its continuance, or (2) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees; and

(d) The deduction serves the convenience and interest of the employee.

SECTION 3.7 APPLICATIONS FOR THE APPROVAL OF THE SECRETARY OF LABOR

Any application for the making of payroll deductions under 3.6 shall comply with the requirements prescribed in the following paragraphs of this section:

(a) The application shall be in writing and shall be addressed to the Secretary of Labor.

(b) The application shall identify the contract or contracts under which the work in question is to be performed. Permission will be given for deductions only on specification, identified contracts, except upon a showing of exceptional circumstances.

(c) The application shall state affirmatively that there is compliance with the standards set forth in the provisions of 3.6. The affirmation shall be accompanied by a full statement of the facts indicating such compliance.

(d) The application shall include a description of the proposed deduction, the purpose to be served thereby, and the classes of laborers or mechanics from whose wages the proposed deduction would be made.

(e) The application shall state the name and business of any third person to whom any funds obtained from the proposed deductions are to be transmitted and the affiliation of such person, if any, with the applicant.

SECTION 3.8 PROHIBITED PAYROLL DEDUCTIONS

Deductions not elsewhere provided for by this part and which are not found to be permissible under 3.6 are prohibited.

SECTION 3.09 METHODS OF WAGES

The payment of wages shall be by cash, negotiable instruments payable on demand, or the additional forms of compensation for which deductions are permissible under this part. No other methods of payment shall be recognized on work subject to the Copeland Act.

SECTION 3.10 REGULATIONS PART OF CONTRACT

All contracts made with respect to the construction, prosecution, completion, or repair of any public building or public work or building or work financed in whole in part by loans or grants from the United States covered by the regulations in this part shall expressly bind the contractor or subcontractor to comply with such of the regulations in this part as may be applicable. In this regard, see 5.5 (a) of this subtitle.

TITLE 29 - LABOR

Subtitle A - Office of the Secretary of Labor

PART 3 - CONTRACTORS AND SUBCONTRACTORS ON PUBLIC BUILDING OR PUBLIC WORK FINANCED IN WHOLE OR IN PART BY LOANS OR GRANTS FROM THE UNITED STATES

SECTION 3.1 PURPOSE AND SCOPE

This part prescribes "anti-kickback" regulations under section 2 of the Act of June 13, 1934, as amended (40 U.S.C. 276c), popularly known as the Copeland Act. This part applies to any contract which is subject to Federal wage standards and which is for the construction, prosecution, completion, or repair of public buildings, public works or buildings or works financed in whole or in part by loans or grants from the United States. The part is

intended to aid in the enforcement of the minimum wage provisions of the Davis-Bacon Act and the various statutes dealing with Federally-assisted construction that contain similar minimum wage provisions, including those provisions which are not subject to Reorganization Plan No. 14 (e.g., the College Housing Act of 1950, the Federal Water Pollution Control Act, and the Housing Act of 1959), and in the enforcement of the overtime provisions of the Contract Work Hours Standards Act whenever they are applicable to construction work. The part details the obligation of contractors and subcontractors relative to the weekly submission of statements regarding the wages paid on work covered thereby; sets forth the circumstances and procedures governing the making of payroll deductions from the wages of those employed on such work; and delineates the methods of payments permissible on such work.

SECTION 3.2 DEFINITIONS

As used in the regulations in this part:

(a) The term "building" or "work" generally includes construction activity as distinguished from manufacturing, furnishing of materials, or servicing and maintenance work. The terms include, without limitation, buildings, structures, and improvements of all types, such as bridges, dams, plants, highways, parkways, streets, subways, tunnels, sewers, mains, power lines, pumping stations, railways, airports, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, and canals; dredging, shoring, scaffolding, drilling, blasting, excavating, clearing and landscaping. Unless conducted in connection with and at the site of such a building or work as is described in the forgoing sentence, the manufacture or furnishing of materials, articles, supplies or equipment, (whether or not a Federal or State agency acquires title to such materials, articles, supplies, or equipment during the course of the manufacture or furnishing, or owns the materials from which they are manufactured or furnished) is not a "building" or "work" within the meaning of the regulations in this part.

(b) The terms "construction", "prosecution", "completion", or "repair", means all types of work done on a particular building or work at the site there of, including, without limitation, altering, remodeling, painting and decorating, the transporting of material and supplies to or from the building or work by the employees of the construction contractor or construction subcontractor, and the manufacturing or furnishing of materials, articles, supplies, or equipment on the site of the building or work, by persons employed at the site by the contractor or subcontractor.

(c) The terms "public buildings" or "public work" include building or work for whose construction prosecution, completion, or repair, as defined above, a Federal agency is a contracting party, regardless of whether title thereof is in a Federal agency.

(d) The term "building or work financed in whole or in part by loans or grants from the United States" includes building or work for whose construction, prosecution, completion, or repair, as defined above, payment of part payment is made directly from funds provided by loans or grants by a Federal agency. The term does not include building or work for which Federal assistance is limited solely to loan guarantees or insurance.

(e) Every person paid by a contractor or subcontractor in any manner for his labor in the construction, prosecution, completion, or repair of a public building or public work or building or work financed in whole or in part by loans or grants from the United States is "employed" and receiving between him and the real employer.

(f) The term "any affiliated person" includes a spouse, child, parent, or other close relative of the contractor or subcontractor; a partner or officer of the contractor or subcontractor; a corporation closely connected with the contractor or subcontractor as parent, subsidiary or otherwise, and an officer or agency of such corporation.

(g) The term "Federal agency" means the United States, the District of Columbia, and all executive departments, independent establishments, administrative agencies, and instrumentalities of the United States and of the District of Columbia, including corporation, all or substantially all of the stock of which is beneficially owned by the United States, by the District of Columbia, or any of the foregoing departments, establishments, agencies, and instrumentalities.

Section 00 1350

CITY OF SAVANNAH
BUREAU OF PUBLIC DEVELOPMENT
GENERAL SPECIFICATIONS AND CONDITIONS FOR COMMUNITY DEVELOPMENT BLOCK GRANT CONTRACTS WITH CONTRACTORS

INDEX TO
SECTION 00 1350 - COMMUNITY DEVELOPMENT BLOCK GRANT CONTRACTS

Section 00 1350

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
COMMUNITY DEVELOPMENT BLOCK GRANT
SUPPLEMENTARY GENERAL CONDITIONS
FOR CONTRACTS WITH CONTRACTORS

The following conditions take precedence over any conflicting conditions in the Contract:

SEC. 1. APPLICATION TO SUBCONTRACTORS

No money under this Contract shall be disbursed by the Contractor to any sub-contractor or agency except pursuant to a written contract which incorporates the conditions listed below to the extent they are applicable.

SEC. 2. DEFINITIONS

As used in this Contract:

"HUD" means the Secretary of Housing and Urban Development or a person authorized to act on his behalf.

"City" means the Mayor and Aldermen of the City of Savannah or a person authorized to act in their behalf.

"Act" means Title I of the Housing and Community Development Act of 1974, as amended, unless otherwise specified.

SEC. 3. RECORDS

A. Records to be Kept - Records shall be maintained in accordance with requirements prescribed by HUD or the City with respect to all matters covered by this Contract. Except as otherwise authorized by HUD, such records shall be maintained for a period of three years after receipt of the final payment under this contract.

B. Documentation of Costs - All costs shall be supported by properly executed payrolls, time records, invoices, contracts, vouchers, orders, or other accounting documents. All documents pertaining in whole or in part to this Contract shall be clearly identified and readily accessible.

C. Inspection of Records - At any time during normal business hours and as often as the City, HUD and/or the Comptroller General of the United States may deem necessary, the Contractor shall make available to the City, HUD and/or representatives of the Comptroller General for examination all of its records, with respect to all matters covered by this Contract, and will permit the City, HUD and/or representatives of the Comptroller General to audit, examine and make excerpts or transcripts from such records including contracts, invoices, materials, payrolls, records of personnel, conditions of employment and any other data relating to matters covered by this Contract.

SEC. 4. COPYRIGHTS

If this contract results in a book or other copyrightable material, the author is free to copyright the work; but HUD and the City reserve a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, all copyrighted material and all material which can be copyrighted.

SEC. 5. PATENTS

Any discovery or invention arising out of, or developed in the course of, work aided by this Contract shall be promptly and fully reported to HUD for determination by HUD as to whether patent protection on such invention or discovery shall be sought and how the rights in the invention or discovery, including rights under any patent issued thereon, shall be disposed of and administered in order to protect the public interest.

SEC. 6. LOBBYING

This section applies to contracts in excess of $100,000. The Contractor certifies, to the best of his or her knowledge and belief, that:

(1) No Federally appropriated funds have been paid or will be paid, by or on behalf of the Contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal loan, the entering into of any cooperative agreement, or the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.

(2) If any funds other than Federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The Contractor shall require that the language of this certification be included in the award documents for all sub-awards at all tiers exceeding $100,000, including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements.

(4) This certification is a material representation of fact upon which reliance was placed when this Contract was made or entered into. Agreement to this certification is a prerequisite for making or entering into this Contract imposed by Section 1352, title 31, U.S. Code. Any person or agency who makes an expenditure prohibited by this section is subject to a civil penalty from $10,000 up to $100,000 for each failure. This penalty also applies to any person or agency who fails to submit or amend the disclosure form (LLL), when required. Failure to submit the required certification may result in payment under this contract being delayed or denied.

SEC. 7. DISCRIMINATION

Contractors shall comply with all relevant requirements of the following federal laws and regulations dealing with discrimination in federally-assisted programs:

(1) Title VI of the Civil Rights Act of 1964 (42 U.S.C. 20000d) which provides that no person shall, on the ground of race, color, or national origin, be excluded from employment or participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.

(2) Section 109 of Title I of the Housing and Community Development Act of 1974, as amended (42 U.S.C. 5309) and regulations at CFR 570.602 which provide that no person shall on the grounds of race, color, national origin, or sex, be excluded from participation in, be denied the benefits of, be denied employment in, or be subjected to discrimination under any CDBG program or activity.

(3) Section 504 of the Rehabilitation Act of 1973, as amended, (29 U.S.C. 794) which provides that no otherwise qualified handicapped individual shall, solely by reason of his/her handicap, be excluded from the participation in, be denied the benefits of, be denied employment in, or be discriminated against under any program or activity receiving federal assistance.

(4) Age discrimination Act of 1975, as amended (42 U.S.C. 6101) which provides that no person shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal assistance.

(5) Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. 1701u) which provides that, to the greatest extent possible, training and employment opportunities shall be made available to low-income residents of the unit of local government in which the project is located (i.e. the City of Savannah and Chatham County), and that contract and subcontracts be awarded to small businesses located within, or owned in substantial part by residents in the same area.

(6) Executive Order 11246, as amended by Executive Order 12086, and regulations in 41 CFR 60, which provides that no person shall be discriminated against on the basis of race, color, religion, sex, or national origin in all phases of employment during the performance of federally-assisted construction contracts and subcontracts. Contractors and subcontractors shall take affirmative action to ensure fair treatment in employment, including recruitment, training, promotion, demotion, transfer, layoff, termination, and pay.

SEC. 8. <u>LABOR STANDARDS</u>

A. All workers employed by Contractors or subcontractors on construction work costing over $2,000 and financed in whole or in part under this Contract shall be paid wages at rates not less than those prevailing on similar construction in the locality, as determined by the Secretary of Labor in accordance with the Davis-Bacon Act, as amended (40 U.S.C. 276a-276a.7). By reason of the foregoing requirement, the Contract Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.) also applies. However, these requirements apply to the rehabilitation of residential property only if such property is designed for residential use of eight or more families.

B. In construction projects subject to the Davis-Bacon Act, Contractors and subcontractors shall submit weekly payroll information for each worker in the form prescribed by HUD, and shall post a notice listing the minimum wage rates at the work site or sites.

C. The Contractor shall comply with the Copeland "Anti-Kick Back Act" (18 U.S. C. 876) as supplemented in Department of Labor regulations (29 CFR Part 3). This Act provides that the Contractor shall be prohibited from inducing, by any means, any person employed in the

construction, completion, or repair of public work, to give up any part of the compensation to which he is otherwise entitled.

SEC. 9. LEAD-BASED PAINT

A. The use of lead-based paint in the federally-assisted construction or rehabilitation of residential structures is prohibited by Section 401(b) of the Lead-Based Paint Poisoning Prevention Act [42 U.S.C. 4831(b)] and regulations in 24 CFR 35B.

SEC. 10. USE OF DEBARRED, SUSPENDED OR INELIGIBLE CONTRACTORS

CDBG funds shall not be used directly or indirectly to employ, award contracts to, or otherwise engage the services of, or fund any contractor or sub-recipient during any period of debarment, suspension, or placement in ineligibility status under the provisions of 24 CFR Part 24. (Government Debarment and Suspension Regulations)

SEC. 11. CONFLICTS OF INTEREST

A. Conflicts Prohibited - Except for approved administrative or personnel costs, no person who is an employee, officer, agent, consultant, elected official or appointed official of the City or the Contractor and who exercises or has exercised any functions or responsibilities with respect to CDBG-assisted activities, or who is in a position to participate in a decision-making process or gain inside information with regard to such activities, may obtain any personal or financial interest or benefit from the activity, or have an interest in any contract, subcontract or agreement related thereto, or the proceeds thereof, either for himself/herself or those with whom he/she has family or business ties, during his/her employment or tenure or for one year thereafter.

B. Contractor's Responsibilities - The Contractor shall take appropriate steps to assure compliance with paragraph (A) of this section. It also agrees that it will incorporate the following provisions into every sub-contract:

> "Interest of Sub-Contractor and Employees: The Sub-contractor covenants that no person who presently exercises any functions or responsibilities in connection with the Community Development Block Grant Program has any personal financial interest, direct or indirect, in this Contract. Any interest on the part of the Sub-contractor or his employees must be disclosed to the Recipient and the City, provided, however, that this paragraph shall be interpreted in such a manner so as not to unreasonably impede the statutory requirement that maximum opportunity be provided for employment of and participation by residents of the area."

C. Exceptions - The City may request HUD to grant an exception to the provisions of paragraph (A) of this section, when it determines that such an exception will serve to further the purposes of the Act and the effective and efficient administration of the Contractor's program or project.

SEC. 12. DISPUTES, DEFAULT AND TERMINATION

A. Disputes - In the event of dispute arising under this Contract, the Contractor shall notify the City promptly in writing of his contentions and submit his claim. If the dispute arises before performance of the related work, the written notice shall be submitted prior to commencing such work. In any event, the Contractor shall proceed with such work in compliance with the instructions of the City; such compliance shall not be a waiver of the Contractor's rights to make a claim, provided he has

notified the City in writing as above stipulated.

B. Default and Remedies

1. Default shall consist of any failure by the Contractor to perform under this Contract or written amendments thereto or any breach of any covenant, agreement, provision or warranty provided by the Contractor as a part of this Contract. Actions which constitute a default include, but are not limited to:

(i) Failure to submit to the City reports which are required pursuant to this Contract or the submission of required reports which are incorrect or incomplete.

(ii) Submission of requests for payment or reimbursement of amounts which are incorrect or incomplete.

(iii) The failure of the Contractor to accept any additional conditions which may be provided by law, by executive order, by regulation or by other policy announced by the City, the state or any federal agency.

(iv) Failure to perform any activity required by this Contract.

2. Upon occurrence of any default, the City shall advise the Contractor in writing of the action constituting the default, and specify the actions that must be taken to cure the default. The City may suspend payment under the contract. If a default is not cured within 30 days from receipt of written notice of such default by the Contractor, the City may continue the suspension or, by written notice of termination, may terminate the Contract.

3. Notwithstanding the above, the Contractor shall not be relieved of liability to the City for damage sustained by the City by virtue of any default or breach of the Contract; and the City may deduct the amount of damages from any outstanding payments to the Contractor or may withhold payments until such time as the exact amount of the damages is determined.

C. Termination

1. If federal funding for this project is terminated and no other funding is available for continuation of this project, the City will not be obligated to continue funding for the services contained in this contract and may terminate the Contract.

2. In the event of termination, all property and finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs and reports prepared by or purchased with Community Development funds by the Contractor under this Contract shall, at the option of the City, become its property and the Contractor shall be entitled to receive just and equitable compensation for any work satisfactorily completed hereunder.

SEC. 13. ASSIGNABILITY

The Contractor shall not assign any interest in this Contract, and shall not transfer any interest in the same (whether by assignment or novation) without the prior written consent of the City, provided, however, that claims for money due or to become due the Contractor from the City under this contract may be assigned to a bank, trust company, or other financial institution without such prior approval. Notice of any such assignment or transfer shall be furnished promptly to the City.

SEC. 14. OTHER RESPONSIBILITIES OF THE CONTRACTOR

A. Employment Status - It is understood by the Contractor that, in performing services in accordance with the terms and conditions of this Contract, it is so performing as an independent contractor and not as an employee of the City.

B. Taxes, Social Security and Government Reporting - Personal income tax payments, social security contributions, insurance and all other governmental reporting and contributions required as a consequence of the Contractor receiving compensation under this Contract shall be the sole responsibility of the Contractor.

C. Insurance - The Contractor shall secure and maintain such insurance as will protect him from claims under the Worker's Compensation Acts and from claims for bodily injury, death, or property damage which may arise from the performance of his services under this contract.

D. Professional Skills - It is understood and agreed that the Contractor employ persons skilled in the professional callings necessary to perform the work agreed to be performed by it under this Contract, that the City relies upon the skill of such employees to do and perform such work, and that acceptance by the City of the work performed does not operate as a release of the Contractor from its professional responsibility. If it is necessary for the Contractor to consult with appropriate outside specialists, they shall be retained at the cost and expense of the Contractor and at no additional cost to the City.

CONTRACT ADMINISTRATION FORMS

Section 00 1400
ADMINISTRATION OUTLINE

This administration outline was developed to assist in the implementation of the Contract by establishing how the contract requirements are to be administered.

This outline does not supersede, modify, or replace any of the requirements of the General Conditions. Nothing in this outline shall alter those requirements. In the event of conflicts, provisions of the General Conditions shall govern.

The references listed are primary references. Further pertinent information may be found in unlisted references.

1. Pre-Construction Meeting

Attendees:
- Project Manager
- City Project Engineer
- Construction Inspector
- Design Engineer (Consultant)
- Contract Analyst
- Contractor
- Testing Lab (Optional)
- Utility Owners

Objective: Discuss construction related issues; issue Notice to Proceed.

2. Construction Schedule - (ref. Paragraphs 00 1500-32 & 00 1500-46)
(6 copies)

Progression:
- Contractor (submit)
- Design Engineer (Consultant)
- City Project Engineer
- Project Manager
- Construction Inspector (review)

Distribution:
- Project Manager-1
- City Project Engineer-1
- Construction Inspector-1
- Design Engineer (Consultant)-1
- Contractor-2

3. Material Submittals - (ref. Paragraph 00 1500-49)
(6 copies)

Forms: Submittal Transmittal (Section 00 1410)
Responsibility for Shop Drawing Approval (Section 00 1490)

Progression: Contractor (submit)
Design Engineer (Consultant) (review)
Construction Inspector (Review)
Project Engineer (review)
Department Head/Project Manager

Distribution (marked: no exceptions taken, or make corrections noted)

City Project Engineer-1
Project Manager-1
Contractor-2
Design Engineer (Consultant)-1
Construction Inspector-1

Distribution (marked: amend and resubmit, or rejected - see remarks)

City Project Engineer-1
Construction Inspector-1
Contractor-4

4. Request for Substitution (ref. Paragraph 00 1500-50)
(6 copies)

Forms: Request for Substitution (Section 00 1415)

Progression: Contractor (submit)
Design Engineer (Consultant)
Construction Inspector
City Project Engineer/Project Manager (review)
Construction Inspector
Contractor

Distribution (marked: Substitution Approved or Substitution Approved as Noted)

City Project Engineer-1
Design Engineer (Consultant)-1
Contractor-2
Project Manager-1
Construction Inspector-1

Distribution (marked: amend and resubmit, or rejected - see remarks)

Project Manager-1
Design Engineer (Consultant)-1
City Project Engineer-1
Construction Inspector-1
Contractor-4

5. Staging (ref. Paragraph 00 1500-61)
(3 copies)

Progression: Contractor (submit)
Construction Inspector (review)
Contractor

Distribution: Construction Inspector-1
Contractor-2

6. Periodic Payments (ref. Paragraphs 00 1500-74, 00 1500-75 & 00 1500-78)
(3 copies)

Forms: (unit price & lump sum contracts)
Request for Periodic Payment (Section 00 1420)
Stored Material (Section 00 1425)
Progress Report (Section 00 1430)
Updated Schedule
Affidavit of Payment of Claims (Section 00 1435)
DBE Participation Report (Section 00 1437)

Progression: Contractor (submit)
Design Engineer (Consultant)
Construction Inspector (approval)
City Project Engineer (approval)
Contract Analyst (payment procedure)
Project Manager
Contract Analyst
Finance (payment)
Contractor

Distribution: Construction Inspector-1
Contract Analyst-1
Finance-1

Contents (unit price & lump sum contracts):

1. Request for Periodic Payment

2. Stored Material (include supplier invoice)
3. Progress Report
4. Updated Schedule
5. Affidavit of Payment of Claims
6. Certified Payrolls
7. DBE Participation Report

7. Change Order (ref. Paragraphs 00 1500-82 & 00 1500-83)
(7 copies)

Note: Initiation will be dependent upon reason for Change Order

Forms: Contract Change Order (Section 00 1450)

Progression:
Construction Inspector
Contractor
Design Engineer (Consultant)
Contract Analyst (review)
City Project Engineer (review)
Project Manager (approval/signature)
Division Head (approval/signature)
Purchasing
City Manager (approval/signature)
City Council (approval)
Contract Analyst (distribution)
Contractor

Distribution:
City Project Engineer-1
Project Manager-1
Contractor-2
Construction Inspector-1
Clerk of Council-1
Contract Analyst-1
Finance-1
Design Engineer (Consultant)-1

8. Notice of Delay (ref. para. 00 1500-79)
(1 copy)

Forms: Notice of Delay (Section 00 1440)

Progression:
Contractor (submit)
Construction Inspector

Distribution:
City Project Engineer-1
Project Manager-1

Construction Inspector-1
Design Engineer (Consultant)-1
Contractor-1

9. Request for Facility Interruption (ref. Paragraphs 00 1500-57 & 00 1500-59)
(1 copy)

Forms: Request for Facility Interruption (Section 00 1445)

Progression: Contractor (submit)
Construction Inspector

Distribution: City Project Engineer-1
Project Manager-1
Contractor-1
Construction Inspector-1
Design Engineer (Consultant)-1

10. Final Inspection (ref. Paragraph 00 1500-25)
(1 copy)

Forms: Request for Final Inspection (Section 00 1465)

Progression: Contractor (request inspection)
Construction Inspector

Action:
1. Notification
   a. Project Manager
   b. City Project Engineer
   c. Design Engineer (City/Consultant)
   d. Contractor
2. Final Inspection
3. Review As-builts and Recordable Plats

11. Final Payment (ref. Paragraphs 00 1500-74 & 00 1500-85)
(3 copies)

Forms: Request for Periodic Payment Forms
Affidavit of Payment of Claims (Section 00 1435)
Statement of Surety (Section 00 1470)
Contractor's Release (Section 00 1475)
DBE Participation Report (Section 00 1437)

Progression: Contractor (submit)
Design Engineer (Consultant)
Contract Analyst (approval)

Construction Inspector (approval)
City Project Engineer
Contract Analyst (payment procedure)
Project Manager
Contract Analyst
Finance (payment)
Contractor

Distribution: Construction Inspector-1
Contract Analyst-1
Finance-1

Contents (unit price & lump sum contracts):

1. Request for Periodic Payment
2. Stored Material (include supplier invoice)
3. Progress Report
4. Updated Schedule
5. Affidavit of Payment of Claims
6. Certified Payrolls
7. Statement of Surety
8. Contractor's Release
9. DBE Participation Report

12. Final Acceptance (ref. Paragraph 00 1500-25)
(1 copy)

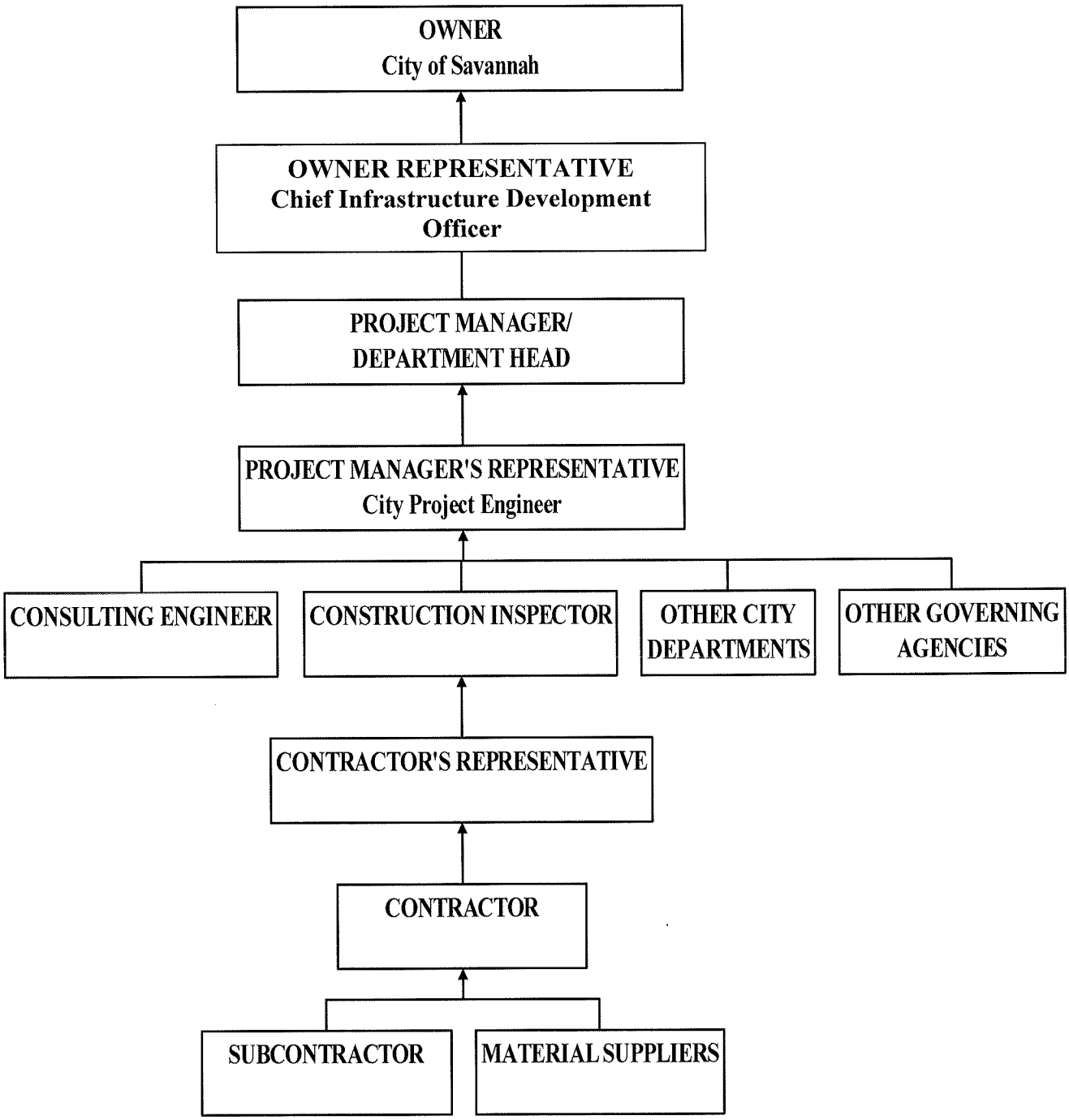
Forms: Notice of Final Acceptance (Section 00 1480)

Progression: Construction Inspector (issue)
Contractor

Distribution: City Project Engineer-1
Design Engineer-1
Project Manager-1
Contractor-1
Construction Inspector-1
Contract Analyst-1

SECTION 00 1405

ORGANIZATIONAL FLOW CHART



Section 00 1410
SUBMITTAL TRANSMITTAL

CONSTRUCTION INSPECTOR:_____
SUBMITTAL No.:_____
PROJECT: Travis Field Water Reclamation Facility Force Main
PROJECT NO.: SW-534-19
CONTRACTOR:_____ **DATE:**_____

The following material is transmitted for submittal review:

NO.	DATE	COPIES	DESCRIPTION/EQUIPMENT NO.

We have verified that the material transmitted herein is in compliance with the specifications:
_____ **with no exceptions**
_____ **except for the following deviations:**

NO.	DEVIATION

_____
(Contractor's Representative's Signature)

SUBMITTAL REVIEW

REVIEW IS FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS. NO RESPONSIBILITY IS ASSUMED FOR CORRECTNESS OF DIMENSIONS OR DETAILS

Remarks:

_____
_____
_____
_____
_____

NO EXCEPTIONS TAKEN _____
MAKE CORRECTIONS NOTED _____
AMEND AND RESUBMIT _____
REJECTED - SEE REMARKS _____

Date:_____ **By:**_____
Design Engineer

Section 00 1415

REQUEST FOR SUBSTITUTION

CONSTRUCTION INSPECTOR:_____
SUBMITTAL No.:_____
PROJECT: Travis Field Water Reclamation Facility Force Main
PROJECT NO.: SW-534-19
CONTRACTOR:_____ **DATE:**_____

The following is requested for substitution:

NO.	MATERIAL/EQUIPMENT SPECIFIED	MATERIAL/EQUIPMENT SUBSTITUTION

We have verified that the material transmitted herein is in compliance with the specifications:

_____ **with no exceptions**
_____ **except for the following deviations:**

NO.	DEVIATION

_____
(Contractor's Representative's Signature)

SUBMITTAL REVIEW

REVIEW IS FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS. NO RESPONSIBILITY IS ASSUMED FOR CORRECTNESS OF DIMENSIONS OR DETAILS

_____ **NO EXCEPTIONS TAKEN**

_____ **MAKE CORRECTIONS NOTED**

_____ **AMEND AND RESUBMIT**

_____ **REJECTED – SEE REMARKS**

Remarks_____

Date:_____ **By:**_____
Design Engineer

Section 00 1420

REQUEST FOR PERIODIC PAYMENT

UNIT PRICE CONTRACT

PROJECT NAME: Travis Field Water Reclamation Facility Force Main

PROJECT NO.: SW-534-19

CONTRACTOR: _____

PAYMENT REQUEST NO: _____

PERIOD| FROM _____; TO _____

APPLICATION DATE: _____

PAGE ____ OF ____

CONTRACT						PREVIOUS		CURRENT		TO DATE	
ITEM NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT	QUANTITY	AMOUNT	QUANTITY	AMOUNT	QUANTITY	AMOUNT

Section 00 1420

REQUEST FOR PERIODIC PAYMENT

UNIT PRICE CONTRACT

PROJECT NAME: Travis Field Water Reclamation Facility Force Main

CONTRACTOR:_____

PERIOD FROM:_____ TO:_____

PAGE_____OF_____

PROJECT NO.: SW-534-19

PAYMENT REQUEST NO.:_____

APPLICATION DATE:_____

CONTRACT						PREVIOUS		CURRENT		TO DATE	
ITEM NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT	QUANTITY	AMOUNT	QUANTITY	AMOUNT	QUANTITY	AMOUNT

Original Contract Completion Date _____

Adjusted Contract Completion Date _____

Original Contract Amount _____

Net Change Orders _____

Adjusted Contract Amount _____

Value of Original Work Performed to Date _____

Value of Change Order Work Performed to Date _____

Total Value of All Work Performed to Date _____

Value of Materials Stored (This Request) _____

Less _____% Retained By Owner _____

Net Amount Earned on Contract to Date _____

Less Amount of Previous Payments Approved _____

BALANCE DUE THIS REQUEST _____

CONTRACTOR:_____

CERTIFICATION OF CONTRACTOR

I certify to the best of my knowledge and belief that all items and amounts on the face of this Periodical Estimate and Application for Payment are correct; that all work has been performed and/or material supplied in full accordance with the terms and conditions of the Contract Documents referred to on the fact of this form, including all duly authorized deviations, substitutions, alterations, additions, and/or deletions; that the forgoing is a true and correct statement of the Contract account up to and including the last day of the period covered by this periodical estimate and application for payment that no part of the "BALANCE DUE THIS PAYMENT" has been received; that all previous Progress Payments received on this Contract have been applied by the undersigned to discharge in full all obligations of the undersigned incurred in connection with the Work covered by prior applications for payment under this Contract; and that all materials and equipment incorporated in said payment or otherwise listed in or covered by this application for payment are free and clear of all liens, claims, security interest and encumbrance.

DATE:_____

BY:_____

TITLE:_____

Section 00 1425

STORED MATERIALS

Attachment to Pay Request No._____

CONSTRUCTION INSPECTOR:_____

PAGE_____ OF _____

PROJECT: Travis Field Water Reclamation Facility Force Main

PROJECT NO.: SW-534-19

DATE:_____

Material Description	This Pay Period				To Date	
	No. Units Stored	Cost Per Unit	Date Stored	Total Cost	No. Units Stored	Total Cost

Section 00 1430

PROGRESS REPORT

CONSTRUCTION INSPECTOR:_____
PROJECT: Travis Field Water Reclamation Facility Force Main
PROJECT NO.: SW-534-19
CONTRACTOR:_____
DATE:_____

The following describes all progress of the work since the date of the last progress report.

_____
_____
_____
_____
_____
_____

During this reporting period the following delays occurred.

_____
_____
_____
_____
_____
_____

The following delays are expected during the next reporting period.

_____
_____
_____
_____
_____
_____

_____

Contractor's Representative

Section 00 1435

AFFIDAVIT OF PAYMENT OF CLAIMS

PROJECT NAME: Travis Field Water Reclamation Facility

_____ (CONTRACTOR)

THIS DAY _____ appeared before me, _____, a Notary Public, in and for the City of Savannah, and being by me first duly sworn states that all subcontractors and suppliers of labor and materials have been paid all sums due them to date for work performed or material furnished in the performance of the contract between:

THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH (OWNER) and _____ (CONTRACTOR), dated _____, 20__, for the construction of Travis Field Water Reclamation Facility Force Main.

City Project No. SW-534-19

CONTRACTOR

BY: _____

TITLE: _____

DATE: _____

SEAL OF CONTRACTOR
(If a Corporation)

Subscribed and sworn to before me on this
___ day of _____, 20__.
My commission expires on the _____ day of
_____, 20__.

NOTARY PUBLIC

(NOTARY SEAL)

SECTION 00 1437
DBE PARTICIPATION REPORT

IMPORTANT NOTICES

- The DBE Participation Report (Form 00 1437) must be submitted to the City of Savannah **Contract Analyst and the Office of Business Opportunity** with each pay request. Failure to submit this form can result in no credit toward contracted DBE requirements and a possible delay in monthly progress payments.
- The Prime Contractor/Consultant **may not change DBE firms without prior written approval of the City.** Contractors/Consultants may use the Add/Change of DBE Subcontractor Form (Section 00 1438) to request changes to the Proposed Schedule of DBE Participation (Section 00 1310). Any unauthorized substitution of DBE subcontractors can result in withholding of payments for up to 30 days until compliance is reestablished.
- **Documentation providing proof of payments to DBEs for work on this project shall be kept on file and available for inspection by City staff.**

PROJECT NAME & NUMBER: Travis Field Water Reclamation Facility Force Main (SW-534-19)_____ DATE _____ REPORT NO. _____

PRIME CONTRACTOR/CONSULTANT _____ CONTRACT AMOUNT ($) _____

DBE GOAL **20%** ☐ **This is the final project report. End Date:** _____

DBE INFORMATION					DBE PAYMENTS			
APPROVED DBEs	DESCRIPTION OF WORK or SUPPLIES	DBE CONTACT PERSON	DBE CONTACT PHONE #	DBE CONTACT EMAIL	ORIGINAL SUBCONTRACT AMOUNT	PAYMENT DATE(S)	TOTAL PAID THIS PERIOD	TOTAL PAID TO-DATE

Total DBE Paid To Date: $_____ _____**%**

CONTRACTOR: I hereby certify this information is true and correct; and supporting documentation is on file and available for inspection by the City at any time.

SIGNED _____ **TITLE** _____ **DATE** _____

CITY OF SAVANNAH

This report has been reviewed for DBE contract compliance.

SBO Compliance Coordinator _____ **DATE**_____

Rev 3/2018

SECTION 00 1437
DBE PARTICIPATION REPORT

INSTRUCTIONS TO CONTRACTOR/CONSULTANT

To receive credit toward contracted DBE goals, the Prime Contractor/Consultant must complete and submit this form with each Request for Periodic Payment, beginning with the first payment request. An additional copy of this section must be submitted **to the SBO Compliance Coordinator**. The Office of Business Opportunity may be contacted by phone at (912) 652-3582 or by fax at (912) 651-3175. **Failure to submit this form may result in no credit toward the contract DBE requirements and a delay in monthly progress payment.**

1. Project Name:	The official name of the project as stated on the contract
2. Date:	Date Report is being submitted
3. Report Number:	Reports must be consecutively numbered.
4. Contract Amount:	Total amount of the contract to be paid to the Prime Contractor/Consultant by the City of Savannah for completion of the project.
5 DBE Goals:	Enter the contracted DBE Goals per the signed agreement.
6. Final Project Report	Place an "X" or checkmark in this box when the project has been completed and the report submitted is the final payment report. Enter the date of project completion.
7. DBE Information:	ONLY DBEs that have been verified and approved by the City of Savannah DBE Office, from the Prime Contractor's/Consultant's "Proposed Schedule of DBE Participation" may be included on the payment report. NO SUBSTITUTIONS OR CHANGES IN GOALS MAY BE MADE without prior written approval by the City.
8. DBE Payments:	Enter the actual amount of the subcontract agreement for each approved DBE, the date of any payments occurring within the report period, the amount of the payments to each DBE during this period and the total each DBE has been paid-to-date.
9. Earnings-to-date:	Enter the total amount paid to date to all DBE subcontractors.
10. Contractor Certification:	The contractor or his authorized representative must sign this form prior to submittal. Signature indicates that all information is true and correct and documented proof of all information is on file and available for City of Savannah review at any time.

GENERAL INFORMATION

The prime contractor/consultant may not change DBE firms without prior written approval of the City of Savannah Office of Business Opportunity. Approval cannot be obtained from the City's Project Manager, Contract Analyst or other City of Savannah employees. Contractors/Consultants must use the Add/Change of DBE Subcontractor Form (Section 00 1438) to request changes to the Proposed Schedule of DBE Participation (Section 00 1310). **Any proposed changes must meet established DBE goals and conform to contract regulations and DBE Program Requirements.**

If the prime contractor/consultant in its bid/proposal included any second or lower tier subcontractor/sub-consultant/supplier towards meeting the goal, it is the sole responsibility of the prime contractor/consultant to ensure all DBE firms have been reviewed and approved by the City of Savannah and to document all subcontracting/sub-consulting and/or supplier participation dollars counted towards the goal, irrespective of tier level. Upon completion of the work, a final "DBE Participation Report" will be required and submitted with the final pay request.

As per the City's contract, the City's SBO policy, and signed participation reports: the prime contractor/consultant certifies all DBE payment information to be true and correct, to have all supporting documentation on file and to make copies of this documentation available to the City of Savannah. **Prime contractors/consultants will periodically be required to provide copies of payment documentation** for DBEs being counted toward the DBE goal (including the prime contractor/consultant, if it is a DBE and being counted toward the goal). Failure to comply with the City's request to provide the required documentation may cause the City to withhold payments due the prime contractor/consultant until compliance is attained. Payment documentation includes but is not limited to:

- signed sub-contracts with DBEs being utilized in meeting the project's DBE goals
- DBE invoices for payment related to the project
- proof of payment of DBE invoices related to the project

City SBO Office Use
Date Received: _____
Time Received: _____

Section 00 1438
ADD/CHANGE OF DBE SUBCONTRACTOR FORM

IMPORTANT NOTICE TO CONTRACTORS: The prime contractor **may not** change DBE firms without **prior** written approval of the City's Office of Business Opportunity. Changes **cannot** be approved by other City of Savannah personnel. All requests for DBE substitutions must be made in writing, must include an explanation for the requested change, and must have supporting documentation. Additionally, all requested changes must continue to meet DBE goals, conform to contract regulations, utilize certified DBEs and meet DBE program requirements. **Any unauthorized substitution of DBE subcontractors may result in withholding of payment to the prime contractor for up to 30 days until compliance is reestablished.**

Project Name: Travis Field Water Reclamation Facility Force Main Project Number: (SW-534-19)

Prime Contractor/Consultant Name: _____

Address: _____ Telephone: _____

Prime Contractor/Consultant - Designee's Signature: _____ Date: _____

Position/Title: _____

APPROVED SCHEDULE OF DBE PARTICIPATION (Section 00 13 10) *(List certified DBEs that were approved per contract.)*		**Proposed Change?**	**PROPOSED ADDITIONS OR CHANGES TO DBE PARTICIPATION** *(Complete only for rows where "Proposed Change" is marked "Yes".)*		
DBE Subcontractor Name	**Estimated Subcontract Value**		**DBE Subcontractor Name**	**Estimated Subcontract Value**	**Certified DBE? Y/N**
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			

Provide a detailed explanation to justify any proposed changes noted in the table above. The explanation must provide a legitimate business-related reason for changing the approved DBE plan. (Attach additional sheets if needed.)

_____

_____

_____

_____

Project Manager

_____Concerns noted regarding proposed change _____No concerns noted regarding proposed change

Project Manager Signature: _____ Date:_____

Office of Business Opportunity

_____Change Approved _____Change Denied

If denied, enter explanation: _____

Signature of Office of Business Opportunity Representative_____ Date: _____

Copy: Prime Contractor, Project Manager, Contract Analyst and Office of Business Opportunity (project file)

Section 00 1440

NOTICE OF DELAY

CONSTRUCTION INSPECTOR:_____
PROJECT: Travis Field Water Reclamation Facility Force Main
PROJECT NO.: SW-534-19
CONTRACTOR:_____
DATE:_____

Notice is hereby given that a delay has or will occur and is described as follows:

_____
_____
_____
_____
_____
_____
_____

By:_____ Date:_____
Contractor's Representative

Received:_____ Date:_____
Construction Inspector

Received:_____ Date:_____
City Project Engineer

Response to Notice:

_____
_____
_____
_____
_____

_____ Date:_____
Construction Inspector

_____ Date:_____
Project Manager

Section 00 1445

REQUEST FOR FACILITY INTERRUPTION

CONSTRUCTION INSPECTOR:_____
PROJECT: Travis Field Water Reclamation Facility Force Main
PROJECT NO.: SW-534-19
CONTRACTOR:_____
DATE:_____

Request is hereby made for temporary interruption of the following facilities:

_____

_____

_____

_____

_____

_____

_____

Requested By:_____
(Contractor's Representative)

Received:_____ Date:_____
Construction Inspector

Received:_____ Date:_____
City Project Engineer

Response to Request

_____

_____

_____

_____

_____

_____

_____ Date:_____
Construction Inspector

_____ Date:_____
Project Manager

SECTION 00 1450

CONTRACT CHANGE ORDER

PROJECT: Travis Field Water Reclamation Facility Force Main CHANGE ORDER NO.:_____

PROJECT NO.: SW-534-19 CONTRACT DATE:_____

CONTRACTOR:_____

The following changes are hereby made to the Contract Documents:

Item No.	Description	Decrease In Contract Price	Increase In Contract Price

TOTALS $_____ $_____

NET CHANGE IN CONTRACT PRICE $_____ $_____

(Decrease) (Increase)

JUSTIFICATION:_____

_____

_____

CONTRACT PRICE PRIOR TO THIS CHANGE ORDER $_____

CONTRACT PRICE BY THIS CHANGE ORDER WILL BE DE/INCREASED BY $_____

NEW CONTRACT PRICE, INCLUDING THIS CHANGE ORDER, WILL BE $_____

COMPLETION DATE PRIOR TO THIS CHANGE ORDER: _____

NEW CONTRACT WILL BE INCREASED BY _____ CALENDAR DAYS.

NEW DATE FOR COMPLETION OF ALL WORK WILL BE: _____

To be effective this Change Order must be approved by the applicable City department. This document will become a supplement to the Contract and all provisions will apply hereto. This Change Order represents final release for any and all amounts due or to become due contracted for changes referred to herein. Contractor further releases all other claims, if any, except those claims previously submitted in writing in strict accordance with the terms of the contract, for additional compensation under this contract, including without limitation any rights Contractor may have for additional compensation arising out of delays or disruptions of the Contractor's schedule as may have arisen prior to the date of the modification.

REQUESTED BY:_____
(CONTRACTOR) NAME SIGNATURE TITLE DATE

RECOMMENDED BY:_____
(CONSULTANT) NAME SIGNATURE TITLE DATE

ACCEPTED BY: Daslin Garcon, PE Water & Sewer Sr. Civil Engineer
(PROJECT ENGINEER) NAME SIGNATURE TITLE DATE

ACCEPTED BY: James Laplander, PE Water & Sewer Planning & Engineering Director
(PROJECT MANAGER) NAME SIGNATURE TITLE DATE

ACCEPTED BY: Eric Larson, PE Water Resources Director
(DEPARTMENT HEAD) NAME SIGNATURE TITLE DATE

ACCEPTED BY: Heath Lloyd, PE Assistant City Manager
(ASST. CITY MANAGER) NAME SIGNATURE TITLE DATE

APPROVED BY: Michael Brown City Manager
(CITY MANAGER) NAME SIGNATURE TITLE DATE

Section 00 1465
REQUEST FOR FINAL INSPECTION

CONSTRUCTION INSPECTOR:_____
PROJECT: Travis Field Water Reclamation Facility Force Main
PROJECT NO.: SW-534-19
CONTRACTOR:_____
DATE:_____

Notice is hereby given that all work has been completed in conformance with the requirements of the contract documents. All "punch list" items have been completed. Record drawings are submitted herewith. Request is hereby made for a final inspection of the work.

Requested date of Inspection:_____

Requested By:_____
Contractor's Representative

Response to Request:_____

_____
Construction Inspector

_____
City Project Engineer

Section 00 1470

STATEMENT OF SURETY COMPANY

IN ACCORDANCE with the provisions of the CONTRACT, dated _____,20_____ BETWEEN THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, OWNER, AND _____ (CONTRACTOR), THE _____(SURETY).

SURETY on the Material and Labor Payment BOND of:

_____(CONTRACTOR).

After careful examination of the books and records of said CONTRACTOR, or after receipt of an affidavit from CONTRACTOR, which examination of affidavit satisfies SURETY that all claims for labor and materials have been satisfactorily settled, hereby approve of the final payment of the said _____(CONTRACTOR) and set forth in the said SURETY COMPANY'S BOND.

IN WITNESS WHEREOF, and SURETY has hereunto set its hand and seal this _____ day of _____, 20___.

ATTEST:

(SEAL) BY:_____
PRESIDENT

NOTE: This statement, if executed by any person other than the President or Vice President of the Company, must be accompanied by a certificate of event date showing authority conferred upon the person so signing to execute such instruments on behalf of the Company represented.

(SEAL) BY:_____
BONDING COMPANY AGENT

NOTE: The statement of surety must come from the bonding company.

Section 00 1475

CONTRACTOR'S RELEASE

KNOW ALL PERSONS BY THESE PRESENTS THAT:

_____(CONTRACTOR)

of _____ County/City and State of _____does hereby acknowledge that upon receipt of final payment, amounting to $_____, from the MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, which then represents full satisfaction and payment of all sums of money owing, payable and belonging to _____(CONTRACTOR) (for myself, my heirs, executors and administrators; for itself, its successors and assigns) who hereby releases the Mayor and Aldermen of the City of Savannah from all claims and demands arising from or in connection with the said CONTRACT, dated _____, 20_____, and of and from all, and all manner of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money agreements, promises, variances, damages, judgments, extent, executions, claims and demand, whatsoever in law or equity, or otherwise which against the said MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, it's successors and assigns ever had, now have, or which (I, my heirs, executors, or administrators; it, its successors and assigns) hereafter can, shall or may have, for upon or by reason of any matter, cause or thing whatsoever, from the award of the contract to the date of these presents.

IN WITNESS WHEREOF _____(CONTRACTOR) has caused these presents to be dully executed this _____ day of _____, 20____.

Signed, Sealed and Delivered in the Presence of:

_____ _____(SEAL)
INDIVIDUAL

_____ _____(SEAL)
PARTNERSHIP CONTRACTOR

ATTEST:

_____ BY:_____(SEAL)
PARTNER

_____(SEAL)
CORPORATION

ATTEST:

_____ BY:_____
SECRETARY

(AFFIX CORPORATE SEAL)

Section 00 1480
NOTICE OF FINAL ACCEPTANCE

CONTRACTOR:_____
PROJECT: Travis Field Water Reclamation Facility Force Main
PROJECT NO.: SW-534-19
CONSTRUCTION INSPECTOR:_____
DATE:_____

Gentlemen:

Based upon our final inspection of the work, we have found the work performed to be complete and in conformance with the contract documents. Therefore, the City of Savannah hereby accepts the work performed and responsibility for regular maintenance of same. This acceptance does not in any way relieve you, as the contractor, of any special maintenance requirements or guarantees as stipulated in the contract documents. You are also hereby informed that the 12 month warranty period as stipulated in the contract shall expire at 11:59 p.m.,_____.

It is the responsibility of the Contractor to notify the Owner prior to this end of the 12-month warranty period. This Warranty period shall remain in effect until the Owner is notified and a Final Inspection has occurred.

_____
Project Manager

cc: City Project Engineer
Contract Analyst
Design Engineer (Consultant)

SECTION 00 1490

CONTRACTOR'S (and SUBCONTRACTORS') ACKNOWLEDGMENT FOR RESPONSIBILITY FOR SHOP DRAWING APPROVAL

(To be submitted by the Contractor/Subcontractor with all shop drawings).

The undersigned Contractor, _____, and his Subcontractor(s), _____, hereby certify that he has reviewed all notes, drawings modifications materials and specifications prepared by the Consulting Engineers pertaining to the "Shop Drawings" attached hereto. It is acknowledged that all changes and variances from the Contract Documents that are contained in said "Shop Drawings" have been flagged or otherwise marked in and ***circled in red.*** It is also acknowledged that any changes must be approved by the Project Manager and the Consulting Engineer. It is further acknowledged that **any work done that differs from the work as described in the Contract Documents that has not been approved by the Owner in a manner described above shall be the exclusive responsibility of the Contractor and/or his Subcontractors;** this responsibility includes liability for any increases in cost above the Contract amount and any cost associated with the repair or restoration of the Work as shown in the Approved Contract Documents, including the cost of the delay associated therewith.

_____ [L.S.]
By:
_____
Date:
_____ , Contractor

_____ [L.S.]
By:
_____
Date:
_____ , Contractor

GENERAL CONDITIONS OF THE CONTRACT

SECTION 00 1500

Approved:

GENERAL CONDITIONS OF THE CONTRACT
Section 00 1500
INDEX

GENERAL CONDITIONS
SECTION 00 1500

01 - Definitions

Where used in the project manual, the following words and terms shall have the meanings indicated. The meanings shall be applicable to the singular, plural, masculine and feminine of the words and terms.

Acceptance. Formal action of the Owner in determining that the Contractor's work has been completed in accordance with the contract and in notifying the Contractor in writing of the acceptability of the work.

Act of God. A cataclysmic phenomenon of nature, such as a hurricane, earthquake or abnormal flood. Rain, wind, high water, or other natural phenomenon which might reasonably have been anticipated from historical records of the general locality of the work shall not be construed as acts of God.

Addenda. Supplemental written specifications or drawings issued prior to execution of the contract which modify or interpret the project manual by addition, deletion, clarification, or corrections.

Bid. Offer of a bidder submitted on the prescribed form setting forth the price or prices of the work to be performed.

Bidder. Individual, partnership, corporation, or a combination thereof, including joint ventures, offering a bid to perform the work.

City. Owner.

Construction Inspector. The person designated, in writing, by the Consultant / Engineer to act as its representative at the construction site and to perform construction inspection services and administrative functions relating to this contract. Initial contact by the Contractor with the Engineer shall be through the Construction Inspector.

Contract. The writings and drawings embodying the legally binding obligations between the Owner and the Contractor for completion of the work.

Contract Documents. Project Manual.

Contract Drawings. The drawings included in the contract documents, plus those prepared by the Owner and the Contractor pursuant to the terms of the contract. They include:

1. Drawings in Contract Documents for bidding.

2. Modifying drawings issued by addenda.

3. Drawings submitted by the Contractor during the progress of the work and accepted by the Owner either as attachments to change orders or as non-modifying supplements to drawings in Item 1 above and drawings issued by addenda.

4. Drawings submitted by the Owner to the Contractor during the progress of the work either as attachments to the change orders or as explanatory supplements to drawings in Item 1 above and drawings issued by addenda.

Contract Price. Amount payable to the Contractor under the terms and conditions of the contract. Based on the price given on the bidding schedule, with adjustments made in accordance with the contract. The base amount given in the bidding schedule shall be either a lump sum bid or the summation of the unit price bids multiplied by the estimated quantities set forth in the bid form.

Contract Time. Number of calendar days stated in the contract for the completion of the work or portions thereof.

Contractor. The individual, partnership, corporation, or combination thereof, including joint venturers who enter into the contract with the Owner for the performance of the work. The term covers subcontractors, equipment and material suppliers, and their employees.

Contractor's Plant and Equipment. Equipment, material, supplies, and all other items, except labor, brought onto the site by the Contractor to carry out the work, but not to be incorporated in the work.

Day. Calendar day.

Direct. Action of the Owner by which the Contractor is ordered to perform or refrain from performing work under the contract.

Directive. Written documentation of the actions of the Owner in directing the Contractor.

Engineer. The City Engineer of the City of Savannah or the City Project Engineer.

Equipment. Mechanical, electrical, instrumentation or other device with one or more moving parts, or devices requiring an electrical, pneumatic, electronic, or hydraulic connection.

Furnish. To deliver to the job site or other specified location any item, equipment or material.

Herein. Refers to information presented in the project manual.

Holidays. Legal holidays designated by the City or specifically identified in supplementary conditions.

Install. Placing, erecting, or constructing complete in place any item, equipment, or material.

May. Refers to permissive actions.

Owner. The City of Savannah.

Owner's Representative. The City Engineer, City Bureau Chief, or their

representative.

Paragraph. For reference or citation purposes, paragraph shall refer to the paragraph, or paragraphs, called out by section number and alphanumeric designator. For example, this definition is found in Section 00 1500, Paragraph 01; permits and regulations are discussed in Section 00 1500, Paragraph 03).

Person. The term, person, includes firms, companies, corporations, partnerships, and joint ventures.

Project. The undertaking to be performed under the provisions of the contract.

Project Manual. Those contact documents prepared for bidding and as amended by addenda.

Provide. Furnish and install, complete in place.

Punch List. List of incomplete items of work and of items of work which are not in conformance with the contract. The list will be prepared by the Engineer when the Contractor (1) notifies the Engineer in writing that the work has been completed in accordance with the contract and (2) requests in writing that the Owner accept the work.

Shall. Refers to actions by either the Contractor or the Owner and means the Contractor or Owner has entered into a covenant with the other party to do or perform the action.

Shown. Refers to information presented on the drawings, with or without reference to the drawings.

Specifications. That part of the contract documents consisting of written descriptions of the technical features of materials, equipment, construction system, standards, and workmanship.

Specify. Refers to information described, shown, noted or presented in any manner in any part of the contract.

Submittals. The information which is specified for submission to the Owner in accordance with the project manual.

Substantial Completion. Sufficient completion of the project or the portion thereof to permit utilization of the project, or portion thereof for its intended purpose. Substantial completion requires not only that the work be sufficiently completed to permit utilization, but that the Owner can effectively utilize the substantially completed work. Determination of substantial completion is solely at the discretion of the Owner. Substantial completion does not mean complete in accordance with the contract nor shall substantial completion of all or any part of the project entitle the Contractor to acceptance under the contract.

Substantial Completion Date. Date shown on the certificate of Substantial Completion.

Will. Refers to actions entered into by the Contractor or the Owner as a covenant with the other party to do or to perform the action.

Work. The labor, materials, equipment, supplies, services, and other items necessary for the execution, completion and fulfillment of the contract.

02 - Royalties and Patents

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall hold the Owner harmless from loss on account thereof except that the Owner shall be responsible for all such loss when a particular manufacturer, product, or process is specified by the Owner.

03 - Permits and Regulations

Permits, licenses, and easements of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor including, but not limited to, business licenses, street maintenance decals, construction easements, burning permits, etc. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. Building permit fees as issued by the City of Savannah Department of Inspections shall be paid for by the City.

The Contractor shall comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified.

04 - Verbal Agreements

No verbal agreement or conversation with any officer, agent or employee of the Owner either before, during or after execution of this Contract, shall affect or modify any of the terms of obligations contained in any of the documents comprising said Contract.

05 - Lands for Work

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

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

06 - Guarantee Against Defective Work

The Contractor shall guarantee the work required under this Contract for a period of twelve months from the date of Final Acceptance (may be Substantial Completion if defined in Section 00 1600). The Contractor shall remedy, at his own expense, and without additional cost to the Owner, all defects arising from either workmanship or materials, as determined by the Engineer. The guarantee shall not cover any accidental or deliberate

damage to the work due to normal wear and tear during the guarantee period.

07 - Bonds

The Contractor shall furnish payment and performance bonds with good and sufficient surety or sureties acceptable to the Owner for the protection of persons furnishing materials or labor in connection with the performance of the work. The penal sum of such payment and performance bond will be 100% of the contract price. The bonds required hereunder will be dated as of the same date as the contract and will be furnished to the Owner at the time the contract is executed. These bonds must be in the form provided herein. **NO OTHER FORM WILL BE ACCEPTED.** These bonds shall be issued from a company licensed to do business in Georgia and shall be signed or counter signed by a Georgia agent, and shall have a proper Power of Attorney evidencing the authority of the individual signing the bond. Included with the Bonds shall be a signed **Affidavit** on the form provided herewith.

The Mayor and Aldermen of the City of Savannah may waive performance and payment bonds on contracts less than $100,000 in value. When this is done, the Special Payment Provision given in Section 00 1500, Paragraph 74 shall apply.

08 – Contractor's Insurance

(a) Liability. The Contractor shall maintain such insurance as will protect him from claims under workers compensation acts and from any other claims for damages to property, and for personal injury, including death, which may arise from operations under this contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them. Certificates of such insurance shall be filed with the Owner, and shall be subject to his approval for adequacy of protection. The Contractor shall be responsible for providing adequate limits of insurance when working within property owned by railroads, as established by such railroad company.

(b) Certificate of Insurance and Endorsements. For each insurance policy required under this contract, the Contractor shall provide a Certificate of Insurance naming the Mayor and Aldermen of the City of Savannah as CERTIFICATE HOLDER and the following endorsements for each policy:

i. A waiver of subrogation in favor of the Mayor and Alderman of the City of Savannah, its agents and/or employees shall also be provided and attached to the Certificate.

ii. A thirty (30) day cancellation in favor of the Mayor and Alderman of the City of Savannah, its agents and/or employees must be endorsed to the policy and attached to the Certificate.

(c) Indemnity. The Contractor shall indemnify and hold harmless, the Owner from and against all losses and all claims, demands, payment, suits, actions, recoveries, and judgments of every nature and description brought or recovered against the Contractor by reason of any act or omission of the said Contractor, his agents or employees, in execution of the work or in the guarding of it.

***The limits of insurance are as follows:**

►**Comprehensive Commercial General Liability** - policy covering bodily injury and property damage including premises, operations, products, and completed operations

Limits (or Higher):

General Aggregate:	$2,000,000
Products Completed Operations Aggregate:	$2,000,000
Each Occurrence Limit:	$1,000,000
Personal Injury Limit:	$1,000,000
Damage to Premises Rented to You:	$ 50,000
Medical Expenses:	$ 5,000 Any One Person

►**Commercial Automobile Liability** - policy covering injury and property damage

Limits:

$1,000,000 per occurrence and aggregate (minimum)

►**Workers Compensation & Employers Liability (includes coverage all employees, volunteers and others under your direction and supervision)**

Limits:

Part A:	Workers Compensation:	Statutory
Part B:	Bodily Injury By Accident:	$500,000 Each Accident
	Bodily Injury By Disease:	$500,000 Policy Limit
	Bodily Injury By Disease:	$500,000 Each Employee

►**Commercial Umbrella Policy**

Limits (or Higher):

$5,000,000 Per Occurrence & Aggregate *(Minimum)*

►**Builders Risk**

Coverage Period: Coverage shall remain in force until final acceptance of the project is granted by the City, and the policy will grant permission to occupy prior to acceptance.

Policy Form: Special form including wind, flood, and earthquake.

Limit: Full value of contract including change orders. The Mayor and Aldermen of the City of Savannah are to be named Sole Loss Payee.

Sublimits:

10% of the total contract cost of the project.

- All other perils including Wind: $10,000 (deductible)
- Flood: $25,000 (deductible)
- Named Storm: 2%, maximum $100,000 (deductible)
- Earthquake: $25,000 (deductible)

- **Other:**
- No coinsurance provision
- No collapse exclusion
- No water damage limitation
- No warranties suspending coverage

►Other Items Required:

- All insurance carriers and policies are required to have an AM Best Rating of A-, IX or better

- The Mayor and Aldermen of the City of Savannah are not responsible for any of the property used in or owned by the Lessee or any participants, advertisers, promoters, etc.

- All deductibles in the coverage are the responsibility of the Contractor/Lessee.

***Contractor's Liability Insurance shall be effective for the duration of the work as described in the contract documents, including authorized change orders, plus any period of guarantee as required in Section 00 1500, Paragraph 06.**

09 - Liens

Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a complete release of all claims or liens arising out of this Contract and an affidavit that so far as he has knowledge or information the release and receipts include all the labor and materials for which a lien or claim could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish an additional bond satisfactory to the Owner, to indemnify the Owner against any claim or lien (in cases where such payment is not already guaranteed by Surety Bond). If any claim or lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay on discharging such a lien, including all costs and a reasonable attorney's fee.

10 - Assignment

The Owner shall have the right to reject the assignment or sub-letting of any portion of the Contract by the Contractor. Assigning or sub-letting the Contract shall not relieve the Contractor or his surety from any Contract obligations.

11 - Joint Venture Contractor

In the event the Contractor is a joint venture of two or more Contractors, the grants, covenants, provisos and claims, rights, power, privileges and liabilities of the contract shall be construed and held to be several as well as joint. Any notice, order, direct request or any communication required to be or that may be given by the Engineer to the Contractor under this contract, shall be well and sufficiently given to all persons being the Contractor if given to any one or more of such persons. Any notice, request or other communication

given by any one of such persons to the Engineer under this contract shall be deemed to have been given by and shall bind all persons being the Contractor.

12 – Successors' Obligations

The grants, covenants, provisos and claims, rights, powers, privileges and liabilities obtained in the contract documents shall be read and held as made by and with, and granted to and imposed upon, the Contractor and the Owner and their respective heir, executors, administrations, successors and assigns.

13 - Business Tax Certificate

Contractors and subcontractors shall have a current business tax certificate, and shall furnish tax certificate numbers prior to entering into a contract with the Mayor and Aldermen of the City of Savannah.

14 - Obligations and Liability of the Contractor

The Contractor shall do all the work and furnish all the materials, tools, and appliances, except as herein otherwise specified, and everything necessary for properly performing and completing the work required by the Contract, in the manner and within the time specified. He shall complete the entire work to the satisfaction of the Engineer, and in accordance with the Specifications and Plans herein mentioned, at the prices herein agreed upon and fixed therefore. All the work, labor and materials to be done and furnished under this Contract shall be done and furnished strictly pursuant to, and in conformity with, the Contract Documents, and the directions of the Engineer as given from time to time during the progress of the work, under the terms of this Contract.

All loss or damage arising out of the performance or nature of the work, or any damage to the work itself to be done under this contract or from any unforeseen obstruction or difficulties which may be encountered in the prosecution of the same, or from the action of the elements or from any cause or causes whatsoever, until the same shall have been finally accepted, shall be sustained and paid for by the Contractor.

The Contractor shall coordinate his operations with those of any other Contractors who may be employed on other work of the Owner and shall avoid interference therewith and cooperate in the arrangements for storage of materials.

The Contractor shall conduct his work so as to interfere as little as possible with private business and public travel. He shall, at his own expense, wherever necessary or required, maintain fences, furnish watchmen, maintain lights, and take such other precautions as may be necessary to protect life and property.

The Contractor shall take all responsibility for the work done under this Contract, for the protection of the work, and for preventing injuries to persons, and damage to property and utilities on or about the work. He shall in no way be relieved of his responsibility by any rights of the Owner to give permission or issue orders relating to any part of the work, or by any such permission given or orders issued, or by failure of the Owner to give such permission or issue such orders. The Contractor shall bear all losses resulting to him or to

the Owner on account of the amount or character of the work, or because of the nature of the land in or on which the work is done is different from what was estimated or expected, or on account of the weather elements or other causes. The Contractor shall assume the defense of all claims arising out of injury or damage to persons, corporations, or property, whether said claims arise out of negligence or not, or whether said claims are for unavoidable damage or not, and from all claims relating to labor and materials furnished for the work and from all expenses incurred in defending or settling such claims, including reasonable attorney's fees.

The Contractor shall so conduct his operations as not to damage existing structures or work installed either by him or by other Contractors. In case of any such damage resulting from his own operations, he shall repair and make good as new the damaged portions at his own expense.

The Contractor warrants that he is familiar with the codes applicable to the work and that he has the skill, knowledge, competence, organization, and plant to execute the work promptly and efficiently in compliance with the requirements of the Contract Documents. The Contractor having the obligation to keep a competent superintendent on the work during its progress, to employ only skilled mechanics, and to enforce strict discipline and good order among his employees, the Contractor, himself is responsible for seeing that the work is installed in accordance with the Contract Documents. Failure or omission on the part of the Owner, representative of the Owner, agents of the Owner, Project Representative, clerk-of-the-works, engineers employed by the Engineer, representatives of the Engineer or the Engineer either to discover or to bring to the attention of the Contractor any deviation from, omission from, or non-compliance with the Contract Documents shall not be set up by the Contractor as a defense of failure to his part to install the work in accordance with the Contract Documents or for any other neglect to fulfill requirements of the Contract; nor shall the presence of any one, or all, or any of the foregoing at the site of the fact that any one, or all, or any of the foregoing may have examined the work or any part of it be set up as a defense by the Contractor against a claim for failure on his part to install the work in accordance with the Contract Documents or for any neglect to fulfill requirements of the Contract. No requirement of this Contract may be altered or waived except in pursuance of a written order of the Owner and in strict accordance with the provisions in the Contract for changes in the work.

15 - Responsibilities of the Contractor

A. Subcontractors, Manufacturers and Suppliers:

The Contractor shall be responsible for the adequacy, efficiency and sufficiency of subcontractors, manufacturers, suppliers and their employees.

B. Contractor's Employees:

The Contractor shall be responsible for the adequacy, efficiency and sufficiency of his employees. Workers shall have sufficient knowledge, skill and experience to perform properly the work assigned to them.

C. Payment for Labor and Materials:

The Contractor shall pay and require his subcontractors to pay any and all accounts for labor including Workers Compensation premiums, State Unemployment and Federal Social Security payments and other wage and salary deductions required by law. The Contractor also shall pay and cause his subcontractors to pay any and all accounts for services, equipment, and materials used by him and his subcontractors during the performance of work under this contract. Such accounts shall be paid as they become due and payable. If requested by the Owner, the Contractor shall furnish proof of payment of such accounts to the Owner.

D. Attention to Work:

The Contractor, acting through his representative, shall give personal attention to and shall manage the work so that it shall be executed faithfully. When his representative is not personally present at the project site, his designated alternate shall be available and shall have the authority to act on the contract.

E. Employee Safety:

The Contractor alone shall be responsible for the safety of his and his subcontractor's employees. The Contractor shall maintain the project site and perform the work in a manner which meets the Owner's responsibility under statutory and common law for the provision of a safe place to work.

F. Public Safety and Convenience:

The Contractor shall conduct his work so as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the Engineer and the proper governmental authority. Fire hydrants on or adjacent to the work shall be accessible to firefighting equipment. Temporary provisions shall be made by the Contractor to insure the use of sidewalks, private and public driveways and proper functioning of gutters, sewer inlets, drainage ditches and culverts, irrigation ditches and natural water courses.

G. Cooperation with the Construction Inspector:

The Contractor, when requested, shall assist the Construction Inspector in obtaining access to work which is to be inspected. The Contractor shall provide the Construction Inspector with information requested in connection with the inspection of the work.

16 - Compliance with Laws

The Contractor shall keep himself fully informed of all existing and future State and Federal Laws, all regulations of the various departments or agencies of the State of Georgia, and municipal ordinances and regulations in any manner affecting those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. If any discrepancy or inconsistency is discovered, in

the Plans, Drawings, Specifications, or Contract for this work in relation to any such law, ordinance, regulations, order, or decree, he shall forthwith report the same to the Engineer in writing. He shall at all times himself observe and comply with, and cause all his agents and employees to observe and comply with, all such existing and future laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner against any claim or liability arising from or based upon violation of any such law, ordinance, regulation, order, or decree, whether by himself or his employees or any subcontractor.

17 - Plans, Specifications and Design

It is agreed that the Owner will be responsible for the accuracy and sufficiency of the plans and specifications. The Owner shall furnish plans and specifications which completely represent the requirements of the work as far as practical to be performed under the Contract. All such drawings and instructions shall be consistent with the Contract Documents. In the cases of unit-price contracts, the units shown on the unit price schedule have been established for the purpose of uniform bidding and may or may not reflect the actual quantity of units required to perform the work. In the case of lump-sum contracts, plans and specifications which completely represent the work to be done shall be furnished prior to the time of entering into the Contract. The Owner may, during the life of the Contract, and in accordance with Section 00 1500 Paragraph 82, issue additional instructions, by means of drawings or otherwise, necessary to illustrate changes in the work.

18 - Drawings Furnished

Unless otherwise provided in the Contract Documents, the Owner will furnish to the Contractor, free of charge, up to 5 copies of drawings and specifications necessary for the execution of the work with delivery of the Notice to Proceed.

19 - Ownership of Drawings

All drawings, specifications and copies thereof furnished by the Owner shall not be reused on other work, and with the exception of the signed Contract, sets are to be returned to him on request, at the completion of the work. All models are the property of the Owner.

20 - Reference Standards

Reference to the Standards of any technical society, organization or association or to codes of local or state authorities, shall mean the latest standard, code, specifications, or tentative standard adopted and published at the date of taking bids, unless specifically stated otherwise.

21 - Division of Specifications and Drawings

Specifications and drawings are divided into groups for the convenience of the Owner. These divisions are not for the purpose of apportioning work or responsibility for work among subcontractors, suppliers and manufacturers.

22 - Order of Completion

Within ten (10) days of issuance of the Notice of Award with the work the Contractor shall submit, to the Engineer, a schedule which shall show the order in which the Contractor proposes to carry on the work, with dates at which the Contractor will start the several parts of the work and estimated dates of completion of the several parts.

Monthly progress reports shall be delivered with the pay estimate to the Engineer showing the progress of the past month's construction in relation to the approved work schedule. **No payments will be made to the Contractor until the construction schedule has been submitted by the Contractor and approved by the Engineer.** If the progress report does not agree with the approved work schedule, the Contractor shall deliver in writing an explanation with the report. Upon request from the Engineer, the Contractor shall submit a revised schedule for approval.

23 - Materials, Appliances & Employees

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, supervision and other facilities necessary for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new. The Contractor shall furnish satisfactory evidence as to the kind and quality of materials in accordance with Section 00 1500 Paragraph 49.

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned to him. If at any time before the commencement or during the progress of work, tools, equipment and supervision appear to the Engineer to be insufficient, inefficient or inappropriate to secure the quality of work required or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, to improve their character, to augment their number, or to substitute new tools, plant or equipment, as the case may be, and the Contractor shall conform to such order; but the failure of the Engineer to demand such increase of efficiency, number, or improvements shall not relieve the Contractor of his obligation to secure the quality of work and the rate of progress necessary to complete the work within the time required by this contract to the satisfaction of the Engineer.

24 - Survey Information

The Owner's representative will establish reference bench marks and base line identified on the drawings. From the information provided, the Contractor shall develop and make such additional surveys as are needed for construction, such as control lines, slope stakes, batter boards, stakes for pipe locations and other working points, lines, and elevations. Survey work shall be performed under the supervision of a licensed land surveyor. Contractor shall reestablish reference bench marks and survey control monuments destroyed by this operation at no cost to the Owner.

25 - Inspection of Work

A. General: If the specifications, the Engineer's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Engineer notice of its readiness for inspection. Such notice shall be a minimum of two working days. If the inspection is by an authority other than the Owner, the Contractor shall furnish the date fixed for such inspection. Inspections by the Owner shall be promptly made and where practicable at the source of supply. If the Engineer instructs the Contractor that inspection of certain phases of the work must be made prior to proceeding, the Contractor shall furnish such inspection, promptly and in such manner as to allow the Contractor to prosecute the work without delay. At such time as the Contractor has completed the work in its entirety the Contractor shall make written request for a final inspection. Such request shall be made no less than seven (7) calendar days prior to the requested date of inspection. An inspection will be made by the Engineer and a determination will be made as to whether or not the work is in fact complete. Acceptance will not be given nor final payment released until all "punch list" items are complete and record drawings have been approved. The "punch list" shall not be considered all-inclusive and, therefore, each requested final inspection may generate additional "punch list" items as the Contractor is responsible for completion of all work described in the contract documents.

B. Authority of Construction Inspector: The Construction Inspector is the construction site representative of the Engineer. The Engineer has delegated his authority to the Construction Inspector to make initial decisions regarding questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work under the contract.

The Construction Inspector interprets the intent and meaning of the contract and makes initial decisions with respect to the Contractor's fulfillment of the contract and the Contractor's entitlement to compensation. The Contractor shall deal solely with the Construction Inspector.

C. Inspection of Construction: The Construction Inspector shall have access to the work and to the site of the work and to the places where work is being prepared or where materials, equipment, and machinery are being obtained for the work. If requested by the Construction Inspector, the Contractor shall provide the assistance necessary for obtaining such access, and shall provide information related to the inspection of construction.

D. Change Orders: The Construction Inspector has the authority to initiate or recommend change orders. Such change orders are subject to review and approval by the Owner.

26 - Inspection and Testing of Materials

The Owner shall provide inspection and testing of all materials and workmanship by a testing lab incorporated in the work. Inspection and testing of materials and workmanship shall be at the Owner's discretion and for the purpose of establishing that all material and workmanship have been provided in general accordance with the contract documents. The Contractor shall give to the Owner a minimum of 48 hours' notice (not to include weekends and holidays) prior to placement of any concrete, fill material, backfill material, street base

or sub-base material. Failure of the Contractor to give such notice shall be cause for the Owner to suspend operations of the Contractor which may impact testing. Such suspension of the Contractor's operations shall not be considered an unavoidable delay and any loss sustained by the Contractor shall be borne by the Contractor. The Contractor shall schedule tests with the lab and also notify the construction inspector of this action. The Contractor shall be responsible for the payment of retesting of failed tests and for standby costs due to the failure of the Contractor or their suppliers to be ready for the testing procedure so scheduled by the Contractor.

Material or workmanship which does not meet the requirements of the contract documents shall be removed and replaced by the Contractor immediately and at the Contractor's expense. Subsequent inspection or testing of said material or workmanship shall be provided by the Owner. However, all costs associated with said subsequent inspection or testing shall be deducted from monies otherwise due the Contractor.

Inspection and testing by the Owner shall be in addition to all inspections or tests required of manufacturers or suppliers by the contract documents, applicable manufacturing standards, Federal, State or Local laws or by the Contractor for materials, equipment, or workmanship. Failure of the Owner to make any inspection or test shall not relieve the Contractor of his obligation to provide materials and workmanship or otherwise perform in accordance with the contract documents.

27 - Substantial Completion

At such time as the Contractor has completed the work and prior to requesting a final inspection, the Contractor shall make written request for an inspection for substantial completion. Such request shall be made no less than seven (7) calendar days prior to the requested date of inspection. An inspection will be made by the Engineer and a determination will be made as to whether or not the work is, in fact, substantially complete and a "punch list" will be developed. "Punch Lists" containing numerous items or items which may affect the intended use of the work will be considered cause to delay issuance of a Certificate of Substantial Completion. Operation and Maintenance manuals shall be submitted and approved prior to issuance of any Certificate of Substantial Completion. The use of Substantial Completion will not be used, unless called for in Section 00 1600.

28 - Rights of Various Interests

Wherever work being done by the Owner's forces or by other Contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer to secure the completion of the various portions of the work in general harmony.

29 - Separate Contracts

The Owner reserves the right to let other Contracts in connection with this work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate the Contractor's work with theirs.

30 - Subcontractors

The Contractor shall notify the Engineer in writing of the names and addresses of all proposed Subcontractors for the work at the Preconstruction Meeting. Subcontractors will not be recognized as having a direct relationship with the Owner. The persons engaged in the work, including employees of subcontractors and suppliers, will be considered employees of the Contractor and their work shall be subject to the provisions of the contract. References in the contract documents to actions required of subcontractors, manufacturers, suppliers, or any person, other than the Contractor, the Owner, the Engineer or the Construction Inspector, shall be interpreted as requiring that the Contractor shall require such subcontractor, manufacturer, supplier or person to perform the specified action.

A subcontractor for any part of the work must have experience on similar work and, if required, furnish the owner with a list of projects and the Owners or Engineers who are familiar with their competence.

31 - Access

The Contractor shall maintain access to the property owners adjacent to the Project covered by the Contract.

32 - Construction Schedule and Procedures

The Contractor shall submit and continually update a time schedule for the work and a sequence of operations.

Before starting any work, and from time to time during its progress, as the Engineer may request, the Contractor shall outline to the Engineer the methods he plans to use in doing the work, and the various steps he intends to take. Failure of the Engineer to reject the methods or steps proposed by the Contractor shall not relieve the Contractor of his responsibility for the correct and timely performance of the work.

33 - Project Management

The Contractor shall schedule and coordinate the work of the Contractor and all subcontractors and others involved to maintain the accepted progress schedule. The Contractor's duties shall also include the planning of the work, the scheduling of ordering and delivery of materials, and checking and control of all work under this contract.

The Contractor shall be responsible for complete supervision and control of their subcontractors as though they were his own forces. Notice to the Contractor shall be considered notice to all affected subcontractors.

34 - Entry

The right of access to the work wherever it is in preparation or progress shall be extended to the Owner and representatives of appropriate regulatory agencies. The Contractor shall provide facilities for such access and inspection.

35 - Restoration

The Contractor shall conduct his operations so that restoration of roadways, driveways, curb and gutter, ditches and easements progresses with the work. If the Engineer determines that inadequate progress is being made with the restoration, he may shut-down the Contractor's operations until the restoration is caught up. Such a shut-down shall be considered required due to the failure of the Contractor to perform as described in this paragraph and therefore shall not constitute a time delay and/or unavoidable delay for the Contractor. Any cost associated with such shut-down as described in this paragraph, including re-mobilization, shall be borne by the Contractor.

Any areas that are disturbed and work is subsequently suspended by the Contractor for a period of more than 24 hours shall be cleaned of debris and shall be graded so as to facilitate effective drainage. Street signs, mailboxes, fences, planters, etc. shall be restored within 24 hours of disturbance. The Contractor shall make inspections of all areas disturbed since the commencement of construction for the purpose of insuring restoration efforts have been effective. Such inspections shall be made daily and deficiencies shall be corrected within 24 hours.

In the event the restoration is not done, the Owner shall reserve the right to employ others to perform the restoration work. The Owner will back charge the Contractor for this service.

36 - Completion of "Punch List" Items

Prior to **completion** of the project, the Contractor shall request an inspection and any deficiencies found at that time will be noted on a "Punch List." The development of a "Punch List" shall not delay or terminate the accumulation or assessment of liquidated damages as established in Section 00 1500, Paragraph 86.

37 - Authority of Contractor

A. Contractor's Representative:

The Contractor shall notify the Owner in writing of the name of the person who will act as the Contractor's representative and shall have the authority to act in matters relating to this contract. This person shall have authority to carry out the provisions of the contract and to supply materials, equipment, tools and labor without delay for the performance of the work.

B. Construction Procedures:

The Contractor shall supervise and direct the work. He has the authority to determine the means, methods, techniques, sequences and procedures of construction, except in those instances where the Owner, to define the quality of an item of work, specifies in the contract a means, method, technique, sequence or procedure for the construction of that item of work.

38 - Authority of Engineer

The Project Engineer is the authorized representative of the Owner. All direction to the Contractor shall be provided only by the Project Engineer.

39 - Owner-Contractor Coordination

A. Service of Notice:

Notice, order, direction, request or other communication given by the Engineer to the Contractor shall be deemed to be well and sufficiently given to the Contractor if left at any office used by the Contractor or delivered to any of his offices, clerks or employees or posted at the site of any work or mailed to any post office addressed to the Contractor at the address given in the contract document or mailed to the Contractor's last known place of business. If mailed by first-class mail, any form of communication shall be deemed to have been given to and received by the Contractor two days after the day of mailing.

B. Suggestions to Contractor:

Plan or method of work suggested by the Engineer to the Contractor but not specified or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor. The Engineer assumes no responsibility therefore and in no way will be held liable for any defects in the work which may result from or be caused by the use of such plan or method of work.

C. Cooperation:

The Contractor agrees to permit entry to the site of the work by the Owner or other Contractors performing work on behalf of the Owner. The Contractor shall afford the Owner, other subcontractors and their employees, reasonable facilities and cooperation and shall arrange his work and dispose of his materials in such a manner as to not interfere with the activities of the Owner or of others upon the site of the work. The Contractor shall promptly make good any injury or damage that may be sustained by other Contractors or employees of the Owner at his hands. The Contractor shall join his work to that of others and perform his work in proper sequence in relation to that of others.

If requested by the Contractor, the Owner shall arrange meetings with other Contractors performing work on behalf of the Owner to plan coordination of construction activities. The Owner shall keep the Contractor informed of the planned activities of other Contractors.

Differences or conflicts arising between the Contractor and other Contractors employed by the Owner or between the Contractor and the works of the Owner, with regard to their work, shall be submitted to the Engineer for his decision in the matter. If the work of the Contractor is affected or delayed because of any act or omission of other Contractors or of the Owner, the Contractor may submit, for the Engineer's consideration, a documented request for a change order.

40 - Interpretation of Specifications and Drawings

A. General:

The specifications and drawings are intended to be explanatory of each other. Work specified on the drawings and not in the specifications, or vice versa, shall be executed as if specified in both.

B. Request for Clarification:

In the event the work to be done or matters relative thereto are not sufficiently detailed or explained in the contract documents, the Contractor shall apply to the Engineer for further explanations as may be necessary and shall conform thereto so far as may be consistent with the terms of the contract. In the event of doubt or question arising respecting the true meaning of the specifications or drawings, reference shall be made to the Engineer for his decision.

41 - Discrepancies in Specifications and Drawings

A. Errors and Omissions:

If the Contractor, in the course of the work, becomes aware of any claimed errors or omissions in the contract documents or in the Owner's field of work, he shall immediately inform the Engineer in writing. The Engineer shall promptly review the matter and if he finds an error or omission has been made, he shall determine the corrective actions and advise the Contractor accordingly. If the corrective work associated with an error or omission increases or decreases the amount of work called for in the contract, the Engineer shall issue an appropriate change order. After discovery of an error or omission by the Contractor, related work performed by the Contractor shall be done at his risk unless authorized, in writing, by the Engineer.

B. Conflicting Provisions:

In cases of conflict between the specifications and drawings, the specifications shall govern. Figure dimensions on drawings shall govern over scale dimensions and detail drawings shall govern over general drawings. In the event an item of work is described differently in two or more locations on the drawings and in the specifications, the Contractor shall request a clarification from the Engineer. For any event where the Contractor claims any ambiguities or discrepancies within the specifications, the Contractor may assume that the higher, greater and most stringent specification or standard applies.

42 - Material, Equipment and Workmanship

Unless otherwise specifically stated in the contract documents, the Contractor shall provide and pay for material, labor, tools, equipment, water, light, power, transportation, supervision, and temporary construction of any nature, and other services and facilities of any nature, whatsoever necessary, to execute, complete and deliver the work within the specified time. Material and equipment shall be new and of the quality specified. Equipment offered shall be current modifications which have been in successful regular operation under comparable conditions. Construction work shall be executed in conformity with the standard practice of the trade.

43 - Demonstration of Compliance with Contract Requirements

A. Inspection:

To demonstrate his compliance with the contract requirements, the Contractor shall assist the Engineer in his performance of inspection work. The Contractor shall grant the Engineer access to the work and to the site of the work, and to the places where work is being prepared, or whence materials, equipment or machinery are being obtained for the work. The Contractor shall provide information requested by the Engineer in connection with inspection work.

If the contract documents, laws, ordinances, or any public regulatory authority require parts of the work to be specially inspected, tested or approved, the Contractor shall give the Engineer adequate prior written notice of the availability of the subject work for examination.

If parts of the work are covered in contravention of the Engineer's directive, the cost of exposing the work for inspection and closing shall be borne by the Contractor regardless of whether or not the work is found to be in compliance with the contract.

If any work is covered in the absence of the Engineer's directive to the contrary, the Contractor shall, if directed by the Engineer, uncover, expose or otherwise make available for inspection, portions of covered work. If it is found that such work is defective, the Contractor shall bear the expense of uncovering and reconstructing. If the work is found to be in compliance with the contract, the Contractor will be allowed an increase in the contract price or an extension in the contract time, or both via a change order.

B. Certification:

In cases where compliance of materials or equipment to contract requirements is not readily determinable through inspection and tests, the Engineer shall request that the Contractor provide properly authenticated documents, certificates or other satisfactory proof of compliance. These documents, certifications and proofs shall include performance characteristics, materials of construction and the physical or chemical characteristics of materials.

C. Inspection at Point of Manufacturing:

If inspection and testing of materials or equipment in the vicinity of the work by the Owner is not practical, the specifications may require that such inspection and testing or witnessing of tests take place at the point of manufacture. In this case and in the event the remote inspection and testing is not specified and is requested by the Owner, the required travel, subsistence, and labor expenses shall be paid by the Owner. If the Contractor requests the Owner to inspect and test material or equipment at the point of manufacture, then the additional costs to the Owner for travel, subsistence, and labor expenses shall be paid by the Contractor.

44 - Project Meetings

1.0 General

Project meetings will be held on site as often as deemed necessary by the Engineer throughout the construction period. Meetings will normally be held monthly. Contractor's representatives shall attend.

The purpose of the meetings will be to discuss schedule, progress, coordination, submittals and job-related problems.

45 - Overtime and Shift Work

Overtime and shift work may be established as a regular procedure by the Contractor with reasonable notice and written permission of the Owner. No work other than overtime and shift work established as a regular procedure shall be performed between the hours of 6:00 p.m. and 7:00 a.m. nor on Sundays or holidays except such work as is necessary for the proper care and protection of the work already performed or in case of an emergency.

Contractor agrees to pay the Owner's costs of overtime inspection except those occurring as a result of overtime and shift work established as a regular procedure. Overtime inspection shall include inspection required during holidays and weekends, and between the hours of 6:00 p.m. and 7:00 a.m. on weekdays. Costs of overtime inspection will cover engineering, inspection, general supervision and overhead expenses which are directly chargeable to the overtime work. Contractor agrees that Owner shall deduct such charges from payments due the Contractor.

46 - Construction Schedule

1.0 Scope:

This section specifies reports and schedules for planning and monitoring the progress of the work.

2.0 Description:

The Contractor shall provide a graphic construction schedule (bar chart) indicating various subdivisions of the work with no task exceeding 90 days in duration and the dates of commencing and finishing each. All items shall correspond to the items shown on the schedule of values as required in Section 00 1500, Paragraph 75. The schedule will also show major equipment submittals and review time. The schedule shall show the time allowed for testing and for other procedures which must be completed prior to the work being put into operation. The schedule will take into account the time of completion and work sequence. The Contractor shall also provide a listing of start and stop dates and durations of all activities listed in the schedule.

3.0 Submittal Procedures:

Within ten (10) days after Notice of Award of the Bid, the Contractor shall submit six (6) copies of the construction schedule to the City Project Engineer.

Within fourteen (14) calendar days after receipt of the submittal, the City Project

Engineer shall review the submitted schedule and return two copies with comments to the Contractor. If the City Project Engineer finds that the submitted schedule does not comply with specified requirements, the corrective revisions will be noted on the submittal copy returned to the Contractor.

4.0 Schedule Revisions:

Revisions to the accepted construction schedule may be made only with the written approval of the Contractor and Owner. A change affecting the contract value of any activity, the completion time, and sequencing shall be made in accordance with applicable provisions of Section 00 1500, Paragraph 82.

5.0 Project Status Update:

Project status, review and update shall be provided with each pay request and at least monthly as specified in Section 00 1500, Paragraph 79.

47 - Quality

Where the contract requires that materials or equipment be provided or that construction work be performed, and detailed specifications of such materials, equipment or construction work are not set forth, the Contractor shall perform the work using materials and equipment of the best grade in quality and workmanship obtainable in the market from firms of established good reputations, and shall follow standard practices in the performance of construction work. The work performed shall be in conformity and harmony with the intent to secure the standard of construction and equipment of work as a whole and in part.

48 - Material and Equipment Specified By Name

A. GENERAL

When material or equipment is specified by reference to two or more patents, brand names, or catalog numbers followed by "or equal," it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements, and that other materials or equipment, of equal capacities, quality and function shall be considered by the Owner upon the Contractor's request for substitution. Requests for substitution shall be made in accordance with Section 00 1500, Paragraph 50.

B. SINGLE SOURCE PRODUCTS:

If material or equipment is specified by one or more patents or proprietary names or by the name of only one manufacturer not followed by "or equal," substitutions will not be considered.

49 - Submittal Procedure

1.0 General

The Contractor shall submit descriptive information which will enable the Engineer to

determine whether the Contractor's proposed materials, equipment, or methods of work are in general conformance to the design concept and in compliance with the drawings and specifications.

2.0 Contractor's Responsibilities

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment, or method of work shall be as described in the submittal. The Contractor shall verify in writing that all features of all products conform to the requirements of the specifications and drawings. Submittal documents shall be clearly edited to indicate only those items, models, or series of material or equipment which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall insure that there is no conflict with other submittals and shall notify the Engineer in each case where his submittal may affect the work of another Contractor or the Owner. The Contractor shall insure coordination of submittals among the related crafts and subcontractors.

The Contractor may authorize in writing a material or equipment supplier to deal directly with the Engineer with regard to a submittal. These dealings shall be limited to contract interpretations.

3.0 Transmittal Procedure

A. General

Submittals regarding material and equipment shall be accompanied by the Submittal Transmittal Form. A separate form shall be used for each specific item, class of material, or piece of equipment. Submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers and specification section and paragraph. Submittals for various items shall be made with a single form when the items taken together constitute a manufacture's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXX;" where "XXX" is the sequential number assigned by the Contractor. Resubmittals shall have the following format: "XXXY;" where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for resubmittals, i.e., A, B, or C being the first, second, and third resubmittals, respectively. Submittal 026B, for example, is the second resubmittal of submittal 026.

B. Deviation from the Contract

If the Contractor proposes to provide material, equipment, or method of work which deviates from the project manual, he shall indicate so under "deviations" on the transmittal form accompanying the submittal copies.

C. Submittal Completeness

Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

4.0 Review Procedure

Review shall not extend to means, methods, techniques, sequences, or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes, or to safety precautions, or programs incident thereto. Review of a separate item, as such, will not indicate approval of the assembly in which the item functions.

The Contractor shall submit six copies of all specified information. Unless otherwise specified, within 30 calendar days after receipt of the submittal, the Engineer shall review the submittal and return one copy of the submittal with comments. The returned submittal shall indicate one of the following actions:

1. If the review indicates conformance with the drawings and specifications, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the Contractor may begin to implement the work or incorporate the material or equipment covered by the submittal.

2. If the review indicates limited corrections are required, submittal copies will be marked "MAKE CORRECTIONS NOTED." The Contractor may begin implementing the work or incorporate the materials or equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.

3. If the review indicates that the submittal is insufficient or contains incorrect data, submittal copies will be marked "AMEND AND RESUBMIT." Except at his own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "NO EXCEPTION TAKEN" or "MAKE CORRECTIONS NOTED."

4. If the review indicates that the submittal does not comply with the plans and specifications, submittal copies will be marked "REJECTED - SEE REMARKS." Submittals with deviations which have not been clearly identified will be rejected. Except at his own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

5.0 Effect of Review of Contractor's Submittals

Review of drawings, methods of work, or information regarding materials or equipment the Contractor proposed to provide, shall not relieve the Contractor of his responsibility for errors and omissions therein and shall not be regarded as an assumption of risks or liability by the Owner or by any officer or employee thereof, and the Contractor shall have no claim under the contract on account of the failure, or partial failure, or the method of work, material, or equipment so reviewed. A mark of "NO EXCEPTION TAKEN" or "MAKE CORRECTIONS NOTED" shall mean that the Owner has no objection to the Contractor, upon his own responsibility, using the plan or method of work proposed, or

providing the materials or equipment proposed.

50 - Requests for Substitution

The Contractor may offer material or equipment of equal or better quality and performance in substitution for those specified as described in Section 00 1500, Paragraph 48. The Owner will consider offers for substitution only from the Contractor and will not acknowledge or consider such offers from suppliers, distributors, manufacturers, or subcontractors. The Contractor's offers of substitution shall be made in writing to the Engineer and shall include sufficient data to enable the Engineer to assess the acceptability of the material or equipment for the particular application and requirements.

If the offered substitution necessitates changes to or coordination with other portions of the work, the data submitted shall include drawings and details showing such changes. Contractor agrees to perform these changes as part of the substitution of material or equipment at no additional cost to the Owner. Within thirty (30) calendar days after receipt of the offer of substitution, the Engineer will review the material submitted by the Contractor and advise the Contractor of objections, if any, to the proposed substitution. Such action shall not relieve the Contractor from responsibility for the efficiency, sufficiency, quality and performance of the substitute material or equipment, in the same manner and degree as the material and equipment specified by name. Any cost differential associated with a substitution shall be reflected in the offer and the contract documents shall be modified by a change order.

51 – Manufacturer's Directions

Manufactured articles, material and equipment shall be applied, installed, connected, erected, adjusted, tested, operated and maintained as recommended by the manufacturer, unless otherwise specified. Manufacturer's installation instructions and procedures shall be provided prior to installation of the manufactured articles, material and equipment.

52 - Product Data

Data required by the Owner for inspecting, testing, operating or maintaining parts of the work shall be provided by the Contractor. Unless otherwise specified, such information shall consist of six (6) copies and shall be provided at the time the referenced material or equipment is delivered to the job site. The data shall include such items as shop drawings, erection drawings, reinforcing steel schedules, testing and adjusting instructions, operations manuals, maintenance procedures, parts lists and record drawings. When applicable, information and data to be provided shall be identified by the specified equipment number. Extraneous material on the pages or drawings provided shall be crossed out, and the equipment or material to be supplied shall be clearly marked. Such information is to be provided as part of the work under this contract and its acceptability determined under normal material submittal procedures. The certificate of substantial completion shall not be issued for any portion of the work for which complete product data has not been submitted and approved.

53 - Operation and Maintenance Information

Six (6) complete sets of operation and maintenance information shall be provided for all mechanical and electrical equipment. Such operating and maintenance information shall consist of the name and address of the manufacturer, the nearest representative of the manufacturer, and the nearest supplier of the manufacturer's equipment and parts. In addition, the following items of information shall be provided where applicable.

1. Lubrication Information: This shall consist of the manufacturer's recommendations regarding the lubricants to be used and the lubrication schedule to be followed.

2. Control Diagrams: Diagrams shall show internal and connection wiring.

3. Start-up Procedures: These instructions consist of the equipment manufacturer's recommendations for installation, adjustment, calibration, and troubleshooting.

4. Operating Procedures: These instructions consist of the equipment manufacturer's recommended step-by-step procedures for starting, operating, and stopping the equipment under specified modes of operation.

5. Preventive Maintenance Procedures: These instructions consist of the equipment manufacturer's recommended steps and schedules for maintaining the equipment.

6. Overhaul Instructions: These instructions consist of the manufacturer's directions for the disassembly, repair and reassembly of the equipment and any safety precautions that must be observed while performing the work.

7. Parts List: This list consists of the generic title and identification number of each component part of the equipment.

8. Spare Parts List: This list consists of the manufacturer's recommendations of numbers of parts which should be stored by the Owner and any special storage precautions which may be required.

9. Original warranties as required by the contract documents and as supplied by the manufacturer.

54 - Record Drawings

It shall be the primary responsibility of the Project Consulting Engineer to gather and prepare detailed information in the field for preparation of record drawings on a monthly basis prior to the Owner approving payments to the Contractor. However, the Contractor

shall maintain a neat set of updated construction drawings and note on these drawings in color any revisions, including any descriptive notes relative to these revisions, and the location of water and sewer laterals. These plans shall be available during normal working hours at the job site for review by the City's/consultant's project inspector, and at the completion of the project shall become the property of the Owner and shall be delivered to the City's Project Engineer. Failure to do so will result in monies being withheld from the Contractor's final payment.

55 - Protection of the Public and Property

The Contractor shall provide and maintain all necessary watchmen, barricades, lights, flagmen and warning signs and take all necessary precautions for the protection of the public. The Contractor shall provide a plan at the Pre-construction meeting.

56 - Protection of the Owner's Property

The Contractor shall continuously maintain adequate protection of all work from damage, and shall take all reasonable precautions to protect the Owner's property from injury or loss arising in connection with this Contract. The Contractor shall adequately protect adjacent private and public property, as provided by Law and Contract Documents.

Before parking any heavy equipment on property of the City of Savannah, the Contractor must request and receive permission from the Owner.

57 - Maintenance of Traffic and Sequence of Operations:

A. GENERAL: The following conditions will apply:

1. A traffic control plan shall be submitted for approval by the City Traffic Engineering Director, hereinafter referred to in this section as the Traffic Engineer, prior to any construction operations. Furthermore, a right-of-way permit must be obtained from the Traffic Engineering Department.

2. All signage for construction operations, lane and street closures, as well as detours, shall be performed in accordance with the current Federal and State Manual on Uniform Traffic Control Devices as well as the current revision of the City of Savannah Traffic Engineering Manual on Traffic Controls and Temporary Street Construction and Maintenance.

3. The work shall be arranged and conducted so that it can be performed with the least interference to all vehicular and pedestrian traffic.

4. No property owner shall be denied vehicular access to their property for any length of time, other than that as determined by the Traffic Engineer, is absolutely necessary.

5. Two-way traffic must be maintained on all public roads and streets, except that during periods of off-peak use, one-way traffic, properly controlled by a certified DOT flagman, will be permitted at the discretion of the Engineer. Each time there is to be a change in the number of lanes open to traffic, it shall be approved by the Engineer.

6. The Traffic Engineer may approve detours around construction sites when one open traffic lane is not feasible.

7. For closing of minor residential streets, a 24 hour advance notice is required.

8. For lane closures involving signalized intersections or arterial streets, a 48 hour advance notice is required.

9. Complete street closures involving collectors and arterial streets, requiring a traffic detour, require 4 working days advance notice in order to coordinate a news release.

10. Construction is not to be permitted on City streets between the hours of 10:00 P.M. through 6:00 A.M., except under emergency situations with the approval of the Traffic Engineer.

11. In order to provide the greatest possible convenience to the public, the Contractor shall remove all lane closure markings and devices immediately when work is complete or temporarily suspended for any length of time.

B. Safety

1. The Contractor performing the work shall be responsible for the erection and maintenance of all traffic control devices during construction.

2. At the end of work each day, the Contractor shall remove all equipment, tools, and any other hazards in the traveled portion of the roadway.

3. When construction necessitates suspension of an existing traffic signal operation, the Contractor shall furnish, at his expense, an off-duty police officer to regulate and maintain traffic control at the site.

C. Enforcement

In the event that compliance with these measures is not achieved, the Engineer may shut down all operations being performed. The Traffic Engineer shall also withhold any payments due until the above requirements have been met. At any time during the course of the work, the Traffic Engineer may, at his discretion and by whatever means necessary, correct any situation that he deems hazardous to the health and welfare of the public. Work performed by the Traffic Engineer, or any entity enlisted by the Traffic Engineer, to correct situations of public hazard shall be deducted from monies due the Contractor.

D. Compensation

There will be no separate pay item for maintenance of traffic or for coordination of the Sequence of Operations.

58 - Lot Corners

In the course of the construction work, it may be necessary to disturb and remove the established lot or property corners of some of the properties. The Contractor shall be

required to record all property corners and replace them after the construction is completed. All lot or property corners removed as described above, or all lot or property corners destroyed by the Contractor's operations, shall be replaced at the expense of the Contractor by a Land Surveyor registered in the State of Georgia. The Contractor shall provide certification from the Land Surveyor for all reset property corners.

59 - Existing Utilities

All known utility facilities are shown schematically on the plans and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on the plans will not relieve the Contractor of his responsibility under this requirement. The Contractor shall be responsible for the cost of repairs to any damaged underground facilities; even when such facilities are not shown on the plans. The Contractor shall contact all utility companies prior to beginning work and request an accurate location of their respective utilities. "Existing Utility Facilities" shall mean any utility that exists on the project in its original, relocated or newly installed position.

The Contractor shall call, by law, the Utilities Protection Center, d/b/a Georgia 811 at "811" or 1-800-282-7411 and shall request that all owners of utilities, including gas companies, electric companies, telephone companies, cable television companies and governmental units, prior to starting any excavation of the project, locate and mark their respective facilities.

All Contractor's operations shall be conducted so as to interfere as little as possible with utility service. Any proposed interruption by the Contractor must be approved in advance by the respective utility's owner.

The existence and location of underground utilities will be investigated and verified in the field by the Contractor before starting work. The location of all known interferences based on the best information available has been shown on the drawings, but this information may not be complete or accurate.

Water lines and gas lines and appurtenances and sewer lines uncovered by the Contractor shall be protected and kept in service by the Contractor and the Contractor shall notify the respective utility's owner that the line has been or will be uncovered. The Contractor shall use adequate braces and slings or other appropriate methods to keep the lines in service, and any repairs made necessary by his operation shall be made at the Contractor's expense.

The Contractor shall familiarize himself with and comply with the provisions of O.C.G.A. Section 25-9-1 et. seq.

If any public or private utility lines, pipes, facilities, or structures are damaged or broken by the operations of the Contractor as a result of being disturbed, exposed or unsupported, the Contractor shall be responsible for the complete and prompt restoration of the same and shall hold the City harmless from any claims or causes or action for damage and for any liability which may arise therefrom.

The Contractor is responsible for coordinating with the respective utility's owner any

relocation, adjustment, holding or replacement of utility facilities.

Power poles to be relocated shall be moved by the Georgia Power Company or the respective power company serving the area. Telephone poles shall be moved by AT&T or the respective telecommunications company servicing the area. Gas lines to be relocated or lowered shall be moved by AGL Resources or the respective gas company servicing the area. The relocation, holding or replacement of any existing utilities shall be considered consequential to the work and any cost associated therewith shall be borne by the Contractor.

60 - Special Protection of Trees

The Contractor shall comply with the City Tree Ordinance. Refer to Section 00 2100, "Clearing and Tree Protection," for procedures and requirements.

61 - Material Delivery, Handling, and Storage

The Contractor shall schedule and sequence the delivery of material and equipment such that installation can be accomplished in a timely manner. The Contractor shall thoroughly examine all material and equipment upon delivery and shall not accept delivery of defective or damaged material or equipment.

Nylon slings and chokers shall be used for lifting all material and equipment. Chains, cables, wire rope, or other such items that may cause change to factory applied coatings shall not be used for handling of material or equipment.

Material and equipment shall be stored as compactly and neatly as practicable at points convenient for the Contractor and which do not damage the work or interfere with or are otherwise hazardous to traffic. Material and equipment shall be stored so as to facilitate inspection and to insure preservation of their quality and fitness for use. All material and equipment shall be stored on wooden skids or platforms such as not to be in direct contact with the ground. All mechanical and electrical equipment shall be stored and covered in a manner such as to completely be protected from dust and moisture. Prior to the delivery of any materials or equipment the Contractor shall submit, for the Engineers approval, a plan showing all designated storage and assembly areas. Should the Contractor choose to store material or equipment or use for assembly property which is not owned by the City of Savannah or the Contractor, a letter of permission signed by the legal owner of the property shall be obtained by the Contractor and submitted to the Engineer a minimum of 24 hours prior to delivery. All material and equipment stored at any facility other than the site shall be tagged with the Owner's name and the project number. Payment shall not be made for "Stored Materials" for any material stored at locations or in any manner not suitable to the Owner.

62 - Maintenance During Construction

The Contractor shall maintain the work from the beginning of construction operations

until final acceptance of the Project. This maintenance shall constitute continuous and effective work prosecuted day by day with adequate equipment and forces to the end that roadways or structures are kept in satisfactory condition at all times, including satisfactory signing or marking as appropriate, and control of traffic where required by use of traffic control devices as required by the State of Georgia.

Upon completion of the work, the Contractor shall remove all construction signs and barricades before final acceptance of the Project.

63 - Emergencies

In an emergency affecting the safety of life or of the work or of adjoining property, the Contractor is, without special instructions or authorization from the Owner, hereby permitted to act at his discretion to prevent such threatening loss or injury. He shall also act, without appeal, if so authorized or instructed by the Owner. The Contractor shall supply the Engineer with two (2) emergency phone numbers for contact 24 hours per day in the event of an emergency. After attempting contact with the Contractor via the emergency phone numbers, the Contractor cannot be reached or should fail to respond, the Owner may remedy the situation by whatever means as may be necessary and deduct the cost for same from any monies due the Contractor.

64 - Compensation

Any compensation claimed by the Contractor due to emergency work shall be determined by force account.

65 - Safety and Health

The Contractor shall comply with Safety and Health Regulations for Construction, promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act, as set forth in Title 29, C.F.R. Copies of these regulations may be obtained from Labor Building, 14th and Constitution Avenue N.W., Washington, D.C. 20013.

The Contractor shall also comply with the provisions of the Federal Occupational Safety and Health Act as amended and the High Voltage Act of the State of Georgia, O.C.G.A. Section 46-3-30 through 46-3-40, and all federal, state, county, and city codes, regulations, and standards.

66 - Accidents

The Contractor shall provide at the site such equipment and medical facilities as are necessary to supply first-aid service to anyone who may be injured in connection with the work. The Contractor shall report in writing to the Owner all accidents whatsoever arising out of, or in connection with, the performance of the work, whether on or adjacent to the site, which causes death, personal injury, or property damages, giving full details and statement of witnesses. In addition, if death or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Contractor and any subcontractor an account of any accident, the Contractor shall promptly report the facts to

the Owner, giving full details in writing of the claim.

The Contractor shall provide his Superintendent and Foreman, who are on the site of the work, the name of the hospital and telephone number and the name and phone number of the doctor he proposes to use in case of accident.

67 - Load Limits

The Contractor shall be governed by the local load limit requirements of the Georgia Standard Specifications on State, County or City maintained roadways. The Contractor shall be responsible for his damage to existing streets and roads.

68 - Sanitary Provisions

The Contractor shall provide temporary sanitary facilities for the use of the workmen during the progress of the work. The sanitary facilities shall conform to the requirements of the Federal Occupational Safety and Health Administration. All facilities shall be removed at the completion of the Contract.

69 - Construction Buildings

Should the Contractor desire, he may erect structures for housing tools, machinery and supplies; structures will be permitted only at places approved by the Owner. Their surroundings shall be maintained at all times in a sanitary and satisfactory manner. On or before the completion of the work, all such structures shall be removed, together with all rubbish and trash, and the site shall be restored to its original condition at the expense of the Contractor. Structures will not be permitted for the housing of workers.

70 - Cleaning Up

The Contractor shall, as directed by the Owner, remove at his own expense from the Owner's property and from all public and private property all temporary structures, rubbish and waste materials resulting from his operations. Clean-up shall be concurrent with the work. Where complete restoration is not reasonable until testing or inspection is complete, the Contractor shall, at minimum, remove all debris and trash and perform grading such that the area is left neat and without depressions that may hold water. The sufficiency of temporary clean-up shall be at the discretion of the Engineer.

71 - Electrical Energy

The Contractor shall make all necessary applications and arrangements and pay all fees and charges for electrical energy for power and light required for the proper completion of this contract during its entire progress. The Contractor shall provide all temporary wiring, switches, connections and meters.

There shall be sufficient artificial light, by means of electricity, so that all work may be done in a workmanlike manner when there is not sufficient daylight.

The Contractor shall remove all temporary electrical service and appurtenances prior

to final acceptance by the Owner. Where permanent electrical service is required, the Contractor shall request, in writing, an inspection of the electrical components of the work. Such request for inspection shall be given a minimum of 48 hours in advance. At such time as the electrical components of the work have been inspected and approved, the Contractor shall request from the Owner, in writing, an electrical service. Such request for electrical service shall be given a minimum of ten (10) days in advance.

72 - Water Supply

The Contractor shall provide all water required to successfully perform the work. All water provided by the Contractor which is not potable shall be clearly marked as such. All water from fire hydrants, post hydrants, or otherwise from the existing distribution system of the City of Savannah shall be metered with a meter supplied by the City of Savannah Water Department and shall be obtained only with written authorization of the Owner. The Contractor shall be required to pay all costs associated with meters or back flow prevention devices.

73 - Environmental Impact

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

A. Noise. All equipment and machinery shall be provided with exhaust mufflers maintained in good working order so as to reduce operating noise to minimum levels. In addition, operation of equipment and machinery shall be limited to daylight hours, except with the permission of the Owner, based on critical need for the operation.

B. Dust/Smoke. All equipment movements shall be accompanied by a minimum of dust. Traveled surfaces and earthwork shall be maintained in a moist condition to avoid the generation of dust or the airborne movement of particulate matter under all prevailing atmospheric conditions.

C. Traffic. Trucks carrying spoil, fill, concrete or other materials shall be routed over roads which will result in the least effect on traffic and nuisance to the public. All material shall be loaded in a manner which will preclude the loss of any portion of the load in transit, including covering, if necessary.

D. Siltation. All points of concentrated runoff from rainfall shall be visually monitored to determine that no eroded material leaves the construction site. Measures shall be taken to promptly eliminate offsite deposition of eroded material, including the installation of silt fencing and detention basins.

74 - Monthly Payments

This section is to control payments and is entered into instead of the Georgia prompt payment act OCGA 13-11-1. Not later than the fifth day of every month the Contractor shall prepare and submit a Request for Periodic Payment, along with an Affidavit of Payment of Claims, covering the total quantities under each item of work that has been completed from the start of the job up to and including the last day of the preceding month, and the value of

the work so completed determined in accordance with the schedule of values for such items together with such supporting evidence as may be required by the Engineer. This estimate may also include an allowance for the cost of such materials and equipment required in the permanent work as has been delivered to the site or stored in an approved location and suitably protected but not as yet incorporated in the work. Under no circumstances shall any material or equipment, for which payment has been made by the owner to the Contractor, be sold, returned to the supplier or otherwise moved from storage except for incorporation into the work as covered in this contract without written authorization from the Owner.

Not later than the 30th day after submitting an accepted, approved and correct estimate along with all required documentation (as per these contract documents) as detailed in the above paragraph, the Owner shall, after deducting previous payments made, pay to the Contractor 90% of the amount of the estimate as approved by the Owner, 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 Owner, the Owner shall retain 10% of the gross value of the completed work as indicated by the current approved estimate. After the gross value of completed work becomes equal to 50% of the total Contract amount within a time period satisfactory to the Owner, then the Owner will continue to retain the 10% of the first 50% of the work but will not require any additional retainage; provided, however, that if work is unsatisfactory or falls behind schedule, retention may be resumed at the previous level after notification to the Contractor.

The Contractor shall also submit with each Request for Periodic Payment a progress report (Section 00 1430-1). Failure to submit said form shall be grounds for the Owner to withhold payment.

The City has a right to hold a payment to a Contractor who has not included an updated progress report with his pay request.

Retention of contractual payments and the creation of escrow accounts for contracts for the installation, improvement, maintenance or repair of water or sewer facilities shall be in accordance with the **Georgia Retainage Law, Section 13-10-20, Article 2, as found in O.C.G.A.**

Before final payment is due, the Contractor shall submit evidence satisfactory to the Engineer that all payrolls, material bills, and other indebtedness connected with the work have been paid, except that in case of disputed indebtedness or liens, the Contractor may submit in lieu of evidence of payment an additional Surety Bond satisfactory to the Owner guaranteeing payment of all such disputed amounts when adjudicated.

Special Payment Provision: For a Contractor where payment bonds have been waived, all Request for Periodic Payment forms submitted by the Contractor shall be accompanied by payment affidavits from each subcontractor/supplier for the services/materials claimed before payment will be released by the Owner. Application for final payment shall also be accompanied by a lien waiver from each (sub)contractor/supplier who furnished labor or materials for the job.

75 - Measurement and Payment

Measurement and payment shall be made for the units or lump sum contract prices shown on the Bid Schedule. Direct payment shall only be made for those items of work specifically listed in the proposal and the cost of other work must be included in the contract price for the applicable item to which it relates.

Within ten (10) days of issuance of the Notice of Award, on lump sum contracts, the Contractor shall provide, for review and approval, a schedule of values for the various subdivisions of the work. No item shall have a value greater than $N/A. The schedule of values shall be submitted on the Request for Periodic Payment Form (Section 00 1420). All items shall correspond to the items shown on the construction schedule as required in Section 00 1500, Paragraph 46.

76 - Use of Completed Portions

The Owner may, at any time during progress of the work, after written notice to the Contractor, take over and place in service any completed portions of the work which are ready for service, although the entire work of the Contract is not fully completed, and notwithstanding the time for completion of the entire work or such portions which may not be expired. In such case, the Owner may issue certificates of substantial completion for such portions of the work as defined in Section 00 1600 (if appropriate), but such taking possession thereof shall not be deemed an acceptance of any other portions of the work, nor of any uncompleted portions, nor of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of or delays the work, the Contractor shall be entitled to such extra compensation, or extension of time, or both, as determined by the Owner. The warranty period will be as defined in Section 00 1500, Paragraph 06. There will be no issue of Substantial Completion, unless defined in Section 00 1600.

77 - Beneficial Use

During the execution of the work certain portions of the work may be directly or indirectly placed in service. However, "beneficial use" shall not be claimed by the Contractor as a means to force acceptance or completion. It shall be the responsibility of the Contractor to request, in writing to the Owner, an inspection to determine acceptance on all or any portion of the work. It shall be the responsibility of the Contractor to consider the amount of time any particular portion of this job may be used prior to Final Acceptance and bid the job accordingly.

78 - Payments Withheld Prior to Final Acceptance

The Owner may withhold or, in the event of subsequently discovered evidence, nullify the whole or part of any certificate of payments to such extent as may be necessary to protect himself from loss on account of:

(a) Defective work not remedied.

(b) Claims filed or reasonable evidence indicating proposed public filing of claims

by other parties against the Contractor.

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

(d) Damage to another Contractor.

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

79 - Contract Time

A. General

Time shall be of the essence of the contract. The Contractor shall promptly start the work after the date of the notice to proceed and shall prosecute the work so that portions of the project shall be complete within the times specified in Section 00 1500, Paragraph 46. During periods when weather or other conditions are unfavorable for construction, the Contractor shall pursue only such portions of the work as shall not be damaged thereby. No portions of the work, where acceptable quality or efficiency will be affected by unfavorable conditions, shall be constructed while those conditions exist. It is expressly understood and agreed by and between the Contractor and the Owner that the contract time for completion of the work described herein is a reasonable time taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

B. Construction Schedule:

The Contractor shall provide a construction schedule and reports as specified in Section 00 1500, Paragraph 46 for scheduling and coordinating the work within the contract time. Contract time extensions shall be incorporated into updated schedules, reflecting their effect at the time of occurrence. Failure of the Contractor to comply with these requirements for submittal of the construction schedule and reports shall be cause for delay in review of progress payments by the Owner.

C. Construction Progress:

The Contractor shall furnish such manpower, materials, facilities and equipment as may be necessary to insure the prosecution and completion of the work in accordance with the accepted schedule. If work falls fourteen (14) days or more behind the accepted construction schedule, the Contractor agrees that he will take some or all of the following actions to return the project to the accepted schedule. These actions may include the following:

1. Increase manpower in quantities and crafts.

2. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of equipment, or any combination of the foregoing.

3. Reschedule activities.

If requested by the Engineer, the Contractor shall prepare a proposed schedule revision demonstrating a plan to make up the lag in progress and insure completion of the work within the contract time. The proposed revision shall be submitted to the Engineer in accordance with Section 00 1500, Paragraph 46. Upon receipt of an acceptable proposed schedule, the revision to the construction schedule shall be made in accordance with Section 00 1500, Paragraph 22. All actions to return the project to the acceptable schedule are at the Contractor's expense.

The Contractor shall pay all costs incurred by the Owner which result from the Contractor's action to return the project to its accepted schedule. The Contractor agrees that the Owner shall deduct such charges from payments due the Contractor. It is further understood and agreed that none of the services performed by the Engineer in monitoring, reviewing and reporting project status and progress shall relieve the Contractor of responsibility for planning and managing construction work in conformance with the construction schedule.

D. Delays:

1. Notice of Delays: When the Contractor foresees a delay in the prosecution of the work and, in any event, immediately upon the occurrence of a delay which the Contractor regards as unavoidable, he shall notify the Engineer in writing of the probability of the occurrence of such delay, the extent of the delay, and its possible cause. The Contractor shall utilize that which is set forth herein (Section 00 1440) in reporting such delay. The Contractor shall take immediate steps to prevent, if possible, the occurrence or continuance of the delay. If this cannot be done, the Engineer shall determine how long the delay shall continue and to what extent the prosecution and completion of the work are being delayed thereby. He shall also determine whether the delay is to be considered avoidable or unavoidable and shall notify the Contractor of his determination. The Contractor agrees that no claim shall be made for delays which are not called to the attention of the Engineer at the time of their occurrence.

2. Avoidable Delays: Avoidable delays in the prosecution of the work shall include delays which could have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or his subcontractors. Avoidable delays include:

a. Delays which may in themselves be unavoidable but which affect only a portion of the work and do not necessarily prevent or delay the prosecution of other parts of the work nor the completion of the whole work within the contract time.

b. Time associated with the reasonable interference of other Contractors employed by the Owner which do not necessarily prevent the completion of the whole work within the contract time.

3. Unavoidable Delays: Unavoidable delays in the prosecution or completion of the work shall include delays which result from causes beyond the control of the Contractor and which could not have been avoided by the exercise of care, prudence, foresight and

diligence on the part of the Contractor or his subcontractors. Delays in completion of the work of other Contractors employed by the Owner will be considered unavoidable delays insofar as they interfere with the Contractor's completion of the work. Delays due to normal weather conditions shall not be regarded as unavoidable as the Contractor agrees to plan his work with prudent allowances for interference by normal weather conditions. Delays caused by acts of God, fire, unusual storms, floods, tidal waves, earthquakes, strikes, labor disputes and freight embargoes shall be considered as unavoidable delays insofar as they prevent the Contractor from proceeding with at least 75 percent of the normal labor and equipment force for at least five hours per day toward completion of the current controlling items on the accepted construction schedule.

Should abnormal conditions prevent the work from beginning at the usual starting time, or prevent the Contractor from proceeding with 75 percent of the normal labor and equipment force for a period of at least five (5) hours per day, and the crew is dismissed as a result thereof, he will not be charged for the working day whether or not conditions change so that the major portion of the day could be considered to be suitable for work on the controlling item.

E. Extension of Time:

1. Avoidable Delays: In case the work is not completed in the time specified, including extensions of time as may have been granted for unavoidable delays, the Contractor will be assessed liquidated damages, as specified in Section 00 1500, Paragraph 86.

The Owner may grant an extension of time for avoidable delay if he deems it in his best interest. If the Owner grants an extension of time for avoidable delay, the Contractor agrees to pay the liquidated damages.

2. Unavoidable Delays: For delays which the Contractor considers to be unavoidable, he shall submit to the Engineer complete information demonstrating the effect of the delay on the controlling operation in his construction schedule. The submission shall be made within thirty (30) calendar days of the occurrence which is claimed to be responsible for the unavoidable delay. The Engineer shall review the Contractor's submission and determine the number of days of unavoidable delay and the effect of such unavoidable delay on controlling operations of the work. The Owner agrees to grant an extension of time to the extent that unavoidable delay affects controlling operations in the construction schedule. During such extension of time, neither extra compensation or engineering inspection and administration nor damages for delay will be charged by the Contractor to the Owner. It is understood and agreed by the Contractor and Owner that time extensions due to unavoidable delays will be granted only if such unavoidable delays involve controlling operations which would prevent completion of the whole work within the specified contract time. It is understood and agreed by the Contractor and Owner that during such extension of time, no extra compensation shall be paid to the Contractor.

3. DAMAGES FOR DELAYS: For the period of time that any portion of the work remains unfinished after the time fixed for completion in the contract documents, as modified by extensions of time granted by the Owner, it is understood and agreed by the Contractor and the Owner that the Contractor shall pay the Owner the liquidated damages,

specified in section 00 1500, Paragraph 86.

80 – Omissions

The drawings and specifications shall both be considered as a part of the contract. Any work and material shown in the one and omitted in the other, or described in the one and not in the other, or which may fairly be implied by both or either, shall be furnished and performed as though shown in both, in order to give a complete and first class job.

81 – Differing Site Conditions

a. The Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of: (1) subsurface or latent physical conditions differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Engineer shall promptly investigate the conditions, and, if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performances of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

b. No claim of the Contractor under this clause shall be allowed unless the Contractor has given the required notice.

c. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

82 - Changes in Work

The Owner, without invalidating the Contract, may order additions to or deductions from the work. The Contractor shall proceed with the work, as changed and the value of any such extra work or change shall be determined as provided in the Agreement, and the contract sum adjusted accordingly. Any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

In giving instructions, the Engineer shall have authority to make minor changes in the work which does not involve extra cost and is consistent with the purpose of the work. Except in an emergency endangering life and property, no extra work or change shall be made unless in pursuance of a written order, and no claim for an addition to the Contract Sum shall be valid unless the additional work was so ordered.

a. Modification of Quantities: The itemized quantities shall be considered by the Contractor as the quantities required to complete the work for the purpose of bidding. Should actual quantities required in the construction of the work be greater or lesser than the quantities shown on the items, an amount equal to the difference in quantities at the unit price bid for the items will be added to or deducted from the Contract Sum.

b. When itemized quantities are not given in the Proposal, the work shown on the plans or specifications shall be considered by the Contractor to be included in his contract for the lump sum prices bid.

83 - Force Account and Extra Work

If the Engineer orders, in writing, the performance of any work not covered by the plans or included in the specifications, and for which no unit price or lump sum basis can be agreed upon, then such extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

a. The Contractor shall be reimbursed for all costs incurred in doing the work, and shall receive an additional payment of 15% of all such cost to cover his overhead and profit for said work. In the event the Contractor has employed a subcontractor for this work, the total additional mark-up shall be 20%, 10% for the Main Contractor and 10% for the subcontractor. The total mark-up shall not exceed 20%. The City will not recognize subcontractors of subcontractors.

b. The term "Cost" shall cover all payroll charges for persons employed and supervision required under the specific Order, together with all workmen's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at the current Associated Equipment Distributors (AED) rate; and any other costs incurred by the Contractor as a direct result of executing the Order, if approved by the Engineer.

c. Except in an emergency endangering life and property, no extra work or change shall be made unless in pursuance of a written order, and no claim for an addition to the Contract Sum shall be valid unless the additional work was so ordered. The cost of the work shall be submitted to the Engineer along with the monthly pay request.

84 - Claims for Extra Cost

a. If the Contractor claims that any instructions by drawings or otherwise issued after the date of the Contract involved extra cost under the Contract, he shall give the Engineer written notice thereof within seven (7) days after the receipt of such instructions, and in any event before proceeding to execute the work, except in an emergency endangering life or property, and the procedure shall then be as provided for changes in the work. No such claim shall be valid unless so made.

b. Extra work not included in Article (a) but authorized after the date of the Contract that cannot be classified as coming under any of the Contract units may be done at mutually agreed upon unit price, or on a lump sum basis, or under the provision of Section 00 1500, Paragraph 83.

c. Extra costs which result from delays which cause an interruption in the orderly progress of the work as described in Section 00 1500, Paragraph 79 hereinbefore,

will be considered under the following conditions.

(1) No claim will be considered for delays less than five (5) hours in duration.

(2) No claim will be considered in cases where the Contractor is able, without undue hardship, to shift his work crew to other productive work on the same project in the same general work area.

(3) The claim for extra cost due to delay shall be computed on a cost plus percentage basis as hereinafter specified under Paragraph 83.

(4) Unavoidable delays caused by weather as defined in Section 00 1500, Paragraph 79 (D) (3) shall be cause for extensions of time. However, damage to the Contractor caused by weather or an Act of God shall not be cause for additional compensation or monetary adjustment.

85 - Correction of Work Before Final Payment

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

If the Contractor does not remove such condemned work and materials as promptly as possible, after written notice, the Owner may remove them and store the material at the expense of the Contractor.

86 - Liquidated Damages

Failure to complete the work within the number of days stipulated in the Agreement, including extensions granted thereto, shall entitle the Owner to retain from compensation otherwise due to be paid to the Contractor, or otherwise recover by all remedies of law an amount equal to **$1,000.00** for each and every calendar day that the work is not complete.

It is agreed by and between the Owner and the Contractor that this sum has been established, not as a penalty but as liquidated damages and that it is reasonable and acceptable, as the City provides services necessary for the health and welfare of the public and due to the impracticability and extreme difficulty of fixing and ascertaining the actual damages sustained in such an event.

87 - Suspension of Work

The Owner may at any time suspend the work, or any part thereof by giving three (3) days' notice to the Contractor in writing. The work shall be resumed by the Contractor within ten (10) days after the date fixed in the written notice from the Owner to the Contractor. The Owner shall reimburse the Contractor for expenses incurred by the Contractor in connection with the work under this Contract and adjust the date of

completion as a result of such suspension. Nothing in this paragraph shall prevent the Owner from immediate suspension of the Contractor's work where, in the Engineer's opinion, the health or welfare of the public are at risk.

88 - Termination of Contract

A. TERMINATION FOR CONVENIENCE OF OWNER

The Owner may, at any time upon ten (10) days written notice to the Contractor, terminate (without prejudice to any right or remedy of the Owner) the whole or any portion of the Work for the convenience of the Owner.

The Contractor, in calculating his termination application for payment, shall develop his outstanding costs in accordance with Section 00 1500, Paragraph 83, including those materials in transit and not cancellable with the appropriate percentage markups; subcontractors shall follow same procedures. All costs must be substantiated by adequate back-up documentation.

B. DEFAULT TERMINATION

The Owner may upon ten (10) days written notice to the Contractor, terminate (without prejudice to any right or remedy of Owner) the whole or any portion of the Work required by the contract Documents in any one of the following circumstances:

1. If the Contractor refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will ensure the Substantial Completion of the Work within the Contract time;

2. If the Contractor is in material default in carrying out any provisions of this Contract for a cause within its control;

3. If the Contractor files a voluntary petition in bankruptcy or a petition seeking or acquiescing in any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief for itself under any present or future federal, state or other statute, law or regulation relating to bankruptcy, insolvency or other relief for debtors;

4. If a trustee, receiver or liquidator is appointed for the Contractor or for all or any substantial part of the property of the Contractor; or if the Contractor makes a general assignment for the benefit of creditors or admits in writing its inability to pay its debts generally as they become due;

5. If the Contractor has filed against it a petition in bankruptcy under any present or future federal or state statute, law or regulation relating to bankruptcy, insolvency or other relief for debtors and the same is not discharged on or before forty-five (45) days after the date of the filing thereof; or if the Contractor is adjudged a bankrupt;

6. If the Contractor is adjudged a bankrupt, makes a general assignment for the benefit of its creditors, or if a receiver is appointed on account of its insolvency;

7. If the Contractor fails to supply a sufficient number of properly skilled workmen or proper materials;

8. If the Contractor fails to make prompt payment to subcontractors for materials or labor, unless Contractor otherwise provides Owner satisfactory evidence that payment is not legally due;

9. If the Contractor persistently disregards laws, ordinances, rules, or regulations or order of any public authority having jurisdiction;

10. If the Contractor substantially violates any provision of the Contract Documents; or

If, after Contractor has been terminated for default pursuant to Paragraph B, it is determined that none of the circumstances set forth in Paragraph B exist, then such termination shall be considered a termination of convenience pursuant to Paragraph A.

If Owner terminates this agreement for any of the reasons enumerated in Paragraph B, then the Owner may take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

C. ALLOWABLE TERMINATION COSTS

If the Owner terminates the whole or any portion of the Work pursuant to Paragraph A, then the Owner shall only be liable to Contractor for those costs reimbursable to Contractor in accordance with Paragraph D, plus the cost of settling and paying claims arising out of the termination of Work under subcontracts or orders, pursuant to Paragraph D, which are properly chargeable to the terminated portion of the Contract (exclusive of amounts paid or payable on account of completed items of equipment delivered or services furnished by subcontractors or vendors prior to the effective date of the Notice of Termination), which amounts shall be included in the costs payable under (1) above, and the reasonable costs of settlement, including accounting, legal, clerical and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the Contract, together with reasonable storage, transportation and other costs incurred in connection with the protection of disposition of property allocable to this contract.

Provided, however, that if there is evidence that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed hereunder and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss.

The total sum to be paid to the Contractor under this Paragraph C shall not exceed the Contract sum as reduced by the amount of payments otherwise paid, by the Contract price of Work not terminated and as otherwise permitted by this Contract. Except for

normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor, as provided in this Paragraph C, the fair value, as determined by the Engineer, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Owner.

D. GENERAL TERMINATION PROVISIONS

After receipt of a Notice of Termination from the Owner, pursuant to Paragraph A or B, and except as otherwise directed by the Engineer, the Contractor shall:

1. Stop Work under the Contract on the date and to the extent specified in the Notice of Termination;

2. Place no further orders or subcontracts for materials, services or facilities, except as may be necessary to complete the portion of the Work under the Contract as is not terminated;

3. Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the Notice of Termination;

4. Assign to the Owner in the manner, at the times and to the extent directed by the Engineer, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the Owner shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification considered final for all the purposes of this clause;

6. Transfer title and deliver to the entity or entities designed by the Owner, in the manner, at the times and to the extent, if any, directed by the Engineer, and to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the work as had been terminated;

a. The fabricated or unfabricated parts, work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of the Work terminated by the Notice of Termination, and

b. The completed or partially completed plans, drawings, information, and other property related to the Work;

7. Use his best efforts to sell, in the manner, at the times, to the extent and at the price or prices directed or authorized by the Engineer, and property of the types referred to in Paragraph D; provided, however, that the Contractor:

a. Shall not be required to extend credit to any buyer, and

b. May acquire any such property under the conditions prescribed by and at a price or prices approved by the Engineer; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under this Contract or shall otherwise be credited to the price or cost of the Work covered by this Contract or paid in such other manner as the Engineer may direct;

8. Complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and

9. Take such action as may be necessary, or as the Engineer may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

a. The Contractor shall, from the effective Date of Termination until the expiration of three (3) years after Final Settlement under this contract, preserve and make available to the Owner, at all reasonable times at the office of the Contractor, but without direct charge to the Owner, all its books, records, documents, and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the Work terminated hereunder, or, to the extent approved by the Engineer, photographs, microphotographs or other authentic reproductions thereof.

In arriving at any amount due the Contractor pursuant to Paragraph C, there shall be deducted:

b. All unliquidated advance or other payments on account theretofore made to the Contractor applicable to the terminated portion of this Contract;

c. Any claim which the Owner may have against the Contractor;

d. Such claim as the Engineer determines to be necessary to protect the Owner against loss because of outstanding or potential liens or claims; and

e. The agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the Contractor or sold, pursuant to the provisions of Paragraph D, and not otherwise recovered by or credited to the Owner. Contractor shall refund to the Owner any amounts paid by the Owner to Contractor in excess of costs reimbursable under Paragraph C.

The Owner, at its option and Contractor's expense, may have costs reimbursable under Paragraph C audited and certified by independent certified public accountants selected by the Owner.

89 – Contractor's Right to Stop Work or Terminate Contract

If the Work should be stopped under an order of any court for a period of three (3)

months, through no fault of the Contractor or of anyone employed by him, then the Contractor may, upon seven (7) days written notice to the Owner and the Engineer, stop work or terminate this Contract and recover from the Owner payment for all work executed, plus any loss sustained upon any plant or materials, plus reasonable profit and damages, as defined in Section 00 1500, Paragraph 83 (a).

90 - Settlement Upon Termination of Contract

Upon termination of this Contract in accordance with Section 00 1500, Paragraph 88 or Section 00 1500, Paragraph 89 settlement shall be computed on the basis prescribed in Section 00 1500, Paragraph 83 (a).

91 - Removal of Equipment

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

92 - Laws of Georgia

This contract shall be governed by the Laws of the State of Georgia.

93 - Discrepancy between General Conditions and Technical Specifications

Should there be a discrepancy between the General Conditions and Technical Specifications, the Technical Specifications shall govern.

94 - Debarment and Suspension

Contractors or their principals who are debarred, suspended, proposed for debarment, declared ineligible or voluntary excluded by any Federal department or agency pursuant to the regulations implementing Executive Order 12549,29 CFR Part 98, Section 98.510 shall be precluded from bidding on all City work for the period of their debarment.

SECTION 00 1600

SUPPLEMENTAL GENERAL CONDITIONS

1. THE GENERAL CONDITIONS:

The General Conditions shall apply to all work in this Contract, except as otherwise specified in the Supplemental General Conditions. Requirements of the Supplemental General Conditions supersede those of the General Conditions.

2. DIFFERING SITE CONDITIONS:

The Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of: 1) subsurface or latent physical conditions differing materially from those indicated in the Contract, or 2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Engineer shall promptly investigate the conditions. If such conditions materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this Contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made, and the Contract modified in writing accordingly.

3. ADJUSTMENT OF DISCREPANCIES:

In all cases of discrepancies between the various dimensions and details shown on drawings, or between the drawings and these specifications, the more expensive construction shall be estimated before work is started. The matter shall be submitted to the Engineer for clarification. Without such a decision, discrepancies shall be adjusted by the Contractor, who shall bear all of the extra expense involved.

4. The Contractor shall take all necessary precautions to protect existing structures, curbs, sidewalks, etc. from damage due to heavy construction traffic or equipment. The Contractor shall repair all items damaged during the construction at no additional cost to the Owner.

5. The Contractor shall protect freshly placed concrete from vandalism or other damage.

6. Items that are to be reset (i.e., sidewalks, steps, fence, etc.) shall be done so using original patterns and materials only. In the event of breakage of materials, only materials accepted in writing by the Engineer/Owner may be used by the Contractor as replacements. The cost of replacement materials shall be paid for by the Contractor.

7. All new manholes shall be pre–cast concrete as shown on detail sheet.

8. Should any damage to existing trees, shrubs, etc., that are called to be replanted on the plans, occur in the opinion of the Owner, the Contractor shall either repair the damage (if possible) or provide new trees, shrubs, etc., of the same type at no additional cost to the Owner.

9. The cost to remove all trees, regardless of size (including stump), shall be included in the contract lump sum price.

10. The Contractor shall comply with all local, state, and federal regulations as they pertain to construction activities (erosion control, etc.)

11. The Contractor shall provide a project manager acceptable to the Owner for the duration of the work of this project. The Contractor shall not replace the project manager without approval of the owner's representative. The Contractor shall provide a superintendent acceptable to the Owner for the duration of the work of this project. The Contractor shall not replace the superintendent without the approval of the owner's representative. In the case that either representative's employment is terminated with the contractor, replacements credentials should be submitted. Neither representative may be integrated into the actual workforce in a task completion role. The costs associated with the above shall be included in the overall project cost.

12. The Owner reserves the right to switch from seed to sod where a sufficient stand of grass, per the specifications, cannot be obtained.

13. Ensure that existing water main/laterals are not damaged during construction. Any damage must be repaired and paid for by the Contractor.

14. **Record Data and Drawings:** The Contractor shall keep accurate, legible records of the locations, types, and sizes of sanitary lines, service laterals, manholes, cleanouts, force mains, water lines, fittings, valves, hydrants, drainage pipes, drainage structures, and other related work performed under this project. On a set of project prints provided by the Owner, the Contractor shall prepare a set of "as–built" drawings for the data stated above. Invert elevations of all manholes, storm sewers and structures, sanitary sewers and lift stations shall be clearly indicated. These "as–built" drawings shall be kept clean and dry and maintained in a current state with the progress of the work. Updated "as–built" drawings shall be submitted at least monthly with payment request or as determined necessary with the progress of work.

    Before final acceptance of the completed installation and before final payment by the Owner, the Contractor shall deliver to the Engineer, four (4) sets of "Record Survey" Drawings accurately depicting the horizontal and vertical as–built data described above. "Record Survey" drawings for the items installed on this project shall be certified by a licensed engineer or surveyor, registered in the State of Georgia. The size of the drawings shall be 24" x 36". The "Record Survey" drawings shall have a coordinate system based on the Georgia State Plane Coordinate System, East Zone, North American Datum of 1983 (NAD83). Elevations shall be based on the North American Vertical Datum of 1988 (NAVD 88). All measurements and coordinates shown shall use the U.S. Survey definition.

    Coordinates shall be shown on all drainage structures, sanitary sewer manholes, storm manholes/boxes, valve boxes/vaults, valve manholes, valves, fire hydrants, fittings, and all other related work performed under this contract. Vertical data including but not limited to, structure and manhole frame and inverts, pipe inverts, valve manhole frames, lift station frame, inverts, control levels, and bottom, site grading, and as–built grading shall be shown. In addition to the "Record" drawings, Contractor shall deliver to Engineer electronic AutoCAD (v. 14 or later) files of all the data described above on a CD–ROM.

15. **Geotechnical Evaluation Reports:** Geotechnical evaluation reports are provided as Exhibit "A" to this section (attached). <u>These reports are provided for reference only to aid in the bidding of the project</u>. Contractor is responsible for verifying soil conditions, characteristics, geotechnical parameters, and foundation requirements with any additional site inspections, testing, or study necessary.

    The Contractor is responsible for complying with all site preparations, surcharge/pre–loading, pipe/utility installation, structural fill, trenching, embankment, and details of construction recommendations as presented in the Geotechnical Evaluation Reports by Terracon Consultants, Inc. Exhibit A – Supplemental General Conditions. The geotechnical reports are furnished to the Contractor to assist in the foundation design, site preparation, pipe bedding design, embankment, and surcharge requirements, and may or may not represent all field conditions. Additional testing required for verifying site condition, settlement monitoring, and surcharge design shall be done at the Contractor's expense.

16. **Examinations of Plans, Specifications, and Supplemental General Conditions:** The Bidder is expected to carefully examine the site of the proposed work, the Proposals, Plans, Specifications, Supplemental Specifications, Supplemental General Conditions, and Contract forms before submitting a bid. The submission of a bid shall be considered prima facie evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing The Work and as to requirements of the Plans, Specifications, Supplemental Specifications, Supplemental General Conditions, and Contract.

    It is the obligation of the Bidders to make their own interpretation of all subsurface data that may be available as to the nature and extent of the materials to be excavated, graded, compacted, as well as requirements for surcharging, pipe laying, pile driving, and all other aspects of the construction. Such information, if available and furnished to the Bidders by the Owner, does not in any way guarantee the amount or nature of the material which may be encountered.

17. **Interpretation of Estimates:** Although the project is a LUMP SUM, there are some items that should be performed and included that is not call out but must be furnished to complete the construction of The Work as shown on the Plans. The Owner does not guarantee that the quantities indicated on the Plans or given in the Proposal will be the actual construction quantities. The Contractor shall not plead deception or misunderstanding because of variation from these quantities or minor variations from the locations, or character of the Work. Payment to the Contractor will be made only for the actual quantities of work performed in accordance with the Plans and Specifications. Upon completion of construction, if the actual quantities are more or less than the quantities given in the Proposal, the lump sum Prices Bid in the Proposal will still prevail, except as otherwise provided in the General Conditions.

18. **Contractor** shall coordinate all construction activities with City of Savannah, Chatham County, Port Authority, Railroad Companies Gas Company, Georgia Power, and any other utility owners within the project area. Any and all approval and permits for work in these areas, which have not been included with these Contract Documents, shall be the responsibility of the Contractor. There will be no separate measurement or payment for cost or fees associated with coordination with or for obtaining approvals from these parties. These costs shall be considered a subsidiary obligation of the Contract.

19. **Contractor** shall coordinate all construction activities with Chatham County, Port Authority, Gas Company, Railroads, and Georgia Power prior to commencing work. Contractor will verify all existing power lines, gas lines, existing utilities prior to starting work and will comply with all parties involved safety requirements for working in proximity of their properties.

20. **Contractor** shall be responsible for supporting existing storm water lines, power lines, rail roads, sewer structures and other force main during the connection process. Contractor shall submit a support and protection plan to City/Engineer detailing how existing structures will be supported during excavation, connection, and backfilling operations. No separate measurement or payment will be made for protection of existing structure or for preparation of support/protection plan. These costs shall be considered a subsidiary obligation of the contract.

21. **Contractor** shall coordinate all construction including traffic control, roadway closures and detours with the City of Savannah, railroads, and Port Authority. Any and all approval and permits for work in the roadway, and railroads, shall be the responsibility of the Contractor. Contractor shall also be responsible for providing all traffic marking/striping on the roadway surface in accordance with City, DOT, and Port Authority requirements. All costs associated with the traffic control, roadway closures and detours shall be included in the contract lump sum bid price.

22. **Water Distribution System Specifications:** The following items shall be modified, as indicated, in the City of Savannah Standard Specification Section 00 25 50 – "Water Distribution System."

Part 1.01 Pipe

- Add the following paragraph to Paragraph A. Ductile Iron Pipe:

  1. 30"–inch pipe shall be ductile iron pressure class 350 restrained joint pipe and shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53.

- Add the following paragraphs to Paragraph B. PVC Pipe

2. PVC Pipe – AWWA C–900 shall be used for sizes 16" and greater and shall meet the requirements of AWWA C900 "Poly Vinyl Chlorine (PVC) Pressure Pipe and Fabricated Fittings, 14 in. through 48 in." and shall conform to all the requirements of ASTM D1784 and ASTM D2241. The pipe shall be a minimum of DR 25 and shall be capable of withstanding the overburden pressures determined by the depth of burial in the field.

   Pipe material shall be made from clean, virgin, NSF approved Class 12454–A PVC compound conforming to resin specification ASTM D1784. Standard laying lengths shall be 20–feet (±1 inch). Reruns of reclaimed material shall not be accepted.

   The pipe shall have bell and spigot ends with push–on, O–ring rubber gasket, compression type joints. Elastomeric gaskets shall conform to the requirements of ASTM D3139 and ASTM F477.

   Minimum pipe stiffness (F/dY) at 5% deflection shall be 435 psi for all sizes when tested in accordance with ASTM D2241.

   The pipe shall be designed to pass a quick burst test pressure of 755 psi applied in 60 to 70 seconds when tested in accordance with ASTM D1599, as referenced in ASTM D2241.

   Fittings for C900–Class 165, DR 25 shall be ductile iron, bolted mechanical joint.

Part 1.03 Fittings

- Add the following paragraph:

  All fittings and all joints shall be restrained on all proposed water and sewer force mains.

Part 1.10 Butterfly Valves

- Add the following paragraph:

  I. Manholes for butterfly valves shall be precast reinforced concrete sections as shown on the plans.

  The product design, performance, materials, manufacture, handling, and installation shall conform to the following references and the project specifications:

  ACI 318 – Building Code Requirements for Reinforced Concrete

  ASTM C 39 – Compressive Strength of Cylindrical Concrete Specimens

  ASTM C – 478 – Precast Reinforced Concrete Manhole Sections

ASTM C 890 – Minimal Structural Design Loading for Precast Concrete Water and Wastewater Structures

ASTM C 891 – Installation of Underground Precast Concrete Utility Structures

ASTM C 913 – Precast Concrete Water and Wastewater Structures

The Contractor or supplier shall provide for the design of the precast structure. Each section of the structure shall be designed and manufactured for its individual depth, loading conditions (lateral, surcharge and hydrostatic), and opening requirements. All concrete in the precast structure shall have a minimum compressive strength of 4,000 psi after 28 days. Reinforcing steel shall comply with ASTM A 615 Grade 60 (min. fy = 60,000 psi). Bar bending, and placement shall comply with the ACI latest standards.

The precast structure manufacturer shall have the necessary equipment and facilities for the proper manufacture of the sections and to perform compressive strength tests on concrete tests specimens. Test cylinders shall be made for each structure and test conducted in accordance with ASTM C 39, except the compressive strength shall be equal to or greater than the design of the concrete. Structure design computations, concrete mix design, and test reports certifying design strength has been achieved at the 28–day break shall be submitted to the Engineer. Design of the structure shall be performed by a Registered Professional Engineer at the Contractor's expense. The design parameters for the precast structure shall include:

Lateral load based on a water table at the surface using equivalent fluid pressure of 80 pcf from the surface grade down and a vehicle wheel load designation of HS20–44. Design live load for the top slab shall be for a vehicle wheel load designation of HS20–44. The precast concrete sections shall have a minimum wall thickness of 12–inches for 12–foot diameter manholes. The minimum top slab thicknesses shall be 12–inches for all wet wells. The minimum bottom slab thickness shall be 12–inches. Actual thicknesses greater than minimum shall be as required by the loading conditions based on precast manufacturers design.

The structure manufacturer shall prepare and submit six (6) sets of shop drawings showing wall and slab thicknesses, structural reinforcing, and opening locations. The manufacturer shall also provide the design analyses and calculations to show all sections have been designed for the burial depths shown on the construction drawings as well as stresses incurred during transport, handling, and installation. Calculations and analyses must be performed and sealed by a Licensed Professional Engineer and submitted for review. All shop drawings and design calculations shall be submitted to the Contractor for review. Contractor shall forward these documents to the Engineer. Such documents shall bear the stamp or written statement of the Contractor indicating Contractor's review for completeness and receipt. Contractor shall be responsible for the accuracy of the shop drawings and for their conformity to the plans and specifications. Shop drawings with insufficient or incomplete data required to indicate compliance with these specifications are not acceptable and will be returned to the Contractor. Rejected shop drawings shall not relieve the Contractor from his completing the project within the time allowed by the Contract Documents.

Part 1.07 Casing and Casing Spacers

- Add the following paragraph:

Design and installation of casings and pipelines crossing CSX Railroads shall be performed in accordance with "CSX Transportation Design & Construction Standard Specifications –

Pipeline Occupancies," latest revision. Casings and pipelines crossing Norfolk Southern railroads shall be designed and constructed in accordance with "Specifications for Pipeline Occupancy of Norfolk Southern Property," latest revision. At a minimum 36–inch steel casings will have a wall thickness of 0.532–inches, 30–inch steel casings shall have a minimum wall thickness of 0.500–inches, and all casings 24–inch and smaller shall have a minimum wall thickness of 0.375–inch, unless thicker walls are required by the design and specifications manuals listed in this section.

23. All roadway and storm drainage system construction shall be in accordance with the Georgia Department of Transportation (GDOT) Standard Specifications for Construction of Transportation Systems (2013 Edition), except noted and amended elsewhere herein.

24. Televising of storm lines shall be conducted a minimum of 30 days following installation. Televising may be conducted by the Contractor or his sub at no additional cost to the City. The scheduling of the televising, regardless of televising source (City provided or private contractor), is the responsibility of the Contractor.

25. The following is agreed to as a condition of this project, and the costs associated with same shall be included in the overall project cost. The Contractor shall provide a superintendent acceptable to the Owner for the duration of the work of this project. The Contractor shall not replace the superintendent without acceptance of the owner's representative. The Contractor shall provide a construction quality control/quality assurance representative acceptable to the Owner for the duration of the work of this project. The Contractor shall not replace the quality control/quality assurance representative without the acceptance of the owner's representative. In the case that either representative's employment is terminated with the contractor, replacements credentials should be submitted. Neither representative may be integrated into the actual workforce in a task completion role.

26. The contractor shall pay particular attention to the need for proper shoring and bracing of excavation for construction of utility lines and structures. The contractor shall note that no separate payment shall be made for sheet piling, shoring, and bracing of excavations. Contractor shall incorporate any such costs into bid price for the item to which it pertains. Any damages that occur due to the installation of sheeting for any other type of excavation bracing shall be the responsibility of the contractor.

27. Adjustment of manhole to grade shall be done with brick and mortar, not exceeding 12–inches in height.

28. All efforts have been made to identify underground and above–ground utilities; however, the contractor has the ultimate obligation to proceed with caution when a suspected utility line is present in the excavation. Any lines, which are not shown to be abandoned, shall be repaired immediately if broken during construction at the Contractor's expense. All service laterals shall remain in service and contractor must keep each service in operation during construction. The contractor shall be responsible for furnishing all necessary materials for temporary bypassing of any utilities as needed. Prior to performing any by–pass operation, the contractor shall submit his proposed method of bypassing and/or hydro stopping. Bypassing or hydro–stopping shall be included in the bid price. Temporary relocation of electric, gas, or cable utilities will be coordinated by the contractor with the respective utility provider to maintain continuous service, at no additional cost to the city.

29. Construction Site Safety: Contractor shall comply with paragraphs 55 and 56 in Section 001500 of the General Conditions in regard to Site Safety. During construction of the project, the contractor shall provide and maintain all necessary safety measures adequate to prevent unauthorized entry to the construction area. The contractor shall be held liable for any injuries to a member of the public due to insufficient safety measures. The contractor, upon request of the construction inspector, shall provide safe access to the work for adequate inspection at no additional cost to the City, as per Section 001500, paragraph 15–G of the General Conditions.

34. DEFECTIVE

The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. Does not conform to the Contract Documents; or
b. Does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
c. Has been damaged prior to Engineer's recommendation of final payment

35. DUCTILE IRON SANITARY SEWER AND WATER PIPING

a. Ductile iron sanitary sewer and water piping shall be pressure class 350, unless otherwise specifically noted in the plans.

36. Any and all work, labor, equipment, materials, design, and other incidental required to provide and maintain temporary drainage, traffic flow, water/sewer utility service, other utility service, earthwork, by-passing, and all other temporary work shall not be measured or paid for separately. All cost for all temporary work shall be considered a subsidiary obligation to the contract.

37. TESTING FORCE MAIN LINES

Force mains shall be tested in accordance with AWWA Standard C600 latest revision.

A. Hydrostatic Tests:

1. After a new force main has been laid and backfilled, it shall be pumped to a pressure of 150 PSI and all visible leaks stopped by approved methods. During the test, the pressure cannot drop more than 5 PSI below the starting pressure point.

2. A leakage test shall then be conducted at the above-mentioned pressure and no installation will be acceptable by the Engineer until the leakage is less than the number of gallons per hour as determined by the formula:

$$L = (S \times D \times P) \div 148000$$

in which L equals the allowable leakage in gallons per hour; S is the length of line in feet being tested; D is the nominal diameter of the pipe in inches; and P is the square root of the average test pressure during the leakage test in pounds per square inch. The test is usually maintained for two hours but it may be continued for one additional hour if it becomes apparent that the leakage is equal to or greater than the amount allowable. Water supplied to the main during the test to maintain the required pressure shall be measured by a 5/8-inch meter installed on the discharge side of the test pump, or by pumping from a calibrated container. A hose bib connection will be provided to accept the test gauge supplied by Owner.

3. The section of main being tested shall be limited to a maximum length of 2000 liner feet, or as allowed by the Engineer. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in. of nominal valve size shall be allowed. Any questions pertaining to procedures used during the test shall be decided by Engineer.

END SECTION 00 1600

30. Beside County right away property noted in Section 01 30 00, no additional property is currently owned and available for the contractor's use as a laydown area, materials storage, or secure storage area. Property lines shown on the project drawings depict the public right–of–way, utilized for the project design. It is the Contractor's responsibility to locate, obtain entry, and maintain property to be used in construction of the project. Any costs related to those properties utilized by the contractor shall be included in the contract lump sum price for "Mobilization." No separate measurement or payment shall be made for any cost related to use of property outside the project rights–of–way.

31. Construction Schedules: In accordance with General Conditions Section 00 1500, paragraph 46, the Contractor shall submit an updated schedule and sequence of operation for completing the work with each pay request or at the request of the Engineer or Owner. As a minimum, the schedule shall include the following:

a. Start/finish duration all activities
b. Identification of all activities along the critical path
c. Identification of all activities that involve the Owner
d. Narrative explaining construction sequencing
e. Name of person who prepared schedule
f. Identification of all activities over 30 days.
g. Date Prepared

32. Shop Drawing/Product Submittals: The contractor is required to provide the following generally described shop drawing submittals that will be required for the project:

a. All items listed in Section 01 33 00 "Submittal Procedures" Water system–Piping, fittings, restraints, valves manhole structures, sealant, rings and covers, stoppels, hydrants, tracer wire, marker tape, valve boxes, casings for crossings, coatings for ferrous materials;
b. Sanitary sewer system – Piping, fittings, manhole structures, sealant, rings and covers, stoppels for force main connection, casings for crossings, coatings for ferrous materials, tracer wire and marker tape.
c. Control and auxiliary Building – masonry, roof sheathing, doors, louvers, door hardware, bricks, color selection charts, gutters, downspouts, flow meter equipment, control valve assemblies, electrical/control equipment, lighting, concrete mix design, fittings, and all other appurtenances and equipment.
d. Any other items that are not listed but are outlined in the plans and specifications or as requested by the Engineer or Owner.

33. Warranty Period:

The Owner is requiring the Contractor to guarantee all work for twelve (12) months from the date of Final Acceptance pursuant to Section 00 1500, General Conditions. In addition, the following shall supplement the requirements of the warranty period as specified in Section 00 1500.

A. The intent and purpose of the warranty period is as follows:

1.) To have the Contractor guarantee the work against all defects arising from workmanship or materials for a period of twelve (12) months from the date of Final Acceptance.

2.) To have the Contractor remedy, at his own expense and without additional cost to the Owner, rebuild, repair, restore, correct, and make good work that may become non–conforming during the warranty period.

3.) To have a functionally complete project conforming to the Contract Documents at the end of the twelve (12) month Warranty Period.

INDEX TO

SECTION 00 1700 – MEASUREMENT AND PAYMENT

SECTION 00 1700

MEASUREMENT AND PAYMENT

PART 1 – MEASUREMENT

1.1 MEASUREMENT

The items listed in the proposal shall be considered as sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not listed in the bid form shall be deemed to be a part of the item that it is associated with and shall be included in the cost of the unit shown on the bid form. Payment for the unit shown on the bid form shall be considered to cover the cost of all labor, material, equipment and performing all operations necessary to complete the work in place. The unit of measurement shall be the unit shown on the bid form (if shown). Payment shall be based upon the actual quantity multiplied by the unit prices. Where work is to be performed at a **lump sum price**, the lump sum shall include all operations and elements necessary to complete the work. No payment will be made for any material wasted, unused, rejected, or used for the convenience of the Contractor.

1.2 CONTRACTOR'S DETAILED ITEMIZATION

The *selected bidder* shall provide the Engineer and the Owner with a *Detailed Itemization* of all the construction costs to include mobilization, L.F. of the force main by size, method & material, number of fittings, number of valves, manholes, equipment, material, labor, insurance (to include railroad, DOT, & gas line), bonds, overhead, and other costs related to the construction of Travis Field Water Reclamation Facility Force Main. The Engineer will utilize these breakdowns to process monthly pay requests. Each item will be paid based on the L.F. or percentage of completion at the end of each pay period.

PART 2 – PAYMENT

2.1 30" DIAMETER DIRECT BURY FORCE MAIN

Payment shall be paid monthly according to the Contractor's provided detailed breakdown for each task. The monthly payment will be based on liner footage or percentage completed for each item, material in storage, valves, Manholes, air relies valves, and erosion control footage installed.

2.2 DIRECTIONAL DRILL PIPE INSTALLATION

Payment shall be paid monthly according to the Contractor's provided detailed breakdown for each task. The monthly payment will be based on liner footage or percentage completed for directional drill task.

2.3 JACK & BORE PIPE INSTALLATION

Payment shall be paid monthly according to the Contractor's provided detailed breakdown for J&B task. The monthly payment will be based on liner footage or percentage completed for jack& bore task.

2.4 OUTFALL STRUCTURE

Payment shall be based on the lump sum bid allowance for the outfall structure. The monthly payment will be based on the percentage completed for structure.

2.5 CRUSHED STONE BEDDING

Payment shall be on the basis of the cubic yard unit price in the Bid Proposal which shall include placement of crushed stone bedding. This allowance is for the "foundation" stone only and shall not include the cost of "bedding" stone or the "haunching" stone as shown on the plans.

2.6 REMOVE & REPLACE UNSUITABLE MATERIAL ALLOWANCE

Payment shall be on the basis of the in-place, cubic yard unit price in the Bid Proposal which shall include the removal and lawful reuse or disposal of unsuitable material and replacement with approved offsite borrow material for construction of the force main.

END OF SECTION

INDEX TO

SECTION 00 21 10 – SITE CLEARING

SECTION 00 21 10

SITE CLEARING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Removal of surface debris.

B. Removal of paving, curbs, and other materials located along proposed sewer utility route.

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

D. Topsoil excavation.

1.2 RELATED SECTIONS

A. Section 00 22 04 – Earthwork.

B. Section 00 27 31 – Wastewater Collection System.

1.3 MEASUREMENT AND PAYMENT

A. Site Clearing: Clearing, grubbing and other items to be removed will be paid for at the contract unit price in the proposal for clearing work. Includes clearing site, loading and removing waste materials from site.

1.4 REGULATORY REQUIREMENTS

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

B. Coordinate clearing Work with utility companies.

PART 2 – PRODUCTS

2.1 MATERIALS

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

PART 3 – EXECUTION

3.1 PREPARATION

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

B. Identify a salvage area for placing removed materials. All non–salvageable material shall be disposed of off–site by Contractor at his expense.

3.2 PROTECTION

A. All trees on site will be saved except those marked specifically by the Owner's representative for removal during construction. No trees, either those marked for removal on site or any other tree, may be removed prior to the preconstruction conference. All trees not to be removed will be protected from injury to their roots and to their top to a distance three feet (3') beyond the drip–line and no grading, trenching, pruning, or storage of materials may go in this area except as provided by an Owner's representative stakeout. Contractor will pay a penalty for any tree removed from the site which has not been marked specifically for removal. Contractor also will pay for any tree which dies due to damage during construction. This applies to all trees on site whether or not they are shown on the plans.

B. Contractor shall not be held accountable for damages to trees resulting from placement of fill or removal of soils where such action is required by the contract documents. Any tree, the trunk of which is within 10 feet of any footing or trench, shall be exempt from these penalties except that the Contractor shall exercise all reasonable precautions to preserve even these trees. Contractor agrees to pay fines as established below in the event he or any of his subcontractors causes loss or removal of trees designated to be saved under provisions of this contract.

The fines are as follows:

Caliper	Fine
1" – 2"	$ 150.00
2" – 3"	200.00
3" – 4"	250.00
4" – 5"	400.00
5" – 6"	500.00
6" – 7"	600.00
7" – 8"	750.00
8" – 11"	1,500.00
12" – 20"	2,000.00
21" & larger	$ 2,500.00

C. Trees shall be graded by Owner's representative as to variety, condition and site importance, with above figures acting as a maximum fine. Lowest assessment amount shall be no less than one–half of the above fine figures.

D. Protect benchmarks, survey control points, and existing structures from damage or displacement.

E. Protect all remaining utilities.

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

3.3 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 an acceptable tree wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations, by the erection of timber barriers or by such other means as circumstances require. Such barriers must be placed and be approved by the OWNER before construction observations can proceed (See 3.2). Clearing shall also include removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.4 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.

C. Partially remove paving, curbs, and driveways as indicated. Neatly saw cut edges at right angle to surface.

3.5 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. Contractor shall be responsible for compliance with all local and State laws and regulations relative to the removal and disposal of material. 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 unless directed to do so by the OWNER.** Contractor shall obtain a permit to burn on site from local fire department, before beginning the work.

3.6 GRUBBING

A. Grubbing shall consist of removal and disposal of stumps, roots larger than one (1) 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 or building pads, 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 with original adjacent ground.

END OF SECTION

INDEX TO

SECTION 00 21 40 – DEWATERING

SECTION 00 21 40

DEWATERING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope of Work: The work to be performed under this section shall include furnishing all equipment and labor necessary to remove storm or subsurface waters from excavation areas in accordance with the requirements of this project.

B. Related Work Described Elsewhere:

1. City of Savannah- Standards for Water and Sewer Design and Construction

2. Earthwork: Section 00 22 00.

3. *Exhibit "A" September 3, 2019 Terracon Geotechnical Engineering Investigation, Travis Field WRF Force Main, Savannah, Georgia, Terracon Project No. ES185299.*

1.02 QUALITY ASSURANCE

A. The dewatering of any excavation area and the disposal of the water shall be in strict accordance with the latest revision of all local, state, and federal government rules and regulations.

B. Qualifications: The temporary dewatering system shall be designed by a firm who regularly engages in the design of dewatering systems and who is fully experienced, reputable and qualified in the design of such dewatering systems. The firm shall have a successful record of operation for a minimum of five (5) years prior to bid date.

1.03 SUBMITTALS

A. Contractor shall engage a Professional Geotechnical Engineer registered in the State of Georgia to prepare a signed and sealed Dewatering Plan for the project if either of the following should occur:

1. If Contractor anticipates dewatering activities will be necessary along the route of the force main or water main installed via open cut construction or for the Horizontal Directional Drill pits.

B. Materials and Shop Drawings: Shop drawings required to establish compliance with the specifications and any Dewatering Plan shall be submitted in accordance with the provisions of the Special Conditions. Submittals shall include at minimum the following:

1. Design notes and drawings.

2. Descriptive literature of the temporary dewatering system.

3. Layout of all pumps and piping involved.

4. Bill of materials.

PART 2 – PRODUCTS

2.01 GENERAL

A. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters which may accumulate in the excavations. The equipment used for dewatering systems shall be standard dewatering equipment of proven ability as designed and manufactured by firms having experience in the design and production of such equipment. The equipment furnished shall be designed, constructed and installed in accordance with the best practices and methods.

B. The Contractor shall engage a Professional Geotechnical Engineer registered in the State of Georgia to design temporary dewatering systems for the project in compliance with the Dewatering Plan. The Contractor shall submit to Engineer and the City of Savannah for review, a conceptual plan for the dewatering systems prior to commencing work. The dewatering systems installed shall be in conformity with the overall construction plan, and certification of this shall be provided by the Geotechnical Professional Engineer. The Contractor shall be required to monitor the performance of the dewatering systems during the progress of the work and require such modifications as may be necessary to assure that the systems will perform satisfactorily. Dewatering systems shall be designed in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed structures and to preserve the integrity of adjacent structures.

PART 3 – EXECUTION

3.01 DEWATERING

A. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters which may accumulate in the excavation.

B. If subsurface water is encountered, the Contractor shall utilize suitable equipment to adequately dewater the excavation so that it will be dry for work and pipe laying. A wellpoint system or other Engineer approved dewatering method shall be utilized if necessary, to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying. The water table should be maintained at least 2 feet below the required depth of excavation. The dewatering system should not be decommissioned until sufficient deadweight exists on the structures to prevent uplift or an uplift protection system, if necessary, is in place.

C. Dewatering by trench pumping will not be permitted if migration of fine-grained natural material from bottom, side walls, or bedding material will occur.

3.02 DISPOSAL

A. Water pumped from the trench or other excavation shall be disposed of in storm sewers having adequate capacity, canals, or suitable disposal pits.

B. Contractor is responsible for acquiring any permits required to discharge the water and shall protect waterways from turbidity during the operation by the use of Best Management Practices.

C. In areas where adequate disposal sites are not available, partially backfilled trenches may be used for water disposal only when the Contractor's plan for trench disposal is approved in writing by the Engineer. The Contractor's plan shall include temporary culverts, barricades and other protective measures to prevent damage to property or injury to any person or persons.

D. No flooding of streets, roadways, driveways, or private property will be permitted. Engines driving dewatering pumps shall be equipped with residential type mufflers. Where practical and feasible, electric "drops" should be used in lieu of portable generators.

END OF SECTION

INDEX TO

SECTION 00 22 04 – EARTHWORK

SECTION 00 22 04

EARTHWORK

PART 1 – GENERAL

1.1 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

1.2 RELATED SECTIONS

A. Section 00 21 40 – Dewatering

B. Section 00 21 10 – Site Clearing

C. Section 00 26 67 – Water Distribution System

1.3 MEASUREMENT AND PAYMENT

A. All grading including grading to sub grades, construction of ditches, dressing of disturbed areas, removing and replacing topsoil, excavating, backfilling and compacting to required elevations, testing, staking, and construction supervision shall not be measured for direct payment. Payment for grading shall be included in the item to which it pertains.

B. Unsuitable Material – No direct payment will be made for excavation, removal, and disposal of unsuitable material, and shall be considered a subsidiary obligation of the contract. The new backfill will be paid at C.Y. price as indicated on bid form.

C. Earthwork – All earthwork associated with the installation of water mains, gravity sewer, force mains, rip–rap, etc. shall not be measured for direct payment. Payment for the earthwork shall be included in the item to which it pertains.

D. Dewatering – No direct payment shall be made for dewatering. Dewatering shall be included in the item to which it pertains.

E. Proof Rolling – No separate measurement or payment shall be made for proof rolling. All cost to provide a loaded truck, truck driver, fuel, and rolling the designated areas if requested by Owner or Engineer shall be solely the responsibility of the Contractor. Payment for proof rolling shall be included in the item to which it pertains.

1.4 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 2922 – Density of Soil and Soil–Aggregate in Place by Nuclear Methods (Shallow Depth).

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

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

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

1.5 SUBMITTALS

A. Section 01300 – Submittals: Procedures for submittals.

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

1.6 QUALITY ASSURANCE

A. Perform work in accordance with Federal, State of Georgia, and Bryan County/City of Richmond Hill standards.

1.7 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 2922.

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 a minimum of 48 hours notice prior to taking any of the tests.

E. Testing shall be Contractor's responsibility and performed at Contractor 's expense by a commercial testing laboratory operating in accordance with subparagraph C above.

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

PART 2 – PRODUCTS

2.1 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 and parking lots shall have no more than 15% passing the # 200 sieve. Fill soils used for house lots shall have no more than 25% passing the # 200 sieve.

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.

2.2 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

3.1 TOPSOIL

A. Contractor shall strip topsoil and stockpile on site at a location determined by the Owner at the Contractor's expense.

B. Topsoil shall be placed to a depth of 4 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 determined by the Owner or Engineer to be useful will be stored on site at a location determined by the Owner at the Contractor's expense.

E. Do not excavate wet topsoil.

3.2 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 and under building pads, shall be excavated 2 feet below final grade and replaced with suitable material from site or borrow excavations. Contractor shall notify Engineer 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. Methods shall be in accordance with the National Pollutant Discharge Elimination System standards and other local, state, and federal regulations.

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 two feet of pavement subbase shall have no more than 15% passing the # 200 sieve.

3.3 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.

3.4 FILL

A. Shall be placed in successive horizontal layers 8 inches to 12 inches in loose depth for the full width of the cross–section and compacted as required.

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

3.6 DISPOSAL OF WASTE MATERIAL

A. All vegetation, roots, brush, sod, broken pavements, curb and gutter, rubbish, and other unsuitable or surplus material stripped or removed from limits of construction shall be disposed of by the Contractor.

3.7 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 Owner at all times during earthwork operations.

C. Repair or re–establishment of graded areas prior to final acceptance shall be at the Contractors expense.

D. Site drainage shall be provided and maintained by Contractor during construction until final acceptance of the project. Drainage may be by supplemental ditching, or pumping if necessary, prior to completion of permanent site drainage.

3.8 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 Owner's property, and those properties downstream.

3.9 FIELD QUALITY CONTROL

A. Compaction testing shall be performed in accordance with ASTM D 2922. Where tests indicate the backfill does not meet specified requirements, the backfill shall be reworked or removed and replaced, and then retested at the Contractor's expense.

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

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 approval by the Engineer. Approval in no way relieves Contractor of the responsibility to perform in correct and timely means.

E. Number of Tests – Under paved areas, no less than one density test per horizontal layer per 5,000 square feet of 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.

3.10 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 Engineer. 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 ten (10) wheeled dump truck. A full load shall consist of ten (10) to twelve (12) cubic yards of soil or rock. The dump truck shall be capable of traveling at a speed of two (2) to five (5) miles per hour and be in sound mechanical shape with no exhaust leaks or smoking from burning oil. The Engineer shall determine number of passes and areas rolled.

END OF SECTION

INDEX TO

SECTION 00 22 10 – SOIL EROSION CONTROL

SECTION 00 22 10

SOIL EROSION CONTROL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

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

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

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.

1.3 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.

1.4 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.

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

Georgia Projects

C. The 24-hour contact for erosion and sedimentation control measures is:

Name: Mr. Keith Strong

Address: Thomas & Hutton
50 Park of Commerce Way
Savannah, GA 31405

Phone: (912) 667-9793

1.5 SUBMITTALS

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

1.6 MEASUREMENT AND PAYMENT

A. No unit measurements will be made for soil erosion control. Payment will be made at the lump sum price as shown on the bid proposal. The cost of soil erosion control shall include all equipment, labor and materials necessary to comply with the State of Georgia Erosion and Sediment Control Program.

PART 2 – PRODUCTS

2.1 GRASSING MATERIALS

A. Refer to Section 00 29 02 – Grassing.

1. General: All grass seed shall be free from noxious weeds, grade A recent crop, recleaned and treated with appropriate fungicide at time of mixture. Deliver to site in original sealed containers with dealer's guarantee as to year grown, percentage of purity, percentage of germination and date of the test by which percentages of purity and germination were determined. All seed sown shall have a date of test within six months of the date of sowing.

2. Type of Seed: Either Annual Rye or Common Bermuda Grass seed will be used depending on time of year in which seeding is to occur.

3. Mulch: Straw.

4. Fertilizer: Commercial balanced 4-12-12 fertilizer.

2.2 HAY BALES

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

2.3 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.

Fabric shall meet the following requirements:

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

2.4 CHEMICALS FOR DUST CONTROL

A. Calcium Chloride, Anionic Asphalt Emulsion, latex Emulsion or Resin-in-Water Emulsion may be used for dust control.

2.5 RIP-RAP

A. Shall be hard quarry or field stone of such quality the pieces will not disintegrate on exposure to water, sunlight, or weather. Stone shall range in weight from a minimum of 25 pounds to a maximum of 125 pounds. At least 50 percent of the stone shall weigh more than 60 pounds. The stone shall have a minimum dimension of 12 inches.

2.6 PRODUCT REVIEW

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

PART 3 – EXECUTION

3.1 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. Storm water conveyance systems shall have sediment barriers installed at all entrances, intersections, change in direction and discharge points.

3.2 GRASSING

A. Refer to Section 00 29 02 - Grassing.

3.3 SEDIMENT BARRIERS

A. Hay Bales for Sheet Flow Applications:

1. Excavate a 4-inch-deep trench the width of a bale and length of proposed barrier. Barrier should be parallel to the slope. Place barrier 5 to 6 feet away from toe of slope, unless otherwise instructed.

2. Place bales in the trench with their ends tightly abutting. Corner abutment is not acceptable. A tight fit is important to prevent sediment from escaping through spaces between the bales.

3. Backfill the trench with previously excavated soil and compact it. Backfill soil should conform to ground level on downhill side of barrier and should be built up to 4 inches above ground on uphill side of bales.

4. Inspect and repair or replace damaged bales promptly. Remove hay bales when uphill sloped areas have been permanently stabilized.

B. Hay Bales for Ditch Check Applications:

1. Install hay bales as described for sheet flow with the following exceptions:

a. Place bales in a single row, lengthwise, oriented perpendicular to the flow, and with ends of adjacent bales tightly abutting one another.

b. Extend barrier to such a length so the bottoms of end bales are at a higher elevation than the top of lowest middle bale to assure sediment-laden runoff will flow either through or over barrier but not around it.

3.4 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.

3.5 DUST CONTROL

A. Dust raised from vehicular traffic will be controlled by wetting down access road with water or by the use of a deliquescent chemical, such as calcium chloride, if relative humidity is over 30%. Chemicals shall be applied in accordance with manufacturer's recommendations.

B. Contractor shall use all means necessary to control dust on and near the work, or off-site borrow areas 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.

3.6 SEDIMENT BASIN

A. A sediment basin equal in volume to 3,600 cubic feet per disturbed acre is required. The sediment basin/lagoon adjacent to the outfall for the site shall be constructed and stabilized prior to any additional land disturbed activity.

3.7 RIP-RAP

A. Rip-Rap shall be placed at the locations shown and installed in accordance with the detail on the construction drawings.

3.8 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.

3.9 INLET PROTECTION

A. 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

INDEX TO

SECTION 00 22 11 – EROSION, SEDIMENTATION, AND POLLUTION CONTROL (GA)

SECTION 00 22 11

EROSION, SEDIMENTATION, AND POLLUTION CONTROL (GA)

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Soil erosion, sediment and pollution control measures shall include all temporary and permanent means of soil protection, trapping soils and containment of pollutants on the construction site during land disturbing activities. Activities covered in this section are regulated by the Manual for Erosion and Sediment Control in Georgia (latest revision) and Georgia's National Pollutant Discharge Elimination System Permit (NPDES), General Permit No. GAR100002.

B. Reporting

C. Sampling

1.2 RELATED SECTIONS

A. Section 00 2110 – Site Clearing

B. Section 00 22 04 – Earthwork

C. Section 00 26 67 – Water Distribution System

1.3 PURPOSES

A. The purpose of this section is to achieve the following goals:

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

2. Retain existing vegetation whenever feasible.

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

4. Divert runoff away from disturbed areas.

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

6. Reduce runoff velocities with check dams or surface roughing.

7. Trap sediment on site.

8. Inspect and maintain erosion, sedimentation and pollution control measures.

9. Report on condition of Best Management Practices (BMPs).

10. Sample site run off per Georgia's NPDES Permit.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of soil erosion, sedimentation and pollution control systems products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

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

1.5 SUBMITTALS

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

1.6 MEASUREMENT AND PAYMENT

A. No unit measurements will be made for soil erosion control. Payment will be made at the lump sum price as shown on the bid proposal. The cost of soil erosion control shall include all equipment, labor, maintenance, monitoring, reporting, and materials necessary to comply with the State of Georgia NPDES Permit.

PART 2 – PRODUCTS

2.1 VEGETATIVE MATERIALS

A. Mulch

1. Dry straw or hay.
2. Wood chips, sawdust or bark.
3. Cutback asphalt.

B. Temporary Seeding

1. Annual Ryegrass
2. Browntop Millet

C. Permanent Seeding

1. Common Bermuda
2. Centipede

D. Sod

1. Common Bermuda

2. Centipede

3. St. Augustine

E. Fertilizer

1. Commercial 6–12–12

2.2 STRUCTURAL MATERIALS

A. Check Dam

1. Stone (2" – 10")

2. Bales of densely baled hay or straw wrapped with synthetic or wire bands (two minimum per bale).

B. Construction Exit

1. Minimum 20' x 50' x 0.5' layer of 1.5" to 3.5" stone with a geotextile underliner.

C. Filter Ring

1. Minimum 2' high stone ring. Stone shall be no smaller than 3" to 5" when utilized at storm drain inlets and pond outlets with pipe diameters less than 12".

2. Minimum 2' high stone ring. Stone shall be no smaller than 10" to 15" when utilized at storm drain inlets and pond outlets with pipe diameters greater than 12".

D. Sediment Barrier

1. Bales of densely baled hay or straw wrapped with synthetic or wire bands (two minimum per bale).

2. Silt Fence – Shall be a woven geotextile fabric sheet of plastic yarn composed of a long chain synthetic polymer with at least 85% by weight propylene, ethylene, amide, ester or vinylidene chloride, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultra–violet and/or heat exposure. The fabric shall be finished so the filaments will retain their relative position with respect to each other. The fabric shall be free of defects, rips, holes or flaws. The manufacturer shall have either an approved color mark yarn in the fabric or label the fabricated silt fence with both the manufacturer and fabric name every 100'.

The fabric shall meet the following requirements:

Grab Strength	90 lbs.
Mullen Burst Strength	150 lbs.
UV Resistance	80 %

E. Inlet Sediment Trap

1. Silt fence (Type C) supported by steel posts.

2. Baffle Box – Constructed of 2" x 4" boards spaced a maximum of 1" apart or plywood with weep holes 2" in diameter (See detail).

3. Sod Inlet Protection – Four (4) one (1) foot wide strips of sod on each side of the inlet (See detail).

4. Curb Inlet Protection – Eight (8) inch concrete blocks wrapped in filter fabric, placed in front of a curb inlet.

F. Storm Drain Outlet Protection

1. Geotextile fabric equivalent to Mirafi 140N.

2. Rip–rap (See detail for size).

2.3 CHEMICAL MATERIALS

A. Dust Control – Calcium Chloride, Anionic Asphalt Emulsion, Latex Emulsion or Resin–in–Water Emulsion.

B. Anionic Polyacrylamide (PAM) – Consult state and local laws concerning the regulations of this chemical.

PART 3 – EXECUTION

3.1 GENERAL

A. All disturbed soil areas except those to support paving shall be graded and protected from erosion with vegetative materials. Sedimentation discharge from the construction site into natural drainage ways and storm drainage systems shall be prevented by means of vegetative measures and temporary structural practices. These vegetative measures and structural practices are known as Best Management Practices (BMPs). Rainfall, pollution control measures and construction exit condition shall be monitored and reported on each day when construction activities take place. Erosion and sedimentation control measures shall be monitored and reported on every seven (7) days and within 24 hours of a qualifying rainfall event of 0.5–inches or more. Sampling of construction site discharging water shall be sampled within 45 minutes of a qualifying rainfall event and analyzed immediately or no later than 48 hours after collection. The above reports shall be submitted to the Georgia EPD by the fifteenth day of the month following the reporting period.

B. The Contractor (Operator) is considered a "Primary Permittee" and shall submit a Notice of Intent (NOI) in accordance with General Permit No.GAR100002 at least fourteen (14) days prior to the commencement of construction activities. Contractor shall retain a copy of the Erosion, Sedimentation, and Pollution Control Plan and Comprehensive Monitoring Program required by above permit at construction site or be readily available at a designated alternate location from date of project initiation to date of final stabilization. Copies of all Notice of Intent, Notice of Termination, plans, monitoring reports and all other records required by above permit shall be retained by Contractor for a period of at least three (3) years from date the site is finally stabilized. Copies of Notice of Intent (NOI), Notice of Termination (NOT) and General Permit Number GAR100002 are found at the end of this section.

3.2 ON–SITE OBSERVATION

A. Engineer is required by General Permit No. GAR100002 to check the installation of Erosion, Sedimentation and Pollution Control measures within one (1) week after initial construction activities commence. The Contractor shall notify Engineer within 24 hours of control measures installation for the above site visit. Engineer, within the above parameters, shall check subsequent installation of control measures.

3.3 VEGETATIVE PRACTICES

A. Mulch

1. Dry straw or hay shall be applied at a depth of 2 to 4 inches by hand or mechanical equipment providing complete soil coverage. Straw or hay shall be anchored immediately after application. Straw or hay can be anchored with a disk harrow, packer disk or emulsified asphalt.

2. Wood chips, sawdust or bark shall be applied at a depth of 2 to 3 inches by hand or mechanical equipment providing complete soil coverage. Netting of the appropriate size shall be used to anchor the above materials.

3. Cutback asphalt shall be applied at 1,200 gallons per acre or 1/4 gallon per square yard.

B. Seeding

1. Seed shall be applied uniformly by hand, cyclone seeder, drill, cultipacker seeder or hydraulic seeder. Drill or cultipacker seeders shall place seed 1/4" to 1/2" deep. Soil shall be raked lightly to cover seed with soil if seeded by hand.

2. During times of drought, water shall be applied at a rate not causing runoff and erosion. The soil shall be thoroughly wetted to depth insuring germination of the seed. Subsequent applications of water shall be made when needed.

3. Refer to Section 00 29 02 – Grassing for additional seeding requirements.

C. Sodding

1. Bring soil surface to final grade. Clear surface of trash, woody debris stones and dirt clods larger than 1". Mix fertilizer into soil surface. Apply sod to soil when surface is not muddy or frozen. Lay sod with tight joints and in straight lines. Do not overlap joints. Stagger joints and do not stretch sod. On slopes steeper than 3:1, sod shall be anchored with pins or other approved methods. Installed sod shall be rolled or tamped to provide good contact between sod and soil. Irrigate sod and soil to a depth of 4" immediately after installation. Irrigation shall be used to supplement rainfall for a minimum of 2–3 weeks.

2. Refer to Section 00 29 02 – Grassing for additional sodding requirements.

3.4 STRUCTURAL MEASURES

A. Check Dam

1. Stone – Shall be constructed of graded size 2–10 inch stone underlayed with a geotextile fabric. Mechanical or hand placement shall be required to insure complete coverage of entire width of ditch or swale and center of dam is lower than edges. Sediment shall be removed when it reaches a depth of one–half the original dam height or before.

2. Haybale – Shall be staked and embedded a minimum of 4" and may be used as temporary check dams in concentrated flow areas while vegetation is becoming established. They should not be used where the drainage area exceeds one acre. Sediment shall be removed when it reaches a depth of one–half the original dam height or before.

B. Construction Exit

1. A stone stabilized pad shall be located at any point where traffic will be leaving the construction site to a public right–of–way, street, alley, sidewalk, parking area or any other area where there is a transition from bare soil to a paved area. The pad shall be constructed of 1.5" to 3.5" stone, having a minimum thickness of 6" and not less than 20' wide and 50' long. The pad shall be underlayed with a geotextile fabric. The pad shall be maintained in a condition, which will prevent tracking or flow of mud onto public rights–of–way. This may require periodic top dressing with 1.5" to 3.5" stone. All materials spilled, dropped, washed or tracked from vehicles or site onto roadways or into storm drains must be removed immediately.

C. Filter Ring

1. Shall surround all sides of the structure receiving runoff from disturbed areas. It shall be placed a minimum of 4' from the structure. It may also be used below storm drains discharging into detention ponds, creating a centralized area for sediment accumulation. When utilized below a storm

drain outlet, it shall be placed such that it does not create a condition causing water to back–up into the storm drain and inhibit the function of the storm drain system. The larger stone can be faced with smaller filter stone on the upstream side for added sediment filtering capabilities. Mechanical or hand placement of stone shall be required to uniformly surround the structure.

2. Filter ring must be kept clear of trash and debris. This requires continuous monitoring and maintenance, which includes sediment removal when one–half full. Filter rings are temporary and should be removed when the site has been stabilized.

D. Sediment Barrier

1. Hay or straw bales may be used in areas of low sheet flow rates. They shall not be use if the project duration is expected to exceed three (3) months. Bales shall be placed in a single row, lengthwise, and embedded in the soil to a depth of 4". Bales must be securely anchored in place by stakes or bars driven through the bales or by other acceptable means to prevent displacement. Bales shall be placed so the binding wire or twine around the bale will not touch the soil. Sediment shall be removed once it has accumulated to one–half the original height of the barrier. Barriers shall remain in place until disturbed areas have been permanently stabilized. All sediment accumulated at the barrier shall be removed and properly disposed of before the barrier is removed. The slope lengths contributing runoff to a bale barrier cannot exceed those listed below.

Land Slope (Percent)	Maximum Slope Length Above Bale (Feet)
< 2	75
2 to 5	50
5 to 10	35
10 to 20	20
> 20	0

2. Silt fence may be used in areas of higher sheet flow rates. The drainage area shall not exceed ¼ acre for every 100' of silt fence. **Silt fence shall not be installed across streams, ditches, waterways or other concentrated flow areas.** Silt fence shall be installed according to this specification, as shown on the construction drawings or as directed by the Engineer. See details on the construction drawings for installation requirements.

a) Type A – A 36" wide filter fabric silt fence shall be used on construction sites where the life of the project is greater than or equal to six (6) months.

b) Type B – A 22" wide filter fabric silt fence shall be limited to use on minor projects, such as residential home sites or small commercial

developments where permanent stabilization will be achieved in less than six (6) months.

c) Type C – A 36" wide filter fabric silt fence with wire reinforcement shall be used where runoff flows or velocities are particularly high or where slopes exceed a vertical height of 10'. Along stream buffers and other sensitive areas, two (2) rows of Type C silt fence or one (1) row of Type C silt fence backed by hay bales shall be used.

3. Where all runoff is to be stored behind the silt fence (where no stormwater disposal system is present), the slope lengths contributing runoff to a silt fence barrier cannot exceed those listed below.

Land Slope (Percent)	Maximum Slope Length Above Fence (Feet)
< 2	100
2 to 5	75
5 to 10	50
10 to 20	25
> 20*	15

*In areas where the slope is greater than 20%, a flat area length of 10' between the toe of the slope and the fence shall be provided.

4. Sediment shall be removed once it has accumulated to one–half the original height of the barrier. Filter fabric shall be replaced whenever it has deteriorated to such an extent that the effectiveness of the fabric is reduced (approximately six months). Barriers shall remain in place until disturbed areas have been permanently stabilized. All sediment accumulated at the barrier shall be removed and properly disposed of before the barrier is removed.

E. Inlet Sediment Trap

1. Shall be installed at or around all storm drain inlets receiving runoff from disturbed areas. Sediment traps must be self draining unless they are otherwise protected in an approved manner that will not present a safety hazard. The drainage area entering the inlet sediment trap shall be no greater than one acre. Sediment traps may be constructed on natural ground surface, on an excavated surface or on machine compacted fill provided they have a non–erodible outlet.

2. Type C silt fence supported by steel posts may be used where the inlet drains a relatively flat area (slope no greater than 5%) and shall not apply to inlets receiving concentrated flows, such as in street or highway medians. The stakes shall be spaced evenly around the perimeter of the inlet a maximum of 3' apart and securely driven into the ground, approximately 18" deep. The fabric shall be entrenched 12" and backfilled with crushed stone or compacted soil. Fabric and wire shall be

securely fastened to the posts and fabric ends must be overlapped a minimum of 18" or wrapped together around a post to provide a continuous fabric barrier around the inlet. The trap shall be inspected daily and after each rain. Repairs are to be made as needed. Sediment shall be removed once it has accumulated to one–half the height of the trap. **Sediment shall not be washed into the inlet.** It shall be removed from the sediment trap and disposed of and stabilized so it will not enter the inlet again. When the contributing drainage area has been permanently stabilized, all materials and any sediment shall be removed and either salvaged or disposed of properly. The disturbed area shall be brought to proper grade, smoothed and compacted. Appropriately stabilize all disturbed areas around the inlet.

3. A baffle box shall be used for inlets receiving runoff with a higher volume or velocity. The box shall be constructed of 2" x 4" boards spaced a maximum of 1" apart or of plywood with weep holes 2" in diameter. The weep holes shall be placed approximately 6" on center vertically and horizontally. The entire box shall be wrapped in Type C filter fabric that is entrenched 12" and backfilled. Gravel shall be placed around the box to a depth of 2" to 4". The trap shall be inspected daily and after each rain. Repairs are to be made as needed. Sediment shall be removed once it has accumulated to one–half the height of the trap. **Sediment shall not be washed into the inlet.** It shall be removed from the sediment trap and disposed of and stabilized so it will not enter the inlet again. When the contributing drainage area has been permanently stabilized, all materials and any sediment shall be removed and either salvaged or disposed of properly. The disturbed area shall be brought to proper grade, smoothed and compacted. Appropriately stabilize all disturbed areas around the inlet.

4. Sod Inlet Protection shall be used only at the time of permanent seeding, to protect the inlet from sediment and mulch material until permanent vegetation has become established. The sod shall be place to form a turf mat covering the soil for a distance of 4' from each side of the inlet structure. Sod strips shall be staggered so adjacent strip ends are not aligned. Re–sod areas where an adequate stand of sod is not obtained. New sod should be mowed sparingly. Grass height should not be less than 2" to 3".

5. Curb Inlet Protection shall be used on curb inlets receiving runoff from disturbed areas once pavement has been installed. Place 8" concrete blocks wrapped in filter fabric in front of the curb inlet opening. A gap of approximately 4" shall be left between the inlet filter and the inlet to allow for overflow and prevention of hazardous ponding in the roadway. **This method of inlet protection shall be removed if a safety hazard is created.** Sediment shall be removed from curb inlet protection immediately.

F. Storm Drain Outlet Protection

1. Outlet protection aprons shall be constructed at all storm drain outlets, road culverts, paved channel outlets discharging into natural or constructed channels. Apron will extend from end of the conduit,

channel or structure to the point of entry into an existing stream or publicly maintained drainage system. Apron length, width and stone size shall conform to details on the construction drawings. Apron shall be constructed with no slope along its length. Invert elevation of the downstream end of apron shall be equal to the elevation of the receiving channel invert. There shall be no overfall at the end of apron. Apron shall be located so there are no bends in the horizontal alignment.

2. Subgrade for geotextile fabric and rip–rap shall follow required lines and grades shown on the construction drawings. Compact any subgrade fill required to the density of surrounding undisturbed material. Low areas in subgrade on undisturbed soil may also be filled by increasing rip–rap thickness. Geotextile fabric shall be protected from punching or tearing during installation. Repair any damage by removing rip–rap and placing another piece of fabric over the damaged area. All connecting joints shall overlap a minimum of 1'. If damage is extensive, replace entire geotextile fabric. Rip–rap shall be placed by equipment or hand. Minimum thickness of rip–rap shall be 1.5 times the maximum stone diameter. Immediately after construction, stabilize all disturbed areas around apron with vegetation.

3. Check outlet apron after heavy rains to see if any erosion around or below the rip–rap has taken or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

3.5 CHEMICAL MEASURES

A. Dust Control

1. Dust raised from vehicular traffic shall be controlled by wetting down roads with water or by the use of chemicals. Chemicals shall be applied in accordance with the manufacturer's recommendations.

B. Soil Binding

1. This temporary practice is intended for direct soil surface application to sites where the timely establishment of vegetation may not be feasible or where vegetative cover is absent or inadequate. **This temporary practice is not intended for application to surface waters of the state.** It is intended for application within construction storm water ditches and storm drains which, feed into previously constructed sediment ponds or basins.

2. Anionic Polyacrylamide (PAM) is available in emulsions, powders, gel bars and logs. It is required that other Best Management Practices be used in combination with anionic PAM. The use of seed and mulch for additional erosion protection beyond the life of anionic PAM is recommended. Use 50' setbacks when applying anionic PAM near natural water bodies. Never add water to PAM, add PAM slowly to water. If water is added to PAM, globs can form which can clog dispensers. This signifies incomplete dissolving of PAM and therefore increases the risk of under application. Application rates shall conform to manufacturer's guidelines. **The maximum application rate of PAM, in pure form, shall not exceed**

200pounds/acre/year. Contractors using anionic PAM shall obtain and follow all Material Safety Data Sheet requirements and manufacturer's recommendations. Gel bars and logs of anionic PAM mixtures may be used in ditch systems. This application shall meet the same testing requirements as anionic PAM emulsions and powders. Maintenance will consist of reapplying anionic PAM to disturbed areas, including high traffic areas, which interfere in the performance of this practice.

3.6 MONITORING AND REPORTING

A. Each day, when any type of construction activity takes place on the construction site, Contractor's qualified personnel shall monitor and record rainfall, inspect all areas where petroleum products are stored, used or handled for spills and leaks from vehicles and equipment and check all locations where vehicles enter or exit the site for evidence of off site sediment tracking. These inspections shall be conducted until a Notice of Termination (NOT) is submitted. For linear construction where a phased activity is conducted, this paragraph applies to the active phase(s) of work.

B. Once every seven (7) calendar days and within 24 hours of the end of a storm 0.5 inches or greater, Contractor's qualified personnel shall inspect disturbed areas of the construction site that have not undergone final stabilization, areas used for storage of materials that are exposed to precipitation that have not undergone final stabilization and structural control measures (BMPs). Erosion and sediment control measures identified in the Erosion, Sedimentation and Pollution Control Plan shall be observed to ensure they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving water(s). These inspections must be conducted until a Notice of Termination is submitted. For linear construction where a phase activity is conducted, this paragraph applies to the active phase(s) of work.

C. Contractor's qualified personnel shall inspect a least once per month during the term of the General Permit, areas of the construction site having undergone final stabilization. These areas shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and receiving water(s). Erosion and sediment control measure shall be observed to ensure they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measure are effective in preventing significant impacts to receiving water(s). For linear construction, monthly inspections in accordance with this paragraph shall be made for those phases on which final stabilization has been completed.

D. Contractor shall prepare a report summarizing the scope of inspections, name(s) of qualified personnel making the inspections, date(s) of inspections, major observations relating to the implementation of the Erosion, Sedimentation and Pollution Control Plan and any actions taken. This report shall be retained on the construction site or be readily available at a designated alternate location until the entire site or portion of a construction project that was phased, has undergone final stabilization and a Notice of Termination (NOT) is submitted to EPD. Such reports shall identify any incidents of non–compliance. Where the report does not identify any incidents of non–compliance, the re report shall

contain a certification that the facility is in compliance with the Erosion, Sedimentation and Pollution Control Plan and the General Permit. The report shall be signed in accordance with the General Permit.

3.7 SAMPLING AND ANALYSIS

A. Contractor must manually or automatically sample in accordance with the Comprehensive Monitoring Plan (CMP) at least once for each rainfall event described below. For a qualifying event, samples must be taken within forty–five (45) minutes of:

1. The accumulation of the minimum amount of rainfall, if the storm water discharge to a monitored receiving water or from a monitored outfall has begun at or prior to the accumulation.

2. The beginning of any storm water discharge to a monitored receiving water or from a monitored outfall, if the discharge begins after the accumulation of the minimum amount of rainfall.

However, where manual and automatic sampling are impossible (as defined in the permit), or are beyond the Contractor's control, the Contractor shall take samples as soon as possible, but in no case more than twelve (12) hours after the beginning of the storm water discharge.

B. Sampling shall occur for the following events:

1. For each area of the site discharging to a receiving stream, the first rain event reaching or exceeding 0.5 inch and allows for monitoring during normal business hours* (Monday thru Friday, 8:00 a.m. to 5:00 p.m. and Saturday 8:00 a.m. to 5:00 p.m. when construction activity is being conducted by the Primary permittee) occurring after all clearing and grubbing operations are completed in the drainage area of the location selected as the sampling location;

2. In addition to (1) above, for each area of the site discharging to a receiving stream, the first rain event reaching or exceeding 0.5 inch and allows for monitoring during normal business hours* occurring either 90 days after the first sampling event or after all mass grading operations are completed in the drainage area of the location selected as the sampling location, whichever comes first.

3. At the time of the sampling performed pursuant to (1) and (2) above, if BMPs are found to be properly designed, installed, and maintained, no further action is required. If BMPs in any area of the site discharging to a receiving stream are not properly designed, installed, and maintained, corrective action shall be defined and implemented within two business days, and turbidity samples shall be taken from discharges of the same area for each subsequent rain event reaching or exceeding 0.5 inch during normal business hours* until the selected turbidity standard is attained, or until post–storm event inspections determine BMPs are properly designed, installed, and maintained;

4. Existing construction activities, i.e., those occurring on or before the effective date of this permit, having met the sampling required by (1) above shall sample in accordance with (2). Those existing construction activities having met the sampling required by (2) above shall not be required to conduct additional sampling other than as required by (3) above.

   * Note the Permittee may choose to meet the requirements of (1) and (2) above by collecting turbidity samples from any rain event reaching or exceeding 0.5 inch and allows for monitoring at any time of the day or week.

5. For linear construction, if at any time during the life of the project, BMPs have not been properly designed, installed or maintained for the construction activities that discharge into a receiving water which is not being sampled, the Contractor shall sample that receiving water for the first rainfall event greater than or equal to 0.5 inches thereafter and for every rainfall event greater than or equal to 0.5 inches until BMPs are properly designed, installed and maintained.

C. Sampling shall be collected by "grab samples" and the analysis of these samples must be conducted in accordance with methodology and test procedures established in the General Permit. Sample containers shall be labeled prior to collecting the samples. Samples shall be well mixed before transferring to a secondary container. Large mouth, well cleaned and rinsed glass or plastic jars shall be used for collecting samples. The jars shall be cleaned thoroughly to avoid contamination. Manual or automatic sampling shall be utilized. Samples required by the General Permit shall be analyzed immediately, but in no case later than 48 hours after collection. However, samples from automatic samplers must be collected no later than the next business day after their accumulation, unless flow through automated analysis is utilized. Samples are not required to be cooled. Samples taken for the purpose of compliance with the General Permit shall be representative of the monitored activity and representative of the water quality of the receiving water(s) and/or the storm water outfalls using the following minimum guidelines:

1. The upstream sample for each receiving water(s) must be taken immediately upstream of the confluence of the first storm water discharge from the permitted construction site but downstream of any other storm water discharges not associated with the site. Where appropriate, several upstream samples from across the receiving water(s) may need to be taken and the average turbidity of these samples used for an upstream turbidity value.

2. The downstream sample for each receiving water(s) must be taken downstream of the confluence of the last storm water discharge from the construction site but upstream of any other storm water discharge not associated with the site. Where appropriate, several downstream samples from across the receiving water(s) may need to be taken and the average turbidity of these samples used for a downstream turbidity value.

3. Samples shall be taken from the horizontal and vertical center of the receiving water(s) or the storm water outfall channel(s).

4. Care shall be taken to avoid stirring the bottom sediments in the receiving water(s) or in the outfall storm water channel(s).

5. Sampling container shall be held so the opening faces upstream.

6. Samples shall be kept from floating debris.

D. For all construction sites and common developments other than linear construction projects, the Contractor shall sample all receiving water(s), or all outfall(s) or a combination of receiving water(s) and outfall(s). For linear construction projects, the Contractor must sample all perennial and intermittent streams and other water bodies shown on an USGS topographic map and all other field verified perennial and intermittent streams and other water bodies, or all outfalls into such streams and other water bodies, or a combination thereof.

E. Contractor shall provide and implement all safety equipment and procedures necessary for sampling during hazardous weather conditions and in the event of biological, chemical or physical hazards

F. Contractor shall submit a summary of the monitoring results to the EPD at the address shown in the General Permit by the fifteenth day of the month following the reporting period. For a monitoring period during which no qualifying rainfall events occur, a monitoring report must be submitted stating such. Monitoring periods are calendar months beginning with the first month after the effective date of the General Permit. Monitoring reports shall be signed in accordance with the General Permit and submitted to EPD until such time as a NOT is submitted.

G. Contractor must retain copies of all monitoring results and monitoring information reported. In addition to other record keeping requirements, the monitoring information shall include:

1. Date, exact place and time of sampling or measurements.

2. Name(s) of the individual(s) who performed the sampling and measurements.

3. Date(s) analyses were performed.

4. Time(s) analyses were initiated.

5. Name(s) of the individual(s) who performed the analyses.

6. References and written procedures, when available, for the analytical techniques or methods used. A quality control/quality assurance program must be included in the written procedures.

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, used to determine these results.

8. Results exceeding 1,000 NTU shall be reported as "Exceeds 1,000 NTU."

H. Suggested monitoring and report forms are found at the end of this section.

END OF SECTION

INDEX TO

SECTION 00 22 20 – EXCAVATION, BACKFILLING, AND COMPACTING

SECTION 00 22 20

EXCAVATING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The work included under this Section consists of clearing, excavating, grading and backfilling as required for the construction of the buildings, structures, piping and appurtenances as shown on the Drawings and specified herein.

B. Related Work Described Elsewhere:

1. City of Savannah Standards for Water and Sewer Design and Construction

2. Dewatering: Section 00 21 40.

3. Site Clearing: Section 00 2110.

4. Earthwork: Section 00 22 04.

5. *Exhibit "A" September 3, 2019 Terracon Geotechnical Engineering Investigation, Travis Field WRF Force Main, Savannah, Georgia, Terracon Project No. ES185299.*

C. Definitions:

1. Maximum Density: Maximum weight in pounds per cubic foot of a specific material.

2. Optimum Moisture: Percentage of water in a specific material at maximum density.

3. Rock Excavation: Excavation of any hard-natural substance which requires the use of explosives and/or special impact tools such as jack hammers, sledges, chisels or similar devices specifically designed for use in cutting or breaking rock, but exclusive of trench excavating machinery.

4. Suitable: Suitable materials for fills shall be a non-cohesive, non-plastic granular local sand and shall be free from vegetation, organic material, marl, silt or muck and shall generally consist of soils classified SP per ASTM D-2487. The Contractor shall furnish all additional fill material required. Where shown on the Drawings, back fill shall be No. 57 stone meeting all applicable Georgia Department of Transportation standards. All fill and backfill material shall be subject to approval of the Engineer.

5. Unsuitable: Unsuitable materials are highly organic soil (peat or muck) or loose to very loose clayey soils classified as Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 or Groups A-2-6, A-2-7, A-4, A-5, A-6, A-7, and A-8 according to AASHTO M 145, or a combination of these groups.

a. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Plan for Earthwork: The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the conformation of the ground, the character and quality of the substrata, the types and quantities of materials to be encountered, the nature of the groundwater conditions, the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract. Prior to commencing the excavation, the Contractor shall submit a plan of his proposed operations to the Engineer for review. The Contractor shall consider, and his plan for excavation shall reflect, the equipment and methods to be employed in the excavation. No claims for extras based on substrata or groundwater table conditions will be allowed.

1.02 QUALITY ASSURANCE

A. A Testing Laboratory employed by the Contractor and approved by the Engineer will make such tests as are specified. The Contractor shall schedule his work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of his progress. Costs for all testing shall be paid by the Contractor, including any and all tests which have to be repeated because of the failure of the tested material to meet specifications. Testing Laboratory or Contractor shall provide a map of all test locations.

B. Determination of laboratory moisture-density relationship and maximum density shall be by modified Proctor method of ASTM D-1557. At least one (1) test per soil type shall be made.

C. In place soil density shall be determined either by use of the Drive Sleeve Method per ASTM D-2937 or by use of a Nuclear Density Meter per ASTM D-2922. In place field densities shall be taken at least one (1) every 2,500 square feet at not greater than one (1) foot vertical intervals for all areas of potential building construction. Field Density Tests are to be located no further than 300 feet apart on center with a minimum of one (1) per roadway and one (1) per 5,000 square feet of parking/maneuvering area. One (1) density test is required for each pad or isolated footing and for every 20 linear feet of strip/wall footing length. For each tank mat foundation at least four (4) in place field densities shall be taken. In place field densities shall be taken at least one (1) every 300 feet of utility trench and not further than one (1) foot vertically or per lift, whichever is less.

D. Fill material from offsite shall be tested using a minus 200 sieve wash to check grain size. At least one (1) such test shall be run per 500 cubic yards of material brought from offsite.

E. Compaction shall be deemed to comply with the Specifications if no tests fall below the specified relative compaction. The Contractor shall pay the costs of any retesting of work not conforming to the Specifications.

1.03 JOB CONDITIONS

A. If, in the opinion of the Engineer, conditions encountered during construction warrant a change in structure elevation, or in the depth of removal of unsuitable

material from that indicated on the Drawings, an adjustment will be made in the contract price by the unit cost, as provided per the Terms and Conditions of the Contract and the Schedule of Values.

1.04 PROTECTION

A. Pre-Construction Survey:

1. Prior to commencing excavation or dewatering, the Contractor shall conduct a survey of those existing structures which may be subject to settlement or distress resulting from excavation or dewatering operations.

2. The Contractor shall monitor the structures surveyed to ascertain evidence of settlement or distress. If settlement or distress becomes evident the Contractor shall be required to repair the structures to the previous condition to the satisfaction of the Engineer. Costs shall be paid by the Contractor.

B. Excavation Support

1. Furnish, install, monitor and maintain excavation support (e.g., shoring, sheeting, bracing, trench boxes, etc) as required by Federal, State or local laws, ordinances, regulations and safety requirements. Support the sides of excavation, to prevent any movement which could in any way reduce the width of the excavation below that necessary for proper construction and protect adjacent structures from undermining, settlement or other damage. Take care to prevent the formation of voids outside of sheeting. If voids occur behind sheeting, immediately backfill and compact the voids with common fill material. Voids in locations that cannot be properly compacted upon backfilling shall be filled with lean concrete.

2. Install excavation supports outside the neat lines of foundations. Supports shall be plumb and securely braced and tied in position. Excavation support shall be adequate to withstand all pressures to which the supports will be subjected. Any movement or bulging of supports shall be corrected to provide the necessary clearances, dimensions and structural integrity.

3. Excavation Supports Left in Place

a. Excavation supports that are required to remain in place, if applicable, are indicated on the Drawings.

b. The Owner or Engineer may direct that certain excavation supports remain in place, or be cut off at any specific elevation. Supports directed by the Owner or Engineer to be left in place and not so designated on the Drawings or otherwise specified herein to remain in place, will be paid for in accordance with Terms and Conditions of the Contract. If the Contractor believes that such a directive increases Contractor's cost and would thereby entitle Contractor to a change in contract cost, Contractor shall notify the Engineer in accordance with the applicable article(s) in the Terms and Conditions of the Contract pertaining to changes in the work.

c. The right of the Owner or Engineer to direct that certain excavation supports remain in place shall not be construed as creating any obligation on the Owner or Engineer to give such direction, nor shall failure to give such direction relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient excavation supports to prevent any movement of the ground or damage to adjacent structures.

4. Excavation supports shall be carefully removed in such manner so as not to endanger the Work or other adjacent structures, utilities, or property. All voids left or caused by withdrawal of supports shall be immediately filled with sand and compacted.

C. Pumping and Drainage:

1. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory undisturbed suborder foundation condition until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels. The Contractor shall engage a Geotechnical Professional Engineer registered in the State of Georgia, to design the temporary dewatering systems for all structures in accordance with Division 2 Section 02140 Dewatering. The dewatering system installed shall be in conformity with the overall construction plan, and certification of this shall be provided by the Geotechnical Professional Engineer. The Contractor shall be required to monitor the performance of the dewatering systems during the progress of the work and require such modifications as may be required to assure that the systems are performing satisfactorily.

2. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the suborder soils at proposed bottom of excavation and to preserve the integrity of adjacent structures. Well or sump installation shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.

3. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.

4. The Contractor shall take all additional precautions to prevent uplift of any structure during construction.

5. The conveying of water in open ditches or trenches will not be allowed. Permission to use any storm sewers, or drains, for water disposal purposes shall be obtained from the authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the Contractor. However, the Contractor shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and he shall leave the facilities unrestricted and as clean as originally found. Any damage to facilities shall be repaired

or restored as directed by the authority having jurisdiction, at no cost to the Owner.

6. Flotation shall be prevented by the Contractor by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages which may result from failure of this system.

7. Removal of dewatering equipment shall be accomplished after the system is no longer required; the material and equipment constituting the system shall be removed by the Contractor.

8. The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. in order to prevent adverse effects on groundwater quality.

D. Trench Safety Practices:

1. The Contractor shall comply with the Federal Department of Labor, Bureau of Labor Standards, 29 CFR, 1926.650 Subpart P. All trench work shall be in compliance with requirements of the State of Georgia.

2. The Contractor shall submit written assurance with the associated cost that the trench excavator shall comply with all applicable trench safety standards.

1.05 SUBMITTALS

A. The Contractor shall submit sieve analysis for all soils and Testing Laboratory data in accordance with Special Conditions and City of Savannah Standards for Water and Sewer Design and Construction.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:

1. All fill and backfill material shall be subject to the approval of the Engineer.

2. All fill and backfill material shall be free of organic material, trash, or other objectionable material. Excess or unsuitable material shall be removed from the job site by the Contractor.

B. Common Fill Material: Common fill shall be sand and shall not contain stones, rock, concrete or other rubble larger than 2 inches in diameter. It shall have physical properties which allow it to be easily spread and compacted.

C. Structural Fill: Structural fill shall be reasonably well graded sand to gravelly sand having the following gradation:

U.S. Sieve Size	Percent Passing by Weight
1/2	100
3/8	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 50	0-5

To minimize capillary rise under the slabs on grade, the upper one (1) foot of soil in building pad areas shall consist of soils classified SP per ASTM D-2487 and shall have less than 2 percent passing the No. 200 sieve.

D. Select Fill material shall meet the following soil and gravel classifications as covered in ASTM D2321 and restated below:

1. Class I Soils*: Manufactured angular, granular material, 1/4 to 1-1/2 inches (6 to 4 mm) size, including materials having significance such as crushed stone or rock, broken coral, crushed slag, cinders, or crushed shells. Sieve analysis for crushed stone is given below separately.

   a. Crushed Stone: Crushed stone shall consist of clean mineral aggregate free from clay, loam or organic matter, conforming with ASTM C-33 stone size No. 89 and with particle size limits as follows:

U.S. Sieve Size	Percent Passing by Weight
1/2	100
3/8	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 50	0-5

2. Class II - Coarse sands and gravels with maximum particle size of one and one half (1-1/2") inch, including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW, and SP (Unified Soil Classification System) are included in this class. In accordance with ASTM D-2487, less than 5 percent pass No. 200 sieve.

   a. GW: Well-graded gravels and gravel-sand mixtures, little or no fines. 50 percent or more retained on No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.

   b. GP: Poorly graded gravels and gravel-sand mixtures, little or no fines. 50 percent or more retained on No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.

   c. SW: Well-graded sands and gravelly sands, little or no fines. More than 50 percent passes No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.

d. SP: Poorly graded sands and gravelly sands, little or no fines. More than 50 percent passes No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.

E. Coarse Sand: Sand shall consist of clean mineral aggregate with particle size limits as follows:

U.S. Sieve Size	Percent Passing by Weight
3/8 inch	100
No. 10	85-100
No. 40	20-40
No. 200	0-12

F. Other Material: All other material, not specifically described, but required for proper completion of the work shall be selected by the Contractor and approved by the Engineer.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clearing:

1. The site shall be cleared in accordance with Division 2 Section 02110 Site Clearing.

2. The construction areas shall be cleared of all obstructions and vegetation including large roots and undergrowth, within 10 feet of the lines of the excavation.

3. Strip and stockpile topsoil on the site at the location to be determined by the Engineer.

3.02 EXCAVATION

A. General: Excavations for roadways, structures and utilities must be carefully executed in order to avoid interruption of any existing utilities and to minimize disruption of traffic flows.

B. Excavating for Roadways/Structures/Utilities:

1. Excavation shall be made to such dimensions as will give suitable room for building the foundations and the structures, for bracing and supporting, for pumping and draining, and for all other work required.

a. Excavation for precast or prefabricated structures shall be carried to an elevation 2 feet lower than the proposed outside bottom of the structure to provide space for the selected backfill material. Prior to

placing the selected backfill the excavation shall be sounded, if not dewatered, using a rigid pole to indicate to the satisfaction of the Owner that excavation has been carried to the proper depth and is reasonably uniform over the area to be occupied by the structure.

b. Excavation for structures constructed or cast in place in dewatered excavations shall be carried down to the bottom of the structure where dewatering methods are such that a dry excavation bottom is exposed and the naturally occurring material at this elevation leveled and left ready to receive construction. Material disturbed below the foundation elevation in dewatered excavation shall be replaced with 3000 psi concrete.

c. Footings: Cast-in-place concrete footing sides shall be formed immediately after excavation. Forming for footing sides is specified elsewhere.

2. Immediately document the location, elevation, size, material type and function of all new subsurface installations, and utilities encountered during the course of construction.

3. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the Drawings and should anticipate the encounter of unknown obstructions during the course of work.

4. Encounters with subsurface obstructions shall be hand excavated.

5. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of suborder soils. Suborder soils which become soft, loose, "quick" or otherwise unsatisfactory for support of structures as a result of inadequate dewatering or other construction methods, shall be removed and replaced by crushed stone as required by the Engineer at the Contractor's expense.

6. The bottom of excavations shall be rendered firm and dry before placing any structure. Excavated material not suitable for backfill shall be removed from the site and disposed of by the Contractor.

7. All pavements shall be cut prior to removal, with saws and approved power tools.

8. Excavated material shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered.

9. All locations and elevations as required herein must be permanently documented by the Contractor, on the As-Built Drawings prior to the Engineer approval of the Application for Payment for that work.

3.03 DRAINAGE

A. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations and keep such excavations dry so as to obtain a satisfactory

undisturbed suborder foundation condition. The dewatering method used shall prevent disturbance of earth below grade.

B. All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work, without damage to surrounding property, and in accordance with pertinent rules and regulations.

C. No construction, including pipe laying, shall be allowed in water. No water shall be allowed to contact masonry or concrete within 24 hours after being placed. The Contractor shall constantly guard against damage due to water and take full responsibility for all damage resulting from his failure to do so.

D. The Contractor will be required at his expense to excavate below grade and refill with approved fill material if the Owner determines that adequate drainage has not been provided.

3.04 UNDERCUT

A. If the bottom of any excavation is below that shown on the Drawings or specified because of Contractor error, convenience, or unsuitable suborder due to the Contractor's excavating method, he shall refill to normal grade with structural fill at his own cost. Fill material and compaction method shall be as directed by the Engineer.

3.05 FILL AND COMPACTION

A. Compact and backfill excavations according to the following schedule. (Proctor Standard shall be ASTM D-698, Modified Proctor Standard shall be ASTM D-1557):

B. STRUCTURES AND ROADWORK

Area	Material	Compaction
Backfill beneath Structures (footings and/or slab Excavations)	Structural Fill	6 inch lifts, compacted backfill beneath to 98 percent by Modified Proctor Method Maximum density. Fill should not be placed over any in-place soils until those deposits have been compacted to 98 percent Modified Proctor maximum density.
Backfill beneath Roadways, Parking, and Service Drives *	Structural Fill	12 inch lifts, compacted backfill beneath to 100 percent by Standard Proctor Method Maximum density.

		Fill should not be placed over any in-place soils until those deposits have been compacted to 100 percent Standard Proctor maximum density.

*The upper one (1) foot of soils supporting slabs on grade or sidewalks should be compacted to 100 percent maximum dry density.

Utility Trenches	Select Fill/ Structural Fill (beneath Roadways)	6-inch lifts (to 1 ft above pipe), compacted backfill beneath to 98 Percent by Modified Proctor Method Maximum density. Fill should not be placed over any in-place soils until those deposits have been compacted as indicated.
Around structures	Select Fill	6-inch lifts, 95 percent of Modified Proctor maximum density by Proctor Method. Use light rubber-tired or vibratory plate compactors.
Non-structural Areas	Common Fill	12-inch lifts, 90 percent of Modified Proctor Method

B. Pipe shall be laid in open trenches unless otherwise indicated on the Drawings or elsewhere in the Contract Documents.

C. Excavations shall be backfilled to the original grade or as indicated on the Drawings. Deviation from this grade because of settling shall be corrected. Backfill operation shall be performed to comply with all rules and regulations and in such a manner that it does not create a nuisance or safety hazard.

D. Embankments shall be constructed true to lines, grades and cross sections shown on the Drawings or ordered by the Owner and Engineer. Embankments shall be placed in successive layers of not more than 12 inches in thickness, loose measure, for the full width of the embankment. As far as practical, traffic over the work during the construction phase shall bc distributed so as to cover the maximum surface

area of each layer.

E. If the Contractor requests approval to backfill material utilizing lifts and/or methods other than those specified here, such request shall be in writing to the Engineer. Approval will be considered only after the Contractor has performed tests, at the Contractor's expense, to identify the material used and density achieved throughout the backfill area utilizing the method of backfill requested. The Owner's approval will be in writing.

END OF SECTION

INDEX TO

SECTION 00 23 10 – JACK AND BORE

SECTION 00 23 10

JACK AND BORE

PART 1 – GENERAL

1.1 SECTION DESCRIPTION

A. This section includes materials, performance and installation standards, and Contractor responsibilities associated with the furnishing of all labor, materials, equipment and incidentals required to install, complete required boring and jacking installations, or other trenchless methods for pipelines, as shown on the Drawings and as specified herein.

B. The provision of this section shall be the minimum standards for the installation of casing pipe by the boring and jacking method. Other types of trenchless methods may be acceptable and encouraged if the specific method is at least equal to the performance of typical jack and bores and is comparable in cost.

C. Payment for Jack & Bore will be made under the lump sum price for miscellaneous piping and fittings. Payment will include excavation, dewatering, backfilling, compaction, testing, and all equipment, labor and materials necessary to complete the work.

PART 2 – PRODUCTS

2.1 CASING PIPE MATERIALS AND INSTALLATION

A. Casing shall be steel pipe conforming to the requirements of ASTM Designation A–139. The minimum casing pipe size and wall thickness shall be as shown herein. For sizes not included, or for special design considerations, approval shall be obtained from the Engineer of Record.

B. For crossing of state roads, casing materials and installation shall conform to GADOT or SCDOT Standards, latest edition, or as minimum shall comply with the following table:

Minimum Steel Pipe Casing Dimensions
for
D.I.P

Carrier Pipe	Steel Casing Pipe Size		Highway & DOT Bores < 200 L.F.		Highway & DOT Bores > 200 L.F.		Railroad Bores		
I.D. (Nom.)	Pressure System	Gravity System	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in) Pressure	Minimum Wall Thickness (in) Gravity	Weight Class
4	12	16	0.375	STD	0.500	XS	0.500	0.500	XS
6	16	20	0.375	STD	0.500	XS	0.500	0.500	XS
8	18	24	0.375	STD	0.500	XS	0.500	0.500	XS
10	20	24	0.375	STD	0.500	XS	0.500	0.500	XS
12	24	30	0.375	STD	0.500	XS	0.500	0.500	XS
16	30	36	0.375	STD	0.500	XS	0.500	0.532	XS
18	36	48	0.375	STD	0.500	XS	0.532	0.688	XS
24	38	48	0.375	STD	0.500	XS	0.532	0.688	XS
30	48	54	0.375	STD	0.500	XS	0.688	0.781	XS
36	54	60	0.375	STD	0.500	XS	0.781	0.844	XS

Minimum Steel Pipe Casing Dimensions
for
Fusible
PVC

Carrier Pipe	Steel Casing Pipe Size		Highway & DOT Bores < 200 L.F.		Highway & DOT Bores > 200 L.F.		Railroad Bores		
I.D. (Nom.)	Pressure System	Gravity System	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in) Pressure	Minimum Wall Thickness (in) Gravity	Weight Class
4	**8**	16	0.375	STD	0.500	XS	0.500	0.500	XS
6	**10**	20	0.375	STD	0.500	XS	0.500	0.500	XS
8	**12**	24	0.375	STD	0.500	XS	0.500	0.500	XS
10	**16**	24	0.375	STD	0.500	XS	0.500	0.500	XS
12	**16**	30	0.375	STD	0.500	XS	0.500	0.500	XS
16	**20**	36	0.375	STD	0.500	XS	0.500	0.532	XS
18	**24**	48	0.375	STD	0.500	XS	0.532	0.688	XS
24	**30**	48	0.375	STD	0.500	XS	0.532	0.688	XS
30	**36**	54	0.375	STD	0.500	XS	0.688	0.781	XS
36	**42**	60	0.375	STD	0.500	XS	0.781	0.844	XS

2.2 CARRIER PIPES

A. Wastewater and water carrier pipes to be installed within the specified casings shall be equipped with restrained joint connections. Pipe and fittings shall comply with the applicable provisions of these Standards, with minimum Ductile Iron Pipe Class 51.

2.3 CASING INSULATORS

A. Non–corrosive casing insulators shall be used. The casing runner height shall be large enough so that it does not interfere with the pipe–restrained joints. Stainless steel nuts and bolts shall be used. Installation and spacing of casing insulators shall be as required by the manufacturer.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Casing pipes crossing under roadways/railroads shall be located at suitable approved alignments in order to eliminate possible conflict with existing or future utilities and structures, with a minimum 36–inch depth of cover between the top of the casing pipe and the surface of the roadway. For casing pipe crossings under roadways/railroads, the Contractor shall comply with the regulations of said authority in regard to design, specifications, and construction. Casing installations shall be as specified in the State of Georgia or South Carolina Department of Transportation, "Utility Accommodation Guide", and for railroads the American Railway Engineering Association.

B. The boring and jacking operations shall be done simultaneously, with continuous installation, until the casing pipe is in final position. Correct line and grade shall be carefully maintained. Add–on sections of casing pipe shall be full–ring welded to the preceding length, developing watertight total pipe strength joints. The casing installation shall produce no upheaval, settlement, cracking, movement, or distortion of the existing roadbed or other facilities. Following placement of the carrier pipe within the steel casing, end link seals are to be installed at each open end. Said end link seals shall be suitable for restraining the external earth load, while allowing internal drainage.

C. Casing pipe holes shall be mechanically bored through the soil by a cutting head on a continuous auger mounted inside the pipe. The distance between the leading end of the first auger section and the leading end of the casing shall be as necessary to maintain a solid plug of spoil material inside the forward portion of the casing.

D. The casing pipe shall be adequately protected to prevent crushing or other damage under jacking pressures. Backstops shall be provided for adequately distributing the jack thrust without causing deformation of the soil or other damage. Should the casing pipe be damaged, such damaged portion not in the hole shall be replaced; however, if installed, the encasement pipe shall be abandoned in place, grouted full, and suitably plugged, and an alternate installation made. An alternate installation will also be required if the casing alignment or elevation substantially deviates from the plan locations, and results in the installation being unusable, as determined by the Project Engineer.

E. Required boring and jacking pits or shafts shall be excavated and maintained to the minimum dimensions necessary to perform the operation. Said excavations shall be adequately barricaded, sheeted, braced and dewatered as required, in accordance with the applicable portions of Section 02204, "Earthwork" and the above–stated regulations/specifications. Boring and jacking pits will normally be no closer than five (5) feet from the edge of pavement, with the permitting agency having final determination of the required setback distance.

END OF SECTION

INDEX TO

SECTION 00 25 50 - WATER DISTRIBUTION SYSTEM

SECTION 00 25 50

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 pipes shall be cement lined in accordance with ANSI/AWWA C104/A21.4 latest revision.

B. P.V.C. Pipe - All P.V.C. pipe shall bear the seal of the National Sanitation Foundation. All waterline pipes shall be 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, and shall be DR-18 with a minimum pressure rating of 150 psi.

   Pipe larger than 12-inches shall conform to all requirements of ANSI/AWWA C905, latest revision, and shall be DR-18 with a minimum pressure rating of 150 psi.

C. Tubing - Tubing shall conform to the following:

   1. Polyethylene – 1-inch 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 – One (1) inch and two (2) inch 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.

3. All water service tubing two (2) inches 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. Fluorinated Hydrocarbon Gaskets - Fluorinated hydrocarbon gaskets for ductile iron pipe 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.

E. Plastic Pipe

1. Joints in plastic pipe four (4) inches and larger shall meet all requirements of ANSI/AWWA C900/C905 latest revision. The integral bell joint system (push-on joints) shall meet the requirements of ASTM D-3139 and utilize an elastomeric seal conforming to ASTM F-477.

2. Joints in one (1) inch and two (2) inch plastic tubing shall conform to ASTM D3139 latest revision. Solvent joints shall not be used. Compression joints with no lead brass are acceptable only for one (1) inch and two (2) inch pipes.

3. Butt-fused joints for FPVC pipe are acceptable when performed in accordance with manufacturers' guidelines.

F. 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° and shall be able to take up 3° of deflection after burial.

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 plastic tubing - Shall be low lead brass, 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:	1,200 psi minimum
Elongation:	300 percent minimum
Dielectric Strength:	800V/mil thickness minimum
Thickness:	Nominal thickness of 0.008 inch (8 mil)

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 three (3) inch width and a minimum tensile strength of 2,800 psi. A continuous warning message repeated every 16 to 36-inches 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-inches above the pipe on all water mains

1.06 TRACER WIRE AND CONNECTORS

A. Tracer Wire

Tracer wire shall be installed on all water mains and service laterals from the main to the meter, with direct burial connectors, and provide continuous electrified conductivity. Area markers shall be at least every 500 feet with tracer wire attached, unless a manhole or fire hydrant is available. A six (6) foot lead attached to the inside of the ring and cover shall be provided at manholes. On laterals, the tracer wire shall terminate inside the meter box.

1. Tracer wire shall be copper clad steel with high-density, high molecular weight polyethylene (HDPE) insulation, and rated for direct burial use at 30 volts. Conductor must meet 21% conductivity for locate ability purposes. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities.

2. Tracer wire for direct burial shall be a #12 AWG HS-CCS high-strength copper clad steel conductor (HS-CCS), insulated with a 30 mil, HDPE insulation. Minimum break load shall be 380 lbs. Wire must be installed in the 3 o'clock position during installation. Tracer wire shall be Boar Tough High Strength CCS PE30 UL by Agave Wire Ltd or Copperhead HS-CCS HDPE 30 MIL or Pre-Approved Equal.

3. Tracer wire for directional drilling/boring shall be #12 AWG extra-high-strength copper clad steel conductor (EHS-CCS), insulated with a 45 mil, HDPE insulation. Minimum break load shall be 1,150 lbs. Tracer wire shall be Boar Tough Extra High Strength by Agave Wire Ltd, Copperhead EHS-CCS HDPE 45 MIL or Pre-Approved Equal.

B. Connectors

1. Wire connectors shall be UL 486D listed, one-piece direct bury twist-on type, UL designation MDB, sealed wire connectors. Max voltage shall be 600 Volts. Connectors shall be rated to 105° C and sized to accommodate a minimum of four (4) #12 copper / steel core tracer wires. Silicone sealant shall be rated for temperatures from -45° F to 400° F. Connector shall be DryConn King 6 Blue by King Innovation, or pre-approved equal.

2. Spliced connectors shall be direct bury design, with a maximum voltage of 50-volts. Spliced connectors shall have a tin plated high conductivity aluminum lug, zinc-plated steel screws, high-impact polypropylene housing, and a non-hardening viscous dielectric silicone sealant. Silicone sealant shall be rated for temperatures from -45° F to 400° F. Spliced connector shall be DryConn Direct Bury Lug Aqua, or pre-approved equal.

C. Area Markers - Utility marker posts equal to Rhino TriView Plus Test Station shall be installed every 500-foot along water mains. Posts shall be marked as "Water Pipeline".

1.07 CASING AND CASING SPACERS

A. Casing pipe shall be steel conforming to ASTM A139, latest revision, minimum yield point of 35,000 psi, and of the diameter and thickness shown on the contract drawings at each crossing. The pipe ends shall be tapered where welding is required. Full pipe lengths shall be provided. No pipe casing lengths less than eight (8) feet shall be allowed unless approved by the Owner. All casing welds shall be continuous and made by a certified welder.

For casing pipe crossings under roadways/railroads, the Contractor shall comply with the regulations of said authority in regard to design, specifications, and construction. State highway casing installations shall be as specified in the GDOT, "Utility Accommodation Manual," and for railroads, the American Railway Engineering and Maintenance-of-Way Association (AREMA) manual for Railway Engineering, Chapter 1,

Part 5, Section 5.3, "Specifications for Pipelines Conveying Non-Flammable Substances," shall be applicable.

Where allowed by the affected utility owner(s), fusible PVC casing may be used with fusible PVC carrier pipe. The design engineer shall calculate the appropriate piping dimension ratio (DR) for fusible PVC casing considering earth, live, and groundwater, service loads and pullback forces.

Use of PVC casing shall require the use of rubber boots for end seals. End seals shall be neoprene with 304 SS banding clamps as manufactured by Cascade CCES, or approved equal. End seals shall be installed per manufacturer's recommendations, to include casing spacer spacing to provide adequate reinforcement at end of casing pipe.

All carrier pipes shall be restrained joint ductile iron or fusible PVC.

B. 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. Installation and spacing of casing spacers shall be as required by the manufacturer. Casing spacers shall be as manufactured by Cascade Waterworks Manufacturing Company, or approved equal.

   Casing spacers for fusible PVC carrier pipe should be of a projection type that has a minimum number of projections around the circumference that total the number of diameter inches. For example: 8" pipe should have a minimum of 8 projections and 18" pipe should have a minimum of 18 projections. Spacing between spacer rings (span) should be calculated based on the actual installed load (weight of pipe filled with liquid) but should not exceed 10 feet. Refer to the manufacturer's tables for the load carrying capacity of each type of spacer used. Casing spacers should be projection type – non metallic spacers constructed of preformed sections of high-density polyethylene. Spacers should be ISO 9001:2000 certified for strength and quality. Casing spacers should be installed using double backed tape provided with the spacers in order to fasten them tightly to the carrier pipe. Casing spacers for fusible PVC carrier pipe shall be as manufactured by Raci North America, or approved equal.

1.08 VALVE MANHOLES

A. Manholes shall be precast concrete, unless authorized by the Water Department. Manhole diameter shall be large enough to allow an eighteen (18) inch clearance between any bolts necessary for valve / actuator removal or in-situ maintenance or repair, and the manhole inner wall.

B. 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.

1. 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 three (3) inches between the reinforcing and the ground.

2. 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.

3. 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.

C. Precast concrete manholes with four (4) feet internal diameter shall be used for lines 8" in diameter or less and have a minimum wall thickness of five (5) inches. Precast concrete manholes with six (6) feet internal diameter shall be used for lines 10" in diameter or more and have a minimum wall thickness of seven (7) 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. Top slabs shall be six (6) inches thick and be reinforced with No. 6 rebar at 6" O.C.E.W. Bottom slabs shall be six (6) 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 (6) inches of any joint on structures.

It shall be the responsibility of the Contractor to ensure 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 a design with greater strength.

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.

D. Ring and Cover - Manhole ring and cover shall be gray cast iron per ASTM A48, Class 35B without perforations and suitable for addition of cast iron or steel rings for upward adjustment of top. The words "CITY OF SAVANNAH WATER GEORGIA" shall be cast into the face of the cover in 1.5-inch to 2-inch letters raised flush with the top of the cover. Ring and cover shall have machine ground seats and be an approved equal to model V1327-1 RG V1327GS EPIC SAVANNAH SN as manufactured by E.J. All manhole rings and covers shall be made water resistant by means of dovetail grooves and gaskets in the cover. Provide circular cover with two (2) pick slots for removing cover spaced at 180° and weighing not less than 138 pounds. No stacking lugs shall be allowed.

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 M306-10, Section 6, 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.

E. Manhole Steps – Manhole steps shall be provided at 16-inches O.C. for manholes greater than five (5) feet deep. Steps shall have impact resistant co-polymer

polypropylene plastic molded around ½" diameter, grade 60 reinforcing steel. Manhole steps shall be M.A. Industries PS1-PF reinforced plastic step complying with the requirements of ASTM C 478, or approved equal.

F. Final Grade - 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. Tops of manholes outside of roads, streets, and highways shall be flush with the finished ground surface unless otherwise shown on the plans. Manholes shall not be located in areas where ponding or the collection of surface water may occur.

1.09 GATE VALVES

A. Valves shall conform to the latest revision of AWWA Standard C515 covering resilient seated gate valves for water supply service. Valves shall be as manufactured by the Clow Valve Company, or approved equal.

B. The valves shall have a ductile iron body, bonnet, and O-ring plate. The wedge shall be totally encapsulated with rubber.

C. The sealing rubber shall be permanently bonded to the wedge per ASTM D429.

D. Valves shall be supplied with O-ring seals at all pressure retaining joints.

E. The valves shall be non-rising stem, opening by turning left or right, and provided with 2" square operating nut with the word "Open" and an arrow to indicate the direction to open.

F. Stems shall be cast copper alloy with integral collars in full compliance with AWWA. All stems shall operate with copper alloy stem nuts independent of wedge and of stem. Stems shall have two O-rings located above thrust collar and one O-ring below. Stem O-rings shall be replaceable with valve fully opened and subjected to full pressure. The stems on 4" – 20" shall also have two low torque thrust bearings located above and below the stem collar to reduce friction during operation.

G. Waterway shall be smooth, unobstructed and free of all pockets, cavities and depressions in the seat area. Valves 4" and larger shall accept a full size tapping cutter.

H. The body, bonnet and O-ring plate shall be fusion-bond epoxy coated, both interior and exterior on body and bonnet. Epoxy shall be applied in accordance with AWWA C550 and be NSF 61 Certified.

I. Bolts, studs, and nuts shall be made of 304 stainless-steel. Stainless steel bolts and studs shall not be used on stainless nuts unless the threads are coated with an anti-seize compound.

J. Each valve shall have maker's name, pressure rating, and year in which it was manufactured cast in the body. Prior to shipment from the factory, each valve shall be tested by hydrostatic pressure equal to the requirements of AWWA C515 (and UL/FM where applicable). Gate valves shall be installed in a manhole per Details W-25A, B, C, or D.

1.10 BUTTERFLY VALVES

A. All butterfly valves shall be of the rubber-seated, tight-closing type. They shall meet or exceed AWWA standard C504, latest edition, Class 150. Butterfly valves shall not be used on pipe smaller than 14-inches unless, otherwise specified, and shall be installed in a manhole per Detail W-26. All valves shall be M&H 4500/1450 butterfly valves, or approved equal.

B. Both ends shall be flanged per ANSI B16.1 (or as otherwise noted on plans and specs).

C. Valve shafts shall be ASTM A276 Type 304 stainless steel. Valve shafts shall have a minimum diameter extending through the valve bearings and into the valve disc as specified in AWWA C504. All valve shafts must meet or exceed the minimum connection torque requirement set forth in AWWA C504.

D. Valve body and vane shall be high-strength cast iron to ASTM A126, Class B or high-strength ductile iron to ASTM A536 with ASTM A276 Type 304 stainless steel body seats. For valves 18" and larger, valve body and vane shall be of high-strength ductile iron to ASTM A536, Grade 70-50-05 with ASTM A276 Type 304 stainless steel body seat.

E. Rubber valve seats shall be a full-circle 360 degree, seat not penetrated by the valve shaft. Valve seat shall be EPDM for cold or high water temperature applications. The valve seat will be attached to the valve vane by 18-8 Type 304 stainless steel self-locking fasteners. The valve seat must be easily field adjustable and replaceable without any special tools or lengthy curing time.

F. Valve shaft seals shall be of the O-ring type and utilize the same elastomer as specified for the valve seats and for the intended service. All valve shaft seals must be easily field replaceable.

G. Valve actuator shall be of the traveling nut type, sealed and lubricated for underground or in-plant service. Operator shall be capable of withstanding an overload input torque of 450 ft-lbs. at full-open or full-closed position without damage to the valve operator. Operators must have a 304 stainless steel external stop limiting device and travel adjustment. The travel adjustments must be able to be operated without removing the valve from the line or removing the actuator cover. All valve actuators must be sized per AWWA C504. Certification of proof of design and torque requirements shall be submitted to the owner upon request.

H. The valve interior and exterior surfaces shall be coated in accordance with the latest revisions of AWWA C504 and must be NSF 61 Certified.

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.

1.12 TAPPING SLEEVES

Tapping Sleeves shall be compact ductile iron mechanical joint type conforming to ANSI/AWWA C153/A21.53 for fittings four (4) inches to 16-inches or ANSI/AWWA C110/A21.10 for fittings larger than 16-inches, latest revision. All tapping sleeves and valves shall be pressure tested prior to tapping. The tapping sleeve shall include the necessary pressure test port.

1.13 AIR RELEASE VALVE

A. General:

Air Release Valves (ARV's) shall be provided as required by the Engineer, who shall specify ARV type (or function), size, and location. The ARV's specified below are one-inch air release valves suitable for most water main applications and larger combination air and vacuum release valves suitable for water transmission mains.

The specification of these two (2) valves below does not relieve the Engineer of the responsibility to select and locate ARV's for proper main operation and long-term durability. ARV selection shall be in accordance with AWWA Manual of Water Supply

Practices M51 - Air-Release, Air/Vacuum & Combination Air Valves, the manufacturer's published information, and the Engineer's experience.

The manhole and installation of the one-inch air release valve shall be in accordance with the City of Savannah Standard Construction Detail W40. Prior to deciding on the location of any air release valve, the Contractor shall provide the Engineer with an accurate profile of the installed mains so that high points in the system can be determined. The locations of the valves shall be field adjusted based on the locations of the high points.

B. Small (1") Air Release Valves for Water Mains

Air release valves shall be designed to vent small amounts of air from the system while it is pressurized.

1. The valve(s) shall operate through a compound lever system and shall have a 1/4-inch orifice with valve sealing faces of an adjustable Buna-N rubber valve and PVC seat. It shall operate at 150 PSIG, and be capable of passing 98 SCFM of air.

3. The valve(s) shall be one-inch NPT screwed inlet connection and shall have a cast iron body and top, a stainless steel float and trim. Valves which use a needle to seal the orifice will not be acceptable.

4. The body and cover shall be cast iron conforming to ASTM 126, Class B and have a maximum operating pressure of 300 psi.

5. The valve(s) shall be Crispin Model PL10 Pressure Air Valve(s), Type N, as manufactured by Crispin-Multiplex Manufacturing Co., Berwick, PA.

6. A turn-down, or snorkel, shall be provided to prevent dirt and other debris from falling into the orifice while allowing the free discharge of air or water.

7. When submergence of the air release valve is possible, a Vacuum Check Valve shall be supplied on the outlet to eliminate the possibility of water (or air) from entering the system when the pressure decreases, or if a vacuum is drawn.

8. Corporation stops for air release valves shall be 1" Brass or Bronze with one (1) inch inlet and one (1) inch outlet outside iron pipe threads equivalent to Mueller Model #H-10013.

9. Tapping saddles for combination air release valves shall be equivalent to Smith-Blair No. 313-015.

C. Large (4") Combination Air Valves for Water Transmission Mains

Combination Air Valves shall be automatic float operated valves designed to exhaust large quantities of air during the filling of a piping system and close upon liquid entry. The valve shall open during draining or if a negative pressure occurs. The valve shall also release accumulated air from a piping system while the system is in operation and under pressure.

Valves shall be manufactured and tested in accordance with American Water Works Association (AWWA) Standard C512 and shall be certified to NSF/ANSI 61.

1. Connections - Air valves shall have full size NPT inlets and outlets equal to the nominal valve size. The valve shall have two additional NPT connections for the connection to gauges, testing, and draining.

2. Design - Valve shall provide a through flow area equal to the nominal size. Floats shall be unconditionally guaranteed against failure including pressure surges. The cover shall be bolted to the body and sealed with a flat gasket. A resilient bumper shall be provided to cushion the float during sudden opening conditions. The resilient seat shall be replaceable and provide drop tight shut off to the full valve pressure rating.

   Single body combination valves shall have an expanded outlet to provide full flow area around the guide mechanism. The valve shall have a double guided plug and an adjustable threaded orifice button. The plug shall be protected against direct water impact by an internal baffle. The plug shall have a precision orifice drilled through the center stem. A protective hood shall be provided to prevent debris from entering the valve.

   All air (Release, Vacuum, etc) valves installed in vaults or flood prone locations (where submergence of the valve is possible) shall include an inflow preventer to prevent the introduction of contaminated water through the air valve outlet. The inflow preventer shall allow the admittance and exhausting of air while preventing contaminated water from entering during normal operating conditions. The inflow preventer shall be flow tested by an independent third party testing lab, approved by the American Society of Sanitary Engineers, to certify performance.

3. Materials - The valve body and cover shall be constructed of ASTM A126 Class B cast iron. All wetted or internal parts shall be constructed of Type 316 stainless steel. Non-metallic floats, linkage, or bushings are not acceptable. Resilient seats shall be Buna-N.

4. Manufacture - Combination Air Release Valves shall be Series 204C.2 as manufactured by Val-Matic Valve and Manufacturing Corporation, Elmhurst, Il, USA or approved equal.

1.14 SMALL BALL VALVE

Ball Valves two (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 no lead brass in accordance with AWWA C800 and ASTM B62 latest revision. The ball shall be fluorocarbon coated 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.

1.15 VALVE BOXES

Valve Boxes - Underground two (2) inch 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 1500 psi. The top section shall be the screw type, adjustable for elevation. When installed in paved areas or sidewalks, the top shall be set flush into the pavement or sidewalk. When installed in unpaved areas, a pre-cast concrete collar edge shall be set flush at finished grade level. Valve boxes and collars shall conform to the detail shown.

1.16 POST TYPE FIRE HYDRANTS

Post Type Fire Hydrants shall be equivalent to Mueller 2-1/8-inch Post Type Fire Hydrant, have one way main valve opening and one 2½-inch hose nozzle. All internal and external parts shall conform to Section 1.17 Fire Hydrants.

1.17 FIRE HYDRANTS

A. General - Hydrants shall be manufacturer's current model design and construction. All units are 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-inch 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 approximate bury of 3½-foot 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 one (1) foot 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 cap nut or stop nut at the end of the main valve stem. Operating nut shall be bronze, 1¼-inches, 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 six (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.

1.18 CORPORATION STOPS

Corporation stops shall be no lead brass 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 or Ford.

1.19 CURB STOPS

Curb stops shall be a one (1) inch no lead 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 or Mueller or equal. Valves shall be full part, packed joint with one (1) inch diameter locking grip compression connection on the inlet side and one (1) inch diameter female iron pipe thread connection on the meter side.

1.20 TAPPING SADDLES

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

1.21 PERMANENT SAMPLING STATION

Sampling Stations shall be 36-inch minimum bury, with a 3/4-inch FIP Inlet and a 3/4-inch 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 piping shall be galvanized. The sampling station shall be Kupferle "Eclipse No. 88", or approved equal.

1.22 STANDARD METER BOX

A. Meter boxes for all 5/8", 1", and 1-1/2" water meters will be provided by the City of Savannah Water Distribution Department upon purchase of the meter.

B. For 2" water meter installations, please refer to the City of Savannah Standard Construction Detail W-5A.

C. For 3" and larger water meter installations, please refer to the City of Savannah Standard Construction Detail W-5B.

1.23 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 bolts shall be Corten or ductile iron, high strength, low alloy steel per ANSI/AWWA A21.11/C111. An asphaltic coating with a thickness of one (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.

1.24 BLOW-OFF HYDRANTS

All blow-off hydrants shall be manufactured to fit in a standard 5¼" valve box and shall include a two (2) inch coupling riser and a self draining valve with a two (2) inch FIP inlet connection. The operating screw shall fit a standard 3/4" 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 TF500 Blow Off Hydrant by The Kupferle Foundry Company of St. Louis, Missouri.

1.25 BACKFLOW PREVENTION DEVICES

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

1.26 BEDDING AND BACKFILL

A. Classification of Materials – ASTM D-2321 classifies soils using the Unified Soils Classification System (ASTM D-2487). For the purpose of this specification, soils to be used as backfill material are grouped into five classes according to soil properties and characteristics.

1. Class I - Angular, 1/4 to 1-1/2 inch graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, crushed gravel, and crushed shells.

2. Class II - Coarse sands and gravels with maximum practical size of 1-1/2 inch, including variously graded sands and gravels containing small percentages of fines,

generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class.

3. Class III - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class. These materials are not to be used for bedding or haunching.

4. Class IV - Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH, and CL are included in this class. These materials are not to be used for bedding, haunching, or initial backfill.

5. Class V - This class includes the organic soil, OL, OH, PT as well as soils containing frozen earth, debris, rocks, larger than 1-1/2 inch in diameter, and other foreign materials. These materials are not to be used.

B. Stone Bedding - Stone used for foundation and bedding shall be shall be crushed stone or gravel conforming to ASTM C33, Size #57, with size range of ¼ to 1-inch, free from debris, roots, trash, stones, or other harmful substances.

C. Backfill – Whether imported borrow material or from on-site excavations, backfill shall be suitable Class II or Class III material. Backfill material shall be free from debris, roots, trash, stones, or other harmful substances. Suitable soils are those complying with ASTM-2487 soil classification groups GW, GP, GM, SW, SP, and SM, as defined in ASTM D2487.

1. Common Backfill

Common backfill shall consist of mineral soil, substantially free of clay, organic material, loam, wood, trash, and other objectionable material which may be compressible or which cannot be compacted properly. Common backfill shall not contain stones larger than 6 inches in any dimension, asphalt, broken concrete, masonry, rubble, or other similar materials.

The backfill shall have physical properties such that it can be readily spread and compacted during filling. Additionally, common backfill shall be no more than 12 percent by weight finer than the No. 200 mesh sieve unless finer material is approved for use in a specific location by the City.

Material falling within the above specifications, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion

of the Engineer, is not suitable for reuse on the site shall be removed and disposed of by the Contractor.

2. Select Backfill

   Select Backfill shall be as specified above for common backfill, except that the material shall contain no stones larger than 1-1/2 inches in largest dimension, and shall be no more than 5 percent by weight finer than the No. 200 mesh sieve.

3. Borrow Material

   Where it is determined that sufficient suitable material is not available from the site to satisfactorily backfill the pipe to at least two (2) feet above the top of the pipe, suitable borrow material meeting the requirements of this specification unless otherwise noted, shall be provided by the Contractor from other sources at Contractor's expense. All material from the excavation unsuitable for bedding, backfill, or other uses as directed by the Engineer and approved by the Owner, shall be removed and disposed of by the Contractor.

1.27 PRODUCT REVIEW

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 USE OF STANDARD CONSTRUCTION TECHNIQUES

A. Responsibility for Proper Construction - The standard construction techniques presented herein for bedding, backfill, and compaction are suitable in areas of favorable soils. However, the ENGINEER SHALL REMAIN RESPONSIBLE FOR CONDUCTING ON-SITE SOILS INVESTIGATIONS appropriate for the nature of the project at hand. The ENGINEER SHALL REMAIN FURTHER RESPONSIBLE for providing the procedures and details necessary for proper waterline installation throughout the entire project corridor.

B. Minimum Site Soils Investigation Requirements - All projects requiring the installation of any water or sanitary pipe other than service laterals shall require a minimum of one (1) soil boring every 300 linear feet along the proposed utility corridor. Borings shall be to a depth of two (2) feet deeper than the deepest proposed line within 150 feet. A

Geotechnical Report identifying the type(s) of soils found on the project site shall be provided with the construction plan submittal. The report shall include, at a minimum, boring logs, (types of soils encountered, e.g. - type GW, GP, SW, SP, etc., depths of soil types, observed groundwater, seasonal high groundwater, etc.), and any special requirements for pipe bedding, backfill, or compaction. The location of the boring(s) shall be clearly shown on the construction plans.

C. Use of Standard Procedures and Details - If site-specific procedures or details for bedding, backfill, compaction, and joint restraint are not provided in the contract documents and the Engineer includes only the standard City of Savannah specifications and details for pipe bedding and joint restraints, the ENGINEER IS ATTESTING THAT SOIL CONDITIONS ARE FAVORABLE, and that the STANDARD METHODS ARE ACCEPTABLE based on the soil conditions observed and the Engineer's experience.

2.02 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 UNI-B-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, locate request shall be called into Georgia 811, and 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 from the finished grade:

Pipe	Minimum Cover
Diameter ≤ 12-inches	36-inches
Diameter > 12-inches	48-inches
Laterals	36-inches under paved or traffic areas or 24-inches under non-paved, non-traffic areas

A maximum cover of 60-inches from finished grade shall be used unless approved by the City to avoid a conflict. If the depth of cover will be less than the minimum required, ductile 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 (i.e. OSHA), 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.

A four-inch layer of loose backfill shall be provided on the trench bottom to conform to and evenly support the pipe bottom. Material shall be Class II select backfill material (coarse clean sand), and shall remain un-compacted until placement of the pipe into the trench. In lieu of placing the four-inch loose backfill layer, and provided that the trench bottom will provide suitable pipe bedding material, the Contractor may loosen the bottom of the trench using an excavator bucket with four-inch teeth.

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 six (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. Push-on 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 - 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, Class II or better select backfill material (graded stone, gravel, or coarse

sands), 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 six (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 Class II or better select backfill material (coarse clean sands). 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 or lower pipe into the trench or ditch.

1. Examination of material - All pipe, fittings, valves, hydrants, and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Damaged or defective materials will not be accepted or installed.

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 City. 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 shall 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 push-on joint connections the cut end shall be beveled by methods recommended by the manufacturer and accepted by the City.

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.

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)	
Nominal Pipe Size (in)	Deflection Angle (Degrees)	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	340	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	3*	11	12	340	380
48	3*	-	12	-	380

* 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)	
Nominal Pipe Size (in)	Deflection Angle (Degrees)	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

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. Extensions on fire hydrants shall not be allowed, final grade adjustment must be made when hydrant is installed. Hydrants and valves shall have the interiors cleaned of all foreign matter before installation. Not less than seven (7) cubic feet of crushed stone shall be placed around the base of the hydrant. See Details W-36 or W-37 for hydrant installation.

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

2. 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.

3. 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.

4. 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.

1. Initial Backfill – Initial backfill shall be from the bottom of the pipe (above loose bedding layer) to two (2) feet above the pipe.

   From the bottom of the pipe to the top of the pipe, Class II select backfill material (coarse clean sand) shall be placed and compacted into six (6) inch lifts. The backfilling of the trench above the pipe shall be carried on simultaneously on both sides of the pipe in such a manner that injurious side pressure does not occur. From the top of the pipe to two (2) feet above the pipe, Class III or better select backfill material (coarse clean sand with some silt) shall be placed and compacted into twelve (12) inch lifts. Each layer shall be spread uniformly and tamped until thoroughly compacted.

   Initial backfill material shall be selected and deposited with special reference to the future safety of the pipes. The material shall be select backfill 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.

2. Final Backfill - Except where special methods of bedding and tamping are provided, common backfill material (Class IV or better) shall be placed in lifts from two-feet above the top of the pipe to final grade. Backfill may be selected from excavated material anywhere on the work if any of the material is suitable. Backfill may be by hand or mechanical placement. Trench backfill above the embedment zone shall be compacted in twelve (12) inch lifts.

2. Compaction - 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 D1556 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.

3. 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. The finished surface shall be free of depressions and shall not allow ponding of stormwater runoff above utility lines.

4. 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, horizontal or vertical deflection of the pipe so as not to impair flow capacity.

G. Joint Restraint - All bends, plugs, valves, caps and tees on four (4) inch pipe and larger, shall be provided with joint restraints equivalent to Megalugs. 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. Tracer 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. All one (1) inch and two (2) inch service laterals shall be of one piece construction, no couplings or sectional lines will be allowed from the corporation stop to

the curb stop. 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 1/4-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. All one (1) inch and two (2) inch service laterals shall be of one piece construction; no couplings or sectional lines will be allowed from the corporation stop to the curb stop. 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 AREMA

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 two (2) inch or larger. The tape shall be laid 24" above existing main. Tracer wire shall be securely fastened to fire hydrants, valves, and valve covers according to the specification. Locate wire for laterals shall extend one (1) foot beyond the curb stop.

L. Tracer Wire - Tracer wire will be installed on all water mains and connected with direct burial sealed connection on all water service laterals directly on top of the water line. Tracer wire shall be attached directly to the pipe in the 3 o'clock position and shall be securely fastened to fire hydrants, valves, and valve covers according to the specification. Locate wire for laterals shall extend one (1) foot beyond the curb stop. The wire shall be secured to the pipe with tape or other acceptable methods at spacing of no more than 36" apart. Where water service laterals connect to water mains, the specified spliced connector shall used. The insulated wire must maintain electrical continuity. This tracer 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 six (6) inches in diameter. A direct tap shall be made on all pipe six (6) inches in diameter and larger.

2.03 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 2.02, Paragraph B.8, 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 Engineer, and replaced with accepted backfill material and compacted per Section 2.02, Paragraph B.8.

2.04 OFFSET EXISTING WATER MAINS

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.

2.05 SEPARATION BETWEEN WATER AND SEWER

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 five (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.

2.06 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 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 preventer. 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 passed hydrostatic testing requirements and has been chlorinated in accordance with paragraph 2.07, 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.

The City will provide the tapping machine, the air compressor, 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 submitting an application to the Water and Sewer Planning and Engineering Department with 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 the receipt for the $ 1,000.00 deposit noted above.

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

4. A double check valve will be installed on the fire hydrant meter prior to usage. The double check assembly provided shall be the responsibility of the contractor to remain connected at all times. No fire hydrant meter shall be used without a double check valve assembly. The fire hydrant meter shall be directly connected to the fire hydrant and the double check assembly shall be connected to the meter with the 4-inch fire hose provided by the City in order to relieve weight on the fire hydrant 2½-inch 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.

2.07 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 double detector check valve 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 (912-351-3434) 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 2.07 C and 2.07 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 traffic hazard. The Contractor may request that an affected 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 (912-351-3434) for approval prior to valve operation.

1. Water Mains 10" and Smaller

For water mains with a nominal diameter up to and including 10 inches, the double

detector check valve installed between the existing City's water main and the new main to be flushed shall be no less than 6 inches in diameter.

Flushing shall continue until the water is clear to the eye and no foreign material is observed. Examination for sediment in 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 2.07 C and 2.07 E).

2. Water Mains 12" and Larger

For water mains with a nominal diameter of 12 inches and larger, the double detector check valve installed between the existing City's water main and the new main to be flushed shall be no less than 10 inches in diameter.

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 2.07 C and 2.07 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. The granular or tablet form of sodium hypochlorite shall NOT be introduced directly into water lines. 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. The granular or tablet form of sodium hypochlorite shall NOT be introduced directly into water lines. 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.

d. No pool treatment chemicals containing algaecide will be allowed for use of disinfecting of potable water lines.

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 feet of pipe. 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 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 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 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 2.07 D. 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 2.07 C.

c. Slug Method - The slug method shall ONLY be used where the total volume of the new water main to be disinfected is greater than 500,000 gallons. When the slug method is 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 moves through the main, sampling shall occur at each end of the slug and at intervals of not more than 1,000 feet throughout 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 applied to restore the free chlorine within the slug to 100 mg/L or more.

D. Removal of Heavily Chlorinated Water

Upon successful chlorination as described in Section 02550, Part 2.07 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 (SO2), Sodium Bisulfite (NaHSO3), Sodium Sulfite (Na_2SO_3), and/or Sodium Thiosulfate ($Na_2S_2O_3 \bullet 5H_20$) 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 (gal/hr) = (Cl_2 x GPM x 0.003) / % Concentration

Where:

Cl_2 – Free chlorine residual (mg/L) of water to be neutralized
GPM – Flow rate of water (gallons / minute) to be neutralized
% Concentration – Concentration of H_2O_2 used (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.

Free Chlorine	H_2O_2 Concentration		
(mg/L)	**10%**	**15%**	**20%**
	Gallons of H_2O_2 Solution / 100,000 Gallon of Water		
1	0.5	0.33	0.25
2	1	0.67	0.5
10	5	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 e-mailed or faxed to the City's inspector as soon as they are available. THE LAB SHALL NOT GIVE RESULTS OF BACTERIOLOGICAL TESTING DIRECTLY TO THE CONTRACTOR.

Upon successful completion of proper chlorination/dechlorination in accordance with Section 02550, Parts 2.07 C and 2.07 D, the new main(s) shall be sampled for bacteriological contamination in TWO STAGES as follows:

1. Stage 1 Sampling

   At a minimum, bacteriological samples shall be collected at each end of the new main(s) for mains less than 500 feet in length. Where new main(s) exceed 500 feet in length, but are less than 1200 feet in length an intermediate sample shall be taken. Where new mains exceed 1200 feet in length intermediate samples shall be collected at intervals of no 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.

Example of Required Number of Sampling and Location

Length of Line	# of Samples	Location of Samples
0 - 500 feet	2	Beginning, End
501 - 1200 feet	3	Beginning, End, 1 Intermediate
1201 -2400 feet	4	Beginning, End, 2 Intermediate
2401 - 3600 feet	5	Beginning, End, 3 Intermediate
3601 - 4800 feet	6	Beginning, End, 4 Intermediate
4801 - 6000 feet	7	Beginning, End, 5 Intermediate

In the event that Stage 1 bacteriological testing fails the contractor may re-flush the main(s) in accordance with section 02550, Part 2.07 B and collect a ONE TIME ONLY re-sample of the Stage 1 bacteriological samples. If the Stage 2 bacteriological samples are collected before the results of the failed Stage 1 samples are received by the City's inspector those samples become the resample of the Stage 1 sampling and the opportunity to flush without re-chlorinating is forfeited. Therefore, it is

strongly recommended not too begin the Stage 2 sampling until confirmations of acceptable Stage 1 sampling results have been obtained.

2. Stage 2 Sampling

Not less than 24 hours following the collection of the Stage 1 bacteriological sample(s) a second set (Stage 2) of bacteriological samples shall be collected from the same sampling points as the Stage 1 bacteriological sampling. The main(s) being disinfected shall be ABSOLUTELY UNDISTURBED; this means NO FLUSHING OR OTHER USE OF WATER, between Stage 1 and Stage 2 samplings.

Bacteriological tests shall be failed as follows:

a. Where bacteriological tests indicate too much trash exists within the sample.
b. Where more than ten (10) non-coliform bacteria are found in any tested sample.
c. Where any coliform bacteria are found in any tested sample.
d. In the event that lab personnel have suspicion that the samples and or test results are not of sufficient quality to warrant acceptance.

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.

2.08 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 is any possibility 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. Refer to Section 02550, Part 2.07 D for the information on the chemical requirements. In cases where lower chlorine residual is required by environmental permit, more neutralizing chemical may be required to further lower the residual chlorine levels in the discharge.

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. Mixing and Contact Requirements

Concentrated hydrogen peroxide shall be diluted prior to use. Mix the concentrated hydrogen peroxide into potable solution water in a well ventilated area. Always add hydrogen peroxide to water, NOT water to hydrogen peroxide.

The reaction is rapid at alkaline pH and the dechlorination rate is directly proportional to the concentrations of free chlorine and hydrogen peroxide, e.g. – at a starting pH of 7 and 2 mg/L of free chlorine, the reaction is over within 3 minutes using 5% excess hydrogen peroxide.

Field testing shall be performed (to the satisfaction of the City) to determine the contact time required for dechlorination of the heavily chlorinated water prior to discharge. The dechlorination system shall be large enough to provide a contact time of 120% of the experimentally determined contact time. Adequate mixing shall be provided, either by mechanical means or hydraulic turbulence.

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 notice prior to chlorination/dechlorination (where required) shall be required for the contractor to contact the City Water Supply & Treatment at 912-351-3434, 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 912-651-6510.

Facilities shall be included for sampling the dechlorinated effluent for residual chlorine. When using hydrogen peroxide for dechlorination, use an ortho-tolidine test method to check the chlorine residual. Unlike other chlorine test methods, the presence of excess hydrogen peroxide does not interfere with the ortho-tolidine method.

2.09 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.

2.10 GRASSING

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

PART 3 - TESTING

3.01 HYDROSTATIC 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. 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. A LEAKAGE RECOVERY TEST WILL NOT BE ACCEPTABLE.

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.

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

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

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SECTION 00 25 58

HORIZONTAL DIRECTIONAL DRILLING (HDD) INADVERTENT RELEASE CONTROL PLAN (IRCP)

PART 1 – GENERAL

1.1 DESCRIPTION

Installation of a pipeline using a trenchless excavation method is known as horizontal directional drilling (HDD). A primary environmental impact potentially associated with HDD is inadvertent release of drilling fluids/mud (water/bentonite mixture) to the surface during construction (sometimes referred to as "frac–out"). Objective of this section is to provide procedures which will minimize the potential for release of drilling fluids/mud into wetlands, waterbodies or onto adjacent surface soils.

1.2 SCOPE OF WORK

HDD is to be conducted in accordance with an Inadvertent Release Control Plan (IRCP). As such, HDD will be conducted in a manner to prevent inadvertent releases of drilling mud. Contractor shall have a written IRCP which shall address the "Containment, Response and Notification". This plan shall elaborate on measures to be implemented if a release occurs despite prevention efforts. The plan is to be implemented if a release occurs despite prevention efforts. The plan is to be implemented as appropriate by the Contractor under supervision of Regulatory Agencies to contain, control and clean up any release of drilling mud during HDD pipeline construction. Prior to commencement of HDD operations, Contractor shall inform construction personnel involved in HDD as to the responsible party(ies) for release containment and response. Contractor will ensure the appropriate response personnel and containment equipment are on site for each HDD. A copy of the plan shall be submitted to Owner and Engineer for review prior to any drilling taking place. A copy of the plan shall be onsite during drilling activities.

At a minimum, sediment control devices and spill control barriers (such as straw bales, silt fence or similar) shall be erected between the bore site and nearby areas such as wetlands, rivers, and critical lines to prevent material from reaching these areas. The drilling entry and exit areas will be surrounded by a barrier and/or sediment control device to control spill. These devices shall be as approved by the Regulatory Agencies. All barriers shall be installed according to the Regulatory Agency requirements.

Prior to initiating construction activities, Owner, Engineer and Contractor will review applicable permits to ensure Contractor and all personnel involved are made aware of and understands the permit and its requirements, including any special conditions of the permit, monitoring of the project required by the permit, implementation of the IRCP (frac–out) Response Plan and the implementation of Best Management Practices (BMP) during all phases of construction which are designed to prevent release of sediment or deleterious substances into adjacent wetlands or waterways. It is the responsibility of Owner to initiate this meeting. Additionally, wetland boundaries will be marked in the field and silt fencing will be established along these boundaries by Contractor prior to any other land disturbing activities on site.

1.3 MEASUREMENT AND PAYMENT

No separate payment will be made for preparation and/or implementation of the IRCP, including but not limited to plan preparation, observation, response, agency notifications, cleanup, containment, etc. Payment shall be incidental to cost of HDD work and considered a subsidiary obligation of the contract.

1.4 ON–SITE OBSERVATION DURING CONSTRUCTION

A. During construction of a directionally drilled crossing, pipeline construction personnel will monitor pipeline route throughout the process, as follows:

1. The drill path will be continually monitored during active drilling with mud circulation.

2. Construction observers will be briefed on what to watch for and will be made aware of the importance of timely detection and response actions to any release of drilling mud.

3. Construction observers will have appropriate, operational communication equipment (e.g. radio, cell phones) available at all times during installation of the directionally drilled crossing, with ability to communicate directly with HDD operations control center.

4. If HDD operator realizes a sustained loss in fluid pressure or loss of circulation, operator will immediately notify construction observers of the assumed position of drill head and forward drilling progress will be temporarily suspended until area is reviewed.

5. Construction observers will have the authority to order installation of containment structures, if needed, and to require additional response measures if deemed appropriate.

6. Contractor shall maintain records on drilling fluid pumping rates, pressure, viscosity, density, etc. throughout the course of drilling; and

7. If drilling at night is required, appropriate lighting shall be provided.

B. Monitoring the project site during all phases of construction will be conducted by Contractor. Contractor will visually inspect the project site at least twice daily (AM and PM) for compliance with BMP's and to ensure work is proceeding as permitted and conditions are such that problems are not anticipated and an inadvertent release or frac–out has not occurred. Inspection logs will be maintained on–site and will contain the date and time of all inspections and will note any problems or potential problems or other items of interest. All actions occurring on–site causing problems with work or a temporary stop in work will be noted in the log. Daily photographs will also document progress of work, the integrity of any sediment control measures and compliance with permit conditions.

1.5 RESPONSE TO INADVERTENT RELEASES

A. If an inadvertent drilling mud release is observed during an HDD crossing, the release will be assessed to determine amount of drilling mud being released and potential for release to reach sensitive resource areas (e.g. wetlands and waterbodies). Response measure will vary based on location of inadvertent release as discussed below.

1. Upland Locations:

   Response measures include:

   a. Evaluate release to determine if containment structures are warranted and if they will effectively contain the release.

   b. Order installation of containment measures as needed (see Section 1.6); and

   c. Initiate immediate suspension of drilling operations if the mud release cannot be effectively contained.

2. Wetland Location:

   This section also applies to areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling mud releases could quickly reach surface water.

   Response measures include:

   a. Evaluate release to determine the most effective containment measures.

   b. Order installation of containment measures (see Section 1.6);

   c. Initiate immediate suspension of drilling operations if the mud release cannot be effectively contained.

   d. Review and adjust drill pressures, pump volume rates, and drill profile to minimize extent of the release.

   e. Further evaluate the current drill circumstances and site conditions to identify potential means to prevent further inadvertent release events; and

   f. If necessary, suspend drilling operations in accordance with Section 1.6 and in consultation with the Owner and Engineer, and notify appropriate regulatory agencies in accordance with Section 1.7.

1.6 CONTAINMENT

A. Containment, response and clean–up equipment will be available at both sides of HDD crossing location prior to commencement of HDD to assure a timely response in the event of an inadvertent release of drilling mud (i.e. frac–out). Containment and response equipment include but is not limited to:

1. Straw bales, sediment logs, and staking.
2. Silt fence.
3. Plastic sheeting.
4. Shovels and other appropriate hand tools.
5. Squeegees.
6. Pails.
7. Push brooms.
8. Pumps and sufficient hose.
9. Mud storage tanks.
10. Vacuum truck on 24–hour call or on site.
11. Pre–filled sandbags.
12. Geotextile fabric.
13. One small boat (for larger rivers and open water wetlands);
14. Steel box or large–diameter pipe section (or the equivalent) that, under appropriate conditions, could be used to contain a frac–out.
15. Floating containment booms.
16. Standby power; and
17. Lights for possible work at night.

B. Contractor will immediately implement measures to contain any release of sediment or other deleterious substance into adjacent wetlands or waterbodies.

Upland Locations:

1. Deploy appropriate containment measures to contain and recover drilling mud as feasible.
2. Remove excess mud at a rate sufficient to prevent an uncontrolled release.

3. If the amount of surface release is not great enough to allow practical physical collection from affected area, it shall be diluted with clean water and/or allowed to dry and dissipate naturally; and

4. If the amount of surface release exceeds that which can be completely contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be used to remove released drilling mud by use of portable pumps and hoses.

C. Wetland and Waterbody Locations:

This section also applies to areas immediately adjacent to wetlands and waterbodies, such as pond edges, stream banks or steep slopes, where drilling mud releases could quickly reach sensitive water resource areas.

1. In the event of a drilling mud release in wetlands, waterbodies, or adjacent areas:

   a. The release will be evaluated, and appropriate containment measures will be deployed.

   b. Emergency containment measures will be deployed as feasible, based on site–specific conditions, including location of the release.

   c. Following containment, recovery measures will be evaluated to determine the most effective collection method.

   d. Drilling operations will be suspended if, as determined by Owner, containment measure do not effectively control the release; and

   e. Agency and project management personnel will be notified in accordance with Section 1.7.

2. Owner and Contractor shall immediately consult with appropriate regulatory agencies to evaluate circumstances of the release, discuss additional containment or cleanup requirements, and determine whether and under what conditions HDD may proceed (see Section 1.8);

3. If the amount of surface release is not great enough to allow practical physical collection from affected area without causing additional impacts, it shall be diluted with clean water and/or allowed to dry and dissipate naturally.

4. If the amount of surface release exceeds that which can be contained with hand–placed barriers, small collection sumps (less than 5 cubic yards) may be excavated to collect released drilling mud for removal by use of portable pumps and hoses;

5. Excess mud will be held within the containment area and removed using pumps or other appropriate measures at a rate sufficient to maintain secure containment.

6. Removed mud will be stored in a temporary holding tank or other suitable structure out of the floodplain and/or wetland for reuse or eventual disposal in an acceptable disposal facility.

7. If spill affects a vegetated area, the area shall be seeded and/or replanted similar to preconstruction conditions. Re–vegetation must be successful within the warranty period or Contractor shall replant at no additional cost to Owner.

1.7 NOTIFICATION AND RESUMPTION OF SUSPENDED HDD OPERATIONS

For all drilling mud releases during HDD crossings, Contractor will notify Engineer and Owner immediately. If Engineer determines the release affects wetland or in–stream area, he or she will immediately notify Owner and appropriate regulatory agencies.

If notifications are necessary during non–business hours they will be done according to prior arrangements made between the Owner and regulatory agencies. Follow–up notifications will be made as necessary and practicable.

The conditions under which HDD operations can resume will be discussed with appropriate regulatory agencies and/or field representatives. If containment measures are functioning, and circumstances and potential impacts of the release are understood, HDD operations may resume.

1.8 CLEAN–UP

A. Clean–up measures following mud releases in uplands, wetlands, and waterbodies will be implemented as determined by this plan and in consultation with the appropriate regulatory agencies. Contractor shall coordinate with governing regulatory agencies, Owner and Engineer to determine the appropriate method for cleaning up affected areas and appropriate methods for disposing of sediment or deleterious substances. The following measures are to be considered as appropriate:

1. Drilling mud will be cleaned up by hand shovels, buckets and soft–bristled brooms as possible without causing extensive ancillary damage to existing vegetation. Clean water washes may also be employed if deemed beneficial and feasible.

2. Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation.

3. Material will be collected in containers for temporary storage prior to removal from the site; and

4. Potential for secondary impact from clean–up process is to be regularly evaluated and clean–up activities terminated if physical damage to the

site is deemed to exceed benefits of removal activities in consultation with appropriate regulatory agencies and/or field representative.

5. Water containing mud, silt, bentonite or other pollutants from operations, washing or other clean–up activities, shall not be allowed to enter any waterbody, marsh or wetland area. Also, all such pollutants shall be cleaned up.

1.9 RESTORATION AND POST–CONSTRUCTION MONITORING

Following clean–up activities, restoration and re–vegetation of affected areas will be completed by Contractor to restore the site to equal or better than its original condition. All affected areas will be fully stabilized and re–vegetated as appropriate. The site will be reviewed during warranty period to assure adequate restoration. If the site does not restore to equal or better than original conditions, subsequent re–vegetation shall be made by Contractor as part of warranty work.

1.10 ABANDONMENT PLAN

If for any reason, it becomes necessary to suspend HDD operations and/or abandon partially completed drill holes, the following procedures will be implemented:

A. During Pilot Hole Drilling:

If drilling is suspended during reaming of the hole.

1. If possible, reamer will be pushed back to the exit end, then:

   a. Reamer will be replaced with a cementing head; and

   b. Drill string will be withdrawn, and the hole will be pumped with cement or Engineer and industry–accepted fill material to displace drilling fluid.

2. If reamer cannot be pushed back to the exit end, then:

   a. Drill string will be withdrawn, and the hole will be pumped with cement or Engineer and industry–accepted fill material to displace drilling fluid;

   b. Drilling rig will rig down at the entry end and rig up at exit end;

   c. Drilling rig will run in the pilot hole with cement head on pilot hole drill string until previously cemented reamed hole is bumped; and

   d. Drill string will be withdrawn, and hole pumped with cement or Engineer and industry–accepted fill material to displace the drilling fluid.

B. HDD Realignment:

If it is found necessary to abandon original location, the proposed alignment will

be modified to accommodate a new drill. The proposed new exit and entry areas will be surveyed for sensitive biological and cultural resources, and agencies with regulatory control will be contacted to amend permits as needed.

In case of abandonment, an additional attempt at completing the horizontal direction drill may be made in proximity to previous route. A new hole will be drilled in the same general area as initial drill hole. No alternative crossing method will be implemented (i.e. wet trench) without the proper agency notification and permits. All work will occur at no additional cost to the Owner.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 IRCP

A. Contractor shall prepare a written IRCP and submit it to Owner, Engineer, and regulatory agencies for concurrence. The IRCP shall be revised to include all comments from these entities and final IRCP shall remain on site. HDD Project Superintendent shall be familiar with the IRCP and shall have authority to implement it.

END OF SECTION

INDEX TO

SECTION 00 25 59 – HORIZONTAL DIRECTIONAL DRILLING (HDD)

SECTION 00 25 59

HORIZONTAL DIRECTIONAL DRILLING (HDD)

PART 1 – GENERAL

1.1 WORK INCLUDED:

A. The work under this Section is horizontal directional drilling which shall include all work, materials, labor and related necessary for the installation of a steel casing (if applicable) and Fusible Polyvinylchloride (FPVC) pressure pipe, as shown on the Drawings and as specified herein. Services provided by the Contractor shall be performed in accordance with the current industry practice and these Specifications. The Contractor shall accomplish, but is not limited to, the following tasks:

1. Site preparation necessary for construction.
2. Transportation of all equipment, labor, and material to and from the project location.
3. Provide and assemble steel casing and [FPVC] [HDPE] carrier pipe.
4. Erection and dismantling of drilling equipment at the project location.
5. Drilling of a small diameter pilot hole along the alignment.
6. Reaming the pilot hole to a diameter suitable for installation of the steel casing pipe.
7. Pulling the assembled steel casing and [FPVC] [HDPE] carrier pipe through the reamed hole along with a detector wire.
8. Hydrostatic testing of the [FPVC] [HDPE] pipe.
9. Disinfection and bacteriological testing of [FPVC] [HDPE] pipe before and after installation.
10. Removal of all equipment and materials upon completion of construction.
11. Cleanup and final restoration of all work areas.

B. Related Work:

1. Work associated with providing and installing FPVC pipe is specific in Section 00 2610 of these Specifications.

1.2 INSPECTION:

The Contractor will provide and maintain instrumentation, which will accurately locate the pilot hole and measure drilling fluid flow discharge rate and pressure at all times. The Engineer will have access to these instruments and readings.

1.3 SUBMITTALS:

Shop drawings shall be submitted, as required by the contract documents, for the following:

1. **Installation Plan: At least 30 days prior to mobilizing equipment, Contractor shall submit detailed installation plan to the Engineer. The plan shall include a detailed plan and profile of the proposed bores and shall be plotted at a scale no smaller than 1–inch equals 20 feet vertical and horizontal.**

2. Details describing the proposed method of directional drilling. This shall include, but is not limited to, arrangement of equipment, location and size of drilling and receiving pits, methods of dewatering, method of removing spoils material, size and capacity of equipment, method of installing pipe, method of installing detection wire, pipe and seals, support segments, method of monitoring and controlling line and grade and provisions for protecting existing structures. Directional drilling work shall not proceed until shop drawings have been reviewed and accepted by the Engineer. If, in the opinion of the Engineer, modifications to the methods are necessary during construction, the Engineer may direct the Contractor to discontinue any directional drilling activities until proper drawings are submitted and accepted delineating such modifications.

3. Bentonite/drilling mud or other drilling fluid: product information, material specifications, handling procedures, material safety data sheet, special precautions required, and method of mixing and application. Also, submit information on the pit lining material.

4. Methods and material for joining ends of directionally drilled pipe segments.

5. A Georgia Registered Professional Engineer other than Thomas & Hutton Engineering Co. shall design the final steel casing (if applicable) and FPVC pipe wall thickness and shall submit the stamped design calculations to the Owner (assume the area between the steel casing and the FPVC pipe contains water).

6. Manufacturer's certificate documenting the pipe and fittings has been tested and meet the specifications.

7. Equipment: Contractor will submit specifications on directional drilling equipment used to ensure the equipment will be adequate to complete the project. Equipment shall include, but not be limited to, drilling rig, mud system, mud motors (if applicable), down–hole tools, guidance system, and rig safety systems. Calibration records for guidance equipment shall be included. Specifications for any drilling fluid additives the Contractor intends to use or might use will be submitted.

8. Material: Specifications on materials used shall be submitted to Engineer. Material shall include the pipe, fitting, and any other item to be an installed component of the project.

1.4 QUALITY ASSURANCE:

The requirements set forth in this document specify a wide range of procedural precautions necessary to ensure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification or within any associated permit (i.e.: DEP, DOT, Etc.). Adherence to the specifications contained herein, or the Representative's approval on any aspect of any directional bore operation

covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract. The HDD contractor shall be responsible for the repair of all damage to private and/or public property (at no expense to the [Owner] [Engineer]). Repair work shall meet all local and state rules and requirements.

1.5 QUALIFICATIONS:

A. The work shall be accomplished by trained workers with a minimum of three years of directional drill experience. The Contractor's on–site superintendent shall have a minimum of five years' experience. The Contractor shall have installed directionally drilled pipe at least as large as 12 inches in diameter and have performed crossings at least 2,000 feet in length.

B. A Georgia Registered Professional Engineer, other than Thomas & Hutton Engineering Co., shall design the final steel casing size and thickness and FPVC pipe wall thickness and shall submit the stamped design calculations to the Owner (assuming the area between the steel casing (if applicable) and the FPVC pipe contains water).

C. Experience: Each bidder shall submit a list of experience with their bid for the directional drilling Contractor (or Subcontractor) presenting similar experience on at least five projects involving road crossings of 12 inches or greater in the Contractor's qualification form.

D. Material and equipment shall be the standard product of a manufacturer who has manufactured them for a minimum of two years and who provides published data on the quality and performance of the product.

A subcontractor for any part of the work must have experience on similar work and, if required, furnish the Engineer with a list of projects and Owners or Engineers who are familiar with its competence.

All testing of the piping shall be made by the Contractor with equipment qualified by the Owner, Engineer, or utility company and in the presence of the Engineer, Owner and utility company. The Engineer or Project Representative reserves the right to accept or reject testing equipment.

1.6 REFERENCES:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement

documents, the last version of the document before it was discontinued.

3. Where documents dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued, or replaced.

REFERENCE	TITLE
ANSI/AWWA C906	Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inch, for Water Distribution American Society for Testing and Materials (ASTM) Standards.
ASTM D638	Standard Test Method for Tensile Properties of Plastics.
ASTM D2122	Standard Method of Determining Dimensions of Thermoplastic Pipe and Fittings.
ASTM D2683	Standard Specification for Socket–Type Polyethylene Fittings for Outside Diameter–Controlled Polyethylene Pipe and Tubing.
ASTM D2837	Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
ASTM D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR–PR) Based on Controlled Outside Diameter.
ASTM E3261	Standard Specification for Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
ASTM D3350	Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.
ASTM F412	Standard Terminology Relating to Plastic Piping Systems.
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR–PR) Based on Outside Diameter.
ASTM F2620	Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

1.7 PRODUCT DELIVERY, STORAGE & HANDLING:

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. The Contractor shall repair any damage caused by the storage. Material shall be examined before installation and neither damaged nor deteriorated material shall be used in the work. Owner and Engineer have the right to reject defective or damaged material. If stored on private property, Contractor shall obtain permission from the property owner and shall repair all damage caused by the storage.

1.8 SEQUENCING AND SCHEDULING:

The Contractor shall arrange work so sections of mains between valves are tested, sterilized, pavement replaced, and the section placed in service as soon as reasonable after it is placed. Owner reserves the right to dictate the sequence of construction.

1.9 ALTERNATIVES:

The intention of these specifications is to define the acceptable methods and materials for installing FPVC Pipe by horizontal directional drilling and to produce the best system for Owner. If Contractor suggests alternative material, equipment or procedures will improve results at no additional cost, the Engineer and Owner will examine suggestion, and if it is accepted, it may be used. The basis upon which acceptance of an alternative will be given is its value to Owner, and not for convenience of Contractor.

1.10 CALCULATIONS:

The Contractor shall submit final design calculations for Owner's and Engineer's review and approval within 90 days of receiving notice to proceed. Final design calculations shall support the Contractor's specific proposed means, methods, and products. The Contractor's final design calculations shall be prepared and sealed by a Licensed Professional Engineer registered to practice in the State of Georgia and retained by the Contractor. Horizontal directional drilling shall not commence until the Contractor has received written approval of all design calculation submittals from Owner and Engineer.

At a minimum, design calculations shall demonstrate that the proposed pipe, equipment, and means and methods comply with the requirements of this Section and have been designed based on the design borepath, and installation means and methods, for anticipated installation and handling, hydrostatic, earth, and live loads, installation temperature and site conditions. Design calculations shall address the considerations and guidelines presented in ASTM F1962.

The Contractor shall supply copies of all other calculations required to support the required submittals for horizontal directional drilling. At a minimum, the following calculations should be included:

A. Maximum allowable pipe loading limits

B. Pullback load calculation based upon proposed drill path plan and profile.

C. Bouyancy effect calculations.

D. Effects of ballasting plan on pipe pullback forces.

E. Hydrofracture analysis. This should include a maximum annular pressure curve and the respective formation pressure versus depth based on the proposed drill plan and profile.

F. Confirmation that design parameters do not exceed predicted installation stresses including factors such as tensile load, buckling and deformation.

1.11 GUARANTEE:

Contractor shall guarantee the quality of materials, equipment, and workmanship for a period of 18 months after final project acceptance. Defects discovered during period shall be repaired by the Contractor at no cost to the Owner. Contractor shall provide an 18–month guarantee.

1.12 WARRANTY:

The contractor shall supply to Owner a two (2) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

The pipe manufacturer shall provide a warranty to the contractor that the pipe conforms to these specifications and that the pipe shall be free from defects in materials and workmanship for a period of two (2) years from the date of substantial completion of the installation. The manufacturer's warranty shall be in a form acceptable to and for the benefit of Owner and shall be submitted by the contractor as a condition of final payment. The manufacturer's warranty to the contractor shall in no way relieve the contractor from its unconditional warranty to Owner.

The contractor shall warrant to Owner that the methods used on the contract, where covered by patents or license agreements, are furnished in accordance with such agreements and that the prices included herein cover all applicable royalties and fees in accordance with such license agreements. The contractor shall defend, indemnify, and hold Owner and Engineer harmless from and against any and all costs, loss, damage or expense arising out of, or in any way connected with, any claim of infringement of patent, trademark, or violation of license agreement.

1.13 EXISTING UTILITIES:

All known utility facilities are shown schematically on plans and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans 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 the cost of repairs to damaged underground facilities – even when such facilities are not shown on the plans. The Contractor shall contact all utility companies prior to beginning work and request an accurate field location of their respective utility lines. Contractor shall also be responsible for exposing ("potholing") existing utilities as required by utility owner to verify horizontal and vertical position of utility prior to start of bore operations. There will be no separate measurement or payment for any and all labor, equipment, or materials, or incidentals required to locate and expose existing utilities. These costs shall be considered a subsidiary obligation of the contract.

1.14 ENVIRONMENTAL PROTECTION:

Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Contractor shall place hay bales, or

approved protection, to limit intrusion upon project area. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations including environmental condition stated in local, state and federal permits. Fuel may not be stored in bulk containers (greater than 25 gallons) within 200' of any water–body or wetland.

1.15 CONNECT NEW MAIN TO EXISTING SYSTEM:

Contractor shall furnish necessary pipe and perform all excavation, dewatering, shoring, backfilling, etc., necessary to make the connection of a new main to existing system to be or already installed by others. Contractor shall contact the utility a minimum of 72 hours in advance of construction. Contractor shall be responsible for coordinating construction with the utility.

1.16 DAMAGE TO EXISTING WATER SYSTEM:

Damage to any part of existing water system by Contractor or Subcontractors, which is repaired by Utility Owner's forces, or an acceptable Contractor shall be charged to the Contractor on basis of time and material, plus an overhead and administration charge using Commission's multiplier, or plus 30% for overhead and administration for an acceptable Contractor.

1.17 CONSTRUCTION RECORDS:

A. Daily Reports: The Contractor shall maintain daily activity reports throughout all horizontal directional drilling operations, including pipe installation. A sample daily report shall be submitted to Engineer for approval prior to the commencement of drilling operations. Daily reports shall be submitted within 24 hours of completion, and shall include, for each drill rod added or withdrawn, or every 30 feet during drilling, pre–reaming, and pullback:

1. Downhole tools and equipment in use.
2. Description of ground conditions encountered.
3. Description of drilling fluid.
4. Drilling fluid pumping rate.
5. Maximum and minimum downhole fluid pressures.
6. Drilling head location – at least every 10 feet along the bore path.
7. Drill stem torque.
8. Details and perceived reasons for delays greater than one hour other than normal breaks and shift changes.
9. Details of any unusual conditions or events.

B. Production and As–built Drawings: The Contractor shall maintain at the construction site a complete set of field drawings for recording the as–built conditions. The Contractor shall plot as–built conditions on the field drawings, including the location in plan and elevation of the drill string, reaming head, and installed pipe, at the completion of each production shift. The Contractor shall compile and submit as–built data in accordance with Engineer's standards.

C. As–builts shall include all bores successful and failed.

D. Testing and Quality Control and Assurance Documentation: The Contractor shall

maintain records for all testing and quality control and assurance procedures. The following records shall be provided to Engineer on the day that information is acquired by the Contractor:

1. Manufacturer's field reports.
2. Test reports.
3. Fusions reports. For each weld, provide and electronic and printed report of the downloaded information for each weld.

1.18 EQUIPMENT REQUIREMENTS:

A. General: Directional drilling equipment shall consist of a directional drilling rig with sufficient capacity to perform bore and pullback of pipe, a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete crossing, a drilling fluid recycling system to remove solids from drilling fluid so fluid can be re–used, a magnetic guidance system to accurately guide boring operations, a vacuum truck of sufficient capacity to handle drilling fluid volume, and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials, and spare parts on hand to maintain system in good working order for the duration of this project.

B. Drilling System:

1. Drilling Rig: Directional drilling machine shall consist of a hydraulically–powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. Machine shall be anchored to the ground to withstand pulling, pushing and rotating pressure required to complete crossing. The hydraulically–powered system shall be self–contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull–back pressure during pull–back operations. The rig shall be grounded during drilling and pull–back operations. There shall be a system to detect electrical current from the drill string and an audible alarm, which automatically sounds when an electrical current is detected.

2. Drill Head: The drill head shall be steerable by changing its rotation and shall provide necessary cutting surfaces and drilling fluid jets.

3. Mud Motors (if required): Mud motors shall be of adequate power to turn required drilling tools.

4. Drill Pipe: Shall be constructed of high–quality 4130 seamless tubing, Grade D or better, with threaded box and pins. Tool joints should be hardened to 32–36 RC.

C. Guidance System: A Magnetic Guidance System (MGS) probe or proven gyroscopic probe and interface shall be used to provide a continuous and accurate location of the drill head during drilling operation. The guidance shall be capable of tracking at all depths up to one hundred feet and in any soil condition, including hard rock. It shall enable driller to guide drill head by

providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). Guidance system shall be accurate to approximately 2% of vertical depth of the borehole at sensing position at depths up to 100 feet and accurate within 1.5 meters horizontally.

Bore Tracking and Monitoring:

At all times during the pilot bore the Contractor shall provide and maintain a bore tracking system that is capable of accurately locating the position of the drill head in the x, y, and z axes. The Contractor shall record these data at least once per drill pipe length or every twenty–five (25) feet, whichever is most frequent.

1. Downhole and Surface Grid Tracking System: Contractor shall monitor and record x, y, and z coordinate relative to an established surface survey bench mark. The data shall be continuously monitored and recorded at least once per drill pipe–length or at twenty–five (25) feet, whichever is more frequent.

2. Deviations between the recorded and design bore path shall be calculated and reported on the daily log. If the deviations exceed plus or minus 5 feet (horizontal or vertical deviation) from the design path, such occurrences shall be reported immediately to Engineer. The Contractor shall undertake all necessary measures to correct deviations and return to design line and grade.

3. Drilling Fluid Pressures and Flow Rates: Drilling fluid pressures and flow rates shall be continuously monitored and recorded by the Contractor. The pressures shall be monitored at the pump. These measurements shall be made during pilot bore drilling, reaming, and pullback operations.

Components: Contractor shall supply all components and materials to install, operate, and maintain the guidance system. This shall include, but not be limited to the following:

Probe and Interface
Computer, Printer and Software
DC Power Source, Current Control Box, and Tracking Wire

The Guidance System shall be a proven type such as Sharewell TruTracker MGS, or other proven guidance system, and shall be set up and operated by personnel trained and experienced with this system. The Operator shall be aware of any geo–magnetic anomalies and shall consider such influences in the operation of the guidance system.

D. Drilling Fluid (Mud) System:

1. Mixing System: A self–contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to "molecularly shear" individual bentonite particles from the dry

powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be a minimum of 5000* gallons. Mixing system shall continually agitate the drilling fluid during drilling operations.

2. Drilling Fluids: Drilling fluids shall be composed of clean water and bentonite clay. Water shall be from an authorized source with a pH of 8.5 – 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and bentonite clay shall be mixed thoroughly and be absent of any clumps or clods. No additional material may be used in drilling fluid without prior acceptance from Engineer.

   The bentonite mixture used shall have the minimum viscosities as measured by a March Funnel:

Rock, Clay	60 sec.
Hard Clay	40 sec.
Soft Clay	45 sec.
Sandy Clay	90 sec.
Stable Sand	80 sec.
Loose Sand	110 sec.
Wet Sand	110 sec.

   * *dependent upon project size*

   These viscosities may be varied to best fit the soil conditions encountered, as accepted by the Engineer.

3. Delivery System: The mud pumping system shall have a minimum capacity of 500* GPM and be capable of delivering drilling fluid at a constant minimum pressure of 1,200 psi. The delivery system shall have filters in–line to prevent solids from being pumped into drill pipe. Connections between the pump and drill pipe shall be relatively leak–free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system. A berm, minimum of 12 inches high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system to prevent spills into the surrounding environment. Pumps and/or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage and recycling facilities.

4. Drilling Fluid Viscosity:

   In the event that inadvertent returns or returns loss of drilling fluid occurs during pilot hole drilling operations, Contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding120 seconds as measured by a March funnel and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor shall cease operations and notify [Owner] [Engineer]. [Owner] [Engineer] and Contractor shall discuss additional options and work will then proceed accordingly.

5. Drilling Fluid Recycling System: The drilling fluid recycling system shall separate sand, dirt and other solids from drilling fluid and render drilling fluid reusable. Spoils separated from the drilling fluid will be stockpiled for later use or disposal.

6. Control of Drilling Fluids:

   The Contractor shall control operational pressures, drilling mud weights, drilling speeds, and any other operational factors required to avoid hydrofracture fluid losses to formations, and control drilling fluid spillage. This includes any spillages or returns at entry and exit locations or at any intermediate point. All inadvertent returns or spills shall be promptly contained and cleaned up. The Contractor shall maintain on–site mobile spoil removal equipment during all drilling, pre–reaming, reaming and pullback operations and shall be capable of quickly removing spoils. The Contractor shall immediately notify [Owner] [Engineer] of any inadvertent returns or spills and immediately contain and clean up the return or spill.

E. Other Equipment:

1. Pipe Rollers: Pipe rollers shall be of sufficient size to fully support weight of the pipe while being hydro–tested and during pull–back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.

2. Pipe Rammers: Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer.

3. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those previously defined in preceding sections shall not be used unless accepted by Engineer prior to commencement of the work. Consideration for acceptance will be made on an individual basis for each specified location. Proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete utility placement satisfactorily without undue stoppage and to maintain line and grade within tolerances prescribed by particular conditions of the project.

   * Dependent upon project size

PART 2 – PRODUCTS

2.1 STEEL CASING:

A. The casing (if used) shall be new and unused pipe. The casing pipe shall be welded steel pipe, Schedule 30 or thicker and shall conform to ASTM A–139 and AWWA C200.

B. Pipe shall meet size and thickness required to complete the joint pull with an FPVC carrier pipe.

Minimum Steel Pipe Casing Dimensions for Ductile Iron Pipe

Carrier Pipe	Steel Casing Pipe Size	
I.D. (Nom.)	Pressure System	Gravity System
4	12	16
6	16	20
8	18	24
10	20	24
12	24	30
16	30	36
18	36	48
24	38	48
30	48	54
36	54	60

Minimum Steel Pipe Casing Dimensions for Fusible PVC Pipe

Carrier Pipe	Steel Casing Pipe Size	
I.D. (Nom.)	Pressure System	Gravity System
4	8	16
6	10	20
8	12	24
10	16	24
12	16	30
16	20	36
18	24	48
24	30	48
30	36	54
36	42	60

C. Fusible Polyvinylchloride (FPVC) Pipe – FPVC as specified in Section 02610 shall be used for this project.

E. The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rated, and

contamination. The cell classification properties of the material shall be certified by the supplier and verified by Manufacturer's Quality Control.

E. Delivery, Storage and Handling of Products:

2. Contractor shall inspect materials delivered to the site for damage. All materials found during inspection or during the progress of work to have cracks, flaws, cracked linings, or other defects shall be rejected and removed from the job site without delay.

3. Unload and store opposite or near the place where the work will proceed with minimum handling. Store material under cover out of direct sun light. Do not store directly on the ground. Keep all materials free of dirt and debris.

4. Contractor is responsible for obtaining, transporting and sorting any fluids, including water, to the work site.

5. Disposal of fluids is the responsibility of the Contractor. Disposal of fluids shall be done in a manner that is in compliance with all permits and applicable federal, state, or local environmental regulations. Contractor shall thoroughly clean entire area of any fluid residue upon completion of installation, and replace any and all plants and sod damaged, discolored, or stained by drilling fluids.

PART 3 – EXECUTION

3.1 GENERAL:

A. Contractor shall take precautions to protect the pipe during handling and assembly. Chains, hooks, or cable slings shall not be used to handle the pipe.

B. Care shall be used to protect the pipe from scarring, gouging, or excessive abrasion.

C. If pipe is stacked, stacking height shall not exceed the manufacturer's recommendations. Manufacturer's recommendation shall be followed in unloading, storing and protecting pipe.

D. The directional drilling procedure shall include provisions to guard against electrical shock such as ground mats, ground cables, hot boots and gloves. In addition, the drilling equipment shall include an alarm system capable of detecting electrical current as it nears electrical lines.

E. Contractor shall confirm all necessary permits, easements, and/or right–of–ways have been secured before beginning work.

F. The directional drilling method shall have mechanical fluid assistance. Pneumatic, water jetting, or mechanical (jack and bore) methods are not acceptable.

G. Contractor may make changes to proposed vertical and horizontal alignment of the installation and location of entry and exit points, provided these changes are submitted in writing to Engineer, and received acceptance of Engineer prior to construction.

H. Horizontal Directional Drilling operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to adjacent creek or land areas involved during construction process. Contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy–duty plastic sheeting with sealed joints to prevent migration of drilling fluids and/or ground water.

Contractor shall visit the site and must be aware of the close proximity of structures on either side of the crossing and provide Engineer with a drilling plan outlining procedure to prevent drilling fluid from adversely affecting these structures.

The general work areas on entry and exit sides of crossing shall be enclosed by a berm to contain unplanned spills or discharge.

Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desilter/desander, centrifuges, material handlers, and haulers all in a quantity sufficient to perform the cleaning/separating operation without interference with drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by Contractor to extent necessary for disposal in off–site landfills. Water from dewatering process shall be treated by the Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal is subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.

Equipment (graders, shovels, etc.) and materials (such as groundsheets, haybales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps, or spills.

Waste drilling mud and cuttings shall be dewatered dried and stockpiled so it can be loaded by a front–end loader, transferred to a truck, and hauled off–site to a suitable legal disposal site. The maximum allowed water content of these solids is 50% of weight.

Due to a limited storage space and environmental sensitivity at the worksites, dewatering and disposal work shall be concurrent with drilling operations. Treatment of water shall satisfy regulatory agencies before it is discharged.

I. Drill Path Survey: Entire drill path shall be accurately surveyed with entry and exit stakes placed in appropriate locations within the areas indicated on drawings. If Contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo–magnetic variations or anomalies.

J. Environmental Protection: Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel may not be stored in bulk containers within 200 feet of any water–body or wetland.

The Horizontal Directional Drilling operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to the adjacent land areas involved during the construction process. The contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy duty plastic sheeting with sealed joints to prevent the migration of drilling fluids and/or ground water.

The general work areas on the entry and exit sides of the crossing shall be enclosed by a berm to contain unplanned spills or discharge.

Waste cuttings and drilling mud shall be processed through a solids control plant comprised of a minimum of sumps, pumps, tanks, de-silter/de-sander, centrifuges, material handlers, and haulers all in a quantity sufficient to perform the cleaning/separating operation without interference with the drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by the Contractor to the extent necessary for disposal in offsite landfills. Water from the dewatering process shall be treated by the Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal are subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.

Equipment (graders, shovels, etc.) and materials (such as groundsheets, hay bales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by the Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps or spills.

Waste drilling mud and cuttings shall be dewatered dried and stockpiled such that it can be loaded by a front–end loader, transferred to a truck and hauled offsite to a suitable legal disposal site. The maximum allowed water content of these solids is 50% of weight.

Due to a limited storage space and environmental sensitivity at the worksite, dewatering and disposal work shall be concurrent with drilling operations.

K. Safety: Contractor shall adhere to all applicable state; federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer.

L. Pipe: Pipe shall be welded/fused together in one length, if space permits, with welds X–rayed prior to being placed in bore hole. Pipe will be placed on pipe

rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.

3.2 JOINING FPVC PIPE AT ENDS OF DIRECTIONAL DRILLED SEGMENTS:

A. All joints at ends of directionally drilled line shall be fusion bonded to the proposed pipe section. Mechanical couplings are not permitted. Fusion bonded joints shall provide leak free service at the specified test pressure. See details.

B. Fusion bonding shall be accomplished as specified in Section 00 2610 – Fusible Polyvinylchloride (FPVC) Pipe.

3.3 DRILLING FLUID:

A. During the drilling, reaming, or pullback operations, Contractor shall make adequate provisions for handling drilling fluids for cutting entry and exit pits. To the greatest extent practical, these fluids must not be discharged into any waterway. When the Contractor's provisions for storage of the fluids or cuttings on site are exceeded, these materials shall be hauled away to a suitable legal disposal site. Contractor shall conduct directional drilling operation in such a manner that drilling fluids are not forced though the sub–bottom into any waterway. After completion of the directional drilling work, entry and exit pit locations shall be restored to original conditions. The Contractor shall comply with all permit provisions.

B. Pits at entry or exit point areas shall be constructed to completely contain the drill fluid and prevent its escape to any waterway or surrounding drainage system.

C. To the extent practical, Contractor shall maintain a closed loop drilling fluid system.

D. The Contractor shall minimize drilling fluid disposal quantities by utilizing a drilling fluid cleaning system, which allows returned fluids to be reused.

E. As part of the installation plan specified herein before, Contractor shall submit a drilling fluid plan which details types of drilling fluids, cleaning and recycling equipment, estimated flow rates, and procedures for minimizing drilling fluid escapes.

F. The composition of drilling fluid used shall be submitted to Engineer for acceptance prior to starting work. Fluids shall be inert and of no risk to the environment. No fluid will be accepted or utilized which does not comply with permit requirements and environmental regulations.

G. Drilling fluid shall remain in bore hole to increase stability of surrounding soil and to reduce the drag on the pulled pipe.

H. Disposal of drilling fluid and all other spoils shall be the responsibility of the Contractor at no additional cost to Owner and shall be conducted in compliance with all relative environmental regulations, right–of–way and work space agreements and permit requirements.

I. Drilling fluid returns at locations other then the entry and exit points shall be minimized. The Contractor shall immediately clean up any drilling fluid which inadvertently surfaces.

J. Excess drilling fluid shall be disposed of at a pre–permitted location found by Contractor. Contractor is responsible for transporting all excess fluids and other spoils to the disposal site and paying any disposal costs.

K. Drilling fluid shall not be discharged into sanitary or storm drain systems, ditches or waterways nor allowed to enter any wetland area or creek.

3.4 SUBSURFACE CONDITIONS:

A. Anticipated subsurface conditions at the crossing are described in soil borings attached. Borings are being provided for information only and the Owner and Engineer assume no liability for them or their interpretation.

B. Contractor must use its own experience and judgment in interpreting this data to prepare a proposal and/or perform the work.

3.5 EXISTING UTILITIES:

A. The Contractor must exercise caution in regard to existing utilities, including:

1. Verify location of all underground utilities.
2. Exposing any utilities which are to be crossed.
3. Modify drilling practices or down hole assemblies to prevent damage to adjacent underground and above ground utilities and structures.

B. The Contractor shall provide sheeting as necessary to protect adjacent structures.

3.6 DRILLING WATER AND RESTORATION:

A. Potable water is available at a cost to the Contractor in accordance with current utility company rate structure. Cost of transporting water to construction site is an expense of the Contractor.

B. Upon completion of pipe installation, the drilling pit and receiving pit shall be backfilled to original grade.

C. Restoration of any disturbed area shall be completed in accordance with these specifications.

3.7 OMITTED

3.8 SPECIAL CONSTRUCTION REQUIREMENTS FOR 24–INCH AND LARGER PIPE:

For FPVC pipe 24 inch and larger, unless approved otherwise by Engineer, a foundation bed of granular material (57 stone) shall be placed under and around all ductile iron fittings and valves for additional support of heavy system components. A foundation bed of granular material shall be provided for all valves 20 size and larger. For granular materials, the minimum vertical limit is 12 inches under the fitting or valve, up to 1/3 the

overall height of the fitting or valve. The minimum horizontal limits of the granular material shall be 12 inches in all directions beyond the outer edges of the fitting or valve. The compaction of soils below the granular material shall be at 98% of the maximum density. Payment for this work shall be included in the associated fitting or valve unit cost. All spool pieces between 24 inch and larger ductile fittings and valves shall be at least 5 feet long. No joint deflection shall be allowed at the fittings or valves.

3.9 SWABBING:

The purpose of swabbing a new pipeline is to conserve water while thoroughly cleaning the pipeline of all foreign material, sand, gravel, construction debris and other items not found in a properly cleaned system. Prior to pressure testing of a new pipeline swabbing shall be utilized as specified on the construction plans for each project.

All New water, wastewater force, and reclaim mains greater than 12" I.D. (with exceptions to smaller pipe lines as deemed necessary by Engineer) shall be hydraulically cleaned with a polypropylene swabbing device to remove dirt, sand and debris from main.

If swabbing access and egress points are not provided in the design drawings, it will be the responsibility of the CONTRACTOR to provide temporary access and egress points for the cleaning, as required.

Passage of cleaning poly swabs through the system shall be constantly monitored, controlled and all poly swabs entered into the system shall be individually marked and identified so that the exiting of the poly swabs from the system can be confirmed.

Cleaning of the system shall be done in conjunction with, and prior to, the initial filling of the system for its hydrostatic test.

The CONTRACTOR shall insert flexible polyurethane foam swabs (two pounds per cubic foot density) complete with rear polyurethane drive seal, into the first section of pipe. The swabs shall remain there until the pipeline construction is completed. Engineer shall be present for the swabbing process including swab insertion and retrieval.

The line to be cleaned shall only be connected to the existing distribution system at a single connection point.

Locate and open all new in–line valves beyond the point of connection on the pipeline to be cleaned during the swabbing operation.

At the receiver or exit point for the poly swab, the CONTRACTOR is responsible for creating a safe environment for collection of debris, water and the swab. Considerations shall be made for protecting surrounding personnel and property and safe retrieval of the swab.

Cleaning and flushing shall be accomplished by propelling the swab down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear and swab(s) is/are retrieved.

After the swabbing process, pressure testing, and disinfection of the pipe shall be completed in accordance with Section 3.12.

3.10 ON–SITE OBSERVATIONS OF WORK:

A. The Engineer or Project Representative shall have the right to require any portion of the work be completed in their presence. Any work covered up after such instruction shall be exposed by the Contractor for observation. However, if Contractor notifies Engineer or Project Representative such work is scheduled and they fail to appear within 72 hours, Contractor may proceed. All work completed and materials furnished shall be subject to review by the Engineer or Project Representative. All improper work shall be reconstructed, and all materials which do not conform to requirements of specifications, shall be removed from the work upon notice being received from Engineer for rejection of such materials. Engineer shall have the right to mark rejected materials to distinguish them as such.

B. Contractor shall give Engineer or Project Representative a minimum of 72 hours notice for all required observations or tests.

C. It will also be required of Contractor to keep accurate, legible records of the location of all lines, valves, fittings, and appurtenances. These records shall be prepared in accordance with record drawing requirements of these Specifications. Final payment to the Contractor will be withheld until all such information is received and accepted. A disclaimer by the surveyor preparing As–Built drawings concerning location of underground lines will not be acceptable.

3.11 SAFETY:

A. Provide all necessary bracing, sheeting, bulkheads and shields to ensure complete safety to all traffic, persons, and property at all times during the work. Perform the work in such a manner as to not permanently damage existing structures or roadbeds.

B. Observe all applicable regulations of the authorities having jurisdiction over this site.

C. Perform all activities in accordance with Occupational Safety and Health Act of 1970 (PL–596), as amended, applicable regulations of Federal Government, OSHA 29 CFR 1926 and applicable criteria of ANSI A10 16–18, "Safety Requirements for the Construction of Tunnel Shafts and Caissons".

3.12 TESTING:

A. Disinfection tests:

1. All water pipe and fittings shall be thoroughly disinfected prior to being placed in service. Disinfection shall follow the applicable provisions of the procedure established for the disinfection of water mains as set forth in AWWA – Standard C651 entitled "AWWA Standard for Disinfecting Water Mains" and shall be in accordance with Chapter III. 1. – Section 350. Bacteriological testing on the water main shall be scheduled and completed by [Engineer] [Contractor] [Subcontractor]. [Engineer]

[Contractor] [Subcontractor] will collect the water samples and be responsible for completing the water analysis (lab testing).

2. Temporary blow–offs shall be installed for the purpose of cleaning the water main. Blow–offs installed on water mains up to and including 12–inches shall be the same diameter as the water main. Blow–offs installed on 16–inch water mains and larger shall be the next smaller size, in diameter, than the water main being tested. Temporary blow–offs shall be removed and plugged after the main is cleared. The [Engineer] [authorized] representative shall be present prior to and during the operation of blow–offs. The main shall be flushed prior to disinfection.

3. The new water main shall be connected to the existing water main at one point only for flushing purposes (no looping). The new main MUST have a blow off on the end. After the new main is thoroughly flushed, the open end shall be sealed and restrained and the main shall be thoroughly disinfected. Anytime the new line is reopened (to repair defective joints or pipe, defective fitting or valve) the complete disinfection process shall be repeated. Once bacteriological clearance has been received from the regulatory authority, the new main may be pressure tested.

B. Pressure and Leakage Tests:

1. Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by the Engineer. All field tests shall be made in the presence of the Engineer. Except as otherwise directed, all pipelines shall be tested. Unless approved otherwise by Engineer, all fusible or butt weld joints shall be tested, including MJ adapter fittings associated with the new construction. All piping to operate under liquid pressure shall be tested in sections of approved length. The pressure testing of an HDPE line section shall be tested separately from the PVC and DIP line sections. Where impractical, the HDPE test section shall include only a minimum amount of PVC and ductile iron pipe within the test section. If at all possible, the PVC and D.I.P. test sections shall be left exposed during the pressure test for visual leakage observation. For these tests, the Contractor shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment, and all labor required. If the Contractor chooses to pressure test against an existing water main/valve, the new water main must be disinfected prior to connection to the new line. The Engineer will not be responsible for failure of the pressure test due to the existing valve leaking. Engineer may elect to furnish suitable pressure gauges for these tests. If not, the contractor will furnish suitable pressure gauges, calibrated by an approved testing laboratory, which increments no greater than 2 psi. Gauges used shall be of such size that pressures tested will not register less than 10% or more than 90% of the gauge capacity. All valved sections shall be hydrostatic tested to insure sealing (leak allowance) of all line valves. All HDD over 100 LF shall be air pressure tested (above ground) @ 5 PSI for a period of 15 minutes, prior to insertion. There shall be no pressure loss allowed.

2. Unless it has already been done, the section of pipe to be tested shall be filled with potable water and air shall be expelled from the pipe. Reclaimed water may be utilized for filling new reclaimed water or wastewater force main installations. If blow offs or other outlets are not available at high points for releasing air, the Contractor shall provide 1 inch (minimum taps and blow–off valves at the 12:00 position), as necessary. The cost of constructing blow–off valves and plugging them, after a successful pressure test, shall be included in the unit price bid amount for the pipe.

3. For mains larger than 20–inch size, the contractor shall profile (line and grade) the main after installation and prior to pressure and leakage test to accurately locate all high points. Field survey instrument (Level equipment) shall be utilized for this task. Blow off valves shall be installed (at a minimum) at all high points which offset vertically more than two pipe diameters in length (at a minimum). The contractor shall consult the design engineer on any technical questions or concerns.

4. Hydrostatic testing shall consist of a 150 psig test pressures, based on the elevation of the highest point of the line or section under tests. Pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connection and all necessary apparatus shall be furnished by the Contractor and shall be subject to the approval of the Engineer.

5. Maximum duration for pressure test, including initial and final phase of the test, shall not exceed eight (8) hours. If the test is not completed due to leakage, equipment failure, etc., depressurize the test section, and then allow it to "relax" for at least eight (8) hours before bringing the test section up to test pressure again.

6. Initial Phase of Pressure Testing: First, all air must be removed from the test section. The pressure test shall be completed after the line is backfilled. If possible, all flanged or mechanical joint valves and fittings shall be left exposed for visual leak inspection. If possible all PVC and D.I.P. test sections shall be left exposed for visual leak inspection. Initially, the pressure within the test section should be raised to approximately 160 psi and then allowed to be idle (no additional make–up water/pressure to be injected), for approximately 3 hours. During this 3–hour period, the test section shall be allowed to stabilize and come to an equilibrium stage. No additional make–up water/pressure shall be applied to the test section during this 3–hour stabilization period unless the line pressure drops below 140 psi. In this case, make–up water/pressure shall only be applied to the test section to maintain a minimum of 140 psi (during the 3–hour stabilization period).

7. Final Phase of Pressure Testing: The final phase of the pressure test shall involve applying make–up water/pressure to achieve an "initial test pressure" of 150 psi (minimum)/155 psi (maximum). The test section is then allowed to be idle (no make–up water/pressure is added) for a period of 2 hours. After this 2–hour period, make–up water/pressure is applied and measured to re–establish the "initial test pressure". The quantity of water

utilized to re–pump the line shall be measured and compared to the allowable quantities as determined by the table below. If the actual make–up water quantity is equal or less than the allowable amount, the pressure test passes. If the actual make–up water quantities are greater than the allowable amount, the pressure test fails (see table below).

Allowable Make Up Amount

Nominal Pipe Size (in)	Make–up Water Allowance (GAL/LF of pipe), 2–hour test
6	0.003
8	0.005
10	0.0065
12	0.0115
14	0.014
16	0.0165
18	0.0215
20	0.0275
22	0.035
24	0.044
26	0.05
28	0.0555
30	0.0635
32	0.0715
34	0.081
36	0.09
42	0.115
48	0.135
54	0.157

8. In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are complied with. All testing shall be performed at the Contractor's expense.

9. If, in the judgment of Engineer, it is impracticable to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made with approval; but, in any event, the Contractor shall be responsible for the ultimate tightness of the piping within the above requirement. Re–disinfection shall be required if the line is de–pressurized for repairs prior to tying.

C. Locate Wire:

Two locate wires shall be provided on all installations. For HDD projects, locate wire shall be 12 AWG high strength copper–clad carbon steel with 45 mils (min) insulation. The external color shall be either blue for water, green for wastewater, purple for reuse, or black for raw water. Locate wire shall be brought to grade within a valve box or locate station box at all "entry point locations" and all "exit point locations". For HDD projects, there is no maximum length or interval between locate wire stations. The testing and report requirements within Chapter III. 1. – Section 350 and Chapter IV.3.–Section 429 shall be required except as modified herein. If both locate wires break or is not continuous (from end to end), the contractor shall, at the contractor's expense, provide soft–digs for the portions of the main with 12–feet or less cover (every 25 LF along main) to confirm as–built data. This soft–dig data shall be recorded on the as–built record drawings as specified here–in.

3.13 SITE RESTORATION:

Following drilling operations, Contractor will demobilize equipment and restore the worksite to its original condition. All excavations will be backfilled and compacted to 95 percent of original density. Landscaping will be the responsibility of Contractor.

3.14 RECORDKEEPING AND AS–BUILTS:

Contractor shall maintain a daily project log of drilling operations and a guidance system log with a copy given to Engineer at completion of project. As–built drawings shall be completed by a professional surveyor and certified as to accuracy by Contractor.

END OF SECTION

INDEX TO

SECTION 00 25 61 – HIGH DENSITY POLYETHYENE (HDPE) PLASTIC PIPE

SECTION 00 25 61

HIGH DENSITY POLYETHYLENE (HDPE) PLASTIC PIPE

PART 1 – GENERAL

1.1 WORK INCLUDED

The work under this section covers high–density polyethylene (HDPE) pipe for sanitary sewer force mains and or water mains installed as a part of the horizontal directional drill process. The work includes the installation and testing of all polyethylene pipe and fittings for the main as shown on the Drawings. Provide all labor, materials, equipment and services indicated on the Drawings, as specified herein and as reasonably necessary or incidental to complete the job.

1.2 QUALITY ASSURANCE

A Georgia Registered Professional Engineer, other than Thomas & Hutton Engineering Co., shall design the final steel casing size (if applicable) and thickness and HDPE pipe wall thickness and shall submit the stamped design calculations to the Owner (assuming the area between the steel casing and the HDPE pipe contains water).

1.3 REFERENCED STANDARDS

Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

ASTM D2321	Standard Practice for Underground Installation of Flexible Thermoplastic Pipe for Sewers and Other Gravity–Flow Applications
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR–PR) Based on Outside Diameter.
ASTM D3261	Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
AWWA C906	Standard Specification for Polyethylene (PE) Pressure Pipe and Fittings 4" through 63" for Water Distribution and Transmission

1.4 ACCEPTANCE OF PIPE

Acceptance of pipe will be based on design, material tests, and examination of the complete product. Quality of all materials used in the pipe, process of manufacture, and finished pipe shall be subject to examination by Engineer. Examination may be

made at place of manufacture, or on job site after delivery, or at both places and pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample pipe units may have been accepted as satisfactory at place of manufacture. All pipe which is rejected must be immediately removed from project site by the Contractor.

1.5 SUBMITTALS

A. Manufacturer's Certificate Pipe and Fittings: For information only, submit two copies of manufacturer's certificate indicating pipe and fittings have been examined and tested at the place of manufacture and meet requirements of referenced Standards and these Specifications.

B. Submit two copies of the Registered Professional Engineer's Design Calculations required by Paragraph 1.2 of this Section.

1.6 REQUIREMENTS OF REGULATORY AGENCIES

The HDPE pipe shall meet requirements and specifications of Georgia DOT including testing and disinfection as applicable.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

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 and neither damaged nor deteriorated material shall be used in the work. Owner and Engineer have the right to reject defective or damaged material.

1.8 SEQUENCING AND SCHEDULING

Contractor shall arrange work so sections of mains between valves are tested, sterilized, pavement replaced, and the section placed in service as soon as reasonable after it is placed. Owner reserves the right to dictate sequence of construction.

1.9 ALTERNATIVES

The intention of these specifications is to produce best system for Owner. If Contractor suggests alternative material, equipment or procedures will improve results at no additional cost, the Engineer and Owner will examine suggestion, and if it is accepted, it may be used. The basis upon which acceptance of an alternative will be given is its value to Owner, and not for convenience of Contractor.

1.10 GUARANTEE

Contractor shall guarantee the quality of materials, equipment, and workmanship for a period of 18 months after final project acceptance. Defects discovered during this period shall be repaired by Contractor at no cost to the Owner. The Contractor shall provide an 18–month guarantee.

1.11 EXISTING UTILITIES

All known utility facilities are shown schematically on plans and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans 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 plans. Contractor shall contact all utility companies prior to beginning work and request an accurate field location of their respective utility lines.

1.12 CONNECT NEW MAIN TO EXISTING SYSTEM

Contractor shall furnish necessary pipe and perform all excavation, dewatering, shoring, backfilling, etc., necessary to make the connection of a new main to existing system to be or already installed by others. Contractor shall contact the utility a minimum of 72 hours in advance of construction. Contractor shall be responsible for coordinating construction with the utility.

1.13 DAMAGE TO EXISTING SYSTEM

Damage to any part of existing system by Contractor or Subcontractors, which is repaired by Utility Owner's forces, or an acceptable contractor shall be charged to the Contractor on basis of time and material, plus an overhead and administration charge using Commission's multiplier, or plus 30% for overhead and administration for an acceptable contractor.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Polyethylene Pipe:

1. Provide high–density polyethylene pipe and fittings to comply with ASTM D3350. Pipe shall also meet the dimensions and tolerances as specified in ASTM F–714. Pipe shall be equivalent to Driscopipe 1000 as manufactured by Phillips Driscopipe Co., Inc., Plexco PE 3408 by Chevron Plexco, Inc. or by CSR Polypipe.

2. The required pipe SDR shall be determined by a Georgia Professional Engineer to meet operational and load conditions encountered after and during construction. Pipe diameter shall be **30" inside diameter**. The minimum **SDR shall be 17** for all sizes (ASTM F–714).

B. Pipe Joints: Pipe sections shall be permanently connected by thermal butt fusion in accordance with manufacturer's procedures using equipment specified by the pipe manufacturer. Mechanical jointing shall be accomplished with the use of flange adapters and stub ends complying with ASTM D3261 and in accordance with manufacturer's instructions for mechanical joining.

C. Fittings: Unless otherwise specified or indicated on the Drawings, all polyethylene

fittings shall conform to ASTM D3261.

PART 3 – EXECUTION

3.1 GENERAL

Examine areas and conditions under which pipe is to be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PIPE PACKAGING, HANDLING, STORAGE

A. The manufacturer shall package pipe in a manner designed to deliver it to the project neatly, intact, and without physical damage. The transportation carrier shall use appropriate method and intermittent checks to ensure pipe is properly supported, stacked, restrained, and pipe interior protected from airborne contamination during transport, so pipe is not nicked, gouged, or physically damaged.

B. Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If pipe must be stacked for storage, such stacking shall be done in accordance with the manufacturer's recommendations. Handling of pipe shall take place in such a manner it is not damaged by dragging over sharp objects or cut by chokers of lifting equipment.

C. Sections of pressure pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of pipe shall be rejoined using a heat fusion joining method.

D. Fused segments of pipe shall be handled to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable type chokers must be avoided. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections. Care must be exercised to avoid cutting or gouging the pipe.

3.3 PIPE INSTALLATION

Install pipe in accordance with the manufacturer's recommendations. Adhere to Rules, Regulations, and Requirements of OSHA, Occupational Safety, and Health Act.

A. Trench Construction: The trench and trench bottom shall be constructed in accordance with ASTM D2321.

B. Embedment Material: Shall be Class I, Class II, or Class III materials as defined by ASTM D2321. The use of Class IV and Class V materials for embedment is not allowed. Class I crushed stone and Class II well–graded dense aggregates are preferred and shall have an installed density of at least 85% Standard Proctor Density through compaction or consolidation.

C. Bedding: Pipe bedding shall be performed in accordance with ASTM D2321.

Compaction rates shall be as specified in ASTM D2321. Deviation from specified compaction rates shall only be allowed when accepted by the Engineer.

D. Haunching and Initial Backfill: Shall be as specified in ASTM D2321 using Class I, Class II, or Class III materials. In cases where a compaction rate of 95% Standard Proctor Density is not attainable, Engineer may increase the SDR of pipe to provide adequate stiffness.

E. Joint Fusion:

1. Joining sections of pipe and fittings shall be in continuous lengths by the heat fusion method and shall be performed in strict accordance with manufacturer's recommendations. The heat fusion equipment used in joining procedures should be capable of meeting all conditions recommended by pipe manufacturer, including, but not limited to, temperature requirements of 400°F, alignment, and 75 psi interfacial fusion pressure.

2. Heat fusion joining shall be 100% efficient offering a joint weld strength equal to or greater than the tensile strength of pipe. Socket fusion shall not be used. Flanges, unions, grooved–couplers, transition fittings and some mechanical couplers may be used to mechanically connect HDPE pipe without butt fusion. Refer to the manufacturer's recommendations. Both installers and joint examiners shall be trained by the manufacturer or its authorized representative. Fusion of unlike SDRs is not permitted. Transition from different SDRs using mechanical couplings or a transition nipple Polyethylene pipe shall be connected to systems or other material fittings using flanged connections or mechanical compression coupling for use with polyethylene pipe. Mechanical couplings shall be installed according to manufacturer's recommendations.

F. Special Conditions: ASTM–D2321–Section 11.2, Minimum Cover for Load Application, Section 11.3, Use of Compaction Equipment, and Section 11.4, Removal of Trench Protection shall apply unless directed otherwise by the Engineer.

3.4 HYDROSTATIC AND LEAKAGE TESTS

A. Hydrostatic and leakage tests of pressure lines shall be made by Contractor under the direction of Engineer.

B. High density polyethylene pipe shall be tested using hydrostatic procedures. The preferred testing medium is clean water, but other liquids may be used. The test section should be completely filled with liquid, taking care to bleed off any trapped air. While the test section is filling, venting at high points may be necessary to purge air pockets. The test pressure shall be 1–1/2 times the system design operating pressure.

C. The test procedure consists of initial expansion and test phases. For the initial expansion phase, makeup water is added as required to maintain the test pressure for three hours. For the test phase, the test pressure is reduced by 10 psi. If the pressure remains steady (within 5% of the target value) for an hour, no

leakage is indicated. The total test time including initial pressurization, initial expansion, and time at test pressure, must not exceed eight hours. **If the test is not completed due to leakage, equipment failure, etc., depressurize the test section, and then allow it to "relax" for at least eight hours before bringing the test section up to test pressure again.**

D. Should any test of the pipe laid disclose leakage, Contractor shall, at its own expense, locate and repair defective joints.

E. Contractor is responsible for notifying the Engineer 48 hours (minimum) prior to applying pressure for testing. Pressure test will be witnessed by the Engineer, Project Representative, and utility owner.

F. Potable water is available at a cost to the Contractor in accordance with current utility company rate structure. The cost of transporting water to construction site is an expense of Contractor.

3.5 DISINFECTION

A. After hydrostatic and leakage tests are satisfactorily completed, the HDPE carrier pipe shall be disinfected in accordance with AWWA C 651 and Regulations of Georgia EPD.

All new mains and repaired portions of, or existing mains shall be thoroughly flushed at a flow velocity greater than 2.5 feet per second then chlorinated with not less than fifty parts per million (50 ppm) of available chlorine. Chlorine gas or seventy percent high–test calcium hypochlorite can be used. Water from the existing distribution system or other source of supply should be controlled to flow slowly into newly laid pipeline during application of chlorine. The solution shall be retained in pipeline for not less than 24 hours and a chlorine residual of 25 ppm shall be available at this time. Then system shall be flushed with potable water and the sampling program started.

B. A minimum of two bacteriological samples shall be taken at least 24 hours apart after disinfection and tested by a State accepted lab and shall indicate the water line to be absent of total coliform bacteria. The number of sampling sites depends on the amount of new lines; however, all dead lines must be sampled. Results shall be submitted to Engineer by the Contractor. Results shall indicate coliform growth, non–coliform growth (NCG) and chlorine residual at the time of sampling. Results shall indicate sample date, location, and time, and shall be performed less than 30 days prior to the Engineer submitting for final permit to operate. All samples must be analyzed by a state certified laboratory.

END OF SECTION

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SECTION 00 26 10

FUSIBLE POLYVINYLCHLORIDE PIPE FOR INSTALLATION BY HORIZONTAL DIRECTIONAL DRILLING (HDD)

PART 1 – GENERAL

1.1 DESCRIPTION

A. SCOPE:

1. This section specifies fusible polyvinylchloride pipe, including standards for dimensionality, testing, quality, acceptable fusion practice, safe handling, storage, and installation of the pipe by horizontal directional drilling, directional boring, or guided boring.

B. REQUIREMENTS:

1. Contractor shall provide fusible polyvinylchloride pipe conforming to all standards and procedures and meeting all testing and material properties as described in this specification for installation by horizontal directional drilling.

2. Contractor shall be responsible for all installation processes and procedures associated with the installation by horizontal directional drilling in accordance with this specification.

C. PIPE DESCRIPTION:

1. Pipe Supplier shall furnish fusible polyvinylchloride pipe conforming to all standards and procedures and meeting all testing and material properties as described in this specification.

2. Pipe shall conform to the following dimensionality and general characteristics table:

Pipe Description	Nominal Diameter (inches)	DR	Color	Pressure Class (psi)	Required Inner Diameter (inches)
Effluent FM – FPVC	30"	18	Green	165	29.25

1.2 QUALITY ASSURANCE

A. REFERENCES:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the

issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.

3. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued, or replaced.

Reference	Title
ANSI/AWWA C110/A21.10	American National Standard for Ductile–Iron and Gray–Iron Fittings, 3–inch through 48–inch, for Water and Other Liquids
ANSI/AWWA C111/A21.11	American National Standard for Rubber–Gasket Joints for Ductile–Iron Pressure Pipe and Fittings
AWWA C605	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	Standard for Disinfecting Water Mains
AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm Through 300mm), for Water Distribution
AWWA C905	Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm Through 1200mm), for Water Distribution and Transmission
AWWA M23	AWWA Manual of Supply Practices PVC Pipe—Design and Installation, Second Edition
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM D1784	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
	Test Method for Degree of Fusion of Extruded
ASTM D2152	Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
ASTM D2241	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR–PR)
ASTM D2665	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D3034	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F679	Standard Specification for Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F1057	Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique

Reference	Title
ASTM F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low–Pressure Air
UNI–B–6	Recommended Practice for Low–Pressure Air Testing of Installed Sewer Pipe
UNI–PUB–08	Tapping Guide for PVC Pressure Pipe
NSF–14	Plastics Piping System Components and Related Materials
NSF–61	Drinking Water System Components—Health Effects
PPI TR–2	PVC Range Composition Listing of Qualified Ingredients

B. MANUFACTURER REQUIREMENTS

1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

C. FUSION TECHNICIAN REQUIREMENTS

1. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

D. SPECIFIED PIPE SUPPLIERS

1. Fusible polyvinylchloride pipe shall be equivalent to those manufactured under the trade names Fusible C–900®, Fusible C–905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679–9551. Fusion process shall be equivalent to the process as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. No other supplier of fusible polyvinylchloride pipe shall be used unless accepted in writing by Owner/Engineer.

E. WARRANTY

1. The pipe shall be warranted for one year per the pipe supplier's standard terms.
2. In addition to the standard pipe warranty, the fusion services shall be warranted for one year per the fusion service provider's standard terms.

F. PRE–CONSTRUCTION SUBMITTALS

1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:
   a. Pipe Size
   b. Dimensionality
   c. Pressure Class per applicable standard
   d. Color
   e. Recommended Minimum Bending Radius
   f. Recommended Maximum Safe Pull Force
   g. Fusion technician qualification indicating conformance with this specification

2. The following WORK PLAN AND INFORMATION is required from the contractor and/or horizontal directional drilling Contractor. This WORK PLAN AND INFORMATION shall also be supplied to the pipe supplier, should it be requested:

   a. Work plan shall include for each HDD installation any excavation locations and dimensions, interfering utilities, bore dimensions and locations including bend radii used, and traffic control schematics.

   b. A project safety and contingency plan which shall include but shall not be limited to drilling fluid containment and cleanup procedures, equipment and plan for compromised utility installations including electrical and power lines, water, wastewater and any other subsurface utility in the area.

   c. An HDD schedule identifying daily work hours and working dates for each installation.

G. POST–CONSTRUCTION SUBMITTALS

1. The following AS–RECORDED DATA is required from the contractor and/or fusion provider to the owner or pipe supplier upon request:

   a. Approved datalogger device reports

   b. Fusion joint documentation containing the following information:

      i. Pipe Size and Thickness

      ii. Machine Size

      iii. Fusion Technician Identification

      iv. Job Identification

      v. Fusion Joint Number

      vi. Fusion, Heating, and Drag Pressure Settings

      vii. Heat Plate Temperature

      viii. Time Stamp

      ix. Heating and Cool Down Time of Fusion

      x. Ambient Temperature

   c. As–recorded Information

      i. The as–recorded plan and profile will reflect the actual installed alignment and reflect the horizontal offset from the baseline and depth of cover.

      ii. All fittings, valves, or other appurtenances will also be referenced and shown.

      iii. A daily project log, along with tracking log sheets, should they be used, shall be provided. Tracking log sheet data, should it be employed, shall include any and all that apply, including inclination, depth, azimuth, and hydraulic pull–back and rotational force measured.

PART 2 – PRODUCTS

2.1 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR POTABLE WATER

A. Fusible polyvinylchloride pipe shall conform to AWWA C900, ASTM D2241 or ASTM D1785 for standard dimensions, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.

B. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

C. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

D. Fusible polyvinylchloride pipe shall be blue in color for potable water use.

E. Pipe generally shall be marked per AWWA C900, AWWA C905, ASTM D2241, or ASTM D1785, as applicable, and shall include as a minimum:

1. Nominal pipe size
2. PVC
3. Dimension Ratio, Standard Dimension Ratio, or Schedule
4. AWWA pressure class or standard pressure rating for non–AWWA pipe
5. AWWA standard designation number or pipe type for non–AWWA pipe
6. NSF–61 mark verifying suitability for potable water service
7. Extrusion production–record code
8. Trademark or trade name
9. Cell Classification 12454 and/or PVC material code 1120 may also be included

F. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.4 FUSION JOINTS

A. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt–fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed as described in this specification.

2.5 CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS

A. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie–ins to other piping systems.

B. DUCTILE IRON MECHANICAL AND FLANGED FITTINGS

Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10 and AWWA/ANSI C111/A21.11.

1. Connections to fusible polyvinylchloride pipe may be made using a restrained or non–restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.
2. Bends, tees, and other ductile iron fittings shall be restrained with the use

of thrust blocking or other means as indicated in the construction documents.

3. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

C. PVC GASKETED, PUSH–ON FITTINGS

Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard PVC pressure fittings conforming to AWWA C900 or AWWA C905.

1. Acceptable fittings for use joining fusible polyvinylchloride pipe other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push–on type couplings and fittings, including bends, tees, and couplings as shown in the drawings.

2. Bends, tees, and other PVC fittings shall be restrained with the use of thrust blocking or other restraint products as indicated in the construction documents.

3. PVC gasketed, push–on fittings, and mechanical restraints, if used, must be installed per the manufacturer's guidelines.

D. FUSIBLE POLYVINYL CHLORIDE SWEEPS OR BENDS

1. Fusible polyvinyl chloride sweeps, or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.

2. Fusible polyvinyl chloride sweeps, or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.

3. Standard fusible polyvinyl chloride sweeps, or bend angles shall not be greater than 22.5 degrees and shall be used in nominal diameters ranging from 4 inch through 16 inch.

E. SLEEVE–TYPE COUPLINGS

1. Sleeve–type mechanical couplings shall be manufactured for use with PVC pressure pipe and may be restrained or unrestrained as indicated in the construction documents.

2. Sleeve–type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

F. EXPANSION AND FLEXIBLE COUPLINGS

1. Expansion–type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

2. Expansion–type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

G. CONNECTION HARDWARE

Bolts and nuts for buried service shall be made of non–corrosive, high–strength, low–alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

2.6 DRILLING SYSTEM EQUIPMENT

A. GENERAL

1. The directional drilling equipment, as a minimum, shall consist of a directional drilling rig of sufficient capacity to perform the bore(s) and pull–back of the pipe(s), a drilling fluid mixing & delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations, and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project. All required equipment shall be included in the emergency and contingency plan as submitted per these specifications.

B. DRILLING RIG

1. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull drill pipe while delivering a pressurized fluid mixture to a drill head. The machine shall be anchored to withstand the pulling, pushing and rotating forces required to complete the project.

2. The drilling rig hydraulic system shall be of sufficient pressure and volume to power drilling operations. The hydraulic system shall be free from leaks.

3. The drilling rig shall have a system to monitor pull–back hydraulic pressure during pull–back operations.

C. DRILL HEAD

1. The horizontal directional drilling equipment shall produce a stable fluid lined tunnel with the use of a steer–able drill head and any subsequent pre–reaming heads.

2. The system must be able to control the depth and direction of the drilling operation.

3. Drill head shall contain all necessary cutters and fluid jets for the operation and shall be of the appropriate design for the ground medium being drilled.

D. DRILLING FLUID SYSTEM

1. DRILLING FLUID (DRILLING MUD)

a. Drilling fluid shall be composed of clean water and the appropriate additive(s) for the fluid to be used. Water shall be from a clean source and shall meet the mixing requirements of the mixture manufacturer(s).

b. The water and additives shall be mixed thoroughly to assure the absence of any clumps or clods. No hazardous additives may be used.

c. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall(s).

d. Drilling fluid shall be disposed of off–site in accordance with local, state and federal requirements and/or permit conditions.

e. No additional chemicals or polymer surfactants shall be allowed to be added to the drilling fluid unless they have been submitted per

this specification.

2. MIXING SYSTEM

   a. A drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid for the project.

   b. The mixing system shall be able to ensure thorough mixing of the drilling fluid. The drilling fluid reservoir tank shall be sized for adequate storage of the fluid.

   c. The mixing system shall continually agitate the drilling fluid during drilling operations.

3. DRILLING FLUID DELIVERY AND RECOVERY SYSTEM

   a. The drilling fluid pumping system shall have a minimum capacity to supply drilling fluid in accordance with the drilling equipment pull–back rating at a constant required pressure.

   b. The delivery system shall have filters or other appropriate in–line equipment to prevent solids from being pumped into the drill pipe.

   c. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of. The use of spill containment measures shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps, vacuum truck(s), and/or storage of sufficient size shall be in place to contain excess drilling fluid.

   d. A closed–loop drilling fluid system and a drilling fluid cleaning system should be used to whatever extent practical, depending upon project size and conditions. Under no circumstances shall drilling fluid that has escaped containment be reused in the drilling system.

E. DRILLING CONTROL SYSTEM

1. Calibration of the electronic detection and control system shall be verified prior to the start of the bore.

2. The drilling head shall be remotely steer–able by means of an electronic or magnetic detection system. The drilling head location shall be monitored in three dimensions:

   a. Offset from the baseline,

   b. Distance along the baseline, and

   c. Depth of cover.

3. Point of rotation of the head shall also be monitored.

4. For gravity application and on–grade drilling, sonde/beacon or approved equipment applicable for grade increments of 1/10th of one percent shall be used.

2.7 PIPE PULL HEADS

A. Pipe pull heads shall be utilized that employ a positive through–bolt design assuring a smooth wall against the pipe cross–section at all times.

B. Pipe pull heads shall be specifically designed for use with fusible

polyvinylchloride pipe and shall be as recommended by the pipe supplier.

2.8 PIPE ROLLERS

A. Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe during handling and pullback operations.

B. A sufficient quantity of rollers and spacing, per the pipe supplier's guidelines shall be used to assure adequate support and excessive sagging of the product pipe.

PART 3 – EXECUTION

3.1 DELIVERY AND OFF–LOADING

A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the [Owner] [or] [Engineer].

B. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify [Owner] [or] [Engineer] immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.

C. Pipe should be loaded, off–loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed.

D. Off–loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

E. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

F. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to ensure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

3.2 HANDLING AND STORAGE

A. Any length of pipe showing a crack, or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.

B. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the [Owner] [or] [Engineer].

C. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

D. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

E. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build–up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

F. Pipe shall be stored and stacked per the pipe supplier's guidelines.

3.3 FUSION PROCESS

A. GENERAL

1. Fusible polyvinylchloride pipe will be handled in a safe and non–destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:

   a. HEAT PLATE – Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be cap

   b. able of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

   c. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

   d. GENERAL MACHINE – Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

   e. DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:

   a. Pipe rollers shall be used for support of pipe to either side of the machine

   b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for

fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier's recommendations.

c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

d. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

e. Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

B. JOINT RECORDING

Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt–fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.4 DRILLING OPERATIONS

A. GENERAL

1. Bore path and alignment are as indicated in the contract documents. The path of the bore may be modified based on field and equipment conditions. Entry and exit locations and control–point elevations shall be maintained as indicated in the contract documents.

2. Bend radii shown in the contract documents are minimum allowable radii and shall not be reduced.

B. LOCATION AND PROTECTION OF UNDERGROUND UTILITIES

1. Correct location of all underground utilities that may impact the HDD installation is the responsibility of the Contractor, regardless of any locations shown on the drawings or previous surveys completed.

2. Utility location and notification services shall be contacted by the Contractor prior to the start of construction.

3. All existing lines and underground utilities shall be positively identified, including exposing those facilities that are located within an envelope of possible impact of HDD installation as determined for the project specific site conditions. It is the Contractor and HDD system operator's responsibility to determine this envelope of safe offset from existing utilities. This will include, but is not limited to, soil conditions and layering, utility proximity and material, HDD system and equipment, and foreign subsurface material.

C. SITE LOCATION PREPARATION

1. Work site as indicated on drawings shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made

2. Contractor shall confine all activities to designated work areas.

D. DRILLING LAYOUT AND TOLERANCES

1. The drill path shall be accurately surveyed with entry and exit areas placed in the appropriate locations within the areas indicated on drawings. If using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies.

2. Instrumentation shall be provided and maintained at all times that accurately locates the pilot hole, measures drill–string axial and torsional loads and measures drilling fluid discharge rate and pressure.

3. Entry and exit areas shall be drilled so as not to exceed the bending limitations of the pipe as recommended by the pipe supplier.

E. PILOT HOLE BORE

1. Pilot hole shall be drilled along bore path. In the event that the pilot bore does deviate from the bore path, it may require contractor to pull–back and re–drill from the location along bore path before the deviation.

2. The Contractor shall limit curvature in any direction to reduce force on the pipe during pull–back. The minimum radius of curvature shall be no less than that specified by the pipe supplier and as indicated on the drawings.

F. REAMING

1. After successfully completing the pilot hole, the bore hole shall be reamed to a diameter which meets the requirements of the pipe being installed. The following table is offered as an estimated guide:

Nominal Pipe Diameter	Bore Hole Diameter
< 8 inches	Pipe Dia. + 4 inches
8 inches to 24 inches	Pipe Dia. X 1.5
> 24 inches	Pipe Dia. + 12 inches

2. Multiple reaming passes shall be used at the discretion of the Contractor and shall conform to this specification.

3. In the event of a drilling fluid fracture, returns loss or other loss of drilling fluid, the Contractor shall be responsible for restoring any damaged property to original condition and cleaning up the area in the vicinity of the damage or loss.

3.5 PIPE PULL–BACK AND INSERTION

A. Pipe shall be fused prior to insertion, if the site and conditions allow, into one continuous length.

B. Contractor shall handle the pipe in a manner that will not over–stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe does not bend past the pipe supplier's minimum allowable bend radius, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.

C. The pipe entry area shall be graded as needed to provide support for the pipe and to allow free movement into the bore hole.

1. The pipe shall be guided into the bore hole to avoid deformation of, or damage to, the pipe.

2. The fusible polyvinylchloride pipe may be continuously or partially supported

on rollers or other Owner and Engineer approved friction decreasing implement during joining and insertion, as long as the pipe is not over–stressed or critically abraded prior to, or during installation.

3. A swivel shall be used between the reaming head and the fusible polyvinylchloride pipe to minimize torsion stress on the pipe assembly.

D. Buoyancy modification shall be at the sole discretion of the Contractor and shall not exceed the pipe supplier's guidelines in regard to maximum pull force or minimum bend radius of the pipe. Damage caused by buoyancy modifications shall be the responsibility of the Contractor.

E. Once pull–back operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole.

F. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, or movement and distortion of surface features. Any damages caused by the Contractor's operations shall be corrected by the Contractor.

3.6 INSTALLATION CLEANUP

A. Following the installation, the project site shall be returned to a condition equal to or better than the pre–construction condition of the site. All excavations will be backfilled and compacted per the construction documents and jurisdictional standards. All pavement and hardscape shall be repaired per applicable jurisdictional standards, excess materials shall be removed from the site, and disturbed areas shall be re–landscaped. All drilling fluid shall be properly disposed of per these specifications and all applicable jurisdictional laws.

B. Contractor shall verify that all utilities, structures, and surface features in the project area are sound.

3.7 PREPARATION PRIOR TO MAKING CONNECTIONS INTO EXISTING PIPING SYSTEMS

A. Approximate locations for existing piping systems are shown in the construction documents. Prior to making connections into existing piping systems, the contractor shall:

1. Field verify location, size, piping material, and piping system of the existing pipe.

2. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.

3. Have installed all temporary pumps and/or pipes in accordance with established connection plans.

B. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

3.8 PIPE SYSTEM CONNECTIONS

A. Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines.

B. If possible, pipe installed via HDD shall be filled with water prior to making any connections to the existing system or other portions of the project.

3.9 TAPPING FOR POTABLE AND NON–POTABLE WATER APPLICATIONS

A. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni–Pub–8.

B. All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the drawings.

C. Equipment used for tapping shall be made specifically for tapping PVC pipe:

1. Tapping bits shall be slotted "shell" style cutters, specifically made for PVC pipe. 'Hole saws' made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.

2. Manually operated or power operated drilling machines may be used.

D. Taps may be performed while the pipeline is filled with water and under pressure ('wet' tap,) or when the pipeline is not filled with water and not under pressure ('dry' tap).

3.10 TESTING

A. Testing shall comply with all applicable jurisdictional building codes, statutes, standards, regulations, and laws.

B. HYDROSTATIC TESTING AND LEAKAGE TESTING FOR PRESSURE PIPING

1. Hydrostatic and leakage testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.

2. Unless agreed to or otherwise designated by the owner or engineer, for a simultaneous hydrostatic and leakage test following installation, a pressure equal to 150 psi shall be applied. The duration of the pressure test shall be for two (2) hours.

3. If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.

4. In preparation for pressure testing the following parameters must be followed:

a. All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by 'flushing' the pipeline in accordance with the parameters and procedures as described in AWWA C605.

b. The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the restraint manufacturer's guidelines, whether permanent or temporary to the final installation. This also includes the installation and curing of any and all required thrust blocking. All appurtenances included in the pressure test, including valves, blow–offs, and air–relief valves shall be checked for proper

installation and restraint prior to beginning the test.

c. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

C. DISINFECTION OF THE PIPELINE FOR POTABLE WATER PIPING

1. After installation, the pipeline, having passed all required testing, shall be disinfected prior to being put into service. Unless otherwise directed by the owner or engineer, the pipeline will be disinfected per AWWA C651.

D. PARTIAL TESTING

1. Segments of the pipe may be tested separately in accordance with standard testing procedure, as approved by the owner and engineer. Testing of each HDD installation prior to connection to the system or other piping is preferred.

END OF SECTION

INDEX TO

SECTION 00 29 02 – GRASSING

SECTION 00 29 02

GRASSING

PART 1 – GENERAL

1.1 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.

1.2 RELATED WORK

A. Section 00 22 04 – Earthwork

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, and location of packaging. Damaged packages are not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Damaged bags are not acceptable.

C. Deliver sod on pallets.

D. All material shall be acceptable to Engineer prior to use.

1.4 PLANTING DATES

A. This specification provides for the establishment of a permanent grass cover between the dates of March 1 and September 30. If finished earth grades are not completed in time to permit planting and establishment of the permanent grass during the favorable season between the dates specified above unless otherwise accepted, the Contractor will be required to plant a temporary cover to protect the new graded areas from erosion and to keep windborne dust to a minimum. The temporary cover shall be planted between October 1 and February 28 unless otherwise permitted.

1.5 MEASUREMENT AND PAYMENT

A. When the season or stage of the project is such the results of grassing work cannot be determined, conditional acceptance will be made on the work completed. When conditional acceptance is made for the items of work covered, the Contractor shall be entitled to 50% of bid price for the actual work placed and shall receive the remaining 50% of bid price when final acceptance is made. Conditional acceptance shall not apply to the remaining items of work, and full bid price payment shall be made when the work is acceptably placed and completed in accordance with the specifications.

B. Payment for grassing will be made at the contract unit price for the item "Grassing" and such payment shall constitute full compensation for furnishing and placing seed and fertilizer or sod where directed and protecting and maintaining seed and sod in all graded and disturbed areas.

PART 2 – PRODUCTS

2.1 SEED

A. 100% common Bermuda.

B. All seed shall conform to all State Laws and to all requirements and regulations of the State Department of Agriculture.

C. The several varieties of seed 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.

D. The Engineer reserves the right to test, reject, or accept all seed before seeding.

2.2 FERTILIZER

A. 4–12–12, commercial fertilizer of approved type, conforming to state fertilizer laws.

2.3 SEEDING SCHEDULE

A.

SEED	RATE	PLANTING DATES
Bermuda	20–lbs/acre	March 1 – September 30
Rye	75–lbs/acre	October 1 – February 28

B. In areas where existing grass is to be matched, Contractor shall sow seed at the rate and dates recommended by seed distributor.

2.4 LIME

A. Agricultural grade, ground limestone.

2.5 SOD

A. Sod shall be densely rooted, good quality centipede grass, free from noxious weeds. The sod shall be obtained from areas where the soil is reasonably fertile. The sod shall be raked free of all debris and the grass mowed to 2–inches before cutting. The sod shall contain practically all of the dense root system and not be less than 1–inch thick. Sod shall be cut in uniform strips not less than 12–inches in width and not less than 24–inches in length.

2.6 ACCESSORIES

A. Straw Mulch: Oat or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition.

B. Excelsior Mulch: Excelsior mulch shall consist of wood fibers cut from sound, green timber. The average length of the fibers shall be 4 to 6–inches. The cut shall be made in such a manner as to provide maximum strength of fiber, but at a slight angle to the natural grain of the wood to cause splintering of the fibers when weathering in order to provide adherence to each other and to the soil.

C. Wood cellulose fiber shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form homogenous slurry. The mulch fibers shall intertwine physically to form a strong moisture holding mat on the ground surface and allow rainfall to percolate into the underlying soil. The mulch shall be heat processed to contain no germination or growth–inhibiting factors. It shall be dyed (non–toxic) an appropriate color to facilitate metering of material.

2.7 PRODUCT REVIEW

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

PART 3 – EXECUTION

3.1 PREPARATION

A. The areas to be seeded shall be made smooth and uniform and shall conform to the finished grade indicated on the plans.

B. Remove foreign materials, plants, roots, stones, and debris from surfaces to be seeded.

C. Grassing areas, if not loose, shall be loosened to a minimum depth of 3–inches before fertilizer, seed or sod is applied.

3.2 STAND OF GRASS

A. Before acceptance of the seeding performed for the establishment of permanent vegetation, the Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of re–establishment in the spring.

B. Before acceptance of the seeding performed for the establishment of temporary vegetation, the Contractor will be required to produce a stand of grass sufficient to control erosion for a given area and length of time before the next phase of construction or the establishment of permanent vegetation is to commence.

3.3 SEEDING DATES

A. Seeding shall be performed during the periods and at the rates specified in the seeding schedules. Seeding work may, at the discretion of the Contractor, be performed throughout the year using the schedule prescribed for the given period.

Seeding work shall not be conducted when the ground is frozen or excessively wet. The Contractor will be required to produce a satisfactory stand of grass regardless of the period of the year the work is performed.

3.4 APPLYING LIME AND FERTILIZER

A. Following advance preparation and placing selected material for shoulders and slopes, lime, if called for based on soil tests and fertilizer, shall be spread uniformly over the designated areas, and shall be thoroughly mixed with the soil to a depth of approximately 2–inches. Fertilizer shall be applied at the rate of 500 pounds per acre for the initial application unless otherwise directed by the Engineer. Lime shall be applied at the rate determined by the soil test. Unless otherwise provided, lime will not be applied for temporary seeding. In all cases where practicable, acceptable mechanical spreaders shall be used for spreading fertilizer. On steep slopes subject to slides and inaccessible to power equipment, the slopes shall be adequately scarified. Fertilizer may be applied on steep slopes by hydraulic methods as a mixture of fertilizer and seed. When fertilizer is applied with combination seed and fertilizer drills, no further incorporation will be necessary. The fertilizer and seed shall be applied together when Wood Cellulose Fiber Mulch is used. Any stones larger than 2–1/2–inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

3.5 SEEDING

A. Seed shall be sown within 24 hours following the application of fertilizer and lime and preparation of the seedbed as specified in Section 3.4. Seed shall be uniformly sown at the rate specified by the use of acceptable mechanical seed drills. Rotary hand seeders, power sprayers or other satisfactory equipment may be used on steep slopes or on other areas inaccessible to seed drills.

B. The seeds shall be covered and lightly compacted by means of cultipacker or light roller if the drill does not perform this operation. On slopes inaccessible to compaction equipment, the seed shall be covered by dragging spiked chains, by light harrowing or by other satisfactory methods.

C. Apply water with fine spray immediately after each area has been sown.

D. Do not sow seed when ground is too dry, during windy periods or immediately following a rain.

E. If permitted by the special provisions, wood cellulose fiber mulch or excelsior fiber mulch may be used.

3.6 SEED PROTECTION (STRAW MULCH)

A. All seeded areas seeded with permanent grasses shall be uniformly mulched in a continuous blanket immediately following seeding and compacting operations, using at least 2 tons of straw per acre.

3.7 SEED PROTECTION (EXCELSIOR MULCH)

A. Seed shall be sown as specified in Section 3.5. Within 24 hours after the covering of seed, excelsior mulch shall be uniformly applied at the rate of 2 tons per acre. The mulch may be applied hydraulically or by other acceptable methods. Should the

mulch be placed in a dry condition, it shall be thoroughly wetted immediately after placing. The Engineer may require light rolling of the mulch to form a tight mat.

3.8 SEED PROTECTION (WOOD CELLULOSE FIBER MULCH)

A. After the lime has been applied and ground prepared as specified in Section 3.4, wood cellulose fiber mulch shall be applied at the rate of 1,500 pounds per acre in a mixture of seed and fertilizer. Hydraulic equipment shall be used for the application of fertilizer, seed, and slurry of the prepared wood pulp. This equipment shall have a built–in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which will provide an even distribution of the slurry on the various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons.

The seed, fertilizer, wood pulp mulch, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by the hydraulic seeding method specified herein. The materials shall be combined in a manner recommended by the manufacturer. The slurry mixture shall be regulated so the amounts and rates of application shall result in a uniform application of all materials at rates not less than the amount specified. Using the color of the wood pulp as a guide, the equipment operator shall spray the prepared seedbed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream to fall like rain, allowing the wood fibers to build upon each other until an even coat is achieved.

3.9 SODDING

A. Sod shall be placed between March 1st and December 1st.

B. Sod shall be placed within 48 hours of cutting.

C. Sod shall be moist when laid and placed on moist ground. The sod shall be carefully placed by hand, beginning at the toe of slopes and working upwards. The length of the strips shall be at right angles to the flow of surface water. All joints shall be tightly butted, and end joints shall be staggered at least 12–inches. The sod shall be immediately pressed firmly into the ground by tamping or rolling. Fill all joints between strips with fine screened soil. Sod on slopes shall be pegged with sod pegs to prevent movement. The sod shall be watered, mowed, weeded, repaired, or otherwise maintained, to insure the establishment of a uniform healthy stand of grass until acceptance.

3.10 MAINTENANCE

A. Maintain seeded surfaces until final acceptance.

B. Maintenance shall consist of providing protection against traffic, watering to ensure uniform seed germination and to keep surface of soil damp, and repairing any areas damaged as a result of construction operations or erosion.

3.11 ACCEPTANCE

A. Before acceptance of the seeding performed for the establishment of permanent vegetation, the Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of reestablishment in the spring.

B. A minimum coverage of 75% is required before project acceptance.

END OF SECTION

INDEX TO

SECTION 00 29 22 – LOAMING, SEEDING AND MULCHING

SECTION 00 29 22

LOAMING, SEEDING, AND MULCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The Contractor shall furnish all labor, materials, equipment, incidentals necessary and place loam finish grade, seed, and maintain all seeded areas as specified herein including all areas disturbed by the Contractor's operations.

B. Related Work Described Elsewhere:

1. Earthwork: Section 00 22 00.

1.02 WARRANTY

A. All restoration and re-vegetation work shall be subject to the one (1) year warranty period of the Contract as specified in the Special Conditions of the Contract herein.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Loam (topsoil) shall be fertile, natural soil, typical of the locality, free from large stones, roots, sticks, peat, weeds and sod and obtained from naturally well drained areas. It shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth. Topsoil stockpiled under other Sections of this Division may be used, but the Contractor shall furnish additional loam at his own expense, if required. All areas disturbed by the Contractor's operations which are not to be sodded shall be seeded as specified herein, in addition to those areas delineated on the plans for seeding.

B. Fertilizer shall be complete commercial fertilizer, 16-4-8 grade or as recommended by the seed supplier. It shall be delivered to the site in the original unopened containers each showing the manufacturer's guaranteed analysis. Store fertilizer so that when used it shall be dry and free flowing.

C. Lime shall be ground limestone.

D. Seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity not less than 85, and shall have not more than a one (1) percent weed content.

E. Seed shall be a ½ blend of Pensacola Bahia and Rye applied at a rate of 50 - 100 pounds per acre.

F. Seed shall be delivered in sealed containers bearing the dealer's guaranteed

analysis.

G. Mulch shall be clean small-grain straw.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Loam shall be placed to a minimum depth of 4 inches.

B. Lime shall be applied at the rate necessary to achieve a pH of 6 to 7.

C. Fertilizer shall be applied at the rate of 800 pounds per acre.

D. The subgrade of all areas to be loamed and seeded shall be raked and all rubbish, sticks, roots, and stones larger than 2 inches shall be removed. Loam shall be spread and lightly compacted to finished grade. Compacted loam shall not be less than the depth specified. No loam shall be spread in water or while frozen or muddy.

E. After the loam is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over loam surface and thoroughly incorporated with loam. Lime shall be added in sufficient quantity to provide a soil pH of 6 to 7.

F. Fertilizer shall be uniformly spread and immediately mixed with the upper 2 inches of topsoil.

G. Immediately following this presentation, the seed shall be uniformly applied and lightly raked into the surface. Lightly roll the surface and water with fine spray.

H. All seeded areas shall be mulched with clean small-grain straw at a rate of 1-1/2 to 2 tons per acre. Latex acrylic copolymer, or organic tackifier shall be a commercial product specifically manufactured for use as straw mulch tackifier.
An asphalt tackifier shall only be used when temperatures are too low to allow the use of a latex acrylic copolymer and only with prior written approval from the Engineer. Mechanical tacking will be considered on a case-by-case basis as approved by the Engineer.

I. The Contractor shall keep all seeded areas watered and in good condition, reseeding if and when necessary, until a good, healthy, uniform growth is established over the entire area seeded, and shall maintain these areas in an approved condition until final acceptance of the Contract.

J. On slopes, the Contractor shall protect against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until good sod is established.

K. The Contractor shall maintain the areas in grass in a neat manner by watering, mowing, raking clippings and leaves, and appurtenances until the project is completed.

END OF SECTION

Geotechnical Engineering Investigation

Travis Field WRF Force Main
Savannah, Georgia

September 3, 2019
Terracon Project No. ES185299

Prepared for:
Thomas & Hutton
Savannah, Georgia

Prepared by:
Terracon Consultants, Inc.
Savannah, Georgia

September 3, 2019

Terracon

Thomas & Hutton
50 Park of Commerce Way
Savannah, Georgia 31405

Attn: Ms. Aga Beck, P.E.
P: (912) 721 4048
E: beck.a@tandh.com

Re: Geotechnical Engineering Investigation
Travis Field WRF Force Main
Savannah, Georgia
Terracon Project No.: ES185299

Dear Ms. Beck,

Terracon Consultants, Inc. (Terracon) has completed the Geotechnical Engineering Investigation for the above-referenced project. The services were performed in general accordance with our proposal No. PES150356 dated August 7, 2018. This report presents the findings of the subsurface exploration and provides geotechnical recommendations for the proposed force main installation.

We appreciate the opportunity to be of service to you. Should you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Yan Jiang, Ph.D., P.E.
Project Geotechnical Engineer

Guoming Lin, Ph.D., P.E.
Senior Principal

cc: 1 – Client (PDF)
1 – File

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APPENDICES

EXECUTIVE SUMMARY

This report presents the findings of our Geotechnical Engineering Investigation for the proposed force main installation to be located mainly alongside Pipe Makers Canal from Travis Field Waste Water Treatment Plant to the west bank of the Savannah River at the Georgia Port Authority (GPA) in Garden City. The investigation included a field exploration program and engineering evaluation of the subsurface conditions. Based on the results of the subsurface exploration and analyses, the following geotechnical considerations were identified:

- The subsurface conditions of the site are relatively variable along with the alignmen, from very loose/ dense sandy soils to very soft/soft clayey or silty soils to the boring depths of approximately 25 to 30 feet below ground surface (BGS). More detailed subsurface conditions are presented on the individual boring locations in **Appendix A**. Please note these subsurface exploration records represent an interpretation of subsurface conditions at the test locations. The actual soil conditions between the test locations may vary.

- The groundwater depths vary considerably along the proposed alignment etc, ranging from approximately 2.5 to 8.5 feet below the existing grades. The surface conditions and the site topography appear to have influenced the groundwater depths. It is recommended that groundwater be checked immediately prior to construction activities.

- The open-cut excavations for the force main and the entry and exit pits for directional drilling may require protective measures. Groundwater depth varies significantly along the project length. Depending upon the location, dewatering of the pipeline trench and the bore pit excavation should be expected.

- Based on the subsurface information, excavations for the proposed construction can be accomplished with conventional excavation equipment. The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain the stability of both the excavation sides and bottom. Excavations should be sloped or shored following local, and federal regulations, including current OSHA excavation and trench safety standards.

- For seismic design purposes, the subject site shall be classified as Site Class D in accordance with the International Building Code (IBC) 2012 and ASCE 7-10 Section 11.4.2.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the findings and recommendations

contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report's limitations.

GEOTECHNICAL ENGINEERING INVESTIGATION

Travis Field WRF Force Main
Savannah, Georgia

Terracon Project No. ES185299
September 3, 2019

1.0 INTRODUCTION

Terracon Consultants (Terracon) has completed our Geotechnical Engineering Investigation for the proposed force main installation to be located mainly alongside Pipe Makers Canal from Travis Field Waste Water Treatment Plant to the west bank of the Savannah River at the Georgia Port Authority (GPA) in Garden City. The general location of the force main alignment and its vicinity are shown on the Site Location Map in **Exhibit A-1**, **Appendix A**.

Based on the information provided, the proposed force main will be approximately 24 inches in diameter and approximately 17,200 feet long. For easy discussion in this report, we have divided the project length into four sections (Sections 1 through 4) as discussed below.

- Section 1 covers from Travis Field Waste Water Treatment Facility to Norfolk Southern Railroad as shown in **Exhibit A-2-1**
- Section 2 is from Norfolk Southern Railroad to SR 21 (please see **Exhibit A-2-2**)
- Section 3 is from SR 21 to Main Street (please see **Exhibit A-2-3**)
- Section 4 is from Main Street to Savannah River (please see **Exhibit A-2-4**)

The following tables provide the field exploration schedule performed in each section.

Section 1 (From Travis Field Waste Water Treatment Facility to Norfolk Southern Railroad)

Number of Borings	Exploration Type	Approximate Boring Depth Below Existing Grades (ft.)	Planned Location
1 (B1)	Standard Penetration Test (SPT)	25	At / near bore pits
10 (HA1 through HA10)	Hand auger boring (HA)	3.5 to 9	Along the force main alignment

Note: Boring HA6 encountered wood debris and stopped at 42 inches BGS.

Section 2 (From Norfolk Southern Railroad to SR 21)

Number of Borings	Exploration Type	Approximate Boring Depth Below Existing Grades (ft.)	Planned Location
5 (B2 through B6)	Standard Penetration Test (SPT)	20 to 25	At / near bore pits
11 (HA11 through HA21)	Hand auger boring (HA)	5 to 8.5	Along the force main alignment

Section 3 (From SR 21 to Main Street)

Number of Borings	Exploration Type	Approximate Boring Depth Below Existing Grades (ft.)	Planned Location
17 (B7 through B11)	Standard Penetration Test (SPT) or Cone Penetration Test	10 to 30	At / near bore pits
15 (HA22 and HA36)	Hand auger boring (HA)	1.5 to 10	Along the force main alignment

Note: Boring B7 has gravel and brick debris collapsed into the borehole and the boring terminated at a shallow depth of approximately 10 feet BGS. B10 and B11 were relocated due to utility concern. Borings HA26 to HA28, HA30, HA34, and HA35 encountered refusal at different depths.

Section 4 (Main Street to Savannah River)

Number of Borings	Exploration Type	Approximate Boring Depth Below Existing Grades (ft.)	Planned Location
4 (B12 through B13)	Standard Penetration Test (SPT)	30 to 40	At / near bore pits
4 (HA37 and HA40)	Hand auger boring (HA)	5	Along the force main alignment

Note: Boring B34 terminated at a shallow depth of approximately 1.5 feet BGS due to utility concern.

A detailed presentation of the subsurface soils encountered at each borehole location during our site exploration can be found in the CPT sounding and SPT and hand auger boring logs included in **Appendix A** of this report, along with a site location map and exploration location plan.

The purpose of this study is to provide subsurface information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- site preparation
- bore drilling potential issues
- groundwater conditions
- lateral earth pressure parameters
- seismic considerations

2.0 PROJECT INFORMATION

2.1 Project Description

Item	Description
Proposed improvements	The construction of a proposed force main consisting of24-inch diameter pipe of approximately 17,200 feet (i.e., 3.25 miles) long.
Site location	The site is located along Pipe Makers Canal in Savannah, Georgia. Latitude: 32.12118°, Longitude: -81.16759°
Grading	The site grading plan has not been made available at this time. It is anticipated that the finished surface will be near the existing grades.
Current ground cover and access conditions	The route is covered by trees, roadways, and railways along the canal.
Existing topography	Slope and level surfaces.

Should any of the above information or assumptions be inconsistent with the planned construction, Terracon should be informed so that modifications to this report can be made as necessary.

3.0 SUBSURFACE CONDITIONS

3.1 Typical Profile

Based on the results of our field exploration, the subsurface conditions along the force main alignment vary significantly and can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum Below Ground Surface	Material Encountered	SPT - N_{60}
Stratum 1	2 to 12 feet	Predominantly very loose to medium dense silty sands to clayey sands (Based on the hand auger borings, the subsurface conditions consist of sandy clays at various locations along the project length).	2 to 36
Stratum 2 (varying soils)	10 to 40 feet (termination of borings)	Very soft to soft clays or silt.	0 to 4
		Medium dense to very dense sands with silts to silty sands to clayey sands.	10 to 50+

Note: In Borings B8, B9, and B12, gravel or lime rocks were encountered near the ground surface. As such the contractor should expect difficult subsurface conditions in isolated areas near the ground surface during construction.

Details of the subsurface conditions encountered at each boring location are presented on the individual SPT and hand auger boring logs in **Appendix A** of this report. These subsurface exploration records represent an interpretation of subsurface conditions at the test locations. The soil conditions between the test locations may vary. Stratification boundaries on the logs represent the approximate depth of changes in soil types; the transition between materials may be gradual.

3.2 Groundwater

The groundwater depths vary considerably along the project length, ranging from approximately 2.5 to 8.5 feet below the existing grades. The surface conditions and the site topography appear to have influenced the water level elevation. It is recommended that groundwater be checked immediately prior to construction activities to assess the effect on construction methods and dewatering requirements. If the groundwater level is determined to affect the excavation process, the contractor should plan for dewatering of the open trench and the entrance and exit pits according to the anticipated construction methods used.

It should be noted that groundwater levels tend to fluctuate with seasonal and climatic variations, as well as with construction activities. The fluctuation may be more pronounced than most sites as the alignment is along a major drainage canal. The water in the canal may be influenced by the tide in the Savannah River and the weather conditions along the canal area. As such, the possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. The groundwater table should be checked prior to construction to assess its effect on-site work and other construction activities.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Based on the information available, we understand the proposed force main alignment will be constructed using either the open trench or tunneling method. The depths of the trench or tunneling have not been determined at this time. We assumed that the force main will be installed at depths ranging from approximately 3 to 7 feet BGS in general, with tunnel sections (directional drill sections) ranging from approximately 15 to 25 feet BGS. The open-cut excavations for the force main and the entry and exit pits for directional drilling may require protective measures. The trench and drill pits can be made using open slopes or vertical cuts supported with sheet piles or other temporary retaining structures. Soldier piles with tmber lagging shoring may be used in the construction of the trench supporting system. Trench boxes are commonly used for trench safety in open-cut excavations with vertical walls.

It is anticipated that excavations for the proposed construction can be accomplished with conventional large excavator. **The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain the stability of both the excavation sides and bottom.** Excavations should be sloped or shored following local, and federal regulations, including current OSHA excavation and trench safety standards.

The selection of the appropriate method for directional drilling is the contractor's responsibility. The contractor should select the appropriate boring machine and excavation method for directional drilling based on the subsurface soils and groundwater conditions indicated in the soil boring logs.

Stockpiling of excavated material in the proximity to the excavation is not recommended. In general, a distance of half the excavation depth on both sides of the trench should be kept clear of any excavated materials. If this is not possible due to the space limitations, the retaining wall design should take into considerations the surcharge loads from the excavated materials. This is an important consideration. A major slope failure occurred about ten years ago during a Pipemakers Canal improvement project as the excavated material was stockpiled along the canal bank.

Care should be taken during excavations as there is the possibility that sloughing or caving of the excavation trench or excavation slope may cause movement of the surrounding soils leading to a possible settlement of the neighboring structures or features.

Monitoring Despite our best efforts for the thorough geotechnical exploration, the actual subsurface conditions may vary from the anticipated conditions because the subsurface exploration records provided in **Appendix A** represent an interpretation of subsurface conditions at the boring locations and the subsurface conditions between the test locations may vary.

During excavation and pipeline installation, ground movements like settlement and lateral movement may occur and should be monitored and controlled. The monitoring program should include measurements of the groundwater table, ground vibration, lateral ground movements outside excavation, and monitoring of existing cracks at selected locations on the neighboring structures. Terracon can develop a more detailed plan for condition survey and monitoring as construction plans are developed.

We recommend Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; placement and compaction of controlled compacted fill; backfilling of excavations to the completed subgrade.

4.2 Earthwork

The site work conditions will be largely dependent on the weather conditions and the contractor's means and methods in controlling surface drainage and protecting the subgrade. Site preparation should include installation of a site drainage system and excavation for the open trench and the entrance and exit pits. The following paragraphs present our considerations and recommendations for the site and subgrade preparation.

4.2.1 Site Drainage

An effective drainage system should be installed prior to site preparation and grading activities to intercept surface water and to improve overall shallow drainage. The drainage system may consist of perimeter ditches supplemented with parallel ditches and swales to prevent surface water flow into the boring pits. Pumping equipment should be prepared to remove groundwater from the boring pits. The site should be graded to shed water and avoid ponding over the subgrade.

4.2.2 Bore Pit Excavation

At this time, the extent and depth of the excavation for the entrance and exit pits has not been made available. Based on the soil borings performed to approximately 10 to 40 feet BGS, the soils encountered during the excavation will most likely be medium dense to dense silty/clayey sands and very soft to soft clays or silts. These soils are sensitive to moisture and erosion during construction. The contractor should provide methods to control site drainage and provide erosion control of the excavated slope face.

Depending upon the depth of excavation, dewatering should be planned for deep excavation. Groundwater depths vary significantly along the project length from 2.5 to 8.5 feet BGS due to the variation in site topography.

To support the excavation and dewatering activities, a temporary sheet pile wall or similar earth retaining structure should be constructed unless there is a space for a sloped excavation. Shoring may be required to support the temporary retaining structure in order to prevent slope sliding or collapse. If open-pit excavation methods are used for the construction of the entrance and exit pits, a slope inclination of 2 horizontal to 1 vertical or flatter is recommended for slope height less than seven feet due to the nature of the surface soils. A more detailed slope stability analysis should be performed for a slope higher than 7 feet based on the soil conditions and slope configurations. In all cases, excavations should conform to OSHA guidelines.

If the temporary retaining structures are required instead of the sloped open excavation, the temporary retaining walls should be designed for earth pressures equal to those provided in **Section 4.3**.

Please note: as the proposed force main is located underneath railways and roadways, the contractor should take necessary precautions to avoid damages to the existing railways and roadways and other structures in the vicinity of the project area.

4.2.3 Pipe Bedding and Excavations

Care should be taken so that the soils at the base of excavations are not disturbed during construction. Disturbed or unstable materials should be removed before placing any granular bedding material. Where groundwater, lower strength soils, and unstable conditions are encountered, a greater thickness of bedding material should be provided. The minimum thickness of the bedding material should be 12 inches.

Groundwater varies significantly along the project length. Please refer to the individual boring logs for the groundwater depth in each boring location. Depending upon the location, dewatering of the pipeline trench should be expected. We recommend the pipe excavation to be shored with trench boxes or other means to control erosion of the saturated sands into the trench during construction. Sloped excavation could be used for the pipeline trenching however the groundwater should be lowered to a minimum of 2 feet below the bottom of the excavation and the excavation side slopes should be 2 horizontal to 1 vertical or flatter. The excavations should conform to OSHA guidelines.

4.2.4 Fill Material Consideration

The project length is rather long (~ 17,200 ft.) and the subsurface conditions are relatively variable along the project length. The soils in the boring locations vary from sands with silts to silty/clayey

sands to sandy clays to the boring depths of approximately 10 to 40 feet BGS. Please see attached individual boring logs provided in **Appendix A**.

Silty sands are generally considered suitable for structural fill; clayey sands may be considered marginally suitable and the sandy clays are deemed unsuitable for structural fill. We define marginally suitable as the soils that may require extra effort to adjust moisture before they can be compacted. The amount of effort required will be highly dependent on the season and the weather conditions during construction.

Based on the grain size analyses, the near-surface soils should be suitable for backfill. However, our hand auger borings indicated that between the soil boring locations, clayey soils are present within the upper 5 feet BGS, which may not be suitable for structural fill.

It is strongly recommended that Terracon be retained during construction to determine the suitability of the onsite soil as fill material. Imported soils (if required for the project) for use as fill material should conform to low volume change materials as indicated in the following specifications:

Structural fill should be placed over a stable or stabilized subgrade. The soils to be used as structural fill should be free of organics, roots, or other deleterious materials. It should be a non-plastic granular material containing less than 35 percent fines passing the No. 200 sieve. If necessary, soils with more than 35 percent fines may be used as fill in less critical areas under close control of moisture and compaction.

4.2.5 Compaction Requirements

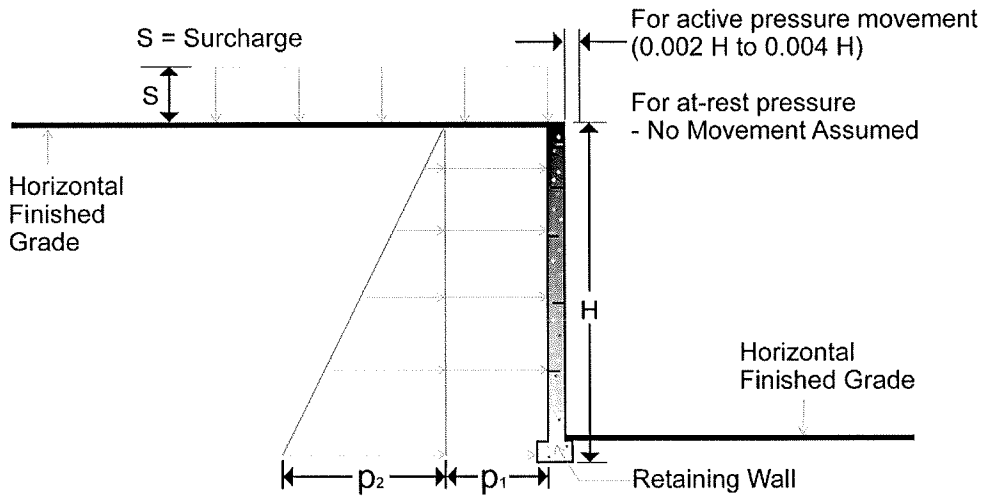
All structural fills should be placed in thin (8 to 10 inches loose) lifts and compacted to a minimum of 95% of the soil's Standard Proctor maximum dry density (ASTM D698). Fill brought to the site should be within 3 percent (wet or dry) of the optimum moisture content.

Utility trench backfill can be compacted to 90% Standard Proctor density. Prior to fill placement, the backfill area should be densified with a vibratory plate compactor to achieve a uniform subgrade. Areas, where excessive deflection is observed, should be undercut, backfilled and then properly compacted.

Some manipulation of the moisture content (such as wetting, drying) will be required during the filling operation to obtain the required degree of compaction. The manipulation of the moisture content is highly dependent on weather conditions and site drainage conditions. Therefore, the contractor should prepare for both dry and wet fill materials to obtain the specified compaction during grading. A sufficient number of density tests should be performed to confirm the required compaction of the fill material.

4.3 Lateral Earth Pressure Considerations

This project does not include independent permanent retaining walls; however, the temporary entrance and exit pits for the bore process may require temporary shoring retaining walls. The temporary retaining walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following table. The earth pressure parameters are recommended based on the soil material obtained in the borings. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement. The recommended design lateral earth pressures do not include a factor of safety or possible hydrostatic pressure on the walls.



Earth Pressure Coefficients

Earth Pressure Conditions	Coefficient for Backfill Type	Equivalent Fluid Density (pcf)	Surcharge Pressure, p_1 (psf)	Earth Pressure, p_2 (psf)
Active (K_a)	Granular - 0.36	42	(0.36)S	(42)H
At-Rest (K_o)	Granular - 0.53	62	(0.53)S	(62)H
Passive (K_p)	Granular - 2.77	319	---	---

Applicable conditions to the above include:

- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 **H** to 0.004 **H**, where **H** is wall height.
- For passive earth pressure to develop, wall must move horizontally against the fill to mobilize resistance.
- Uniform surcharge, where S is surcharge pressure.

- In situ soil backfill weight a maximum of 115 pcf.
- Horizontal backfill, compacted between 95 percent of modified Proctor maximum dry density. The excavation pit may require a design with sloped backfill depending on its proximity to the existing canal and roadway.
- Loading from heavy compaction equipment or dynamic loading not included.
- No hydrostatic pressures acting on wall.
- No safety factor included in soil parameters.

The above earth pressure parameters are based on the typical backfill materials available in this area. Backfill placed against structures should consist of granular soils. The granular backfill must extend out from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively. To calculate the resistance to sliding, a value of 0.35 should be used as the ultimate coefficient of friction between the footing and the underlying soil.

Depending on the depth of excavation and long-term groundwater conditions, the unbalanced hydrostatic pressure may be considered in the design of the retaining wall. Hydrostatic pressure should be added to the lateral earth pressures recommended above. These pressures do not include the influence of surcharge, equipment or floor loading, which should be added. Heavy equipment should not operate within a distance closer than the exposed height of retaining walls to prevent lateral pressures more than those provided.

Due to the presence of the railways and roadways adjacent to the likely excavation areas, the effect of train and vehicular traffic may be considered while designing the lateral support system.

4.4 Seismic Considerations

Based on the findings from the field exploration and our knowledge of the local geological formation in the project area, the site can be classified as Site Class D in accordance with IBC 2012 and ASCE 7-10. The seismic design parameters obtained based on IBC 2012 and ASCE 7-10 are summarized in the table below. The design response spectrum curve, as presented in the appendix, was developed based on the S_{DS} and S_{D1} values.

Summary of Seismic Design Parameters

Site Location (Lat. – Long.)	Site Classification	S_s	S_1	F_a	F_v	S_{DS}	S_{D1}
32.12269° -81.16448°	D	0.307g	0.119g	1.554	2.324	0.318g	0.184g

- In general accordance with the 2012 International Building Code and ASCE 7-10.
- The 2012 IBC and ASCE 7-10 require a site soil profile determination extending a depth of 100 feet for seismic site classification. The current scope does not include 100-foot soil profile determination. Explorations for this

project extended to a maximum depth of 40 feet and this seismic site class definition was provided in consideration of the overall soil conditions as well as the general geology of the area.

5.0 GENERAL COMMENTS

Terracon should be consulted to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the project design and specifications. Terracon should also be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analyses and recommendations presented in this report are based upon the data obtained from the explorations performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between exploration locations, across the site, or may be caused due to the modifying effects of construction or weather. Bear in mind that the nature and extent of such variations may not become evident until construction has started or until construction activities have ceased. If variations do appear, Terracon should be notified immediately so that further evaluation and supplemental recommendations can be provided. The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, and bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or hazardous conditions. If the owner is concerned about the potential for such contamination or pollution, please advise so that additional studies may be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project and site discussed, and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. Site safety, excavation support and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes, and then either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION

APPENDIX A

Field Exploration

- Exhibit A-1 Site Location
- Exhibit A-2 Exploration Plan
- Exhibit A-3 Field Exploration Description
- Exhibit A-4 CPT Cross-Section
- Exhibit A-5 CPT Sounding Logs
- Exhibit A-6 Hand Auger Boring Logs

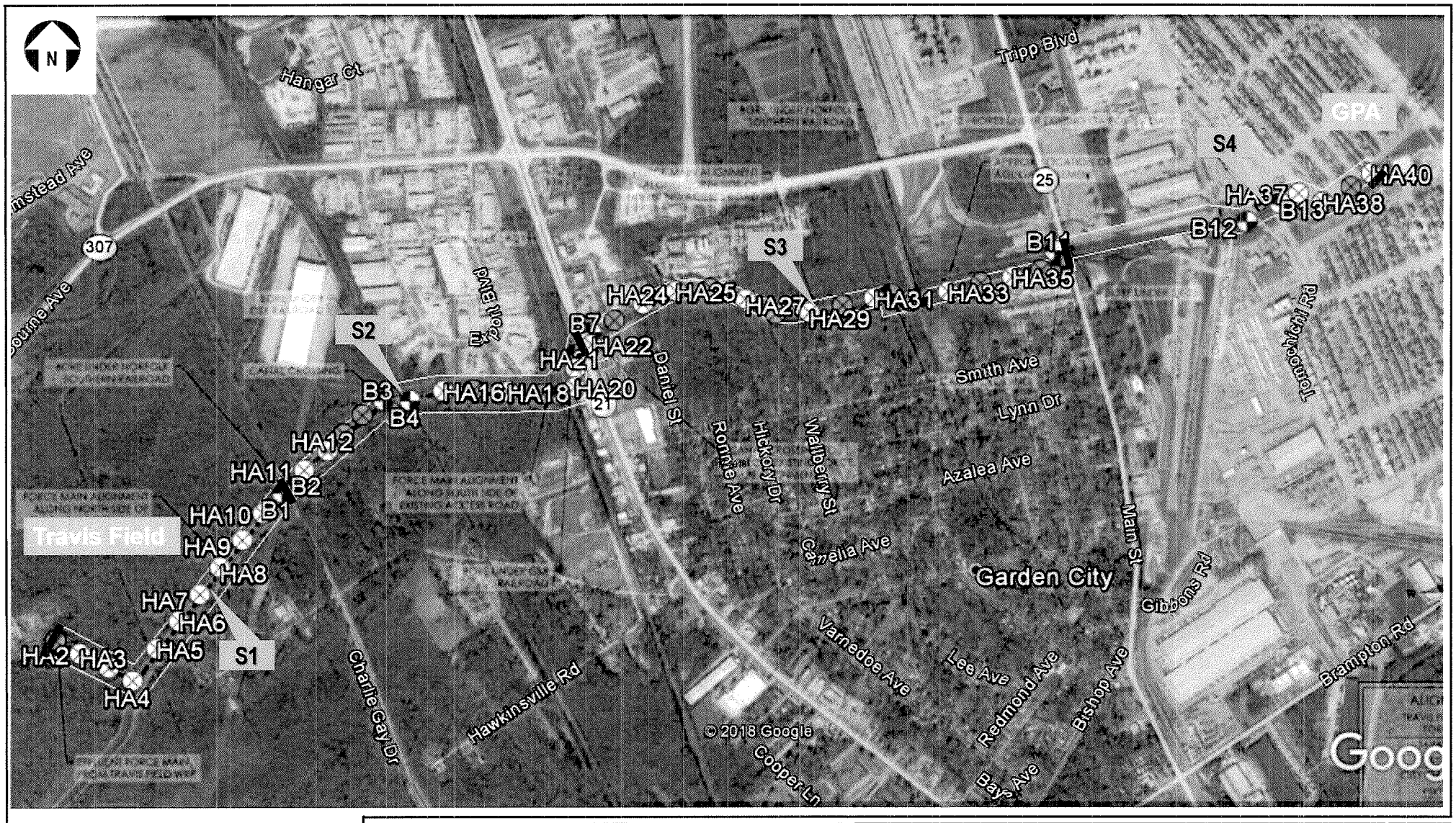


Image Courtesy of
Google Maps™

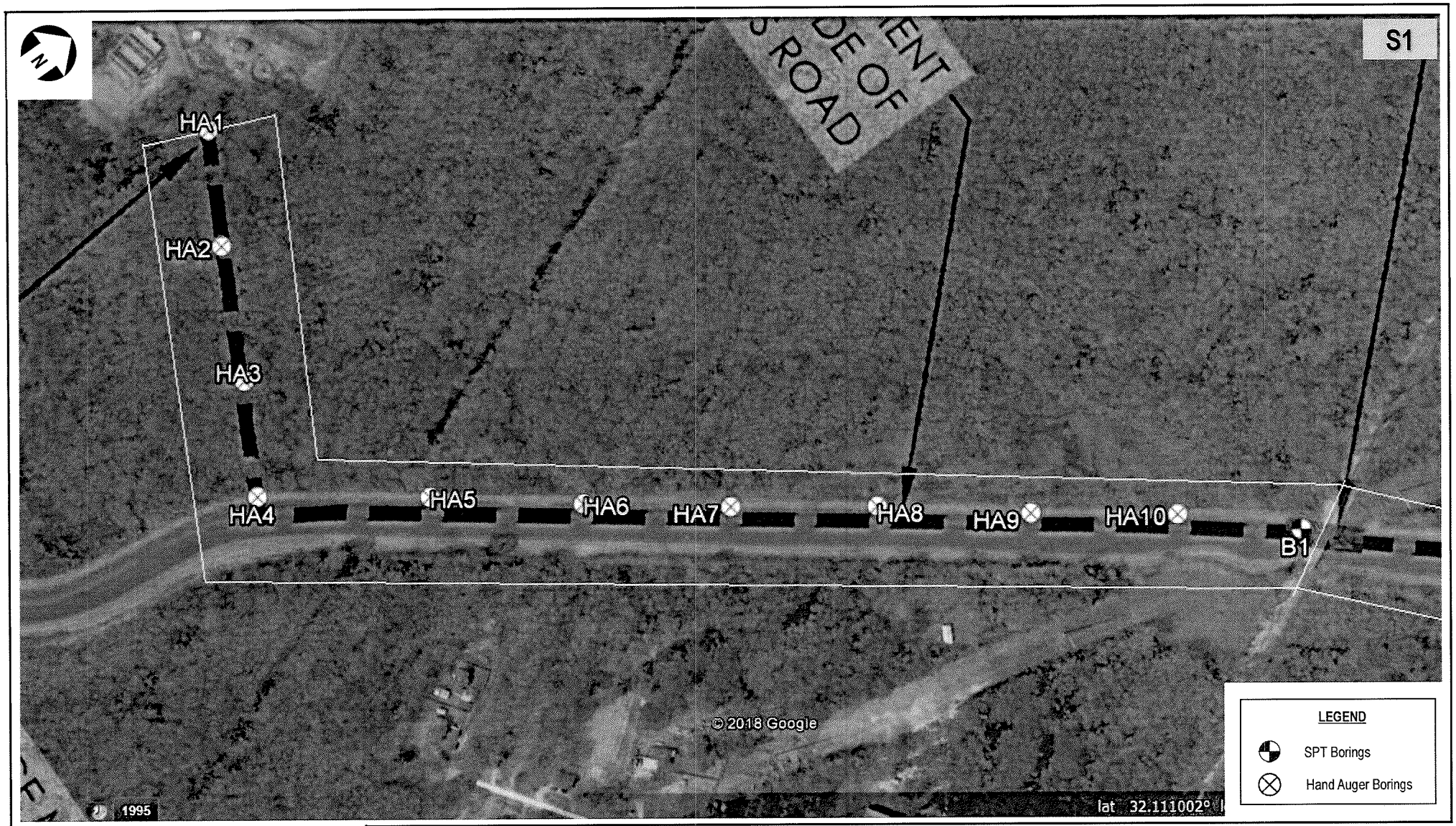
Project Manager:	YJ	Proposal No.	ES185299
Drawn by:	YJ	Scale:	N.T.S.
Checked by:	GL	File Name:	
Approved by:	GL	Date:	6-27-2019

Terracon
Consulting Engineers & Scientists
2201 Rowland Avenue Savannah, Georgia 31404
Phone (912) 629 4000 Fax (912) 629 4001

SITE LOCATION MAP

Travis Field WRF Force Main
Savannah, Georgia

Exhibit:
A1



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Google Maps™

Project Manager:	YJ	Proposal No.	ES185299
Drawn by:	YJ	Scale:	N.T.S.
Checked by:	GL	File Name:	
Approved by:	GL	Date:	6-27-2019

Terracon
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Phone (912) 629 4000 Fax (912) 629 4001

BORING LOCATION MAP

Travis Field WRF Force Main
Savannah, Georgia

Exhibit:
A2-1

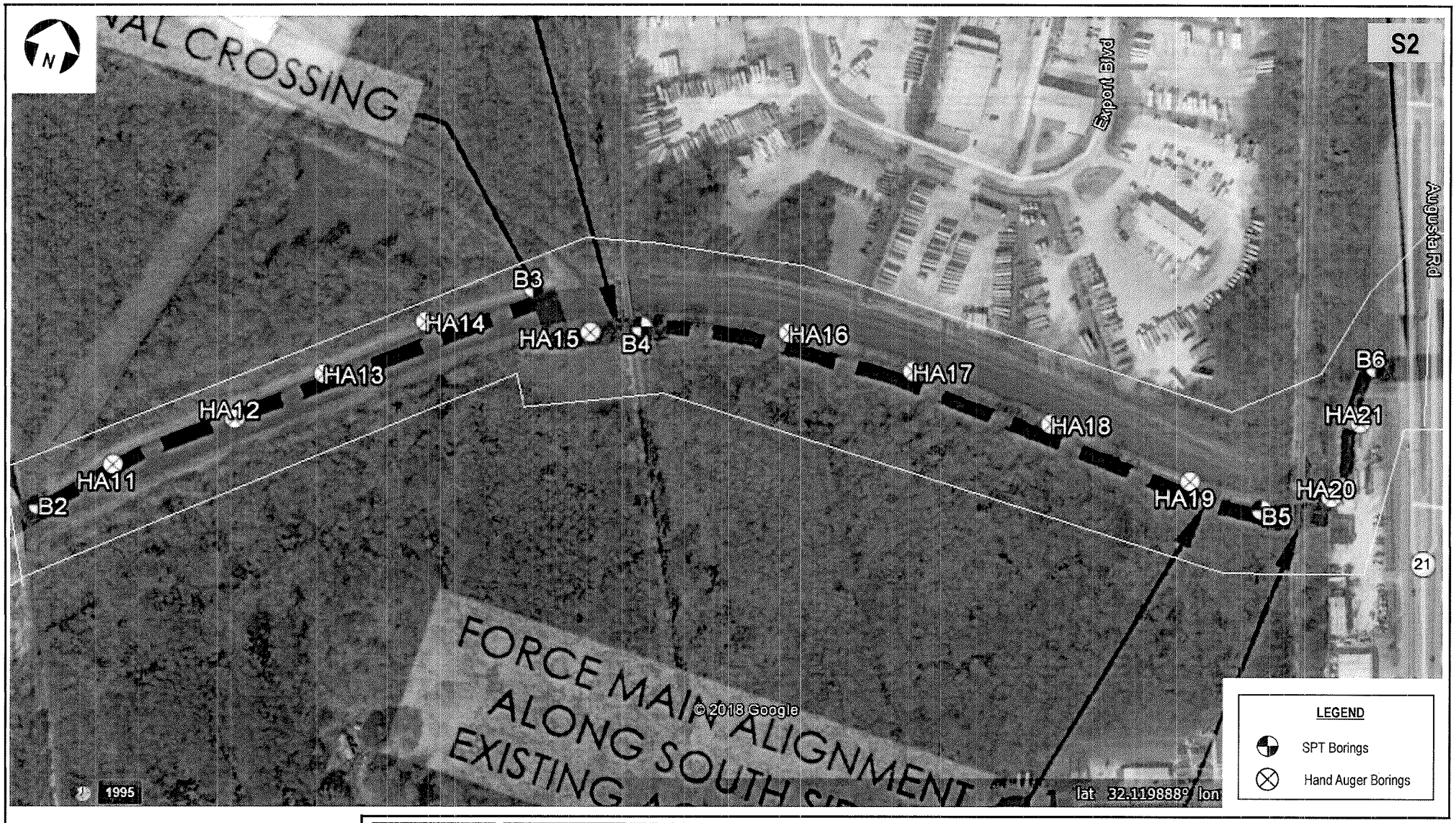

Image Courtesy of
Google Maps™

Project Manager: YJ	Proposal No. ES185299	Terracon Consulting Engineers & Scientists	BORING LOCATION MAP
Drawn by: YJ	Scale: N.T.S.	2201 Rowland Avenue Savannah, Georgia 31404	Travis Field WRF Force Main
Checked by: GL	File Name:	Phone (912) 629 4000 Fax (912) 629 4001	Savannah, Georgia
Approved by: GL	Date: 6-27-2019		Exhibit: A2-2

Image Courtesy of
Google Maps™

Project Manager: YJ	Proposal No. ES185299	Terracon Consulting Engineers & Scientists	BORING LOCATION MAP
Drawn by: YJ	Scale: N.T.S.	2201 Rowland Avenue Savannah, Georgia 31404	Travis Field WRF Force Main
Checked by: GL	File Name:	Phone (912) 629 4000 Fax (912) 629 4001	Savannah, Georgia
Approved by: GL	Date: 6-27-2019		Exhibit: A2-3

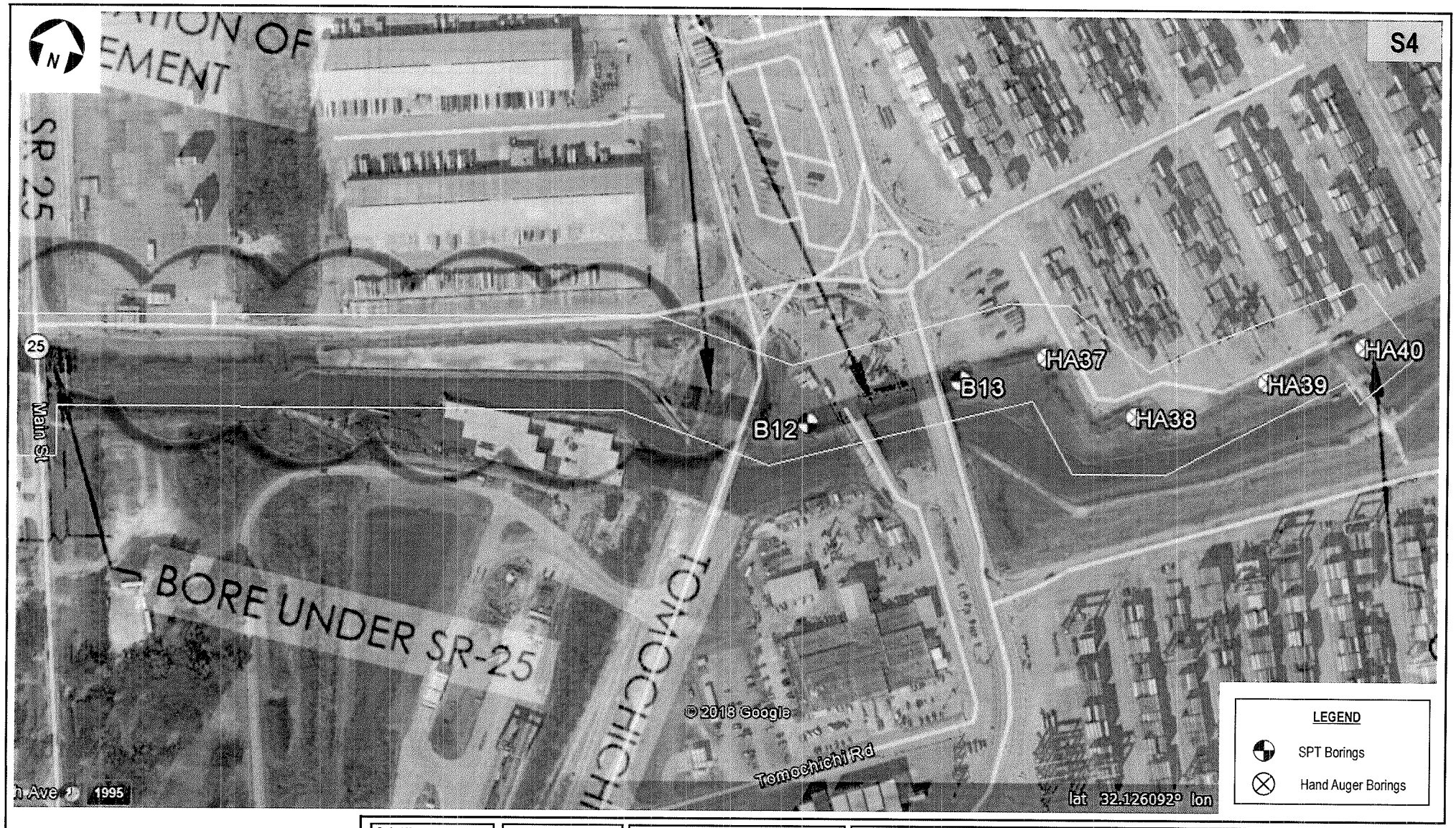

Image Courtesy of
Google Maps™

Project Manager: YJ		Proposal No. ES185299	
Drawn by: YJ		Scale: N.T.S.	
Checked by: GL		File Name:	
Approved by: GL		Date: 6-27-2019	

Terracon
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BORING LOCATION MAP

Travis Field WRF Force Main
Savannah, Georgia

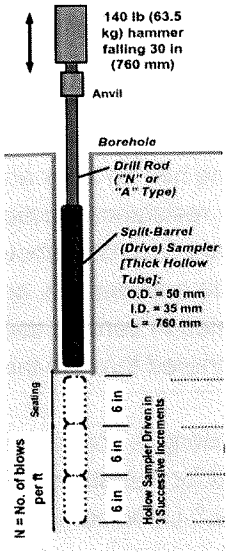
Exhibit:
A2-4

FIELD EXPLORATION DESCRIPTION

The locations of the Standard Penetration Test (SPT) borings and the hand auger borings were located in the field by Terracon using a hand-held GPS unit and in reference to the existing features. These test locations were discussed with the civil engineer prior to performing the field exploration. The test locations are shown in the Exploration Location Plan in **Exhibit A-2** and should be considered approximate.

Standard Penetration Testing

The SPT borings were performed in accordance with ASTM D1586 with an truck-mounted Acker drilling rig using mud rotatory drilling techniques. Samples of the soil encountered in the borings were obtained using split-barrel sampling procedures. In the split barrel sampling procedure, the number of blows required to advance a standard 2-inch O.D. split barrel sampler the last 12 inches of the typical total 18-inch penetration by means of a 140-pound hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is used to estimate the in situ relative density of cohesionless soils and consistency of cohesive soils. A rope and cathead hammer was used to advance the split-barrel sampler in the borings performed on this site.



Source: FHWA NHI-06-088

Hand Auger Borings

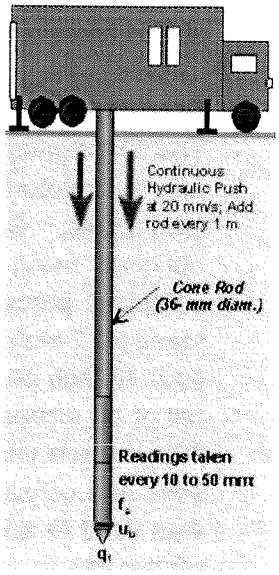
Hand auger borings were conducted in general accordance with ASTM D 1452-80, Standard Practice for Soil Investigation and Sampling by Auger Borings. In this test, hand auger borings are drilled by rotating and advancing a bucket auger to the desired depths while periodically removing the auger from the hole to clear and examine the auger cuttings. The soils were classified in accordance with ASTM D2488.

Field Exploration Description

The locations of Cone Penetration Test (CPT) soundings and Standard Penetration Test (SPT) borings and the hand auger borings were located in the field by Terracon using a hand-held GPS unit and in reference to the existing features. These test locations were discussed with the civil engineer prior to performing the field exploration. They are shown in the Exploration Location Plan in Exhibit A-2, should be considered approximate and are not intended for construction purposes.

Cone Penetration Testing

The CPT hydraulically pushes an instrumented cone through the soil while nearly continuous readings are recorded to a portable computer. The cone is equipped with electronic load cells to measure tip resistance and sleeve resistance and a pressure transducer to measure the generated ambient pore pressure. The face of the cone has an apex angle of 60° and an area of 10 cm^2. Digital data representing the tip resistance, friction resistance, pore water pressure, and probe inclination angle are recorded about every 2 centimeters while advancing through the ground at a rate between 1½ and 2½ centimeters per second. These measurements are correlated to various soil properties used for geotechnical design. No soil samples are gathered through this subsurface investigation technique.

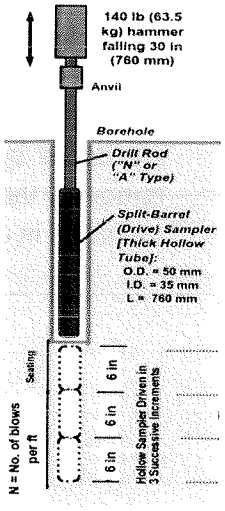


Source: FHWA NHI-06-

CPT testing is conducted in general accordance with ASTM D5778 "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils." Upon completion, the data collected were analyzed and processed by the project engineer.

Standard Penetration Testing

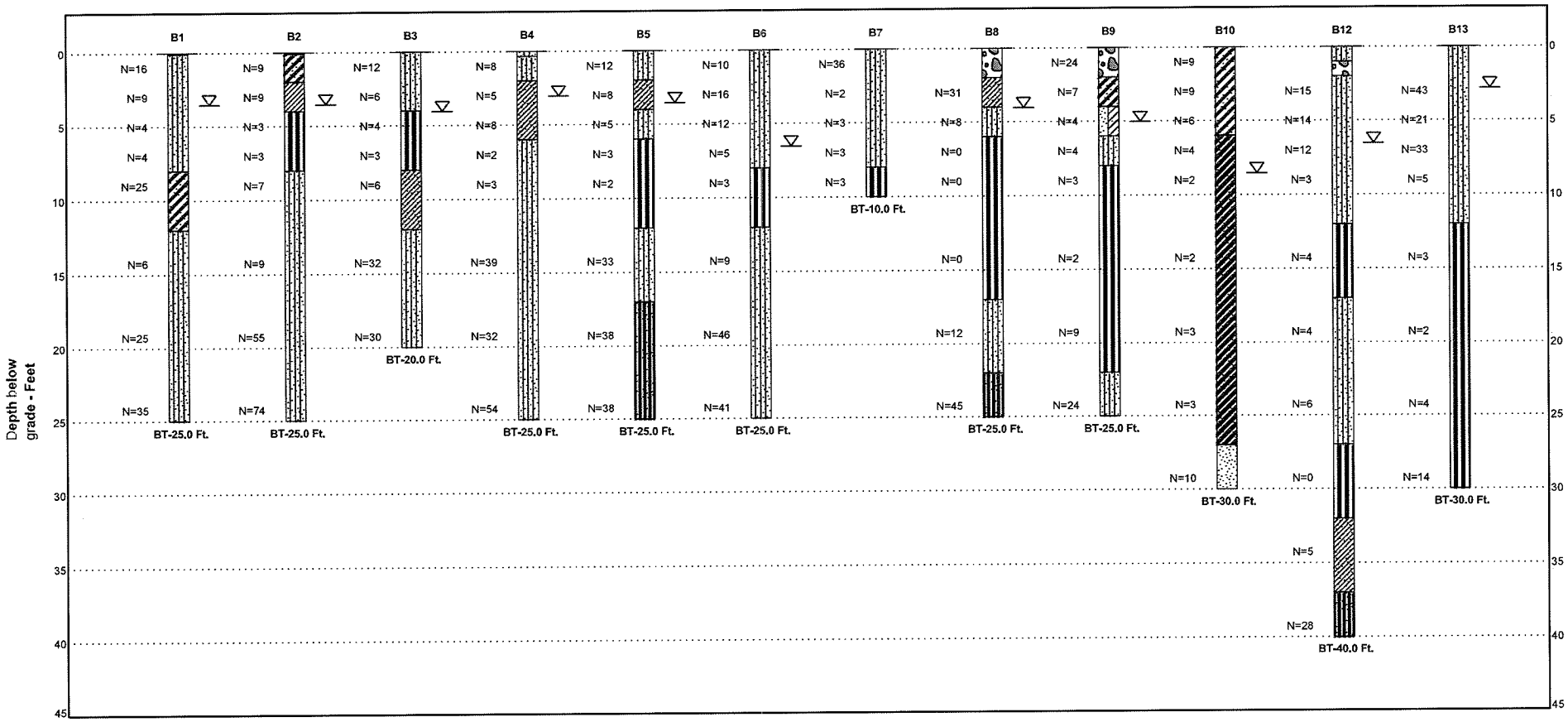
The SPT borings were performed in accordance with ASTM D1586 with a trailer-mounted CME drilling rig using mud rotatory drilling techniques. Samples of the soil encountered in the borings were obtained using split-barrel sampling procedures. In the split barrel sampling procedure, the number of blows required to advance a standard 2-inch O.D. split barrel sampler the last 12 inches of the typical total 18-inch penetration by means of a 140-pound hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is used to estimate the in situ relative density of cohesionless soils and consistency of cohesive soils. A rope and cathead hammer was used to advance the split-barrel sampler in the borings performed on this site.



Source: FHWA NHI-06-088

Hand Auger Borings

Hand auger borings were conducted in general accordance with ASTM D 1452-80, Standard Practice for Soil Investigation and Sampling by Auger Borings. In this test, hand auger borings are drilled by rotating and advancing a bucket auger to the desired depths while periodically removing the auger from the hole to clear and examine the auger cuttings. The soils were classified in accordance with ASTM D2488.



Explanation

B1 — Borehole Number

Moisture Content — %w

LL PL — Liquid and Plastic Limits

Sampling (See General Notes)

Borehole Lithology

AR
BT — Borehole Termination Type

Water Level Reading at time of drilling.

Water Level Reading after drilling.

Topsoil | Silty Sand | Clayey Sand | Lean Clay | Elastic Silt

Sandy Lean Clay | Sandy Silt | Poorly-graded Gravel | Poorly-graded Sand with Clay | Sandy Fat Clay

NOTES:

See Exhibit A-2 for orientation of soil profile.
See General Notes in Appendix C for symbols and soil classifications.
Soils profile provided for illustration purposes only.
Soils between borings may differ
AR - Auger Refusal
BT - Boring Termination

Project Manager: YJ	Project No.: ES185299	
Drawn by: YJ	Scale: N.T.S.	
Approved by: GL	File Name:	
Date: 8/29/2019		

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2201 Rowland Ave
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SUBSURFACE PROFILE

TRAVIS FIELD WRF FORCE MAIN
SAVANNAH, GA

EXHIBIT A-4

BORING LOG NO. B1

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1167° Longitude: -81.1782°

DEPTH	Description	FIELD TEST RESULTS
0.1	**GRAVEL**	
	SILTY SAND (SM), with trace gravel, fine to coarse grained, brown and orange, medium dense	7-9-7-7 N=16
	fine to coarse grained, brown and orange, loose	6-6-3-2 N=9
	fine to coarse grained, brown and orange, loose	1-2-2-1 N=4
	fine grained, brown and gray, loose	3-2-2-4 N=4
8.0	**CLAYEY SAND (SC)**, with trace gravel, fine grained, brown and orange, medium dense	4-10-15-11 N=25
12.0	**SILTY SAND (SM)**, fine to coarse grained, dark gray, loose	4-3-3 N=6
	with shell fragments and trace pebbles, fine grained, dark gray, medium dense	5-11-14 N=25
25.0	with shell fragments, dark gray, dense	13-16-19 N=35
	Boring Terminated at 25 Feet	

DEPTH (Ft.): 5, 10, 15, 20, 25

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-19-2019 | Boring Completed: 07-19-2019

Drill Rig: Diedrich D25 | Driller: Tom and Chris

Project No.: ES185299 | Exhibit: A-5-1

BORING LOG NO. B2

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.117° Longitude: -81.1779°

DEPTH	Description	FIELD TEST RESULTS
0.1	**GRAVEL**	
	CLAYEY SAND (SC), fine to medium grained, brown and orange, loose	3-3-6-8 N=9
2.0	**SANDY LEAN CLAY (CL)**, brown and gray, loose	8-6-3-4 N=9
4.0	**ELASTIC SILT (MH)**, with organics, fine grained, brown, soft	3-2-1-1 N=3
	with organics, fine grained, gray, soft	2-1-2-3 N=3
8.0	**SILTY SAND (SM)**, fine grained, dark gray, loose	1-1-6-7 N=7
	fine grained, dark gray, loose	4-4-5 N=9
	with shell fragments, fine grained, dark gray, very dense	19-26-29 N=55
	fine grained, dark gray, very dense	31-37-37 N=74
25.0	***Boring Terminated at 25 Feet***	

DEPTH (Ft.): 5, 10, 15, 20, 25

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-19-2019 | Boring Completed: 07-19-2019

Drill Rig: Diedrich D25 | Driller: Tom and Chris

Project No.: ES185299 | Exhibit: A-5-2

BORING LOG NO. B3

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1195° Longitude: -81.1747°

DEPTH	Description	Sample	Field Test Results
	SILTY SAND (SM), with roots and trace gravel, fine grained, brown and light orange, medium dense		7-7-5-7 N=12
	fine grained, brown and gray, loose		6-4-2-2 N=6
4.0	**ELASTIC SILT (MH)**, with trace organics, fine grained, brown, soft		2-2-2-3 N=4
	with trace organics, fine grained, dark gray and brown, soft		2-2-1-1 N=3
8.0	**SANDY LEAN CLAY (CL)**, dark gray and brown, medium stiff		3-2-4-5 N=6
12.0	**SILTY SAND (SM)**, with gravel, fine to coarse grained, dark gray, dense		8-16-16 N=32
	with shell fragments, dark gray, dense		9-14-16 N=30
20.0	***Boring Terminated at 20 Feet***		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-18-2019	Boring Completed: 07-18-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-3

BORING LOG NO. B4

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1194° Longitude: -81.1737°

DEPTH	Description	FIELD TEST RESULTS
0.3	**TOPSOIL**	
	SILTY SAND (SM), with wood debris, fine to coarse grained, brown, loose	6-4-4-3 N=8
2.0	**SANDY LEAN CLAY (CL)**, brown, medium stiff	2-2-3-2 N=5
	with trace organics, brown, stiff	2-4-4-9 N=8
6.0	**SILTY SAND (SM)**, fine to coarse grained, brown, very loose	2-1-1-2 N=2
	with organics, fine to medium grained, brown, very loose	1-1-2-2 N=3
	with shell fragments, fine grained, dark gray, dense	16-21-18 N=39
	fine grained, dark gray, dense	10-12-20 N=32
	with trace shell fragments, dark gray, very dense	22-27-27 N=54
25.0	***Boring Terminated at 25 Feet***	

DEPTH (Ft.): 5, 10, 15, 20, 25

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-18-2019	Boring Completed: 07-18-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-4

BORING LOG NO. B5

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1196° Longitude: -81.1685°

DEPTH	Description	FIELD TEST RESULTS
0 – 2.0	**SILTY SAND (SM)**, fine to medium grained, brown, medium dense	8-6-6-6 N=12
2.0 – 4.0	**SANDY LEAN CLAY (CL)**, brown and gray, stiff	6-3-5-4 N=8
4.0 – 6.0	**SILTY SAND (SM)**, with wood debris, fine grained, brown, loose	4-3-2-4 N=5
6.0 – 12.0	**ELASTIC SILT (MH)**, with trace wood debris, fine grained, brown, soft	2-2-1-1 N=3
	fine grained, brown, soft	1-1-1-1 N=2
12.0 – 17.0	**SILTY SAND (SM)**, with shell fragments, fine grained, brown and gray, dense	8-16-17 N=33
17.0 – 25.0	**SANDY SILT (ML)**, with shell fragments, fine grained, dark gray, hard	11-18-20 N=38
	dark gray, hard	10-13-25 N=38
25.0	***Boring Terminated at 25 Feet***	

DEPTH (Ft.): 5, 10, 15, 20, 25

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-18-2019	Boring Completed: 07-18-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-5

BORING LOG NO. B6

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1208° Longitude: -81.168°

DEPTH	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results
	SILTY SAND (SM), with trace gravel, fine grained, light brown, medium dense				5-5-5-6 N=10
	fine grained, light brown, medium dense		▽		4-6-10-7 N=16
	with shell fragments, fine grained, dark gray and light brown, medium dense	5			5-5-7-6 N=12
	fine grained, dark gray and dark brown, loose		▽		6-2-3-5 N=5
8.0	**ELASTIC SILT (MH)**, with organics, fine grained, brown, soft				2-1-2-2 N=3
		10			
12.0	**SILTY SAND (SM)**, fine grained, brown, loose				0-0-9 N=9
		15			
	with shell fragments, fine grained, dark gray, dense				21-27-19 N=46
		20			
	with shell fragments, fine grained, dark gray, dense				22-22-19 N=41
25.0		25			
	Boring Terminated at 25 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

▽ *At completion of drilling*

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-18-2019	Boring Completed: 07-18-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-6

BORING LOG NO. B7

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1215° Longitude: -81.1675°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	SILTY SAND (SM), with gravel, fine grained, brown, dense			X	22-19-17-11 N=36
	with organics, gravel, and brick debris, fine to medium grained, brown, very loose			X	2-1-1-1 N=2
	with organics, gravel, and brick debris, fine to medium grained, brown, very loose	5		X	1-1-2-1 N=3
	with organics, gravel, and brick debris, fine to medium grained, brown, very loose			X	3-2-1-1 N=3
	8.0 **ELASTIC SILT (MH)**, fine to medium grained, dark brown, soft			X	3-2-1-1 N=3
	10.0 *Gravel and Brick Debris Collapsed into Borehole* ***Boring Terminated at 10 Feet***	10			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-17-2019	Boring Completed: 07-17-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-7

BORING LOG NO. B8

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1226° Longitude: -81.157°

DEPTH	Description	FIELD TEST RESULTS
0	**CRUSHED LIME ROCKS**	46-50/5"
2.0	**SANDY LEAN CLAY (CL)**, with organics and pebbles, brown, hard	19-19-12-10 N=31
4.0	**SILTY SAND (SM)**, with organics, fine grained, brown, stiff	3-5-3-4 N=8
6.0	**ELASTIC SILT (MH)**, with organics, brown and dark gray, very soft	0-0-0-0 N=0
	with organics, brown and dark gray, very soft	0-0-0-0 N=0
	with organics, brown and dark gray, very soft	0-0-0 N=0
17.0	**SILTY SAND (SM)**, with organics, fine to medium grained, brown and gray, medium dense	5-6-6 N=12
22.0	**SANDY SILT (ML)**, with organics, fine grained, olive green and dark gray, hard	10-17-28 N=45
25.0	***Boring Terminated at 25 Feet***	

DEPTH (Ft.): 5, 10, 15, 20, 25

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-18-2019 | Boring Completed: 07-18-2019

Drill Rig: Diedrich D25 | Driller: Tom and Chris

Project No.: ES185299 | Exhibit: A-5-8

BORING LOG NO. B9

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1225° Longitude: -81.1559°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
0	**CRUSHED LIME ROCKS**			X	16-16-8-5 N=24
2.0	**CLAYEY SAND (SC)**, with trace crushed lime rocks, fine to coarse grained, light orange and gray, loose			X	4-3-4-5 N=7
4.0	**POORLY GRADED SAND WITH CLAY (SP-SC)**, with trace crushed lime rocks, fine to coarse grained, light orange and gray, loose	5	▽	X	3-2-2-2 N=4
6.0	**SILTY SAND (SM)**, with trace crushed lime rocks, fine to coarse grained, brown, loose			X	1-2-2-2 N=4
8.0	**ELASTIC SILT (MH)**, with organics, fine to medium grained, brown, soft			X	2-1-2-1 N=3
		10			
	fine grained, brown, soft			X	0-0-2 N=2
		15			
	fine grained, gray and green, soft			X	4-4-5 N=9
		20			
22.0	**SILTY SAND (SM)**, fine grained, gray and olive green, medium dense			X	14-12-12 N=24
25.0	***Boring Terminated at 25 Feet***	25			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *While drilling*

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-18-2019	Boring Completed: 07-18-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-9

BORING LOG NO. B10

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1234° Longitude: -81.1506°

DEPTH	Description	Field Test Results
	CLAYEY SAND (SC), fine to medium grained, gray to orange, loose	3-4-5-5 N=9
	fine grained, gray/light brown to orange, loose	4-4-5-5 N=9
	fine grained, gray to orange, loose	2-3-3-3 N=6
6.0	**SANDY FAT CLAY (CH)**, gray to orange, soft	2-2-2-2 N=4
	gray to orange, soft	2-1-1-1 N=2
	soft, no sample recovery	1-1-1 N=2
	gray, soft	1-1-2 N=3
	gray, soft	0-2-1 N=3
27.0	**POORLY GRADED SAND (SP)**, fine to medium grained, light gray, medium dense	7-7-3 N=10
30.0	***Boring Terminated at 30 Feet***	

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-08-2017	Boring Completed: 07-08-2017
Drill Rig: D-50	Driller: Nick
Project No.: ES185299	Exhibit: A-5-10

CPT LOG NO. B11

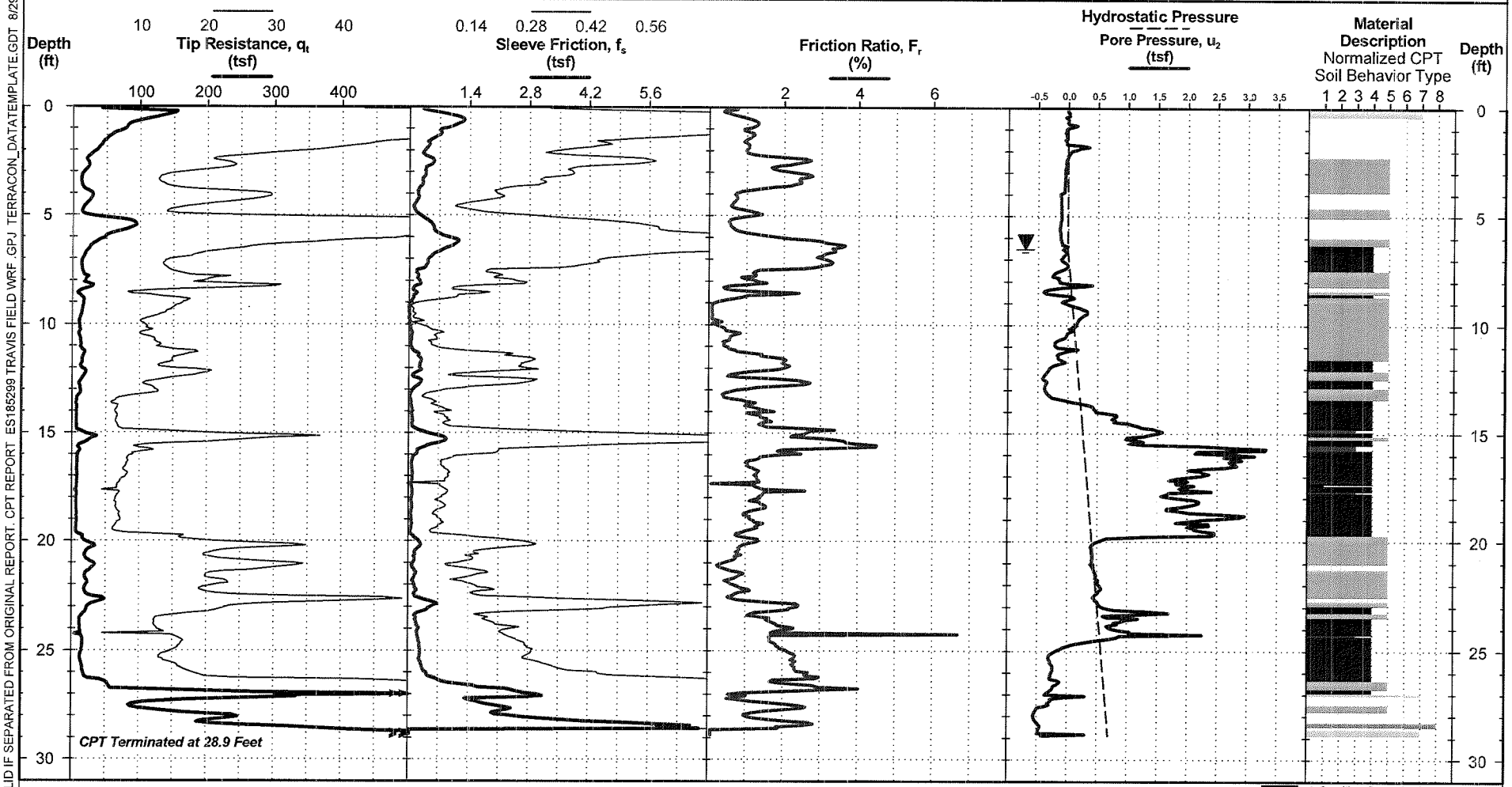
PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

TEST LOCATION: See Exhibit A-2

SITE: Savannah, GA

Latitude: 32.12426°
Longitude: -81.15096°



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION				
6.5 ft measured water depth (used in normalizations and correlations; see Appendix C)	Probe no. DPG1276 with net area ratio of 0.8 U2 pore pressure transducer location Manufactured by Vertek; calibrated 11/21/2013 Tip and sleeve areas of 10 cm^2 and 150 cm^2 Ring friction reducer with O.D. of 1.875 in	Terracon 2201 Rowland Ave Savannah, GA	CPT Started: 7/8/2017 Rig: Pagani TG73-200 Project No.: ES185299	CPT Completed: 7/8/2017 Operator: Tony Exhibit: A-5-1

BORING LOG NO. B12

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1248° Longitude: -81.1446°

DEPTH	Description	Sample	Field Test Results
1.0	**SILTY SAND (SM)**, with trace gravel, fine grained, gray and brown, very dense		11-17-50/0"
2.0	**GRAVEL**		
	SILTY SAND (SM), with trace gravel, fine grained, gray and brown, medium dense		9-8-7-11 N=15
	fine grained, brown and orange, medium dense		8-9-5-7 N=14
	with asphalt and brick debris, fine grained, brown, medium dense		5-5-7-9 N=12
	fine to medium grained, brown and dark gray, very loose		3-1-2-1 N=3
12.0	**ELASTIC SILT (MH)**, with organics, fine grained, dark gray, soft		2-2-2 N=4
17.0	**SILTY SAND (SM)**, with organics, fine to medium grained, brown and dark gray, loose		3-2-2 N=4
	with organics, fine grained, brown and dark gray, loose		4-3-3 N=6
27.0	**ELASTIC SILT (MH)**, with organics, brown and dark gray, very soft		0-0-0 N=0

DEPTH (Ft.): 5, 10, 15, 20, 25, 30

WATER LEVEL OBSERVATIONS: ▽

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-16-2019
Boring Completed: 07-16-2019
Drill Rig: Diedrich D25
Driller: Tom and Chris
Project No.: ES185299
Exhibit: A-5-12

BORING LOG NO. B12

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1248° Longitude: -81.1446°

GRAPHIC LOG	DEPTH		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
		ELASTIC SILT (MH), with organics, brown and dark gray, very soft *(continued)*				
	32.0	**SANDY LEAN CLAY (CL)**, with organics, dark gray, medium stiff				
			35		X	2-2-3 N=5
	37.0	**SANDY SILT (ML)**, with trace gravel, dark gray and olive green, very stiff				
	40.0		40		X	24-11-17 N=28
		Boring Terminated at 40 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-16-2019	Boring Completed: 07-16-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-12

BORING LOG NO. B13

PROJECT: Travis Field WRF Force Main

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

SITE: Savannah, GA

LOCATION See Exhibit A-2

Latitude: 32.1253° Longitude: -81.1434°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	SILTY SAND (SM), with asphalt and gravel, fine grained, brown, very dense				50/3"
	with trace gravel, fine to medium grained, brown and dark gray, dense		▽		31-22-21-22 N=43
	with trace gravel, fine to medium grained, brown and dark gray, medium dense	5			5-7-14-17 N=21
	fine to coarse grained, brown and dark gray, dense				13-15-18-16 N=33
	fine to coarse grained, brown and dark gray, loose				4-3-2-4 N=5
		10			
12.0	**ELASTIC SILT (MH)**, with organics, dark gray, soft				2-2-1 N=3
		15			
	with organics, dark gray, soft				0-0-2 N=2
		20			
	with wood debris, dark gray, soft				2-2-2 N=4
		25			
	with wood debris, dark gray, stiff				7-6-8 N=14
30.0		30			

Boring Terminated at 30 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Rope and Cathead

Advancement Method:
Mud Rotary

Abandonment Method:

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Terracon
2201 Rowland Ave
Savannah, GA

Boring Started: 07-16-2019	Boring Completed: 07-16-2019
Drill Rig: Diedrich D25	Driller: Tom and Chris
Project No.: ES185299	Exhibit: A-5-13

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Terracon GeoReport

Location	Depth (in)	Material Description	USCS Classification
HA1	0 to 4	Dark brown fine silty SAND with tree roots (topsoil)	SM
	4 to 18	Dark brown fine silty SAND	SM
	18 to 72	Brown / orange / gray sandy CLAY	CL
	72 to 102	Dark gray fine to medium poorly graded SAND with clay	SP-SC
	at 102	Cave-in	--
No groundwater encountered. No mottling noted. 0.25" leaves and wood debris at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA2	0 to 3	Dark brown fine silty SAND with tree roots (topsoil)	SM
	3 to 18	Dark brown fine silty SAND	SM
	18 to 60	Brown / gray / orange sandy CLAY	CL
Groundwater encountered @ 60' BGS. Mottling noted @ 24" BGS. 0.25" leaves and wood debris at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA3	0 to 2	Brown fine silty SAND with tree roots (topsoil)	SM
	2 to 18	Brown fine silty SAND	SM
	18 to 58	Gray / orange / brown sandy CLAY with cemented sands	CL
	58 to 60	Dark gray fine to medium clayey SAND	SC
Groundwater encountered @ 60' BGS. Mottling noted @ 24" BGS. Less than 0.25" leaves and wood debris at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA4	0 to 12	Brown fine to medium silty SAND with trace gravel	SM
	12 to 30	Gray / light orange fine SAND with clay	SP-SC
	30 to 54	Dark brown sandy CLAY with organics	CL
	54 to 84	Brown fine sandy SILT with organics	MH
	84 to 96	Brown / dark gray fine to medium silty SAND	SM
	at 96	Cave-in	--
Groundwater encountered @ 84" BGS. Mottling noted @ 14" BGS. Less than 1" sparse grass and gravel at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA5	0 to 1	Brown fine to coarse silty SAND with gravel and grass roots (topsoil)	SM
	1 to 6	Brown fine to coarse silty SAND with gravel	SM
	6 to 12	Dark orange fine to coarse clayey SAND with trace gravel	SC
	12 to 18	Gray / brown fine to medium silty SAND with gravel	SM
	18 to 30	Gray / brown fine SAND with silt	SP-SM
	30 to 42	Gray / brown fine silty SAND	SM
	42 to 60	Brown sandy CLAY with small roots	CL
No groundwater encountered. No mottling noted.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA6	0 to 1	Brown fine to medium silty SAND with gravel and grass (topsoil)	SM
	1 to 4	Brown fine to medium silty SAND with gravel	SM
	4 to 12	Brown fine silty SAND	SM
	12 to 18	Brown / gray fine silty SAND	SM
	18 to 36	Brown / gray / orange fine silty SAND	SM
	36 to 42	Brown medium silty SAND with organics	SM
	at 42	Refusal - wood debris	--
No groundwater encountered. No mottling noted.			
Note: Geogrid encountered @ 38" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA6 - 2nd attempt	0 to 1	Brown / orange / gray fine silty SAND with gravel and grass (topsoil)	SM
	1 to 3	Brown / orange / gray fine silty SAND with gravel	SM
	3 to 14	Brown / orange / gray fine silty SAND	SM
	14 to 40	Brown fine silty SAND	SM
	40 to 42	Dark brown fine silty SAND with organics (wood)	SM
	at 42	Refusal - wood debris	--
No groundwater encountered. No mottling noted.			
Note: Geogrid encountered 20 to 38" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA7	0 to 3	Dark brown fine silty SAND with long grass (topsoil)	SM
	3 to 6	Dark brown fine silty SAND	
	6 to 15	Light brown fine SAND with clay and gravel	SP-SC
	15 o 24	Gray fine to medium clayey SAND	SC
	24 to 30	Gray / dark brown sandy CLAY	CL
	30 to 48	Dark brown SILT with sand	ML
	48 to 60	Dark brown / dark gray / orange sandy CLAY	CL
No groundwater encountered. No mottling noted.			

Location	Depth (in)	Material Description	USCS Classification
HA8	0 to 3	Dark brown fine to meidum silty SAND with gravel and long grass (topsoil)	SM
	3 to 8	Dark brown fine to meidum silty SAND with gravel	SM
	8 to 13	Light brown clayey SAND with gravel	SC
	13 to 30	Gray / dark gray SAND with silt	SP-SM
	30 to 48	Gray / dark gray fine to medium silty SAND	SM
	48 to 60	Dark brown / dark gray SILT with sand and roots	ML
Groundwater encountered @ 30" BGS. No mottling noted.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Terracon GeoReport

Location	Depth (in)	Material Description	USCS Classification
HA9	0 to 1	Brown fine to medium silty SAND with gravel and grass roots (topsoil)	SM
	1 to 4	Brown fine to medium silty SAND with gravel	SM
	4 to 22	Orange fine to medium clayey SAND	SC
	22 to 24	Brown sandy CLAY	CL
	24 to 30	Gray / light orange fine SAND with silt	SP-SM
	30 to 42	Light brown fine silty SAND	SM
	42 to 60	Dark gray / dark brown sandy SILT with trace organics	MH
Groundwater encountered @ 42" BGS. Mottling noted @ 24" BGS.			
Note: cemented sands @ 14" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA10	0 to 1	Brown fine to medium silty SAND with gravel and grass roots (topsoil)	SM
	1 to 12	Brown fine to medium silty SAND with gravel	SM
	12 to 14	Light orange fine SAND with clay	SP-SC
	14 to 18	Gray / light orange fine SAND with CLAY	SP-SC
	18 to 42	Gray / brown fine silty SAND	SM
	42 to 60	Brown fine sandy SILT with organics	MH
No groundwater encountered. Mottling noted @ 14" BGS.			
Note: Geogrid @ 42" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA11	0 to 2	Brown fine to coarse silty SAND with trace gravel and grass roots (topsoil)	SM
	2 to 6	Brown fine to coarse silty SAND with trace gravel	SM
	6 to 12	Gray / light orange fine to coarse SAND with clay	SP-SC
	12 to 16	Light orange fine to medium clayey SAND	SC
	16 to 36	Gray / light brown SAND with silt	SP-SM
	36 to 60	Dark gray fine sandy SILT with organics	MH
Groundwater encountered @ 36" BGS. No mottling noted. Sparse grass and gravel at ground surface.			
Note: no sample taken due to very thin clayey sand layer.			

Location	Depth (in)	Material Description	USCS Classification
HA12	0 to 1	Brown fine to coarse silty SAND with gravel and trace organics and grass roots (topsoil)	SM
	1 to 8	Brown fine to coarse silty SAND with gravel and trace organics	SM
	8 to 18	Light orange fine to medium SAND with clay and trace organics	SP-SC
	18 to 42	Gray / light brown fine SAND with silt	SP-SM
	42 to 60	Dark gray sandy SILT with wood debris and organics	MH
Groundwater encountered @ 36" BGS. No mottling noted. Sparse grass and gravel at ground surface.			
Note: sample taken @ 10" BGS.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA13	0 to 1	Brown fine to coarse silty SAND with gravel and grass roots (topsoil)	SM
	1 to 10	Brown fine to coarse silty SAND with gravel	SM
	10 to 14	Gray / brown / orange fine to coarse SAND with clays	SP-SC
	14 to 18	Gray / light brown fine to medium SAND with silt	SP-SM
	18 to 24	Light orange fine to coarse clayey SAND	SC
	24 to 60	Dark gray / gray fine SAND with silt	SP-SM
Groundwater encountered @ 42" BGS. No mottling noted. Sparse grass and gravel at ground surface.			
Note: sample taken @ 12" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA14	0 to 2	Brown fine to medium silty SAND with trace gravel and grass roots (topsoil)	SM
	2 to 6	Brown fine to medium silty SAND with trace gravel	SM
	6 to 12	Gray /light orange fine to medium SAND with clay	SP-SC
	12 to 20	Light orange fine to coarse SAND with clay	SP-SC
	20 to 36	Gray / light brown fine SAND with silt	SP-SM
	36 to 60	Light brown / dark gray fine SAND with silt	SP-SM
Groundwater encountered @ 42" BGS. No mottling noted. Sparse grass and gravel at ground surface.			
Note: sample taken @ 18" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA15	0 to 6	Brown fine to coarse silty SAND with gravel	SM
	6 to 14	Light orange fine to medium SAND with clay	SP-SC
	14 to 18	Gray / light brown fine SAND with silt	SP-SM
	18 to 22	Dark brown fine silty SAND with trace organics	SM
	22 to 54	Light brown fine silty SAND	SM
	54 to 84	Brown fine sandy SILT with organics	MH
	84 to 96	Dark gray sandy CLAY	CL
Groundwater encountered @ 42" BGS. No mottling noted. Sparse grass and gravel at gorund surface.			
Note: sample taken @ 12" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA16	0 to 1	Brown fine to meidum silty SAND with trace gravel and grass roots (topsoil)	SM
	1 to 10	Brown fine to meidum silty SAND with trace gravel	SM
	10 to 14	Orange fine to medium SAND with clay	SP-SC
	14 to 26	Gray / light orange fine SAND with clay	SP-SC
	26 to 60	Dark brown sandy CLAY with trace organics	CL
No groundwater encountered. Mottling noted @ 12" BGS. Grass at ground surface.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA17	0 to 1	Brown fine to medium silty SAND with gravel and grass roots (topsoil)	SM
	1 to 10	Brown fine to medium silty SAND with gravel	SM
	10 to 12	Orange fine to medium clayey SAND	SC
	12 to 30	Gray fine SAND	SP
	30 to 60	Dark brown sandy CLAY with trave organics	CL
Groundwater encountered @ 30" BGS. No mottling noted. Grass and gravel at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA18	0 to 1	Brown fine to medium silty SAND with trace gravel and grass roots (topsoil)	SM
	1 to 12	Brown fine to medium silty SAND with trace gravel	SM
	12 to 20	Gray / light orange fine SAND with clay	SP-SC
	20 to 60	Brown sandy CLAY with trace organics	CL
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA19	0 to 1	Brown fine to medium silty SAND with gravel and grass roots (topsoil)	SM
	1 to 10	Brown fine to medium silty SAND with gravel	SM
	10 to 14	Orange fine to coarse SAND with clay	SP-SC
	14 to 30	Gray / light orange fine SAND with clay	SP-SC
	30 to 60	Brown sandy CLAY with trace organics	CL
No groundwater encountered. Mottling noted @ 18" BGS.			
Note: sampled @ 12" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA20	0 to 12	Brown fine silty SAND with rubber, metal and plastic debris	SM
	12 to 54	Light brown fine silty SAND	SM
	54 to 86	Brown / orange sandy CLAY	CL
	86 to 94	Gray fine CLAY with sand	CL
	94 to 96	Brown fine to medium silty SAND with gravel	SM
	at 96	Refusal - gravel	--
No groundwater encountered. Mottling noted @ 60" BGS. Sand and trace gravel at ground surface.			
Note: sampled @ 90" BGS.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA21	0 to 4	Brown fine silty SAND	SM
	4 to 30	Light brown / light orange fine silty SAND	SM
	30 to 90	Dark gray fine silty SAND	SM
	90 to 102	Dark gray / brown fine silty SAND with shell fragments	SM
	at 102	Refusal - wood debris	--
Groundwater encountered @ 84" BGS. No mottling noted. Sand at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA22	0 to 1	Brown fine silty SAND with concrete and brick debris and grass with gravel (topsoil)	SM
	1 to 18	Brown fine silty SAND with concrete and brick debris	SM
	18 to 36	Brown / gray / orange fine to medium silty SAND	SM
	36 to 72	Brown sandy CLAY with organics	CL
	72 to 120	Brown fine sandy SILT with organics	MH
Groundwater encountered @ 42" BGS. No mottling noted.			

Location	Depth (in)	Material Description	USCS Classification
HA23	0 to 1	Dark gray fine to medium silty SAND with gravel and grass (topsoil)	SM
	1 to 12	Dark gray fine to medium silty SAND with gravel	SM
	12 to 30	Brown fine to medium silty SAND	SM
	30 to 42	Brown sandy CLAY with trace organics	CL
	42 to 60	Brown fine silty SAND	SM
No groundwater encountered. No mottling noted.			

Location	Depth (in)	Material Description	USCS Classification
HA24	0 to 1	Dark gray fine to medium silty SAND with gravel and grass (topsoil)	SM
	1 to 6	Dark gray fine to medium silty SAND with gravel	SM
	6 to 30	Brown fine silty SAND	SM
	30 to 48	Brown / dark gray fine silty SAND with interbedded clay lenses	SM
	at 48	Refusal	--
No groundwater encountered. No mottling noted.			

Location	Depth (in)	Material Description	USCS Classification
HA25	0 to 2	Dark brown fine silty SAND with gravel and grass (topsoil)	SM
	2 to 12	Dark brown fine silty SAND with gravel	SM
	12 to 24	Brown / gray fine to medium silty SAND	SM
	24 to 40	Brown / orange sandy CLAY	CL
	40 to 60	Gray / light brown fine to medium SAND with silt	SP-SM
Groundwater encountered @ 60" BGS. No mottling noted.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA26	0 to 2	Brown fine silty SAND with gravel and grass roots (topsoil)	SM
	2 to 6	Brown fine silty SAND with gravel	SM
	6 to 24	Gray / orange fine to medium SAND with clay	SP-SC
	24 to 36	Brown fine sandy SILT with organics	MH
	36 to 48	Dark gray sandy CLAY	CL
	at 48	Refusal	--
No groundwater encountered. No mottling noted.			

Location	Depth (in)	Material Description	USCS Classification
HA27	0 to 1	Dark gray fine to coarse silty SAND with gravel and grass (topsoil)	SM
	1 to 12	Dark gray fine to coarse silty SAND with gravel	SM
	12 to 18	Brown / dark gray fine to coarse silty SAND with gravel and brick debris	SM
	at 18	Refusal - gravel and brick debris	--
No groundwater encountered. No mottling noted.			

Location	Depth (in)	Material Description	USCS Classification
HA28	0 to 1	Dark brown fine to medium silty SAND with gravel and grass (topsoil)	SM
	1 to 18	Dark brown fine to medium silty SAND with gravel	SM
	at 18	Refusal	--
No groundwater encountered. No mottling noted.			

Location	Depth (in)	Material Description	USCS Classification
HA29	0 to 8	Gray fine to coarse weathered limestone with fine to medium silty SAND	SM
	8 to 24	Orange / gray fine to coarse clayey SAND	SC
	24 to 60	Dark gray sandy CLAY with trace organics	CL
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA30	0 to 12	Brown fine to medium silty SAND with gravel	SM
	12 to 30	Weathered limestone with fine to medium silty SAND	SM
	at 30	Refusal	--
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA31	0 to 1	Brown / gray fine to medium silty SAND and grass with gravel (topsoil)	SM
	1 to 8	Brown / gray fine to medium silty SAND	SM
	8 to 36	Orange / gray fine to coarse SAND with clay	SP-SC
	36 to 60	Dark gray sandy CLAY with trace organics	CL
Groundwater encountered @ 42" BGS. No mottling noted.			
Note: sampled @ 14" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA32	0 to 2	Brown fine to medium silty SAND with weathered limestone and grass roots (topsoil)	SM
	2 to 6	Brown fine to medium silty SAND with weathered limestone	SM
	6 to 60	Light orange fine to coarse clayey SAND	SC
Groundwater encountered @ 54" BGS. No mottling noted. Grass and gravel at ground surface.			
Note: sampled @ 14" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA33	0 to 2	Weathered limestone with light brown fine to medium silty SAND and grass roots (topsoil)	SM
	2 to 6	Weathered limestone with light brown fine to medium silty SAND	SM
	6 to 40	Light orange fine to coarse clayey SAND	SC
	40 to 44	Dark gray sandy CLAY	CL
	44 to 60	Dark gray fine silty SAND	SM
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA34	0 to 2	Weathered limestone with light brown fine to medium silty SAND and grass roots (topsoil)	SM
	2 to 6	Weathered limestone with light brown fine to medium silty SAND	SM
	6 to 18	Light orange / gray fine to coarse clayey SAND	SC
	18 to 20	Dark brown sandy CLAY	CL
	20 to 36	Dark gray fine silty SAND with wood debris	SM
	at 36	Refusal - wood	--
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA35	0 to 2	Weathered limestone with brown fine to medium silty SAND and grass roots (topsoil)	SM
	2 to 6	Weathered limestone with brown fine to medium silty SAND	SM
	6 to 18	Gray / brown fine to coarse SAND with clay	SP-SC
	at 18	Refusal	--
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			
Note: sampled @ 12" BGS.			

Location	Depth (in)	Material Description	USCS Classification
HA36	0 to 2	Brown fine silty SAND with grass roots (topsoil)	SM
	2 to 12	Brown fine silty SAND	SM
	12 to 40	Brown / dark orange sandy CLAY	CL
	40 to 60	Dark gray sandy CLAY with organics	CL
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA37	0 to 2	Brown fine to coarse silty SAND and grass roots (topsoil)	SM
	2 to 18	Brown fine to coarse silty SAND	SM
	18 to 42	Brown / orange fine to medium silty SAND with trace clays	SM
	42 to 54	Gray / light brown fine to coarse SAND with clay	SP-SC
	54 to 60	Dark gray fine to medium clayey SAND	SC
Groundwater encountered @ 48" BGS. No mottling noted. Grass at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA38	0 to 3	Dark brown fine to coarse silty SAND and grass roots (topsoil)	SM
	3 to 24	Dark brown fine to coarse silty SAND	SM
	24 to 54	Light brown fine to medium silty SAND	SM
	54 to 60	Gray sandy CLAY with wood debris	CL
No groundwater encountered. No mottling noted. Grass at ground surface.			

Note: BGS=Below ground surface

Hand Auger Boring Log

Project Name: Travis Field WRF Force Main
Project No. ES185299
Project Location: Garden City, Chatham County, Georgia

Location	Depth (in)	Material Description	USCS Classification
HA39	0 to 1	Brown fine to medium silty SAND and grass roots (topsoil)	SM
	1 to 4	Brown fine to medium silty SAND	SM
	4 to 24	Light orange / gray fine to medium SAND with silt	SP-SM
	24 to 42	Light orange / gray fine to medium SAND	SP
	42 to 60	Orange / gray fine to medium SAND with clay	SP-SC
No groundwater encountered. No mottling noted. Grass and gravel at ground surface.			

Location	Depth (in)	Material Description	USCS Classification
HA40	0 to 1	Dark brown fine silty SAND with gravel and grass roots (topsoil)	SM
	1 to 4	Dark brown fine silty SAND with gravel	SM
	4 to 24	Brown fine to medium silty SAND	SM
	24 to 60	Brown / light orange fine to medium SAND with clay	SP-SC
Groundwater encountered @ 54" BGS. No mottling noted. Grass and gravel at ground surface.			

Note: BGS=Below ground surface

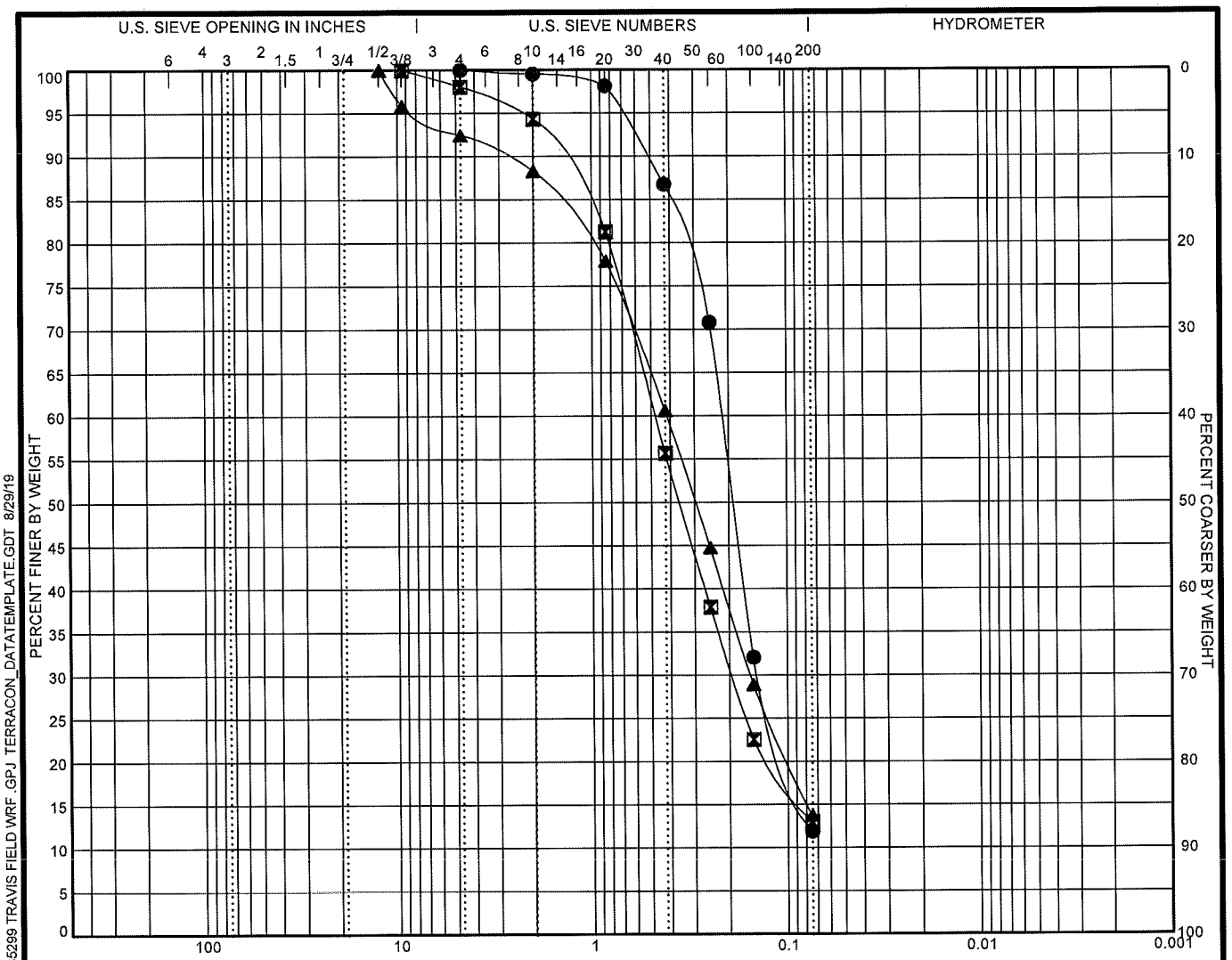
APPENDIX B

Laboratory Test Results

- Exhibit B-1 Grain Size Analysis Results

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	**HA1**	**7.5**	**0.0**	**0.0**	**88.1**		**11.9**		**SP-SC**
⊠	**HA12**	**1.2**	**0.0**	**1.9**	**85.0**		**13.0**		**SP-SC**
▲	**HA13**	**1**	**0.0**	**7.5**	**78.7**		**13.7**		**SP-SC**

	GRAIN SIZE		
	●	⊠	▲
D_{60}	**0.217**	**0.477**	**0.416**
D_{30}	**0.14**	**0.192**	**0.155**
D_{10}			
	COEFFICIENTS		
C_C	**1.28**		
C_U	**3.09**		

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	**100.0**	**3/8"**	**100.0**	**1/2"**	**100.0**
#10	**99.56**	**#4**	**98.06**	**3/8"**	**95.86**
#20	**98.16**	**#10**	**94.35**	**#4**	**92.45**
#40	**86.77**	**#20**	**81.29**	**#10**	**88.3**
#60	**70.82**	**#40**	**55.71**	**#20**	**77.93**
#100	**32.08**	**#60**	**37.89**	**#40**	**60.63**
#200	**11.9**	**#100**	**22.57**	**#60**	**44.77**
		#200	**13.03**	**#100**	**28.91**
				#200	**13.74**

SOIL DESCRIPTION

● Poorly graded sands with clays (SP-SC)

⊠ Poorly graded sands with clays (SP-SC)

▲ Poorly graded sands with clays (SP-SC)

REMARKS

●

⊠

▲

PROJECT: Travis Field WRF Force Main

SITE: Savannah, GA

Terracon

2201 Rowland Ave
Savannah, GA

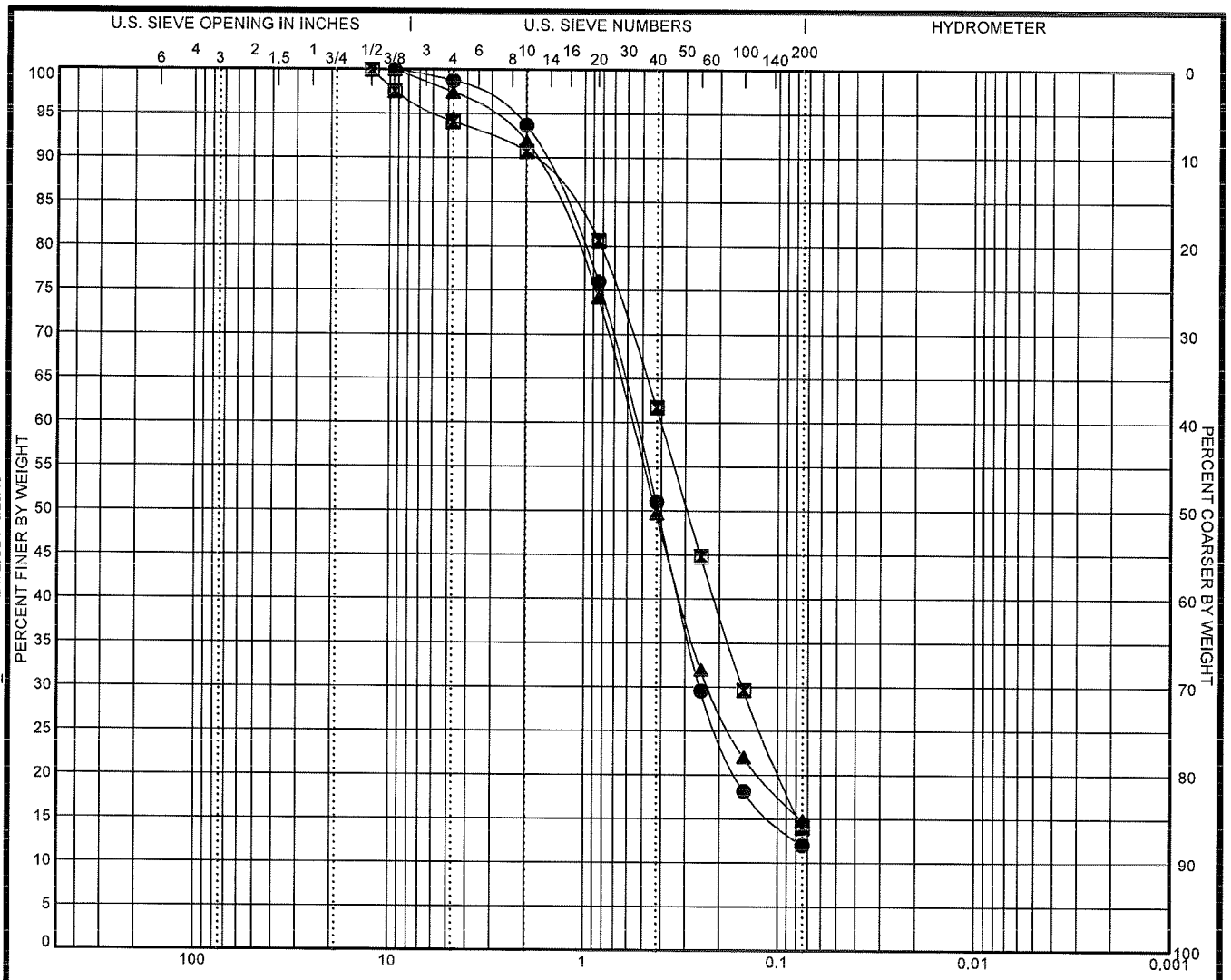
PROJECT NUMBER: ES185299

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

EXHIBIT: B-1

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	HA14	1.5	0.0	1.2	86.7		12.0		SP-SC
⊠	HA15	1	0.0	5.9	80.1		14.0		SP-SC
▲	HA16	1	0.0	2.6	82.6		14.9		SP-SC

GRAIN SIZE	●	⊠	▲
D_{60}	0.545	0.402	0.568
D_{30}	0.253	0.152	0.226
D_{10}			
COEFFICIENTS			
C_C	1.97		
C_U	9.16		

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	1/2"	100.0	3/8"	100.0
#4	98.76	3/8"	97.6	#4	97.43
#10	93.72	#4	94.08	#10	91.91
#20	76.01	#10	90.77	#20	74.2
#40	51.01	#20	80.67	#40	49.74
#60	29.59	#40	61.76	#60	31.97
#100	18.17	#60	44.86	#100	22.03
#200	12.04	#100	29.69	#200	14.87
		#200	14.02		

SOIL DESCRIPTION

● Poorly graded sands with clays (SP-SC)

⊠ Poorly graded sands with clays (SP-SC)

▲ Poorly graded sands with clays (SP-SC)

REMARKS

●

⊠

▲

PROJECT: Travis Field WRF Force Main

SITE: Savannah, GA

Terracon

2201 Rowland Ave
Savannah, GA

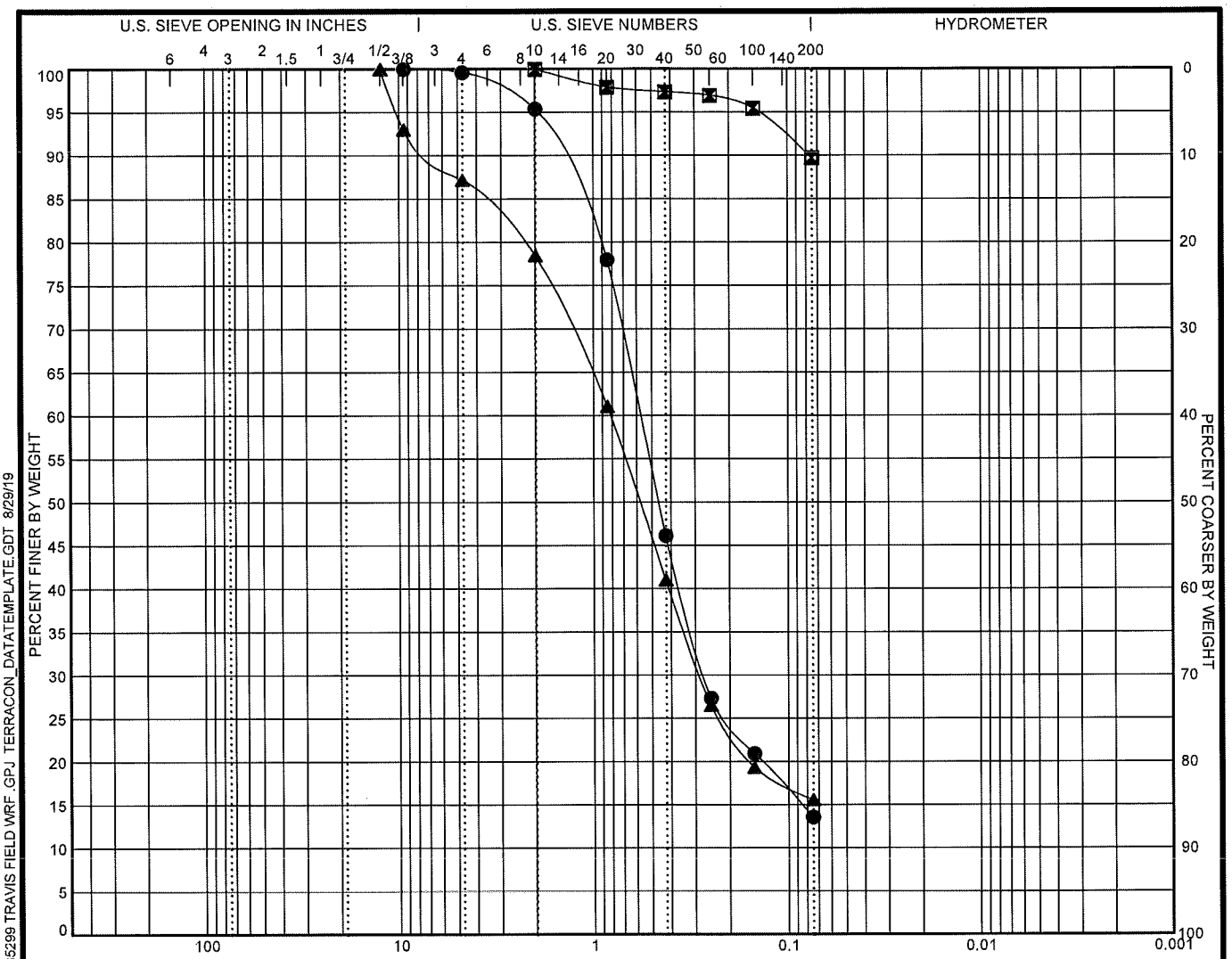
PROJECT NUMBER: ES185299

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

EXHIBIT: B-2

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	HA19	1	0.0	0.4	86.0		13.6		SP-SC
⊠	HA20	7.5	0.0	0.0	10.3		89.7		CL
▲	HA29	0.8	0.0	12.8	71.6		15.6		SC

	GRAIN SIZE		
	●	⊠	▲
D_{60}	0.575		0.819
D_{30}	0.269		0.284
D_{10}			
	COEFFICIENTS		
C_C			
C_U			

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	#10	100.0	1/2"	100.0
#4	99.61	#20	97.9	3/8"	93.03
#10	95.41	#40	97.35	#4	87.18
#20	77.99	#60	96.93	#10	78.48
#40	46.14	#100	95.48	#20	61.08
#60	27.34	#200	89.73	#40	41.0
#100	20.94			#60	26.52
#200	13.57			#100	19.33
				#200	15.58

SOIL DESCRIPTION

● Poorly graded sands with clays (SP-SC)

⊠ Clay with sand (CL)

▲ Clayey sand (SC)

REMARKS

●

⊠

▲

PROJECT: Travis Field WRF Force Main

SITE: Savannah, GA

Terracon

2201 Rowland Ave
Savannah, GA

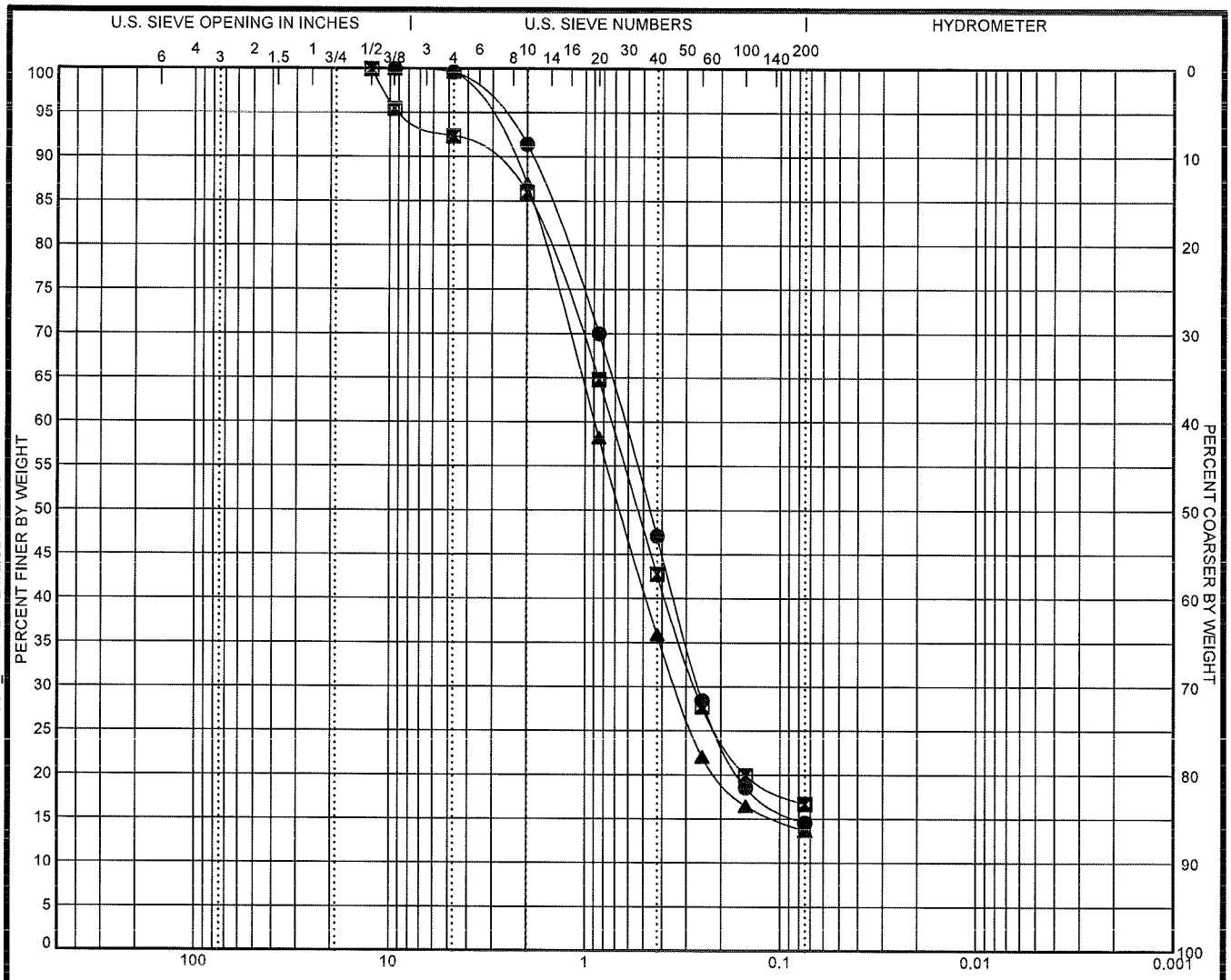
PROJECT NUMBER: ES185299

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

EXHIBIT: B-3

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	**HA31**	**1.2**	**0.0**	**0.4**	**85.0**		**14.6**		**SP-SC**
⊠	**HA32**	**1.2**	**0.0**	**7.6**	**75.7**		**16.7**		**SC**
▲	**HA35**	**1**	**0.0**	**0.4**	**86.0**		**13.6**		**SP-SC**

	GRAIN SIZE		
	●	⊠	▲
D_{60}	**0.628**	**0.73**	**0.895**
D_{30}	**0.261**	**0.271**	**0.339**
D_{10}			
	COEFFICIENTS		
C_C			
C_U			

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
3/8"	100.0	1/2"	100.0	3/8"	100.0
#4	99.62	3/8"	95.49	#4	99.63
#10	91.45	#4	92.38	#10	86.99
#20	70.03	#10	86.02	#20	58.26
#40	47.1	#20	64.82	#40	35.95
#60	28.46	#40	42.77	#60	22.08
#100	18.57	#60	27.75	#100	16.49
#200	14.58	#100	19.97	#200	13.64
		#200	16.72		

SOIL DESCRIPTION

● Poorly graded sand with clay (SP-SC)

⊠ Clayey sand (SC)

▲ Poorly graded sand with clay (SP-SC)

REMARKS

●

⊠

▲

PROJECT: Travis Field WRF Force Main

SITE: Savannah, GA

Terracon

2201 Rowland Ave
Savannah, GA

PROJECT NUMBER: ES185299

CLIENT: Thomas & Hutton Engineering Co
Savannah, GA

EXHIBIT: B-4

APPENDIX C

Supporting Information

- Exhibit C-1 Seismic Design Parameters
- Exhibit C-2 General Notes
- Exhibit C-3 Unified Soil Classification System
- Exhibit C-4 CPT-based Soil Classification

Seismic Design Parameters Based on IBC2012 Code and ASCE 7-10 Standard
Terracon Project Name: Travis Field WRF Force Main
Terracon Project Number: ES185299

Site Location: Savannah, Georgia
Latitude : 32.12269
Longitude : -81.16448

Site Class: D
Design Response Spectrum for the Site Class

S_s	0.307	S_1	0.119
F_a	1.554	F_v	2.324
S_{MS}	0.477	S_{M1}	0.277
S_{DS}	0.318	S_{D1}	0.184

	Period (sec)	Sa (g)
	0.000	0.127
T_0	0.116	0.318
	0.200	0.318
T_S	0.580	0.318
T	0.700	0.263
	0.800	0.230
	0.900	0.205
	1.000	0.184
	1.100	0.168
	1.200	0.154
	1.300	0.142
	1.400	0.132
	1.500	0.123
	1.600	0.115
	1.700	0.108
	1.800	0.102
	1.900	0.097
	2.000	0.092

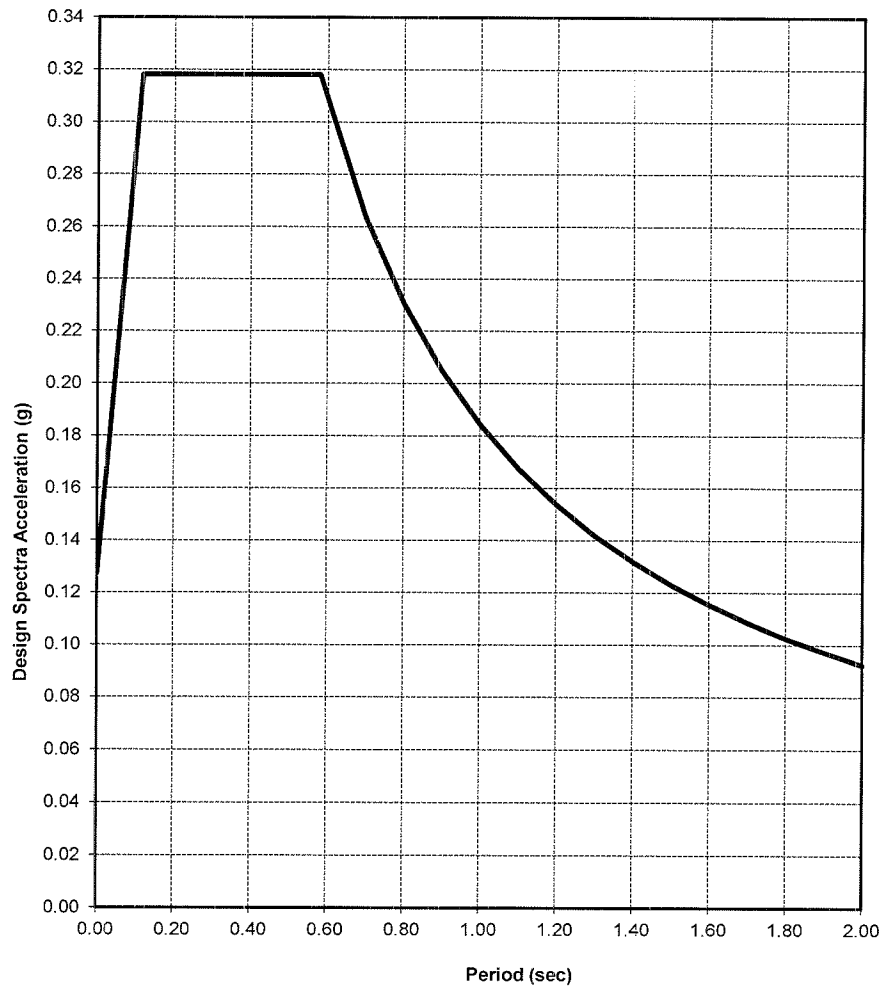


Exhibit C-1

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

- Auger
- Split Spoon
- Shelby Tube
- Macro Core
- No Recovery
- Rock Core
- Ring Sampler

GROUNDWATER

- Groundwater Initially Encountered
- Groundwater Level After a Specified Period of Time
- Static Groundwater Level After a Specified Period of Time
- No Groundwater Observed

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Std. Penetration Resistance (blows per foot)**	**Descriptive Term (Consistency)**	**Undrained Shear Strength (kips per square foot)**	**Std. Penetration Resistance (blows per foot)**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium-Stiff	0.50 to 1.00	5 - 7
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 14
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	above 4.00	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Descriptive Term(s) of other constituents	Percent of Dry Weight
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

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UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]					Soil Classification	
					Group Symbol	Group Name[B]
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$		GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3^E$		GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH		GM	Silty gravel[F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$		SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3^E$		SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH		SM	Silty sand[G,H,I]
			Fines Classify as CL or CH		SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]		CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]		ML	Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line		CH	Fat clay[K,L,M]
			PI plots below "A" line		MH	Elastic Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.

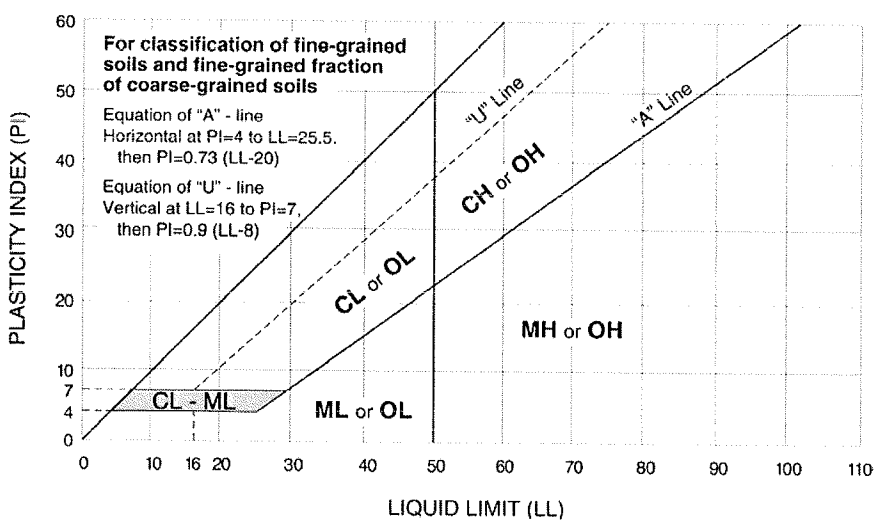

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Exhibit C-3

Form 111—6/98

CPT GENERAL NOTES

DESCRIPTION OF MEASUREMENTS AND CALIBRATIONS

To be reported per ASTM D5778:

Uncorrected Tip Resistance, q_c
Measured force acting on the cone divided by the cone's projected area

Corrected Tip Resistance, q_t
Cone resistance corrected for porewater and net area ratio effects
$q_t = q_c + U2(1 - a)$
Where a is the net area ratio, a lab calibration of the cone typically between 0.70 and 0.85

Pore Pressure, U1/U2
Pore pressure generated during penetration
U1 - sensor on the face of the cone
U2 - sensor on the shoulder (more common)

Sleeve Friction, fs
Frictional force acting on the sleeve divided by its surface area

Normalized Friction Ratio, FR
The ratio as a percentage of fs to q_t, accounting for overburden pressure

To be reported per ASTM D7400, if collected:

Shear Wave Velocity, Vs
Measured in a Seismic CPT and provides direct measure of soil stiffness

DESCRIPTION OF GEOTECHNICAL CORRELATIONS

Normalized Tip Resistance, Q_t
$Q_t = (q_t - \sigma_{vo})/\sigma'_{vo}$

Over Consolidation Ratio, OCR
$OCR\ (1) = 0.25(Q_t)^{1.25}$
$OCR\ (2) = 0.33(Q_t)$

Undrained Shear Strength, Su
$Su = Q_t \times \sigma'_{vo}/N_{kt}$
N_{kt} is a geographical factor (shown on Su plot)

Sensitivy, St
$St = (q_t - \sigma_{vo}/N_{kt}) \times (1/fs)$

Effective Friction Angle, ϕ'
$\phi'\ (1) = \tan^{-1}(0.373[\log(q_t/\sigma'_{vo}) + 0.29])$
$\phi'\ (2) = 17.6 + 11[\log(Q_t)]$

Unit Weight
$UW = (0.27[\log(FR)]+0.36[\log(q_t/atm)]+1.236) \times UW_{water}$
σ_{vo} is taken as the incremental sum of the unit weights

SPT N_{60}
$N_{60} = (q_t/atm) / 10^{(1.1268 - 0.2817/c)}$

Soil Behavior Type Index, Ic
$Ic = [(3.47 - \log(Q_t))^2 + (\log(FR) + 1.22)^2]^{0.5}$

Small Strain Modulus, G_0
$G_0 = \rho Vs^2$

Elastic Modulus, Es (assumes $q/q_{ultimate} \sim 0.3$, i.e. FS = 3)
$Es\ (1) = 2.6\psi G_0$
where $\psi = 0.56 - 0.33\log Q_{t,clean\ sand}$
$Es\ (2) = G_0$
$Es\ (3) = 0.015 \times 10^{(0.55/c + 1.68)}(q_t - \sigma_{vo})$
$Es\ (4) = 2.5q_t$

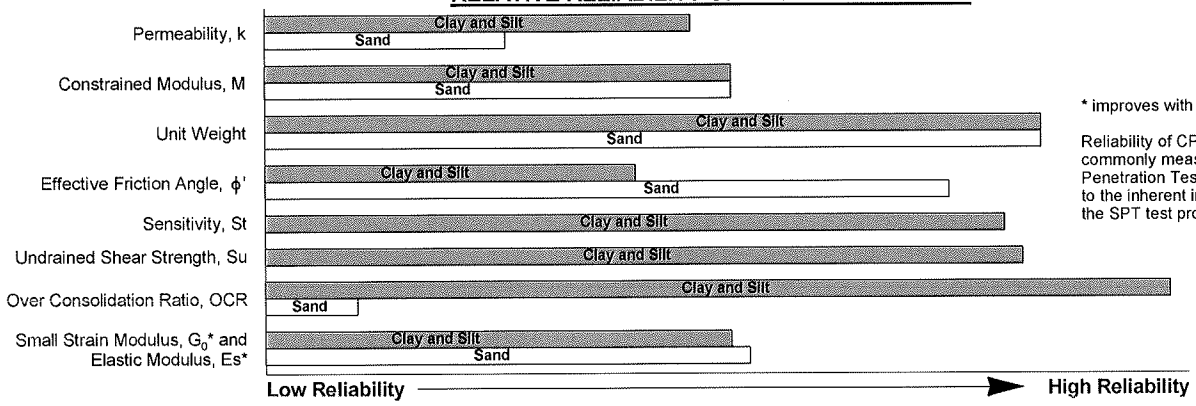
Constrained Modulus, M
$M = \alpha_M(q_t - \sigma_{vo})$
For Ic > 2.2 (fine-grained soils)
$\alpha_M = Q_t$ with maximum of 14
For Ic < 2.2 (coarse-grained soils)
$\alpha_M = 0.0188 \times 10^{(0.55/c + 1.68)}$

Hydraulic Conductivity, k
For 1.0 < Ic < 3.27 $k = 10^{(0.952 - 3.04/c)}$
For 3.27 < Ic < 4.0 $k = 10^{(-4.52 - 1.37/c)}$

REPORTED PARAMETERS

CPT logs as provided, at a minimum, report the data as required by ASTM D5778 and ASTM D7400 (if applicable). This minimum data include tip resistance, sleeve resistance, and porewater pressure. Other correlated parameters may also be provided. These other correlated parameters are interpretations of the measured data based upon published and reliable references, but they do not necessarily represent the actual values that would be derived from direct testing to determine the various parameters. The following chart illustrates estimates of reliability associated with correlated parameters based upon the literature referenced below.

RELATIVE RELIABILITY OF CPT CORRELATIONS



* improves with seismic Vs measurements

Reliability of CPT-predicted N_{60} values as commonly measured by the Standard Penetration Test (SPT) is not provided due to the inherent inaccuracy associated with the SPT test procedure.

WATER LEVEL

The groundwater level at the CPT location is used to normalize the measurements for vertical overburden pressures and as a result influences the normalized soil behavior type classification and correlated soil parameters. The water level may either be "measured" or "estimated:"

Measured - Depth to water directly measured in the field

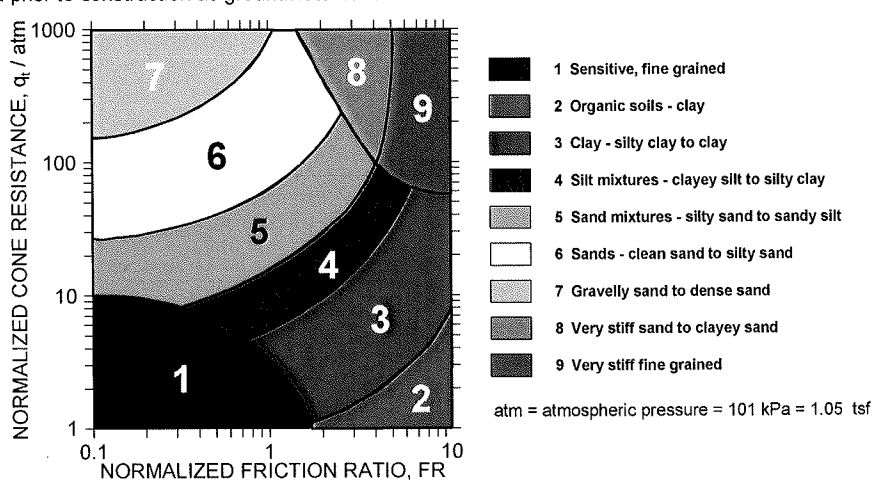
Estimated - Depth to water interpolated by the practitioner using pore pressure measurements in coarse grained soils and known site conditions

While groundwater levels displayed as "measured" more accurately represent site conditions at the time of testing than those "estimated," in either case the groundwater should be further defined prior to construction as groundwater level variations will occur over time.

CONE PENETRATION SOIL BEHAVIOR TYPE

The estimated stratigraphic profiles included in the CPT logs are based on relationships between corrected tip resistance (q_t), friction resistance (fs), and porewater pressure (U2). The normalized friction ratio (FR) is used to classify the soil behavior type.

Typically, silts and clays have high FR values and generate large excess penetration porewater pressures; sands have lower FRs and do not generate excess penetration porewater pressures. Negative pore pressure measurements are indicative of fissured fine-grained material. The adjacent graph (Robertson et al.) presents the soil behavior type correlation used for the logs. This normalized SBT chart, generally considered the most reliable, does not use pore pressure to determine SBT due to its lack of repeatability in onshore CPTs.



atm = atmospheric pressure = 101 kPa = 1.05 tsf

REFERENCES

Kulhawy, F.H., Mayne, P.W., (1997). "Manual on Estimating Soil Properties for Foundation Design," Electric Power Research Institute, Palo Alto, CA.

Mayne, P.W., (2013). "Geotechnical Site Exploration in the Year 2013," Georgia Institue of Technology, Atlanta, GA.

Robertson, P.K., Cabal, K.L. (2012). "Guide to Cone Penetration Testing for Geotechnical Engineering," Signal Hill, CA.

Schmertmann, J.H., (1970). "Static Cone to Compute Static Settlement over Sand," *Journal of the Soil Mechanics and Foundations Division*, 96(SM3), 1011-1043.

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Exhibit C-4

Richard, Christina

From: GDOTWorkFlows@dot.ga.gov
Sent: Monday, May 11, 2020 2:19 PM
To: Richard, Christina; daslin_garcon@savannahga.gov
Cc: Rozier, Dallory; Shenk, George; Kent, John
Subject: GUPS - Permit#1216701, Route# 002100, Chatham County

Workflow Notification

Your permit application to perform specified work within the public right-of-way has been approved and forwarded to the GDOT Area Permit Inspector, John Louis Kent Jr, at 912-651-2144, for activation prior to beginning the End User License Agreement (EULA) process which will allow you to save and print your own permit package. Hard copy permits will no longer be provided by the Department on non-GDOT project permits.

In order for the Inspector to activate the permit, it will be necessary for you or your representative to contact the Inspector who is required to ask you a series of questions and electronically record your answers. Please note that each Inspector may have a specific time-frame and their own method for obtaining the answers to the questions; therefore, it is imperative that you or your representative call to schedule a time or obtain a copy of the questions. As part of the activation process, you will be required to provide estimated beginning and ending dates of construction. Once the Inspector activates the permit, you will receive an email with a link to begin the EULA process.

Richard, Christina

From: GDOTWorkFlows@dot.ga.gov
Sent: Tuesday, June 9, 2020 2:04 PM
To: Richard, Christina; daslin_garcon@savannahga.gov
Cc: Rozier, Dallory; Shenk, George; Kent, John
Subject: GUPS - Permit#1216742, Route# 002500, Chatham County

Workflow Notification

Your permit application to perform specified work within the public right-of-way has been approved and forwarded to the GDOT Area Permit Inspector, John Louis Kent Jr, at 912-651-2144, for activation prior to beginning the End User License Agreement (EULA) process which will allow you to save and print your own permit package. Hard copy permits will no longer be provided by the Department on non-GDOT project permits.

In order for the Inspector to activate the permit, it will be necessary for you or your representative to contact the Inspector who is required to ask you a series of questions and electronically record your answers. Please note that each Inspector may have a specific time-frame and their own method for obtaining the answers to the questions; therefore, it is imperative that you or your representative call to schedule a time or obtain a copy of the questions. As part of the activation process, you will be required to provide estimated beginning and ending dates of construction. Once the Inspector activates the permit, you will receive an email with a link to begin the EULA process.

S40534

AECOM

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215 735 0883 fax

September 03, 2020

Daslin Garcon
Engineer
Mayor and Aldermen of the City of Savannah
P.O. Box 1027
Savannah, GA 31402

Subject: Savannah, Chatham County, Georgia
Milepost FL-4.16, Foundation Lead, Georgia Division
Latitude N 32.122501, Longitude W 81.156107

Norfolk Southern Activity No. 1283819
Proposed installation of an underground crossing of a 30-inch sewage pipeline in a 36-inch steel casing pipe

Dear Mr. Garcon:

Attached is the fully executed Standard Pipe License Agreement dated August 31, 2020 between Central of Georgia Railroad Company and The Mayor and Aldermen of the City of Savannah covering the above referenced project, your project number SW-534-19.

This letter acknowledges receipt of your payment in the amount of $30,100.00, which covers the one-time license fee of $29,100.00 and the Risk Management Fee of $1,000.00. Your Commercial General Liability insurance coverage has been reviewed by Norfolk Southern's Risk Manager and is acceptable through July 13, 2021. If your construction will occur after the expiration date noted above for your insurance, you must furnish a renewal certificate or policy to Norfolk Southern's Risk Manager prior to scheduling construction or contacting the Railway for Flagging.

Prior to start of work on Railway right of way, you are required to contact the following:

For Scheduling of Flagging and Inspection
Lisa Outten, Office Manager of NS' Georgia Division Engineer's office, (770) 405-3675/3680

Once contacted, the Division Engineer requires 72 hours to review the need for and availability of flagmen for this project and will advise you of the cost of said flagmen. No work is permitted on Railway right of way without a flagman or the Division Engineer's agreement to waive the flag protection requirement. Entry onto Railway property without the Division Engineer's prior approval is considered trespassing. In the event you are unable to contact the railway for flagging services, please contact the undersigned for assistance.

Thank you for your cooperation.

Very truly yours,

Angelina DiScienzo

Angelina Discienzo
Contract Administrator
215-789-2168
angelina.discienzo@aecom.com

CC: Archives

THIS AGREEMENT, dated as of the 31st day of August, 2020 is made and entered into by and between

CENTRAL OF GEORGIA RAILROAD COMPANY, a Georgia corporation, whose mailing address is Three Commercial Place, Norfolk, Virginia 23510 (hereinafter called "Railway"); and

THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, a political subdivision of the State of Georgia, whose mailing address is 702 Stiles Ave, Savannah, Georgia 31415 (hereinafter called "Licensee").

W I T N E S S E T H

WHEREAS, Licensee proposes to install, construct, maintain, operate and remove an underground crossing of a 30-inch sewage pipeline in a 36-inch steel casing pipe (hereinafter called the "Facilities") located in, under and across the right-of-way or property and any tracks of Railway, at or near:

- Milepost FL-4.16, Foundation Lead
- Latitude N 32.122501, Longitude W 81.156107
- Savannah, Chatham County, Georgia
- Valuation Section 2, Map 11D, Stationing 202+74

the same to be located in accordance with and limited to the installation shown on print of drawings marked Exhibits A and B, received by Railway on April 28, 2020, and Pipe Data Sheet, attached hereto and made a part hereof; and

WHEREAS, Licensee desires a license to use such right-of-way or property of Railway for the installation, construction, maintenance, operation and removal of the Facilities.

NOW, THEREFORE, for and in consideration of the premises, the payment of a non-refundable, non-assignable one-time fee in the amount of THIRTY THOUSAND ONE HUNDRED AND 00/100 DOLLARS ($30,100.00) to cover the Risk Financing Fee (as hereinafter defined) in the amount of $1,000.00 and a one-time license fee in the amount of $29,100.00, and the covenants hereinafter set forth, Railway hereby permits and grants to Licensee, insofar as Railway has the right to do so, without warranty and subject to all encumbrances, covenants and easements to which Railway's title may be subject, the right to use and occupy so much of Railway's right-of-way or property as may be necessary for the installation, construction, maintenance, operation and removal of the Facilities (said right-of-way or property of Railway being hereinafter collectively called the "Premises"), upon the following terms and conditions:

1. Use and Condition of the Premises. The Premises shall be used by Licensee only for the installation, construction, maintenance, operation and removal of the Facilities and for no other purpose without the prior written consent of Railway, which consent may be withheld by Railway in its sole discretion. Licensee accepts the Premises in their current "as is" condition, as

suited for the operation of the Facilities, and without the benefit of any improvements to be constructed by Railway.

2. Installation of the Facilities; Railway Support. Licensee shall, at its expense, install, construct, maintain and operate the Facilities on a lien-free basis and in such a manner as will not interfere with the operations of Railway, or endanger persons or property of Railway. Such installation, construction, maintenance and operation of the Facilities shall be in accordance with (a) the plans and specifications (if any) shown on the prints attached hereto and any other specifications prescribed by Railway, (b) applicable laws, regulations, ordinances and other requirements of federal, state and local governmental authorities, and (c) applicable specifications of the American Railway Engineering and Maintenance-of-Way Association, when not in conflict with the applicable plans, specifications, laws, regulations, ordinances or requirements mentioned in (a) and (b), above. All underground pipes must have secondary pipe containment if the material flowing through the pipeline poses a safety or environmental hazard. Any change to the character, capacity or use of the Facilities shall require execution of a new agreement.

3. Railway Support. Railway shall, at Railway's option, furnish, at the sole expense of Licensee, labor and materials necessary, in Railway's sole judgment, to support its tracks and to protect its traffic (including, without limitation, flagging) during the installation, construction, maintenance, repair, or removal of the Facilities.

4. Electronic Interference. Licensee will provide Railway with no less than sixty (60) days advance written notice prior to the installation and operation of cathodic protection in order that tests may be conducted on Railway's signal, communications and other electronic systems (hereinafter collectively called the "Electronic Systems") for possible interference. If the Facilities cause degradation of the Electronic Systems, Licensee, at its expense, will either relocate the cathodic protection or modify the Facilities to the satisfaction of Railway so as to eliminate such degradation. Such modifications may include, without limiting the generality of the foregoing, providing additional shielding, reactance or other corrective measures deemed necessary by Railway. The provisions of this paragraph 4 shall apply to the Electronic Systems existing as of the date of this Agreement and to any Electronic Systems that Railway may install in the future.

5. Corrective Measures. If Licensee fails to take any corrective measures requested by Railway in a timely manner, or if an emergency situation is presented which, in Railway's judgment, requires immediate repairs to the Facilities, Railway, at Licensee's expense, may undertake such corrective measures or repairs as it deems necessary or desirable.

6. Railway Changes. If Railway shall make any changes, alterations or additions to the line, grade, tracks, structures, roadbed, installations, right-of-way or works of Railway, or to the character, height or alignment of the Electronic Systems, at or near the Facilities, Licensee shall, upon thirty (30) days prior written notice from Railway and at its sole expense, make such changes in the location and character of the Facilities as, in the opinion of the chief engineering officer of Railway, shall be necessary or appropriate to accommodate any construction, improvements, alterations, changes or additions of Railway.

7. Assumption of Risk. To the extent permitted by State Law (Constitutional or Statutory, as amended), unless caused solely by the negligence of Railway or caused solely by the willful misconduct of Railway, Licensee hereby assumes all risk of damage to the Facilities and Licensee's other property relating to its use and occupation of the Premises or business carried on the Premises and any defects to the Premises; and Licensee hereby indemnifies Railway, its officers, directors, agents and employees from and against any liability for such damage.

8. Entry Upon Premises. Prior to commencement of any work to be performed on or about the Premises, Licensee shall notify the appropriate Division Engineer for the scheduling of protection and inspection. Within seventy-two (72) hours after the Division Engineer's actual receipt of such notification, the Division Engineer shall review the necessity and availability of flagmen for the proposed work and advise Licensee of such matters and the estimated cost therefor. No work shall be permitted on or about the Premises without the presence of Railway's flagman or the Division Engineer's waiver of the requirement for flag protection. Entry on or about the Premises or any other Railway right-of-way without the Division Engineer's prior approval shall be deemed trespassing. Licensee agrees to pay Railway, within thirty (30) days after delivery of an invoice therefor, for any protection and inspection costs incurred by Railway, in Railway's sole judgment, during any such entry.

Should Licensee engage a contractor(s) to install, construct, maintain or operate the Facilities, Licensee shall ensure that said contractor(s) executes and delivers to Railway a standard construction right-of-entry agreement in a form approved by Railway in its sole discretion prior to any entry onto the Premises by said contractor(s).

9. Liens; Taxes. Licensee will not permit any mechanic's liens or other liens to be placed upon the Premises, and nothing in this Agreement shall be construed as constituting the consent or request of Railway, express or implied, to any person for the performance of any labor or the furnishing of any materials to the Premises, nor as giving Licensee any right, power or authority to contract for or permit the rendering of any services or the furnishing of any materials that could give rise to any mechanic's liens or other liens against the Premises. In addition, Licensee shall be liable for all taxes levied or assessed against the Facilities and any other equipment or other property placed by Licensee within the Premises. In the event that any such lien shall attach to the Premises or Licensee shall fail to pay such taxes, then, in addition to any other right or remedy available to Railway, Railway may, but shall not be obligated to, discharge the same. Any amount paid by Railway for any of the aforesaid purposes, together with related court costs, attorneys' fees, fines and penalties, shall be paid by Licensee to Railway within ten (10) days after Railway's demand therefor.

10. Indemnification. To the extent permitted by State Law (Constitutional or Statutory, as amended), Licensee hereby agrees to indemnify and save harmless Railway, its officers, directors, agents and employees, from and against any and all liabilities, claims, losses, damages, expenses (including attorneys' fees) or costs for personal injuries (including death) and property damage to whomsoever or whatsoever occurring (hereinafter collectively called "Losses") that arise in any manner from (a) the installation, construction, maintenance,

operation, presence or removal of, or the failure to properly install, construct, maintain, operate or remove, the Facilities, or (b) any act, omission or neglect of Licensee, its agents, servants, employees or contractors in connection therewith, unless caused solely by the negligence of Railway or caused solely by the willful misconduct of Railway.

11. Insurance.

(a) Without limiting in any manner the liability and obligations assumed by Licensee under any other provision of this Agreement, and as additional protection to Railway, Licensee shall, at its expense, pay the Risk Financing Fee set forth in subparagraph (i) below and shall procure and maintain with insurance companies satisfactory to Railway, the insurance policies described in subparagraphs (ii) and (iii).

(i) Upon execution of this Agreement, Licensee shall pay Railway a risk financing fee of $1,000.00 per installation (herein called the "Risk Financing Fee") to provide Railroad Protective Liability Insurance or such supplemental insurance (which may be self-insurance) as Railway, in its sole discretion, deems to be necessary or appropriate.

(ii) Prior to commencement of installation or maintenance of the Facilities or entry on Railway's property, Licensee, and its contractor if it employs one, shall procure and maintain for the course of said installation and maintenance, a general liability insurance policy naming Railway as an additional insured, and containing products and completed operations and contractual liability coverage, with a combined single limit of not less than $1,000,000 for each occurrence.

(iii) Prior to commencement of any subsequent maintenance of the Facility during the term of this Agreement, unless Railway elects to make available and Licensee pays the then current risk financing fee for each affected installation, Licensee, or its contractor if it employs one, shall furnish Railway with an original Railroad Protective Liability Insurance Policy naming Railway as the named insured and having a limit of not less than a combined single limit of $2,000,000 each occurrence and $6,000,000 aggregate. Such policy shall be written using Insurance Services Offices Form Numbers CG 00 35 01 10 01.

(b) All insurance required under preceding subsection (a) shall be underwritten by insurers and be of such form and content as may be acceptable to Railway. Prior to commencement of installation or maintenance of the Facilities or any entry on Railway's property, Licensee, or its contractor if it employs one, shall: furnish to Railway's Risk Manager, Three Commercial Place, Norfolk, Virginia 23510-2191 (or such other representative and/or address as subsequently given by Railway to Licensee in writing), for approval, the original policy described in subsection (a)(iii) and a certificate of insurance evidencing the existence of a policy with the coverage described in subsection (a)(ii).

Subject to Railway approval, Licensee may self-insure its obligations as required by Section 11.a.ii of this agreement.

12. Environmental Matters. Licensee assumes all responsibility for any environmental obligations imposed under applicable laws, regulations, ordinances or other requirements of federal, state and local governmental authorities relating to (a) the installation, construction, maintenance, operation or removal of the Facilities, including notification and reporting of any releases, and (b) any contamination of any property, water, air or groundwater arising or resulting, in whole or in part, from Licensee's operation or use of the Premises pursuant to this Agreement. In addition, Licensee shall obtain any necessary permits to install, construct, maintain, operate or remove the Facilities. Licensee agrees to indemnify and hold harmless Railway from and against any and all fines, penalties, demands or other Losses (including attorneys' fees) incurred by Railway or claimed by any person, company or governmental entity relating to (a) any contamination of any property, water, air or groundwater due to the use or presence of the Facilities on the Premises, (b) Licensee's violation of any laws, regulations or other requirements of federal, state or local governmental authorities in connection with the use or presence of the Facilities on the Premises or (c) any violation of Licensee's obligations imposed under this paragraph. Without limitation, this indemnity provision shall extend to any cleanup and investigative costs relating to any contamination of the Premises arising or resulting from, in whole or in part, Licensee's use of the Facilities or any other activities by or on behalf of Licensee occurring on or about the Premises. Licensee further agrees not to dispose of any trash, debris or wastes, including hazardous waste, on the Premises and will not conduct any activities on the Premises which would require a hazardous waste treatment, storage or disposal permit.

13. Assignments and Other Transfers.

(a) Licensee shall not assign, transfer, sell, mortgage, encumber, sublease or otherwise convey (whether voluntarily, involuntarily or by operation of law) this Agreement or any interest therein, nor license, mortgage, encumber or otherwise grant to any other person or entity (whether voluntarily, involuntarily or by operation of law) any right or privilege in or to the Premises (or any interest therein), in whole or in part, without the prior written consent of Railway, which consent may be withheld by Railway in its sole discretion. Any such assignment or other transfer made without Railway's prior written consent shall be null and void and, at Railway's option, shall constitute an immediate default of this Agreement. Notwithstanding the foregoing, upon prior written notice to Railway, Licensee may assign this Agreement to a parent, a wholly-owned subsidiary of Licensee or a wholly-owned subsidiary of Licensee's parent without Railway's consent; provided, however, that no such assignment shall relieve Licensee of its obligations under this Agreement.

(b) Railway shall have the right to transfer and assign, in whole or in part, all its rights and obligations hereunder and in or to the Premises. From and after the effective date of any such assignment or transfer, Railway shall be released from any further obligations hereunder; and Licensee shall look solely to such successor-in-interest of Railway for the performance of the obligations of "Railway" hereunder.

14. Meaning of "Railway". The word "Railway" as used herein shall include any other company whose property at the aforesaid location may be leased or operated by Railway. Said term also shall include Railway's officers, directors, agents and employees, and any parent company, subsidiary or affiliate of Railway and their respective officers, directors, agents and employees.

15. Default; Remedies.

(a) The following events shall be deemed to be events of default by Licensee under this Agreement:

(i) Licensee shall fail to pay the Fee or any other sum of money due hereunder and such failure shall continue for a period of ten (10) days after the due date thereof;

(ii) Licensee shall fail to comply with any provision of this Agreement not requiring the payment of money, all of which terms, provisions and covenants shall be deemed material, and such failure shall continue for a period of thirty (30) days after written notice of such default is delivered to Licensee;

(iii) Licensee shall become insolvent or unable to pay its debts as they become due, or Licensee notifies Railway that it anticipates either condition;

(iv) Licensee takes any action to, or notifies Railway that Licensee intends to file a petition under any section or chapter of the United States Bankruptcy Code, as amended from time to time, or under any similar law or statute of the United States or any State thereof; or a petition shall be filed against Licensee under any such statute; or

(v) A receiver or trustee shall be appointed for Licensee's license interest hereunder or for all or a substantial part of the assets of Licensee, and such receiver or trustee is not dismissed within sixty (60) days of the appointment.

(b) Upon the occurrence of any event or events of default by Licensee, whether enumerated in this paragraph 15 or not, Railway shall have the option to pursue any remedies available to it at law or in equity without any additional notices to Licensee. Railway's remedies shall include, but not be limited to, the following: (i) termination of this Agreement, in which event Licensee shall immediately surrender the Premises to Railway; (ii) entry into or upon the Premises to do whatever Licensee is obligated to do under the terms of this License, in which event Licensee shall reimburse Railway on demand for any expenses which Railway may incur in effecting compliance with Licensee's obligations under this License, but without rendering Railway liable for any damages resulting to Licensee or the Facilities from such action; and (iii) pursuit of all other remedies available to Railway at law or in equity, including, without limitation, injunctive relief of all varieties.

16. Railway Termination Right. Notwithstanding anything to the contrary in this Agreement, Railway shall have the right to terminate this Agreement and the rights granted hereunder, after delivering to Licensee written notice of such termination no less than sixty (60) days prior to the effective date thereof, upon the occurrence of any one or more of the following events:

(a) If Licensee shall discontinue the use or operations of the Facilities; or

(b) If Railway shall be required by any governmental authority having jurisdiction over the Premises to remove, relocate, reconstruct or discontinue operation of its railroad on or about the Premises; or

(c) If Railway, in the good faith judgment of its Superintendent, shall require a change in the location or elevation of its railroad on or about the location of the Facilities or the Premises that might effectively prohibit the use or operation of the Facilities; or

(d) If Railway, in the good faith judgment of its Superintendent, determines that the maintenance or use of the Facilities unduly interferes with the operation and maintenance of the facilities of Railway, or with the present or future use of such property by Railway, its lessees, affiliates, successors or assigns, for their respective purposes.

17. Condemnation. If the Premises or any portion thereof shall be taken or condemned in whole or in part for public purposes, or sold in lieu of condemnation, then this Agreement and the rights granted to Licensee hereunder shall, at the sole option of Railway, forthwith cease and terminate. All compensation awarded for any taking (or sale proceeds in lieu thereof) shall be the property of Railway, and Licensee shall have no claim thereto, the same being hereby expressly waived by Licensee.

18. Removal of Facilities; Survival. The Facilities are and shall remain the personal property of Licensee. Upon the expiration or termination of this Agreement, Licensee shall remove the Facilities from the Premises within thirty (30) days after the effective date thereof. In performing such removal, unless otherwise directed by Railway, Licensee shall restore the Premises to the same condition as existed prior to the installation or placement of Facilities, reasonable wear and tear excepted. In the event Licensee shall fail to so remove the Facilities or restore the Premises, the Facilities shall be deemed to have been abandoned by Licensee, and the same shall become the property of Railway for Railway to use, remove, destroy or otherwise dispose of at its discretion and without responsibility for accounting to Licensee therefor; provided, however, in the event Railway elects to remove the Facilities, Railway, in addition to any other legal remedy it may have, shall have the right to recover from Licensee all costs incurred in connection with such removal and the restoration of the Premises. Notwithstanding anything to the contrary contained in this Agreement, the expiration or termination of this Agreement, whether by lapse of time or otherwise, shall not relieve Licensee from Licensee's obligations accruing prior to the expiration or termination date, and such obligations shall survive any such expiration or other termination of this Agreement.

19. Entire Agreement. This Agreement contains the entire agreement of Railway and Licensee and supersedes any prior understanding or agreement between Railway and Licensee respecting the subject matter hereof; and no representations, warranties, inducements, promises or agreements, oral or otherwise, between the parties not embodied in this Agreement shall be of any force or effect.

20. Reserved

21. Severability. If any clause or provision of this Agreement is illegal, invalid or unenforceable under present or future laws effective during the term of this Agreement, then and in that event, it is the intention of the parties hereto that the remainder of this Agreement shall not be affected thereby; and it is also the intention of the parties to this Agreement that in lieu of each clause or provision of this Agreement that is illegal, invalid or unenforceable, there be added as a part of this Agreement a clause or provision as similar in terms to such illegal, invalid or unenforceable clause or provision as may be possible and be legal, valid and enforceable.

22. Modifications; Waiver; Successors and Assigns. This Agreement may not be altered, changed or amended, except by instrument in writing signed by both parties hereto. No provision of this Agreement shall be deemed to have been waived by Railway unless such waiver shall be in a writing signed by Railway and addressed to Licensee, and no such waiver shall affect or alter this Agreement, but each and every covenant, condition, agreement and term of this Agreement shall continue in full force and effect. Nor shall any custom or practice that may evolve between the parties in the administration of the terms hereof shall be construed to waive or lessen the right of Railway to insist upon the performance by Licensee in strict accordance with the terms hereof. The terms and conditions contained in this Agreement shall apply to, inure to the benefit of, and be binding upon the parties hereto, and upon their respective successors in interest and legal representatives, except as otherwise herein expressly provided. If there shall be more than one Licensee, the obligations hereunder imposed upon Licensee shall be joint and several.

23. Notice. Any and all other notices, demands or requests by or from Railway to Licensee, or Licensee to Railway, shall be in writing and shall be sent by (a) postage paid, certified mail, return receipt requested, or (b) a reputable national overnight courier service with receipt therefor, or (c) personal delivery, and addressed in each case as follows:

If to Railway:
c/o Norfolk Southern Corporation
1200 Peachtree Street, NE – 12th Floor
Atlanta, Georgia 30309-3504
Attention: Director Real Estate

If to Licensee:
The Mayor and Aldermen of the City of Savannah
2 East Bay Street
Savannah, Georgia 31401

Attention: City Manager

Either party may, by notice in writing, direct that future notices or demands be sent to a different address. All notices hereunder shall be deemed given upon receipt (or, if rejected, upon rejection).

24. Miscellaneous. All exhibits, attachments, riders and addenda referred to in this License are incorporated into this Agreement and made a part hereof for all intents and purposes. Time is of the essence with regard to each provision of this Agreement. This Agreement shall be construed and interpreted in accordance with and governed by the laws of the State in which the Premises are located. Each covenant of Railway and Licensee under this Agreement is independent of each other covenant under this Agreement. No default in performance of any covenant by a party shall excuse the other party from the performance of any other covenant. The provisions of Paragraphs 7, 9, 10, 12 and 18 shall survive the expiration or earlier termination of this Agreement.

25. Limitations of Grant. Licensee acknowledges that the license granted hereunder is a quitclaim grant, made without covenants, representations or warranties with respect to Railway's (a) right to make the grant, (b) title in the Premises, or (c) right to use or make available to others the Premises for the purposes contemplated herein. Railway is the owner and/or holder of the Premises subject to the terms and limitations under which it is owned or held, including without limitation conditions, covenants, restrictions, easements (including any pre-existing fiber optic easements or licenses), encroachments, leases, licenses, permits, mortgages, indentures, reversionary interests, fee interests, zoning restrictions and other burdens and limitations, of record and not of record, and to rights of tenants and licensees in possession, and Licensee agrees that the rights licensed hereunder are subject and subordinate to each and all of the foregoing. Licensee accepts this grant knowing that others may claim that Railway has no right to make it, and Licensee agrees to release, hold harmless and indemnify (and, at Railway's election, defend, at Licensee's sole expense, with counsel approved by Railway) Railway, its affiliated companies, and its and their respective officers, directors, agents and employees, from and against any detriments to, or liabilities of, any type or nature arising from such claims, including punitive damages and any forfeitures declared or occurring as a result of this grant.

26. Limitations Upon Damages. Notwithstanding any other provision of this Agreement, Railway shall not be liable for breach of this Agreement or under this Agreement for any consequential, incidental, exemplary, punitive, special, business damages or lost profits, as well as any claims for death, personal injury, and property loss and damage which occurs by reason of, or arises out of, or is incidental to the interruption in or usage of the Facilities placed upon or about the Premises by Licensee, including without limitation any damages under such claims that might be considered consequential, incidental, exemplary, punitive, special, business damages or lost profits.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate, each part being an original, as of the date first above written. The parties agree that if an authorized officer of a party fully signs this Agreement in the appropriate location(s) below and then returns that signature to the other party via electronic means with a pdf or similar scanned copy of that signature, then that scanned signature shall serve as that party's signature for the Agreement, and, upon full execution of the Agreement by all parties, shall create a legally binding Agreement.

Witness:

Kiyana Holloway
As to Railway

CENTRAL OF GEORGIA RAILROAD COMPANY

By: Malcolm G. Roof
Real Estate Manager

ATTEST:

(SEAL)

THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH

By: Mark Massey, Clerk of Council
7/23/2020 #8

By: Patrick Monahan, City Manager

Activity Number 1283819
AD: April 28, 2020/Revised July 10, 2020

Attention: City Manager

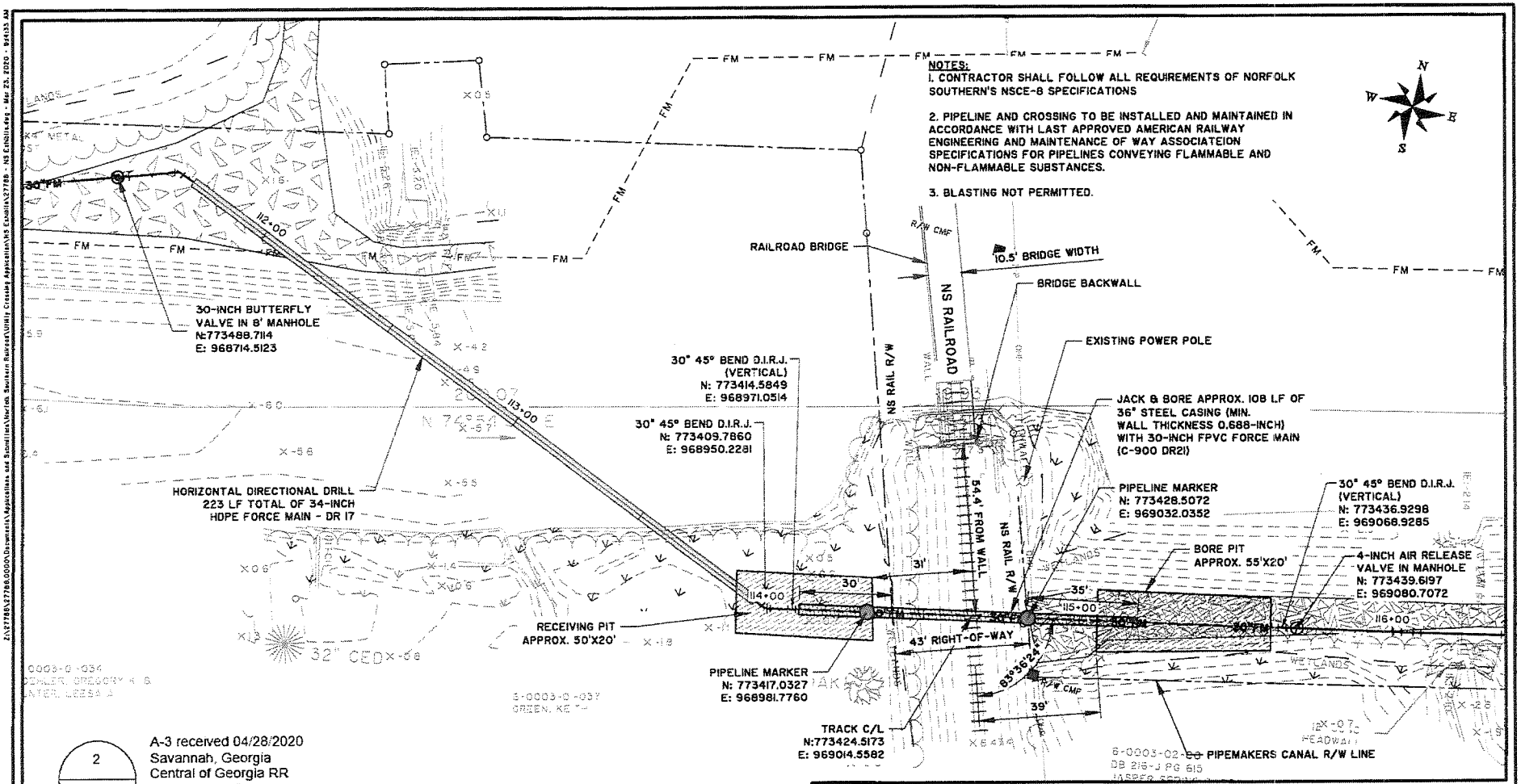
Either party may, by notice in writing, direct that future notices or demands be sent to a different address. All notices hereunder shall be deemed given upon receipt (or, if rejected, upon rejection).

24. Miscellaneous. All exhibits, attachments, riders and addenda referred to in this License are incorporated into this Agreement and made a part hereof for all intents and purposes. Time is of the essence with regard to each provision of this Agreement. This Agreement shall be construed and interpreted in accordance with and governed by the laws of the State in which the Premises are located. Each covenant of Railway and Licensee under this Agreement is independent of each other covenant under this Agreement. No default in performance of any covenant by a party shall excuse the other party from the performance of any other covenant. The provisions of Paragraphs 7, 9, 10, 12 and 18 shall survive the expiration or earlier termination of this Agreement.

25. Limitations of Grant. Licensee acknowledges that the license granted hereunder is a quitclaim grant, made without covenants, representations or warranties with respect to Railway's (a) right to make the grant, (b) title in the Premises, or (c) right to use or make available to others the Premises for the purposes contemplated herein. Railway is the owner and/or holder of the Premises subject to the terms and limitations under which it is owned or held, including without limitation conditions, covenants, restrictions, easements (including any pre-existing fiber optic easements or licenses), encroachments, leases, licenses, permits, mortgages, indentures, reversionary interests, fee interests, zoning restrictions and other burdens and limitations, of record and not of record, and to rights of tenants and licensees in possession, and Licensee agrees that the rights licensed hereunder are subject and subordinate to each and all of the foregoing. Licensee accepts this grant knowing that others may claim that Railway has no right to make it, and Licensee agrees to release, hold harmless and indemnify (and, at Railway's election, defend, at Licensee's sole expense, with counsel approved by Railway) Railway, its affiliated companies, and its and their respective officers, directors, agents and employees, from and against any detriments to, or liabilities of, any type or nature arising from such claims, including punitive damages and any forfeitures declared or occurring as a result of this grant.

26. Limitations Upon Damages. Notwithstanding any other provision of this Agreement, Railway shall not be liable for breach of this Agreement or under this Agreement for any consequential, incidental, exemplary, punitive, special, business damages or lost profits, as well as any claims for death, personal injury, and property loss and damage which occurs by reason of, or arises out of, or is incidental to the interruption in or usage of the Facilities placed upon or about the Premises by Licensee, including without limitation any damages under such claims that might be considered consequential, incidental, exemplary, punitive, special, business damages or lost profits.

[Remainder of page intentionally left blank]



2
11D

A-3 received 04/28/2020
Savannah, Georgia
Central of Georgia RR
Lat: N 32 122501
Long: W 81 156107

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

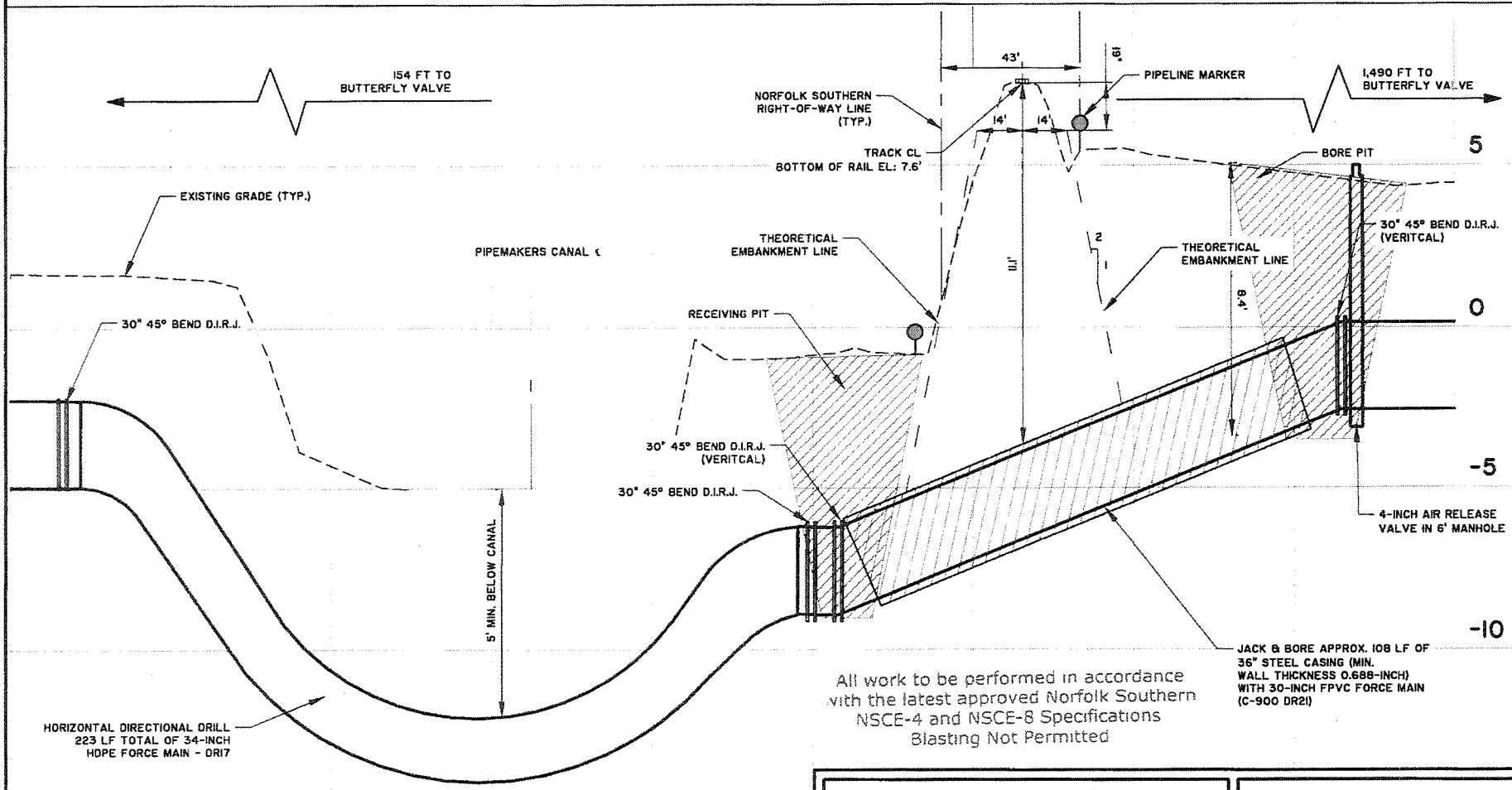
TRAVIS FIELD WRF FORCE MAIN

NS RAILROAD - EFFLUENT FORCE MAIN CROSSING PLAN NO. 2

CLIENT:
CITY OF SAVANNAH

LOCATION: SAVANNAH, GA
DATE: 3-6-20
JOB NUMBER: J-27788.0000
DRAWN BY: CDR
REVIEWED BY: FS
SHEET: 1 OF 2
SCALE: 1" = 30'

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com



All work to be performed in accordance with the latest approved Norfolk Southern NSCE-4 and NSCE-8 Specifications
Blasting Not Permitted

2
11D

A-3 received 04/28/2020
Savannah, Georgia
Central of Georgia RR
Lat: N 32.122501
Long: W 81 156107

TRAVIS FIELD WRF FORCE MAIN

NS RAILROAD - EFFLUENT FORCE MAIN CROSSING PROFILE NO. 2

CLIENT:
CITY OF SAVANNAH

LOCATION: SAVANNAH, GA
DATE: 3-6-20
JOB NUMBER: J-27788.0000
DRAWN BY: CDR
REVIEWED BY: FS
SHEET: 2 OF 2
SCALE: 1" = 30'

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

AECOM

NORFOLK SOUTHERN

PIPE DATA SHEET

	CARRIER PIPE	CASING PIPE
CONTENTS TO BE HANDLED	Treated Sewage	N/A
MAX. ALLOWABLE OPERATING PRESSURE	150 PSI	150 psi
NOMINAL SIZE OF PIPE	30-inch	36-inch
OUTSIDE DIAMETER	32	36
INSIDE DIAMETER	28.23	34.75
WALL THICKNESS	1.78	0.688" min
WEIGHT PER FOOT	117	250
MATERIAL	PVC	STEEL
PROCESS OF MANUFACTURE	N/A	N/A
SPECIFICATION	ANSI/AWWA C900	ASTM A139
GRADE OR CLASS (Specified Minimum Yield Strength)	50	B
TEST PRESSURE	150 psi	N/A
TYPE OF JOINT	RESTRAINED JOINT	WELDED
TYPE OF COATING	POLYETHYLENE	N/A
DETAILS OF CATHODIC PROTECTION	N/A	N/A
DETAILS OF SEALS OR PROTECTION AT END OF CASING	N/A	N/A
CHARACTER OF SUBSURFACE MATERIAL	SAND MIX	SAND MIX
APPROXIMATE GROUND WATER LEVEL	~5-7	~5-7
SOURCE OF INFORMATION ON SUBSURFACE CONDITIONS	GEOTECH INVESTIAGTION	GEOTECH INVESTIGATION

Proposed method of installation (refer to NSCE-8 Specification):

- ☒ Bore and jack
- ☐ Jacking
- ☐ Tunneling (with Tunnel Liner Plate)
- ☐ Directional Bore/Horizontal Direction Drilling – Method A
- ☐ Directional Bore/Horizontal Direction Drilling – Method B
- ☐ Open Cut – *All installations directly under any track must be designed as a bored installation. Open cut installations will be considered on a case-by-case basis by Norfolk Southern's Division Superintendent at the time of installation.*
- ☐ Other (Specify): _____

2

11D

A-3 received 04/28/2020
Savannah, Georgia
Central of Georgia RR
Lat: N 32.122501
Long: W 81.156107

Last Revised: 092319

SW534

AECOM

AECOM
1700 Market Street
Suite 1600
Philadelphia, PA 19103
www.aecom.com

215 735 0832 tel
215 735 0883 fax

September 03, 2020

Daslin Garcon
Engineer
Water & Sewer Planning and Engineering
P.O. Box 1027
Savannah, GA 31402

Subject: Savannah, Chatham County, Georgia
Milepost SA-5.47, Central Jct-Ardmore Line, Georgia Division
Latitude N 32.116844, Longitude W 81.178078

Norfolk Southern Activity No. 1284035
Proposed installation of an underground crossing of a 30-inch PVC sewage pipeline within a 36-inch steel casing pipe

Dear Mr. Garcon:

Attached is the fully executed Standard Pipe License Agreement dated August 31, 2020 between Central of Georgia Railroad Company and The Mayor and Alderman of the City of Savannah covering the above referenced project, your project number SW-534-19.

This letter acknowledges receipt of your payment in the amount of $30,100.00, which covers the one-time license fee of $29,100.00 and the Risk Management Fee of $1,000.00. Your Commercial General Liability insurance coverage has been reviewed by Norfolk Southern's Risk Manager and is acceptable through July 13, 2021. If your construction will occur after the expiration date noted above for your insurance, you must furnish a renewal certificate or policy to Norfolk Southern's Risk Manager prior to scheduling construction or contacting the Railway for Flagging.

Prior to start of work on Railway right of way, you are required to contact the following:

For Scheduling of Flagging and Inspection
Lisa Outten, Office Manager of NS' Georgia Division Engineer's office, (770) 405-3675/3680

Once contacted, the Division Engineer requires 72 hours to review the need for and availability of flagmen for this project and will advise you of the cost of said flagmen. No work is permitted on Railway right of way without a flagman or the Division Engineer's agreement to waive the flag protection requirement. Entry onto Railway property without the Division Engineer's prior approval is considered trespassing. In the event you are unable to contact the railway for flagging services, please contact the undersigned for assistance.

Thank you for your cooperation.

Very truly yours,

Angelina Discienzo

Angelina Discienzo
Contract Administrator
215-789-2168
angelina.discienzo@aecom.com

CC: Archives

THIS AGREEMENT, dated as of the 31st day of August, 2020 is made and entered into by and between

CENTRAL OF GEORGIA RAILROAD COMPANY, a Georgia corporation, whose mailing address is Three Commercial Place, Norfolk, Virginia 23510 (hereinafter called "Railway"); and

THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH, a political subdivision of the State of Georgia, whose mailing address is 702 Stiles Ave, Savannah, Georgia 31415 (hereinafter called "Licensee").

W I T N E S S E T H

WHEREAS, Licensee proposes to install, construct, maintain, operate and remove an underground crossing of a 30-inch PVC sewage pipeline within a 36-inch steel casing pipe (hereinafter called the "Facilities") located in, under and across the right-of-way or property and any tracks of Railway, at or near:

- Milepost SA-5.47, Central Jct-Ardmore Line
- Latitude N 32.116844, Longitude W 81.178078
- Savannah, Chatham County, Georgia
- Valuation Section 2, Map 11, Stationing 290+00

the same to be located in accordance with and limited to the installation shown on print of drawings marked Exhibits A and B, received by Railway on April 23, 2020, and Pipe Data Sheet, attached hereto and made a part hereof; and

WHEREAS, Licensee desires a license to use such right-of-way or property of Railway for the installation, construction, maintenance, operation and removal of the Facilities.

NOW, THEREFORE, for and in consideration of the premises, the payment of a non-refundable, non-assignable one-time fee in the amount of THIRTY THOUSAND ONE HUNDRED AND 00/100 DOLLARS ($30,100.00) to cover the Risk Financing Fee (as hereinafter defined) in the amount of $1,000.00 and a one-time license fee in the amount of $29,100.00, and the covenants hereinafter set forth, Railway hereby permits and grants to Licensee, insofar as Railway has the right to do so, without warranty and subject to all encumbrances, covenants and easements to which Railway's title may be subject, the right to use and occupy so much of Railway's right-of-way or property as may be necessary for the installation, construction, maintenance, operation and removal of the Facilities (said right-of-way or property of Railway being hereinafter collectively called the "Premises"), upon the following terms and conditions:

1. Use and Condition of the Premises. The Premises shall be used by Licensee only for the installation, construction, maintenance, operation and removal of the Facilities and for no other purpose without the prior written consent of Railway, which consent may be withheld by Railway in its sole discretion. Licensee accepts the Premises in their current "as is" condition, as

suited for the operation of the Facilities, and without the benefit of any improvements to be constructed by Railway.

2. Installation of the Facilities; Railway Support. Licensee shall, at its expense, install, construct, maintain and operate the Facilities on a lien-free basis and in such a manner as will not interfere with the operations of Railway, or endanger persons or property of Railway. Such installation, construction, maintenance and operation of the Facilities shall be in accordance with (a) the plans and specifications (if any) shown on the prints attached hereto and any other specifications prescribed by Railway, (b) applicable laws, regulations, ordinances and other requirements of federal, state and local governmental authorities, and (c) applicable specifications of the American Railway Engineering and Maintenance-of-Way Association, when not in conflict with the applicable plans, specifications, laws, regulations, ordinances or requirements mentioned in (a) and (b), above. All underground pipes must have secondary pipe containment if the material flowing through the pipeline poses a safety or environmental hazard. Any change to the character, capacity or use of the Facilities shall require execution of a new agreement.

3. Railway Support. Railway shall, at Railway's option, furnish, at the sole expense of Licensee, labor and materials necessary, in Railway's sole judgment, to support its tracks and to protect its traffic (including, without limitation, flagging) during the installation, construction, maintenance, repair, or removal of the Facilities.

4. Electronic Interference. Licensee will provide Railway with no less than sixty (60) days advance written notice prior to the installation and operation of cathodic protection in order that tests may be conducted on Railway's signal, communications and other electronic systems (hereinafter collectively called the "Electronic Systems") for possible interference. If the Facilities cause degradation of the Electronic Systems, Licensee, at its expense, will either relocate the cathodic protection or modify the Facilities to the satisfaction of Railway so as to eliminate such degradation. Such modifications may include, without limiting the generality of the foregoing, providing additional shielding, reactance or other corrective measures deemed necessary by Railway. The provisions of this paragraph 4 shall apply to the Electronic Systems existing as of the date of this Agreement and to any Electronic Systems that Railway may install in the future.

5. Corrective Measures. If Licensee fails to take any corrective measures requested by Railway in a timely manner, or if an emergency situation is presented which, in Railway's judgment, requires immediate repairs to the Facilities, Railway, at Licensee's expense, may undertake such corrective measures or repairs as it deems necessary or desirable.

6. Railway Changes. If Railway shall make any changes, alterations or additions to the line, grade, tracks, structures, roadbed, installations, right-of-way or works of Railway, or to the character, height or alignment of the Electronic Systems, at or near the Facilities, Licensee shall, upon thirty (30) days prior written notice from Railway and at its sole expense, make such changes in the location and character of the Facilities as, in the opinion of the chief engineering officer of Railway, shall be necessary or appropriate to accommodate any construction, improvements, alterations, changes or additions of Railway.

7. Assumption of Risk. To the extent permitted by State Law (Constitutional or Statutory, as amended), unless caused solely by the negligence of Railway or caused solely by the willful misconduct of Railway, Licensee hereby assumes all risk of damage to the Facilities and Licensee's other property relating to its use and occupation of the Premises or business carried on the Premises and any defects to the Premises; and Licensee hereby indemnifies Railway, its officers, directors, agents and employees from and against any liability for such damage.

8. Entry Upon Premises. Prior to commencement of any work to be performed on or about the Premises, Licensee shall notify the appropriate Division Engineer for the scheduling of protection and inspection. Within seventy-two (72) hours after the Division Engineer's actual receipt of such notification, the Division Engineer shall review the necessity and availability of flagmen for the proposed work and advise Licensee of such matters and the estimated cost therefor. No work shall be permitted on or about the Premises without the presence of Railway's flagman or the Division Engineer's waiver of the requirement for flag protection. Entry on or about the Premises or any other Railway right-of-way without the Division Engineer's prior approval shall be deemed trespassing. Licensee agrees to pay Railway, within thirty (30) days after delivery of an invoice therefor, for any protection and inspection costs incurred by Railway, in Railway's sole judgment, during any such entry.

Should Licensee engage a contractor(s) to install, construct, maintain or operate the Facilities, Licensee shall ensure that said contractor(s) executes and delivers to Railway a standard construction right-of-entry agreement in a form approved by Railway in its sole discretion prior to any entry onto the Premises by said contractor(s).

9. Liens; Taxes. Licensee will not permit any mechanic's liens or other liens to be placed upon the Premises, and nothing in this Agreement shall be construed as constituting the consent or request of Railway, express or implied, to any person for the performance of any labor or the furnishing of any materials to the Premises, nor as giving Licensee any right, power or authority to contract for or permit the rendering of any services or the furnishing of any materials that could give rise to any mechanic's liens or other liens against the Premises. In addition, Licensee shall be liable for all taxes levied or assessed against the Facilities and any other equipment or other property placed by Licensee within the Premises. In the event that any such lien shall attach to the Premises or Licensee shall fail to pay such taxes, then, in addition to any other right or remedy available to Railway, Railway may, but shall not be obligated to, discharge the same. Any amount paid by Railway for any of the aforesaid purposes, together with related court costs, attorneys' fees, fines and penalties, shall be paid by Licensee to Railway within ten (10) days after Railway's demand therefor.

10. Indemnification. To the extent permitted by State Law (Constitutional or Statutory, as amended), Licensee hereby agrees to indemnify and save harmless Railway, its officers, directors, agents and employees, from and against any and all liabilities, claims, losses, damages, expenses (including attorneys' fees) or costs for personal injuries (including death) and property damage to whomsoever or whatsoever occurring (hereinafter collectively called "Losses") that arise in any manner from (a) the installation, construction, maintenance, operation, presence or removal of, or the failure to properly install, construct, maintain, operate or remove, the Facilities, or (b) any act, omission or neglect of Licensee, its agents, servants, employees or contractors in

connection therewith, unless caused solely by the negligence of Railway or caused solely by the willful misconduct of Railway.

11. Insurance.

(a) Without limiting in any manner the liability and obligations assumed by Licensee under any other provision of this Agreement, and as additional protection to Railway, Licensee shall, at its expense, pay the Risk Financing Fee set forth in subparagraph (i) below and shall procure and maintain with insurance companies satisfactory to Railway, the insurance policies described in subparagraphs (ii) and (iii).

(i) Upon execution of this Agreement, Licensee shall pay Railway a risk financing fee of $1,000.00 per installation (herein called the "Risk Financing Fee") to provide Railroad Protective Liability Insurance or such supplemental insurance (which may be self-insurance) as Railway, in its sole discretion, deems to be necessary or appropriate.

(ii) Prior to commencement of installation or maintenance of the Facilities or entry on Railway's property, Licensee, and its contractor if it employs one, shall procure and maintain for the course of said installation and maintenance, a general liability insurance policy naming Railway as an additional insured, and containing products and completed operations and contractual liability coverage, with a combined single limit of not less than $1,000,000 for each occurrence.

(iii) Prior to commencement of any subsequent maintenance of the Facility during the term of this Agreement, unless Railway elects to make available and Licensee pays the then current risk financing fee for each affected installation, Licensee, or its contractor if it employs one, shall furnish Railway with an original Railroad Protective Liability Insurance Policy naming Railway as the named insured and having a limit of not less than a combined single limit of $2,000,000 each occurrence and $6,000,000 aggregate. Such policy shall be written using Insurance Services Offices Form Numbers CG 00 35 01 10 01.

(b) All insurance required under preceding subsection (a) shall be underwritten by insurers and be of such form and content as may be acceptable to Railway. Prior to commencement of installation or maintenance of the Facilities or any entry on Railway's property, Licensee, or its contractor if it employs one, shall: furnish to Railway's Risk Manager, Three Commercial Place, Norfolk, Virginia 23510-2191 (or such other representative and/or address as subsequently given by Railway to Licensee in writing), for approval, the original policy described in subsection (a)(iii) and a certificate of insurance evidencing the existence of a policy with the coverage described in subsection (a)(ii).

Subject to Railway approval, Licensee may self-insure its obligations as required by Section 11.a.ii of this agreement.

12. Environmental Matters. Licensee assumes all responsibility for any environmental obligations imposed under applicable laws, regulations, ordinances or other requirements of federal, state and local governmental authorities relating to (a) the installation, construction, maintenance, operation or removal of the Facilities, including notification and reporting of any releases, and (b) any contamination of any property, water, air or groundwater arising or resulting, in whole or in part, from Licensee's operation or use of the Premises pursuant to this Agreement. In addition, Licensee shall obtain any necessary permits to install, construct, maintain, operate or remove the Facilities. Licensee agrees to indemnify and hold harmless Railway from and against any and all fines, penalties, demands or other Losses (including attorneys' fees) incurred by Railway or claimed by any person, company or governmental entity relating to (a) any contamination of any property, water, air or groundwater due to the use or presence of the Facilities on the Premises, (b) Licensee's violation of any laws, regulations or other requirements of federal, state or local governmental authorities in connection with the use or presence of the Facilities on the Premises or (c) any violation of Licensee's obligations imposed under this paragraph. Without limitation, this indemnity provision shall extend to any cleanup and investigative costs relating to any contamination of the Premises arising or resulting from, in whole or in part, Licensee's use of the Facilities or any other activities by or on behalf of Licensee occurring on or about the Premises. Licensee further agrees not to dispose of any trash, debris or wastes, including hazardous waste, on the Premises and will not conduct any activities on the Premises which would require a hazardous waste treatment, storage or disposal permit.

13. Assignments and Other Transfers.

(a) Licensee shall not assign, transfer, sell, mortgage, encumber, sublease or otherwise convey (whether voluntarily, involuntarily or by operation of law) this Agreement or any interest therein, nor license, mortgage, encumber or otherwise grant to any other person or entity (whether voluntarily, involuntarily or by operation of law) any right or privilege in or to the Premises (or any interest therein), in whole or in part, without the prior written consent of Railway, which consent may be withheld by Railway in its sole discretion. Any such assignment or other transfer made without Railway's prior written consent shall be null and void and, at Railway's option, shall constitute an immediate default of this Agreement. Notwithstanding the foregoing, upon prior written notice to Railway, Licensee may assign this Agreement to a parent, a wholly-owned subsidiary of Licensee or a wholly-owned subsidiary of Licensee's parent without Railway's consent; provided, however, that no such assignment shall relieve Licensee of its obligations under this Agreement.

(b) Railway shall have the right to transfer and assign, in whole or in part, all its rights and obligations hereunder and in or to the Premises. From and after the effective date of any such assignment or transfer, Railway shall be released from any further obligations hereunder; and Licensee shall look solely to such successor-in-interest of Railway for the performance of the obligations of "Railway" hereunder.

14. Meaning of "Railway". The word "Railway" as used herein shall include any other company whose property at the aforesaid location may be leased or operated by Railway. Said term also shall include Railway's officers, directors, agents and employees, and any parent

company, subsidiary or affiliate of Railway and their respective officers, directors, agents and employees.

15. Default; Remedies.

(a) The following events shall be deemed to be events of default by Licensee under this Agreement:

(i) Licensee shall fail to pay the Fee or any other sum of money due hereunder and such failure shall continue for a period of ten (10) days after the due date thereof;

(ii) Licensee shall fail to comply with any provision of this Agreement not requiring the payment of money, all of which terms, provisions and covenants shall be deemed material, and such failure shall continue for a period of thirty (30) days after written notice of such default is delivered to Licensee;

(iii) Licensee shall become insolvent or unable to pay its debts as they become due, or Licensee notifies Railway that it anticipates either condition;

(iv) Licensee takes any action to, or notifies Railway that Licensee intends to file a petition under any section or chapter of the United States Bankruptcy Code, as amended from time to time, or under any similar law or statute of the United States or any State thereof; or a petition shall be filed against Licensee under any such statute; or

(v) A receiver or trustee shall be appointed for Licensee's license interest hereunder or for all or a substantial part of the assets of Licensee, and such receiver or trustee is not dismissed within sixty (60) days of the appointment.

(b) Upon the occurrence of any event or events of default by Licensee, whether enumerated in this paragraph 15 or not, Railway shall have the option to pursue any remedies available to it at law or in equity without any additional notices to Licensee. Railway's remedies shall include, but not be limited to, the following: (i) termination of this Agreement, in which event Licensee shall immediately surrender the Premises to Railway; (ii) entry into or upon the Premises to do whatever Licensee is obligated to do under the terms of this License, in which event Licensee shall reimburse Railway on demand for any expenses which Railway may incur in effecting compliance with Licensee's obligations under this License, but without rendering Railway liable for any damages resulting to Licensee or the Facilities from such action; and (iii) pursuit of all other remedies available to Railway at law or in equity, including, without limitation, injunctive relief of all varieties.

16. Railway Termination Right. Notwithstanding anything to the contrary in this Agreement, Railway shall have the right to terminate this Agreement and the rights granted hereunder, after delivering to Licensee written notice of such termination no less than sixty (60)

days prior to the effective date thereof, upon the occurrence of any one or more of the following events:

(a) If Licensee shall discontinue the use or operations of the Facilities; or

(b) If Railway shall be required by any governmental authority having jurisdiction over the Premises to remove, relocate, reconstruct or discontinue operation of its railroad on or about the Premises; or

(c) If Railway, in the good faith judgment of its Superintendent, shall require a change in the location or elevation of its railroad on or about the location of the Facilities or the Premises that might effectively prohibit the use or operation of the Facilities; or

(d) If Railway, in the good faith judgment of its Superintendent, determines that the maintenance or use of the Facilities unduly interferes with the operation and maintenance of the facilities of Railway, or with the present or future use of such property by Railway, its lessees, affiliates, successors or assigns, for their respective purposes.

17. Condemnation. If the Premises or any portion thereof shall be taken or condemned in whole or in part for public purposes, or sold in lieu of condemnation, then this Agreement and the rights granted to Licensee hereunder shall, at the sole option of Railway, forthwith cease and terminate. All compensation awarded for any taking (or sale proceeds in lieu thereof) shall be the property of Railway, and Licensee shall have no claim thereto, the same being hereby expressly waived by Licensee.

18. Removal of Facilities; Survival. The Facilities are and shall remain the personal property of Licensee. Upon the expiration or termination of this Agreement, Licensee shall remove the Facilities from the Premises within thirty (30) days after the effective date thereof. In performing such removal, unless otherwise directed by Railway, Licensee shall restore the Premises to the same condition as existed prior to the installation or placement of Facilities, reasonable wear and tear excepted. In the event Licensee shall fail to so remove the Facilities or restore the Premises, the Facilities shall be deemed to have been abandoned by Licensee, and the same shall become the property of Railway for Railway to use, remove, destroy or otherwise dispose of at its discretion and without responsibility for accounting to Licensee therefor; provided, however, in the event Railway elects to remove the Facilities, Railway, in addition to any other legal remedy it may have, shall have the right to recover from Licensee all costs incurred in connection with such removal and the restoration of the Premises. Notwithstanding anything to the contrary contained in this Agreement, the expiration or termination of this Agreement, whether by lapse of time or otherwise, shall not relieve Licensee from Licensee's obligations accruing prior to the expiration or termination date, and such obligations shall survive any such expiration or other termination of this Agreement.

19. Entire Agreement. This Agreement contains the entire agreement of Railway and Licensee and supersedes any prior understanding or agreement between Railway and Licensee respecting the subject matter hereof; and no representations, warranties, inducements, promises or

agreements, oral or otherwise, between the parties not embodied in this Agreement shall be of any force or effect.

20. Reserved

21. Severability. If any clause or provision of this Agreement is illegal, invalid or unenforceable under present or future laws effective during the term of this Agreement, then and in that event, it is the intention of the parties hereto that the remainder of this Agreement shall not be affected thereby; and it is also the intention of the parties to this Agreement that in lieu of each clause or provision of this Agreement that is illegal, invalid or unenforceable, there be added as a part of this Agreement a clause or provision as similar in terms to such illegal, invalid or unenforceable clause or provision as may be possible and be legal, valid and enforceable.

22. Modifications; Waiver; Successors and Assigns. This Agreement may not be altered, changed or amended, except by instrument in writing signed by both parties hereto. No provision of this Agreement shall be deemed to have been waived by Railway unless such waiver shall be in a writing signed by Railway and addressed to Licensee, and no such waiver shall affect or alter this Agreement, but each and every covenant, condition, agreement and term of this Agreement shall continue in full force and effect. Nor shall any custom or practice that may evolve between the parties in the administration of the terms hereof shall be construed to waive or lessen the right of Railway to insist upon the performance by Licensee in strict accordance with the terms hereof. The terms and conditions contained in this Agreement shall apply to, inure to the benefit of, and be binding upon the parties hereto, and upon their respective successors in interest and legal representatives, except as otherwise herein expressly provided. If there shall be more than one Licensee, the obligations hereunder imposed upon Licensee shall be joint and several.

23. Notice. Any and all other notices, demands or requests by or from Railway to Licensee, or Licensee to Railway, shall be in writing and shall be sent by (a) postage paid, certified mail, return receipt requested, or (b) a reputable national overnight courier service with receipt therefor, or (c) personal delivery, and addressed in each case as follows:

If to Railway:
c/o Norfolk Southern Corporation
1200 Peachtree Street, NE – 12th Floor
Atlanta, Georgia 30309-3504
Attention: Director Real Estate

If to Licensee:
The Mayor and Aldermen of the City of Savannah
2 East Bay Street
Savannah, Georgia 31401
Attention: City Manager

Either party may, by notice in writing, direct that future notices or demands be sent to a different address. All notices hereunder shall be deemed given upon receipt (or, if rejected, upon rejection).

24. Miscellaneous. All exhibits, attachments, riders and addenda referred to in this License are incorporated into this Agreement and made a part hereof for all intents and purposes. Time is of the essence with regard to each provision of this Agreement. This Agreement shall be construed and interpreted in accordance with and governed by the laws of the State in which the Premises are located. Each covenant of Railway and Licensee under this Agreement is independent of each other covenant under this Agreement. No default in performance of any covenant by a party shall excuse the other party from the performance of any other covenant. The provisions of Paragraphs 7, 9, 10, 12 and 18 shall survive the expiration or earlier termination of this Agreement.

25. Limitations of Grant. Licensee acknowledges that the license granted hereunder is a quitclaim grant, made without covenants, representations or warranties with respect to Railway's (a) right to make the grant, (b) title in the Premises, or (c) right to use or make available to others the Premises for the purposes contemplated herein. Railway is the owner and/or holder of the Premises subject to the terms and limitations under which it is owned or held, including without limitation conditions, covenants, restrictions, easements (including any pre-existing fiber optic easements or licenses), encroachments, leases, licenses, permits, mortgages, indentures, reversionary interests, fee interests, zoning restrictions and other burdens and limitations, of record and not of record, and to rights of tenants and licensees in possession, and Licensee agrees that the rights licensed hereunder are subject and subordinate to each and all of the foregoing. Licensee accepts this grant knowing that others may claim that Railway has no right to make it, and Licensee agrees to release, hold harmless and indemnify (and, at Railway's election, defend, at Licensee's sole expense, with counsel approved by Railway) Railway, its affiliated companies, and its and their respective officers, directors, agents and employees, from and against any detriments to, or liabilities of, any type or nature arising from such claims, including punitive damages and any forfeitures declared or occurring as a result of this grant.

26. Limitations Upon Damages. Notwithstanding any other provision of this Agreement, Railway shall not be liable for breach of this Agreement or under this Agreement for any consequential, incidental, exemplary, punitive, special, business damages or lost profits, as well as any claims for death, personal injury, and property loss and damage which occurs by reason of, or arises out of, or is incidental to the interruption in or usage of the Facilities placed upon or about the Premises by Licensee, including without limitation any damages under such claims that might be considered consequential, incidental, exemplary, punitive, special, business damages or lost profits.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate, each part being an original, as of the date first above written. The parties agree that if an authorized officer of a party fully signs this Agreement in the appropriate location(s) below and then returns that signature to the other party via electronic means with a pdf or similar scanned copy of that signature, then that scanned signature shall serve as that party's signature for the Agreement, and, upon full execution of the Agreement by all parties, shall create a legally binding Agreement.

Witness:

Keyna Holloway
As to Railway

CENTRAL OF GEORGIA RAILROAD COMPANY

By: Malcolm G. Roop
Real Estate Manager

ATTEST:

(SEAL)

THE MAYOR AND ALDERMEN OF THE CITY OF SAVANNAH

Mark Massey
By: Mark Massey, Clerk of Council
7/23/2020 #8

Patrick C. Monahan
By: Patrick Monahan, City Manager

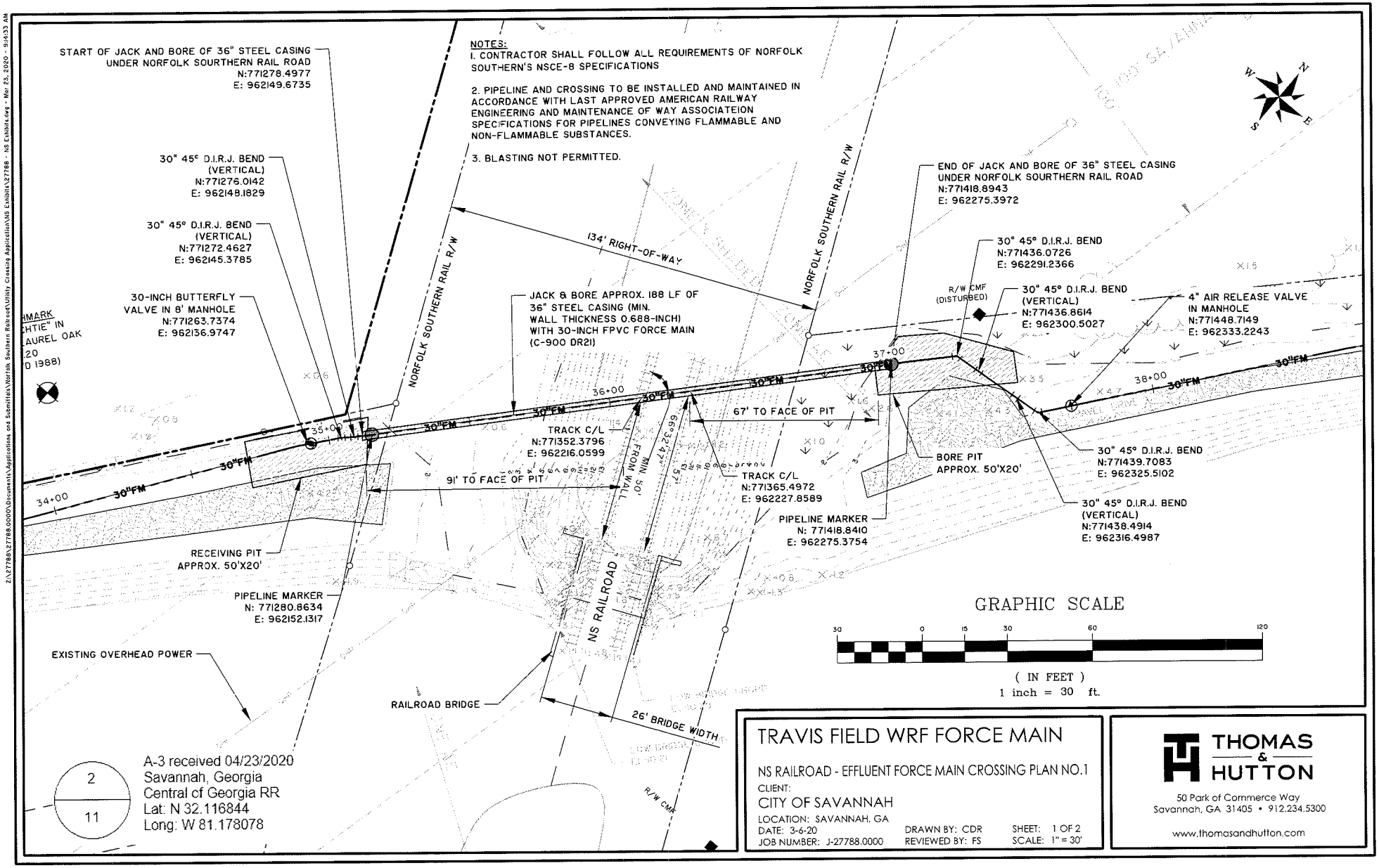
Activity Number 1284035
AD: April 28, 2020/Revised July 10, 2020

24. Miscellaneous. All exhibits, attachments, riders and addenda referred to in this License are incorporated into this Agreement and made a part hereof for all intents and purposes. Time is of the essence with regard to each provision of this Agreement. This Agreement shall be construed and interpreted in accordance with and governed by the laws of the State in which the Premises are located. Each covenant of Railway and Licensee under this Agreement is independent of each other covenant under this Agreement. No default in performance of any covenant by a party shall excuse the other party from the performance of any other covenant. The provisions of Paragraphs 7, 9, 10, 12 and 18 shall survive the expiration or earlier termination of this Agreement.

25. Limitations of Grant. Licensee acknowledges that the license granted hereunder is a quitclaim grant, made without covenants, representations or warranties with respect to Railway's (a) right to make the grant, (b) title in the Premises, or (c) right to use or make available to others the Premises for the purposes contemplated herein. Railway is the owner and/or holder of the Premises subject to the terms and limitations under which it is owned or held, including without limitation conditions, covenants, restrictions, easements (including any pre-existing fiber optic easements or licenses), encroachments, leases, licenses, permits, mortgages, indentures, reversionary interests, fee interests, zoning restrictions and other burdens and limitations, of record and not of record, and to rights of tenants and licensees in possession, and Licensee agrees that the rights licensed hereunder are subject and subordinate to each and all of the foregoing. Licensee accepts this grant knowing that others may claim that Railway has no right to make it, and Licensee agrees to release, hold harmless and indemnify (and, at Railway's election, defend, at Licensee's sole expense, with counsel approved by Railway) Railway, its affiliated companies, and its and their respective officers, directors, agents and employees, from and against any detriments to, or liabilities of, any type or nature arising from such claims, including punitive damages and any forfeitures declared or occurring as a result of this grant.

26. Limitations Upon Damages. Notwithstanding any other provision of this Agreement, Railway shall not be liable for breach of this Agreement or under this Agreement for any consequential, incidental, exemplary, punitive, special, business damages or lost profits, as well as any claims for death, personal injury, and property loss and damage which occurs by reason of, or arises out of, or is incidental to the interruption in or usage of the Facilities placed upon or about the Premises by Licensee, including without limitation any damages under such claims that might be considered consequential, incidental, exemplary, punitive, special, business damages or lost profits.

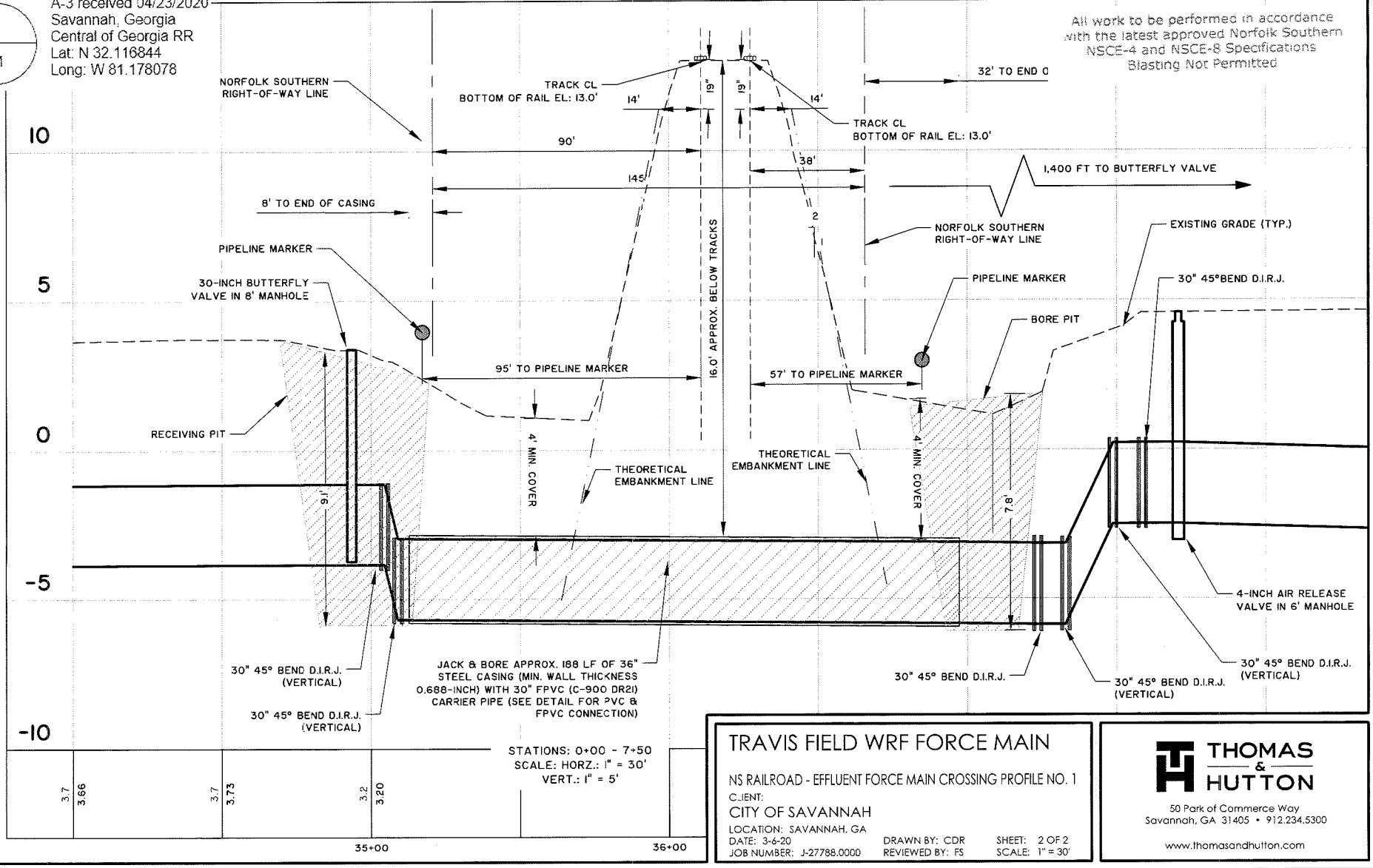
[Remainder of page intentionally left blank]


NOTES:
1. CONTRACTOR SHALL FOLLOW ALL REQUIREMENTS OF NORFOLK SOUTHERN'S NSCE-8 SPECIFICATIONS
2. PIPELINE AND CROSSING TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH LAST APPROVED AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATEION SPECIFICATIONS FOR PIPELINES CONVEYING FLAMMABLE AND NON-FLAMMABLE SUBSTANCES.
3. BLASTING NOT PERMITTED.
START OF JACK AND BORE OF 36" STEEL CASING UNDER NORFOLK SOURTHERN RAIL ROAD N:771278.4977 E: 962149.6735
30" 45° D.I.R.J. BEND (VERTICAL) N:771276.0142 E: 962148.1829
30" 45° D.I.R.J. BEND (VERTICAL) N:771272.4627 E: 962145.3785
30-INCH BUTTERFLY VALVE IN 8' MANHOLE N:771263.7374 E: 962136.9747
NORFOLK SOUTHERN RAIL R/W
134' RIGHT-OF-WAY
JACK & BORE APPROX. 188 LF OF 36" STEEL CASING (MIN. WALL THICKNESS 0.688-INCH) WITH 30-INCH FPVC FORCE MAIN (C-900 DR21)
TRACK C/L N:771352.3796 E: 962216.0599
91' TO FACE OF PIT
67' TO FACE OF PIT
TRACK C/L N:771365.4972 E: 962227.8589
PIPELINE MARKER N: 771418.8410 E: 962275.3754
RECEIVING PIT APPROX. 50'X20'
PIPELINE MARKER N: 771280.8634 E: 962152.1317
EXISTING OVERHEAD POWER
RAILROAD BRIDGE
26' BRIDGE WIDTH
NS RAILROAD
R/W CMF
END OF JACK AND BORE OF 36" STEEL CASING UNDER NORFOLK SOURTHERN RAIL ROAD N:771418.8943 E: 962275.3972
30" 45° D.I.R.J. BEND N:771436.0726 E: 962291.2366
R/W CMF (DISTURBED)
30" 45° D.I.R.J. BEND (VERTICAL) N:771436.8614 E: 962300.5027
4" AIR RELEASE VALVE IN MANHOLE N:771448.7149 E: 962333.2243
BORE PIT APPROX. 50'X20'
30" 45° D.I.R.J. BEND N:771439.7083 E: 962325.5102
30" 45° D.I.R.J. BEND (VERTICAL) N:771438.4914 E: 962316.4987
30"FM
34+00
35+00
36+00
37+00
38+00
GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.
A-3 received 04/23/2020
Savannah, Georgia
Central of Georgia RR
Lat: N 32.116844
Long: W 81.178078
2
11
TRAVIS FIELD WRF FORCE MAIN
NS RAILROAD - EFFLUENT FORCE MAIN CROSSING PLAN NO.1
CLIENT:
CITY OF SAVANNAH
LOCATION: SAVANNAH, GA
DATE: 3-6-20
JOB NUMBER: J-27788.0000
DRAWN BY: CDR
REVIEWED BY: FS
SHEET: 1 OF 2
SCALE: 1" = 30'
THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

2
11

A-3 received 04/23/2020
Savannah, Georgia
Central of Georgia RR
Lat: N 32.116844
Long: W 81.178078

All work to be performed in accordance with the latest approved Norfolk Southern NSCE-4 and NSCE-8 Specifications
Blasting Not Permitted



STATIONS: 0+00 - 7+50
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 5'

TRAVIS FIELD WRF FORCE MAIN

NS RAILROAD - EFFLUENT FORCE MAIN CROSSING PROFILE NO. 1

CLIENT:
CITY OF SAVANNAH

LOCATION: SAVANNAH, GA
DATE: 3-6-20 DRAWN BY: CDR SHEET: 2 OF 2
JOB NUMBER: J-27788.0000 REVIEWED BY: FS SCALE: 1" = 30'

THOMAS & HUTTON
50 Park of Commerce Way
Savannah, GA 31405 • 912.234.5300
www.thomasandhutton.com

AECOM

NORFOLK SOUTHERN

PIPE DATA SHEET

	CARRIER PIPE	CASING PIPE
CONTENTS TO BE HANDLED	Treated Sewage	N/A
MAX. ALLOWABLE OPERATING PRESSURE	150 PSI	150 psi
NOMINAL SIZE OF PIPE	30-inch	36-inch
OUTSIDE DIAMETER	32	36
INSIDE DIAMETER	28.23	34.75
WALL THICKNESS	1.78	1" min
WEIGHT PER FOOT	117	250
MATERIAL	PVC	STEEL
PROCESS OF MANUFACTURE	N/A	N/A
SPECIFICATION	ANSI/AWWA C900	ASTM A139
GRADE OR CLASS (Specified Minimum Yield Strength)	50	B
TEST PRESSURE	150 psi	N/A
TYPE OF JOINT	RESTRAINED JOINT	WELDED
TYPE OF COATING	POLYETHYLENE	N/A
DETAILS OF CATHODIC PROTECTION	N/A	N/A
DETAILS OF SEALS OR PROTECTION AT END OF CASING	N/A	N/A
CHARACTER OF SUBSURFACE MATERIAL	SAND MIX	SAND MIX
APPROXIMATE GROUND WATER LEVEL	~5-7	~5-7
SOURCE OF INFORMATION ON SUBSURFACE CONDITIONS	GEOTECH INVESTIAGTION	GEOTECH INVESTIGATION

Proposed method of installation (refer to NSCE-8 Specification):

- ☒ Bore and jack
- ☐ Jacking
- ☐ Tunneling (with Tunnel Liner Plate)
- ☐ Directional Bore/Horizontal Direction Drilling – Method A
- ☐ Directional Bore/Horizontal Direction Drilling – Method B
- ☐ Open Cut – *All installations directly under any track must be designed as a bored installation. Open cut installations will be considered on a case-by-case basis by Norfolk Southern's Division Superintendent at the time of installation.*
- ☐ Other (Specify): _____

2
11

A-3 received 04/23/2020
Savannah, Georgia
Central of Georgia RR
Lat: N 32.116844
Long: W 81.178078

Last Revised: 092319

PS - FORM 1001-G
REVISED APRIL 29, 2008
AGREEMENT NO. CSX908830

FACILITY ENCROACHMENT AGREEMENT

THIS AGREEMENT, made and effective as of May 26, 2020, by and between CSX TRANSPORTATION, INC., a Virginia corporation, whose mailing address is 500 Water Street, Jacksonville, Florida 32202, hereinafter called "Licensor," and CITY OF SAVANNAH, a municipal corporation, political subdivision or state agency, under the laws of the State of Georgia, whose mailing address is 702 Stiles Avenue, Savannah, Georgia 31415, hereinafter called "Licensee," WITNESSETH:

WHEREAS, Licensee desires to construct (unless previously constructed and designated as existing herein), use and maintain the below described facility(ies), hereinafter called "Facilities," over, under or across property owned or controlled by Licensor, at the below described location(s):

1. One (1) thirty inch (30") diameter sub-grade pipeline crossing, solely for the conveyance of raw/treated sewage, located at or near Garden City, Chatham County, Georgia, Florence Division, Columbia Subdivision, Milepost S-494.95, Latitude N32:07:09.8472, Longitude W81:10:25.7808;

hereinafter, called the "Encroachment," as shown on print(s) labeled Exhibit "A," attached hereto and made a part hereof;

NOW, THEREFORE, in consideration of the mutual covenants, conditions, terms and agreements herein contained, the parties hereto agree and covenant as follows:

1. LICENSE:

1.1 Subject to Article 17, Licensor, insofar as it has the legal right, power and authority to do so, and its present title permits, and subject to:

(A) Licensor's present and future right to occupy, possess and use its property within the area of the Encroachment for any and all purposes;

(B) All encumbrances, conditions, covenants, easements, and limitations applicable to Licensor's title to or rights in the subject property; and

(C) Compliance by Licensee with the terms and conditions herein contained;

does hereby license and permit Licensee to construct, maintain, repair, renew, operate, use, alter or change the Facilities at the Encroachment above for the term herein stated, and to remove same upon termination.

1.2 The term Facilities, as used herein, shall include only those structures and ancillary facilities devoted exclusively to the transmission usage above within the Encroachment, and as shown on attached Exhibit A.

1.3 No additional structures or other facilities shall be placed, allowed, or maintained by Licensee in, upon or on the Encroachment except upon prior separate written consent of Licensor.

2. ENCROACHMENT FEE; TERM:

2.1 Licensee shall pay Licensor a one-time nonrefundable Encroachment Fee of TEN THOUSAND TWO HUNDRED AND 00/100 U.S. DOLLARS ($10,200.00) upon execution of this Agreement. Licensee agrees that the Encroachment Fee applies only to the original Licensee under this Agreement. In the event of a successor (by merger, consolidation, reorganization and/or assignment) or if the original Licensee changes its name, then Licensee shall be subject to payment of Licensor's current administrative and document preparation fees for the cost incurred by Licensor in preparing and maintaining this Agreement on a current basis.

2.2 However, Licensee assumes sole responsibility for, and shall pay directly (or reimburse Licensor), any additional annual taxes and/or periodic assessments levied against Licensor or Licensor's property solely on account of said Facilities or Encroachment.

2.3 This Agreement shall terminate as herein provided, but shall also terminate upon: (a) Licensee's cessation of use of the Facilities or Encroachment for the purpose(s) above; (b) removal of the Facilities; (c) subsequent mutual consent; and/or (d) failure of Licensee to complete installation within five (5) years from the effective date of this Agreement.

2.4 In further consideration for the license or right hereby granted, Licensee hereby agrees that Licensor shall not be charged or assessed, directly or indirectly, with any part of the cost of the installation of said Facilities and appurtenances, and/or maintenance thereof, or for any public works project of which said Facilities is a part.

3. CONSTRUCTION, MAINTENANCE AND REPAIRS:

3.1 Licensee shall construct, maintain, relocate, repair, renew, alter, and/or remove the Facilities, in a prudent, workmanlike manner, using quality materials and complying with any applicable standard(s) or regulation(s) of Licensor (CSXT Specifications), or Licensee's particular industry, National Electrical Safety Code, or any governmental or regulatory body having jurisdiction over the Encroachment.

3.2 Location and construction of Facilities shall be made strictly in accordance with design(s) and specifications furnished to and approved by Licensor and of material(s) and size(s) appropriate for the purpose(s) above recited.

3.3 All of Licensee's work, and exercise of rights hereunder, shall be undertaken at time(s) satisfactory to Licensor, and so as to eliminate or minimize any impact on or interference with the safe use and operation of Licensor's property and appurtenances thereto.

3.4 In the installation, maintenance, repair and/or removal of said Facilities, Licensee shall not use explosives of any type or perform or cause any blasting without the separate express written consent of Licensor. As a condition to such consent, a representative will be assigned by Licensor to monitor blasting, and Licensee shall reimburse Licensor for the entire cost and/or expense of furnishing said monitor.

3.5 Any repairs or maintenance to the Facilities, whether resulting from acts of Licensee, or natural or weather events, which are necessary to protect or facilitate Licensor's use of its property, shall be made by Licensee promptly, but in no event later than thirty (30) days after Licensee has notice as to the need for such repairs or maintenance.

3.6 Licensor, in order to protect or safeguard its property, rail operations, equipment and/or employees from damage or injury, may request immediate repair or renewal of the Facilities, and if the same is not performed, may make or contract to make such repairs or renewals, at the sole risk, cost and expense of Licensee.

3.7 Neither the failure of Licensor to object to any work done, material used, or method of construction or maintenance of said Encroachment, nor any approval given or supervision exercised by Licensor, shall be construed as an admission of liability or responsibility by Licensor, or as a waiver by Licensor of any of the obligations, liability and/or responsibility of Licensee under this Agreement.

3.8 All work on the Encroachment shall be conducted in accordance with Licensor's safety rules and regulations.

3.9 Licensee hereby agrees to reimburse Licensor any loss, cost or expense (including losses resulting from train delays and/or inability to meet train schedules) arising from any failure of Licensee to make repairs or conduct maintenance as required by Section 3.5 above or from improper or incomplete repairs or maintenance to the Facilities or Encroachment.

3.10 In the event it becomes necessary for the Licensee to deviate from the approved Exhibit, Licensee shall seek prior approval from CSXT, or when applicable, an official field representative of CSXT permitted to approve changes, authorizing the necessary field changes and Licensee shall provide CSXT with complete As-Built Drawings of the completed work. As-Built Drawings shall be submitted to Licensor in either electronic or hard copy form upon the substantial completion of the project and upon Licensor's request.

3.11 In the event of large scale maintenance/construction work to railroad bridges Licensee is required to protect power lines with insulated covers or comparable safety devices at their costs during construction/maintenance for safety of railroad employees.

4. PERMITS, LICENSES:

4.1 Before any work hereunder is performed, or before use of the Encroachment for the contracted purpose, Licensee, at its sole cost and expense, shall obtain all necessary permit(s) (including but not limited to zoning, building, construction, health, safety or

environmental matters), letter(s) or certificate(s) of approval. Licensee expressly agrees and warrants that it shall conform and limit its activities to the terms of such permit(s), approval(s) and authorization(s), and shall comply with all applicable ordinances, rules, regulations, requirements and laws of any governmental authority (State, Federal or Local) having jurisdiction over Licensee's activities, including the location, contact, excavation and protection regulations of the Occupational Safety and Health Act (OSHA) (29 CFR 1926.651(b)), et al., and State "One Call" - "Call Before You Dig" requirements.

4.2 Licensee assumes sole responsibility for failure to obtain such permit(s) or approval(s), for any violations thereof, or for costs or expenses of compliance or remedy.

5. MARKING AND SUPPORT:

5.1 With respect to any subsurface installation or maintenance upon Licensor's property, Licensee, at its sole cost and expense, shall:

(A) support track(s) and roadbed in a manner satisfactory to Licensor;

(B) backfill with satisfactory material and thoroughly tamp all trenches to prevent settling of surface of land and roadbed of Licensor; and

(C) either remove any surplus earth or material from Licensor's property or cause said surplus earth or material to be placed and distributed at location(s) and in such manner Licensor may approve.

5.2 After construction or maintenance of the Facilities, Licensee shall:

(A) Restore any track(s), roadbed and other disturbed property; and

(B) Erect, maintain and periodically verify the accuracy of aboveground markers, in a form approved by Licensor, indicating the location, depth and ownership of any underground Facilities or related facilities.

5.3 Licensee shall be solely responsible for any subsidence or failure of lateral or subjacent support in the Encroachment area for a period of three (3) years after completion of installation.

6. TRACK CHANGES:

6.1 In the event that rail operations and/or track maintenance result in changes in grade or alignment of, additions to, or relocation of track(s) or other facilities, or in the event future use of Licensor's rail corridor or property necessitate any change of location, height or depth in the Facilities or Encroachment, Licensee, at its sole cost and expense and within thirty (30) days after notice in writing from Licensor, shall make changes in the Facilities or Encroachment to accommodate such track(s) or operations.

6.2 If Licensee fails to do so, Licensor may make or contract to make such changes at Licensee's cost.

7. FACILITY CHANGES:

7.1 Licensee shall periodically monitor and verify the depth or height of the Facilities or Encroachment in relation to the existing tracks and facilities, and shall relocate the Facilities or change the Encroachment, at Licensee's expense, should such relocation or change be necessary to comply with the minimum clearance requirements of Licensor.

7.2 If Licensee undertakes to revise, renew, relocate or change in any manner whatsoever all or any part of the Facilities (including any change in voltage or gauge of wire or any change in circumference, diameter or radius of pipe or change in materials transmitted in and through said pipe), or is required by any public agency or court order to do so, plans therefor shall be submitted to Licensor for approval before such change. After approval, the terms and conditions of this Agreement shall apply thereto.

8. INTERFERENCE WITH RAIL FACILITIES:

8.1 Although the Facilities/Encroachment herein permitted may not presently interfere with Licensor's railroad or facilities, in the event that the operation, existence or maintenance of said Facilities, in the sole judgment of Licensor, causes: (a) interference (including, but not limited to, physical or interference from an electromagnetic induction, or interference from stray or other currents) with Licensor's power lines, communication, signal or other wires, train control system, or electrical or electronic apparatus; or (b) interference in any manner, with the operation, maintenance or use of the rail corridor, track(s), structures, pole line(s), devices, other property, or any appurtenances thereto; then and in either event, Licensee, upon receipt of written notice from Licensor of any such interference, and at Licensee's sole risk, cost and expense, shall promptly make such changes in its Facilities or installation, as may be required in the reasonable judgment of the Licensor to eliminate all such interference. Upon Licensee's failure to remedy or change, Licensor may do so or contract to do so at Licensee's sole cost.

8.2 Without assuming any duty hereunder to inspect the Facilities, Licensor hereby reserves the right to inspect same and to require Licensee to undertake repairs, maintenance or adjustments to the Facilities, which Licensee hereby agrees to make promptly, at Licensee's sole cost and expense.

9. RISK, LIABILITY, INDEMNITY:

With respect to the relative risk and liabilities of the parties, it is hereby agreed that:

9.1 To the fullest extent permitted by State law (constitutional or statutory, as amended), Licensee hereby agrees to, defend, indemnify, and hold Licensor harmless from and against any and all liability, loss, claim, suit, damage, charge or expense which Licensor may suffer, sustain, incur or in any way be subjected to, on account of death of or injury to any person

whomsoever (including officers, agents, employees or invitees of Licensor), and for damage to or loss of or destruction of any property whatsoever, arising out of, resulting from, or in any way connected with the construction, repair, maintenance, replacement, presence, existence, operations, use or removal of the Facilities or any structure in connection therewith, or restoration of premises of Licensor to good order or condition after removal, EXCEPT when proven to have been caused solely by the willful misconduct or gross negligence of Licensor. HOWEVER, to the fullest extent permitted by State law, during any period of actual construction, repair, maintenance, replacement or removal of the Facilities, wherein agents, equipment or personnel of Licensee are on the railroad rail corridor, Licensee's liability hereunder shall be absolute, irrespective of any joint, sole or contributory fault or negligence of Licensor.

9.2 Use of Licensor's rail corridor involves certain risks of loss or damage as a result of the rail operations. Notwithstanding Section 9.1, Licensee expressly assumes all risk of loss and damage to Licensee's Property or the Facilities in, on, over or under the Encroachment, including loss of or any interference with use or service thereof, regardless of cause, including electrical field creation, fire or derailment resulting from rail operations. For this Section, the term "Licensee's Property" shall include property of third parties situated or placed upon Licensor's rail corridor by Licensee or by such third parties at request of or for benefit of Licensee.

9.3 To the fullest extent permitted by State law, as above, Licensee assumes all responsibility for, and agrees to defend, indemnify and hold Licensor harmless from: (a) all claims, costs and expenses, including reasonable attorneys' fees, as a consequence of any sudden or nonsudden pollution of air, water, land and/or ground water on or off the Encroachment area, arising from or in connection with the use of this Encroachment or resulting from leaking, bursting, spilling, or any escape of the material transmitted in or through the Facilities; (b) any claim or liability arising under federal or state law dealing with either such sudden or nonsudden pollution of air, water, land and/or ground water arising therefrom or the remedy thereof; and (c) any subsidence or failure of lateral or subjacent support of the tracks arising from such Facilities leakage.

9.4 Notwithstanding Section 9.1, Licensee also expressly assumes all risk of loss which in any way may result from Licensee's failure to maintain either required clearances for any overhead Facilities or the required depth and encasement for any underground Facilities, whether or not such loss(es) result(s) in whole or part from Licensor's contributory negligence or joint fault.

9.5 Obligations of Licensee hereunder to release, indemnify and hold Licensor harmless shall also extend to companies and other legal entities that control, are controlled by, subsidiaries of, or are affiliated with Licensor, as well as any railroad that operates over the rail corridor on which the Encroachment is located, and the officers, employees and agents of each.

9.6 If a claim is made or action is brought against Licensor, and/or its operating lessee, for which Licensee may be responsible hereunder, in whole or in part, Licensee shall be

notified to assume the handling or defense of such claim or action; but Licensor may participate in such handling or defense.

9.7 Notwithstanding anything contained in this Agreement, the limitation of liability contained in the state statutes, as amended from time to time, shall not limit Licensor's ability to collect under the insurance policies required to be maintained under this Agreement.

10. INSURANCE:

10.1 Prior to commencement of surveys, installation or occupation of premises pursuant to this Agreement, Licensee shall procure and shall maintain during the continuance of this Agreement, at its sole cost and expense, a policy of

(i) Statutory Worker's Compensation and Employers Liability Insurance with available limits of not less than ONE MILLION AND 00/100 U.S. DOLLARS ($1,000,000.00), which must contain a waiver of subrogation against CSXT and its Affiliates;

(ii) Commercial General Liability coverage (inclusive of contractual liability) with available limits of not less than FIVE MILLION AND 00/100 U.S. DOLLARS ($5,000,000.00), naming Licensor, and/or its designee, as additional insured and in combined single limits for bodily injury and property damage and covering the contractual liabilities assumed under this Agreement. The evidence of insurance coverage shall be endorsed to provide for thirty (30) days' notice to Licensor, or its designee, prior to cancellation or modification of any policy. Mail CGL certificate, along with agreement, to CSX Transportation, Inc., Speed Code J180, 500 Water Street, Jacksonville, FL 32202. On each successive year, send certificate to RenewalCOI@csx.com.

(iii) Business automobile liability insurance with available limits of not less than ONE MILLION AND 00/100 U.S. DOLLARS ($1,000,000.00) combined single limit for bodily injury and/or property damage per occurrence;

(iv) Such other insurance as Licensor may reasonably require.

10.2 If Licensee's existing CGL policy(ies) do(es) not automatically cover Licensee's contractual liability during periods of survey, installation, maintenance and continued occupation, a specific endorsement adding such coverage shall be purchased by Licensee. If said CGL policy is written on a "claims made" basis instead of a "per occurrence" basis, Licensee shall arrange for adequate time for reporting losses. Failure to do so shall be at Licensee's sole risk.

10.3 Licensor, or its designee, may at any time request evidence of insurance purchased by Licensee to comply with this Agreement. Failure of Licensee to comply with Licensor's request shall be considered a default by Licensee.

10.4 Securing such insurance shall not limit Licensee's liability under this Agreement, but shall be security therefor.

10.5 (A) In the event Licensee finds it necessary to perform construction or demolition operations within fifty feet (50') of any operated railroad track(s) or affecting any railroad bridge, trestle, tunnel, track(s), roadbed, overpass or underpass, Licensee shall: (a) notify Licensor; and (b) require its contractor(s) performing such operations to procure and maintain during the period of construction or demolition operations, at no cost to Licensor, Railroad Protective Liability (RPL) Insurance, naming Licensor, and/or its designee, as Named Insured, written on the current ISO/RIMA Form (ISO Form No. CG 00 35 01 96) with limits of FIVE MILLION AND 00/100 U.S. DOLLARS ($5,000,000.00) per occurrence for bodily injury and property damage, with at least TEN MILLION AND 00/100 U.S. DOLLARS ($10,000,000.00) aggregate limit per annual policy period, with Pollution Exclusion Amendment (ISO CG 28 31 11 85) if an older ISO Form CG 00 35 is used. The original of such RPL policy shall be sent to and approved by Licensor prior to commencement of such construction or demolition. Licensor reserves the right to demand higher limits.

(B) At Licensor's option, in lieu of purchasing RPL insurance from an insurance company (but not CGL insurance), Licensee may pay Licensor, at Licensor's current rate at time of request, the cost of adding this Encroachment, or additional construction and/or demolition activities, to Licensor's Railroad Protective Liability (RPL) Policy for the period of actual construction. This coverage is offered at Licensor's discretion and may not be available under all circumstances.

10.6 Notwithstanding the provisions of Sections 10.1 and 10.2, Licensee, pursuant to State Statute(s), may self-insure or self-assume, in any amount(s), any contracted liability arising under this Agreement, under a funded program of self-insurance, which fund will respond to liability of Licensee imposed by and in accordance with the procedures established by law.

11. GRADE CROSSINGS; FLAGGING:

11.1 Nothing herein contained shall be construed to permit Licensee or Licensee's contractor to move any vehicles or equipment over the track(s), except at public road crossing(s), without separate prior written approval of Licensor.

11.2 If Licensor deems it advisable, during any construction, maintenance, repair, renewal, alteration, change or removal of said Facilities, to place watchmen, flagmen, inspectors or supervisors for protection of operations of Licensor or others on Licensor's rail corridor at the Encroachment, and to keep persons, equipment or materials away from the track(s), Licensor shall have the right to do so at the expense of Licensee, but Licensor shall not be liable for failure to do so.

12. LICENSOR'S COSTS:

12.1 Any additional or alternative costs or expenses incurred by Licensor to accommodate Licensee's continued use of Licensor's property as a result of track changes or wire changes shall also be paid by Licensee.

12.2 Licensor's expense for wages ("force account" charges) and materials for any work performed at the expense of Licensee pursuant hereto shall be paid by Licensee within thirty (30) days after receipt of Licensor's bill therefor. Licensor may, at its discretion, request an advance deposit for estimated Licensor costs and expenses.

12.3 Such expense shall include, but not be limited to, cost of railroad labor and supervision under "force account" rules, plus current applicable overhead percentages, the actual cost of materials, and insurance, freight and handling charges on all material used. Equipment rentals shall be in accordance with Licensor's applicable fixed rate. Licensor may, at its discretion, require advance deposits for estimated costs of such expenses and costs.

13. DEFAULT, BREACH, WAIVER:

13.1 The proper and complete performance of each covenant of this Agreement shall be deemed of the essence thereof, and in the event Licensee fails or refuses to fully and completely perform any of said covenants or remedy any breach within thirty (30) days after receiving written notice from Licensor to do so (or within forty-eight (48) hours in the event of notice of a railroad emergency), Licensor shall have the option of immediately revoking this Agreement and the privileges and powers hereby conferred, regardless of encroachment fee(s) having been paid in advance for any annual or other period. Upon such revocation, Licensee shall make removal in accordance with Article 14.

13.2 No waiver by Licensor of its rights as to any breach of covenant or condition herein contained shall be construed as a permanent waiver of such covenant or condition, or any subsequent breach thereof, unless such covenant or condition is permanently waived in writing by Licensor.

13.3 Neither the failure of Licensor to object to any work done, material used, or method of construction or maintenance of said Encroachment, nor any approval given or supervision exercised by Licensor, shall be construed as an admission of liability or responsibility by Licensor, or as a waiver by Licensor of any of the obligations, liability and/or responsibility of Licensee under this Agreement.

14. TERMINATION, REMOVAL:

14.1 All rights which Licensee may have hereunder shall cease upon the date of (a) termination, (b) revocation, or (c) subsequent agreement, or (d) Licensee's removal of the Facility from the Encroachment. However, neither termination nor revocation of this Agreement shall affect any claims and liabilities which have arisen or accrued hereunder, and which at the time of termination or revocation have not been satisfied; neither party, however, waiving any third party defenses or actions.

14.2 Within thirty (30) days after revocation or termination, Licensee, at its sole risk and expense, shall (a) remove the Facilities from the rail corridor of Licensor, unless the parties hereto agree otherwise, (b) restore the rail corridor of Licensor in a manner satisfactory to

Licensor, and (c) reimburse Licensor any loss, cost or expense of Licensor resulting from such removal.

15. NOTICE:

15.1 Licensee shall give Licensor at least thirty (30) days written notice before doing any work on Licensor's rail corridor, except that in cases of emergency shorter notice may be given. Licensee shall provide proper notification as follows:

a. For non-emergencies, Licensee shall submit online via the CSX Property Portal from Licensor's web site, via web link: https://propertyportal.csx.com/pub_ps_res/ps_res/jsf/public/index.faces

b. For emergencies, Licensee shall complete all of the steps outlined in Section 15.1 a. above, and shall also include detailed information of the emergency. Licensee shall also call and report details of the emergency to Licensor's Rail Operations Emergency Telephone Number: 1-800-232-0144. In the event Licensor needs to contact Licensee concerning an emergency involving Licensee's Facility(ies), the emergency phone number for Licensee is: 912-651-6573.

15.2 All other notices and communications concerning this Agreement shall be addressed to Licensee at the address above, and to Licensor at the address shown on Page 1, c/o CSXT Contract Management, J180; or at such other address as either party may designate in writing to the other.

15.3 Unless otherwise expressly stated herein, all such notices shall be in writing and sent via Certified or Registered Mail, Return Receipt Requested, or by courier, and shall be considered delivered upon: (a) actual receipt, or (b) date of refusal of such delivery.

16. ASSIGNMENT:

16.1 The rights herein conferred are the privileges of Licensee only, and Licensee shall obtain Licensor's prior written consent to any assignment of Licensee's interest herein; said consent shall not be unreasonably withheld.

16.2 Subject to Sections 2 and 16.1, this Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors or assigns.

16.3 Licensee shall give Licensor written notice of any legal succession (by merger, consolidation, reorganization, etc.) or other change of legal existence or status of Licensee, with a copy of all documents attesting to such change or legal succession, within thirty (30) days thereof.

16.4 Licensor expressly reserves the right to assign this Agreement, in whole or in part, to any grantee, lessee, or vendee of Licensor's underlying property interests in the Encroachment, upon written notice thereof to Licensee.

16.5 In the event of any unauthorized sale, transfer, assignment, sublicense or encumbrance of this Agreement, or any of the rights and privileges hereunder, Licensor, at its option, may revoke this Agreement by giving Licensee or any such assignee written notice of such revocation; and Licensee shall reimburse Licensor for any loss, cost or expense Licensor may incur as a result of Licensee's failure to obtain said consent.

17. TITLE:

17.1 Licensee understands that Licensor occupies, uses and possesses lands, rights-of-way and rail corridors under all forms and qualities of ownership rights or facts, from full fee simple absolute to bare occupation. Accordingly, nothing in this Agreement shall act as or be deemed to act as any warranty, guaranty or representation of the quality of Licensor's title for any particular Encroachment or segment of Rail Corridor occupied, used or enjoyed in any manner by Licensee under any rights created in this Agreement. It is expressly understood that Licensor does not warrant title to any Rail Corridor and Licensee will accept the grants and privileges contained herein, subject to all lawful outstanding existing liens, mortgages and superior rights in and to the Rail Corridor, and all leases, licenses and easements or other interests previously granted to others therein.

17.2 The term "license," as used herein, shall mean with regard to any portion of the Rail Corridor which is owned by Licensor in fee simple absolute, or where the applicable law of the State where the Encroachment is located otherwise permits Licensor to make such grants to Licensee, a "permission to use" the Rail Corridor, with dominion and control over such portion of the Rail Corridor remaining with Licensor, and no interest in or exclusive right to possess being otherwise granted to Licensee. With regard to any other portion of Rail Corridor occupied, used or controlled by Licensor under any other facts or rights, Licensor merely waives its exclusive right to occupy the Rail Corridor and grants no other rights whatsoever under this Agreement, such waiver continuing only so long as Licensor continues its own occupation, use or control. Licensor does not warrant or guarantee that the license granted hereunder provides Licensee with all of the rights necessary to occupy any portion of the Rail Corridor. Licensee further acknowledges that it does not have the right to occupy any portion of the Rail Corridor held by Licensor in less than fee simple absolute without also receiving the consent of the owner(s) of the fee simple absolute estate. Further, Licensee shall not obtain, exercise or claim any interest in the Rail Corridor that would impair Licensor's existing rights therein.

17.3 Licensee agrees it shall not have nor shall it make, and hereby completely and absolutely waives its right to, any claim against Licensor for damages on account of any deficiencies in title to the Rail Corridor in the event of failure or insufficiency of Licensor's title to any portion thereof arising from Licensee's use or occupancy thereof.

17.4 Licensee agrees to fully and completely indemnify and defend all claims or litigation for slander of title, overburden of easement, or similar claims arising out of or based upon the Facilities placement, or the presence of the Facilities in, on or along any Encroachment(s), including claims for punitive or special damages.

17.5 Licensee shall not at any time own or claim any right, title or interest in or to Licensor's property occupied by the Encroachments, nor shall the exercise of this Agreement for any length of time give rise to any right, title or interest in Licensee to said property other than the license herein created.

17.6 Nothing in this Agreement shall be deemed to give, and Licensor hereby expressly waives, any claim of ownership in and to any part of the Facilities.

17.7 Licensee shall not create or permit any mortgage, pledge, security, interest, lien or encumbrances, including without limitation, tax liens and liens or encumbrances with respect to work performed or equipment furnished in connection with the construction, installation, repair, maintenance or operation of the Facilities in or on any portion of the Encroachment (collectively, "Liens or Encumbrances"), to be established or remain against the Encroachment or any portion thereof or any other Licensor property.

17.8 In the event that any property of Licensor becomes subject to such Liens or Encumbrances, Licensee agrees to pay, discharge or remove the same promptly upon Licensee's receipt of notice that such Liens or Encumbrances have been filed or docketed against the Encroachment or any other property of Licensor; however, Licensee reserves the right to challenge, at its sole expense, the validity and/or enforceability of any such Liens or Encumbrances.

18. GENERAL PROVISIONS:

18.1 This Agreement, and the attached specifications, contains the entire understanding between the parties hereto.

18.2 Neither this Agreement, any provision hereof, nor any agreement or provision included herein by reference, shall operate or be construed as being for the benefit of any third person.

18.3 Except as otherwise provided herein, or in any Rider attached hereto, neither the form of this Agreement, nor any language herein, shall be interpreted or construed in favor of or against either party hereto as the sole drafter thereof.

18.4 This Agreement is executed under current interpretation of applicable Federal, State, County, Municipal or other local statute, ordinance or law(s). However, each separate division (paragraph, clause, item, term, condition, covenant or agreement) herein shall have independent and severable status for the determination of legality, so that if any separate division is determined to be void or unenforceable for any reason, such determination shall have no effect upon the validity or enforceability of each other separate division, or any combination thereof.

18.5 This Agreement shall be construed and governed by the laws of the state in which the Facilities and Encroachment are located.

18.6 If any amount due pursuant to the terms of this Agreement is not paid by the due date, it will be subject to Licensor's standard late charge and will also accrue interest at eighteen percent (18%) per annum, unless limited by local law, and then at the highest rate so permitted.

18.7 Licensee agrees to reimburse Licensor for all reasonable costs (including attorney's fees) incurred by Licensor for collecting any amount due under the Agreement.

18.8 The provisions of this License are considered confidential and may not be disclosed to a third party without the consent of the other party(s), except: (a) as required by statute, regulation or court order, (b) to a parent, affiliate or subsidiary company, (c) to an auditing firm or legal counsel that are agreeable to the confidentiality provisions, or (d) to Lessees of Licensor's land and/or track who are affected by the terms and conditions of this Agreement and will maintain the confidentiality of this Agreement.

18.9 Within thirty (30) days of an overpayment in a cumulative total amount of One Hundred Dollars ($100.00) or more by Licensee to Licensor, Licensee shall notify Licensor in writing with documentation evidencing such overpayment. Licensor shall refund the actual amount of Licensee's overpayment within 120 days of Licensor's verification of such overpayment.

18.10 This Agreement may be executed in any number of counterparts, and such counterparts may be exchanged by electronic transmission. Upon execution by the parties hereto, each counterpart shall be deemed an original and together shall constitute one and the same instrument. A fully executed copy of this Agreement by electronic transmission shall be deemed to have the same legal effect as delivery of an original executed copy of this Agreement for all purposes.

[Signatures on the following page]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate (each of which shall constitute an original) as of the effective date of this Agreement.

Witness for Licensor:

Flavio Rosa

CSX TRANSPORTATION, INC.

By: _____

Print/Type Name: Catherine Atkins

Print/Type Title: Sr Mgr - Real Estate

Attest:

Mark Massey, Clerk of Council

MAYOR AND ALDERMAN OF THE CITY OF SAVANNAH

By: Patrick C. Monahan

Who, by the execution hereof, affirms that he/she has the authority to do so and to bind the Licensee to the terms and conditions of this Agreement.

Print/Type Name: Pat Monahan

Print/Type Title: City Manager

Tax ID No.: _____

Authority under Ordinance or

Resolution
No._____,

Dated
_____.

5W534

PS - FORM 1001-G
REVISED APRIL 29, 2008
AGREEMENT NO. CSX908854

FACILITY ENCROACHMENT AGREEMENT

THIS AGREEMENT, made and effective as of May 26, 2020, by and between CSX TRANSPORTATION, INC., a Virginia corporation, whose mailing address is 500 Water Street, Jacksonville, Florida 32202, hereinafter called "Licensor," and CITY OF SAVANNAH, a municipal corporation, political subdivision or state agency, under the laws of the State of Georgia, whose mailing address is 702 Stiles Avenue, Savannah, Georgia 31415, hereinafter called "Licensee," WITNESSETH:

WHEREAS, Licensee desires to construct (unless previously constructed and designated as existing herein), use and maintain the below described facility(ies), hereinafter called "Facilities," over, under or across property owned or controlled by Licensor, at the below described location(s):

1. One (1) thirty inch (30") diameter sub-grade pipeline crossing, solely for the conveyance of raw/treated sewage, located at or near Garden City, Chatham County, Georgia, Florence Division, Columbia Subdivision, Milepost S-494.95, Latitude N32:07:09.8472, Longitude W81:10:25.7808;

hereinafter, called the "Encroachment," as shown on print(s) labeled Exhibit "A," attached hereto and made a part hereof;

NOW, THEREFORE, in consideration of the mutual covenants, conditions, terms and agreements herein contained, the parties hereto agree and covenant as follows:

1. LICENSE:

1.1 Subject to Article 17, Licensor, insofar as it has the legal right, power and authority to do so, and its present title permits, and subject to:

(A) Licensor's present and future right to occupy, possess and use its property within the area of the Encroachment for any and all purposes;

(B) All encumbrances, conditions, covenants, easements, and limitations applicable to Licensor's title to or rights in the subject property; and

(C) Compliance by Licensee with the terms and conditions herein contained;

does hereby license and permit Licensee to construct, maintain, repair, renew, operate, use, alter or change the Facilities at the Encroachment above for the term herein stated, and to remove same upon termination.

1.2 The term Facilities, as used herein, shall include only those structures and ancillary facilities devoted exclusively to the transmission usage above within the Encroachment, and as shown on attached Exhibit A.

1.3 No additional structures or other facilities shall be placed, allowed, or maintained by Licensee in, upon or on the Encroachment except upon prior separate written consent of Licensor.

2. ENCROACHMENT FEE; TERM:

2.1 Licensee shall pay Licensor a one-time nonrefundable Encroachment Fee of TEN THOUSAND TWO HUNDRED AND 00/100 U.S. DOLLARS ($10,200.00) upon execution of this Agreement. Licensee agrees that the Encroachment Fee applies only to the original Licensee under this Agreement. In the event of a successor (by merger, consolidation, reorganization and/or assignment) or if the original Licensee changes its name, then Licensee shall be subject to payment of Licensor's current administrative and document preparation fees for the cost incurred by Licensor in preparing and maintaining this Agreement on a current basis.

2.2 However, Licensee assumes sole responsibility for, and shall pay directly (or reimburse Licensor), any additional annual taxes and/or periodic assessments levied against Licensor or Licensor's property solely on account of said Facilities or Encroachment.

2.3 This Agreement shall terminate as herein provided, but shall also terminate upon: (a) Licensee's cessation of use of the Facilities or Encroachment for the purpose(s) above; (b) removal of the Facilities; (c) subsequent mutual consent; and/or (d) failure of Licensee to complete installation within five (5) years from the effective date of this Agreement.

2.4 In further consideration for the license or right hereby granted, Licensee hereby agrees that Licensor shall not be charged or assessed, directly or indirectly, with any part of the cost of the installation of said Facilities and appurtenances, and/or maintenance thereof, or for any public works project of which said Facilities is a part.

3. CONSTRUCTION, MAINTENANCE AND REPAIRS:

3.1 Licensee shall construct, maintain, relocate, repair, renew, alter, and/or remove the Facilities, in a prudent, workmanlike manner, using quality materials and complying with any applicable standard(s) or regulation(s) of Licensor (CSXT Specifications), or Licensee's particular industry, National Electrical Safety Code, or any governmental or regulatory body having jurisdiction over the Encroachment.

3.2 Location and construction of Facilities shall be made strictly in accordance with design(s) and specifications furnished to and approved by Licensor and of material(s) and size(s) appropriate for the purpose(s) above recited.

3.3 All of Licensee's work, and exercise of rights hereunder, shall be undertaken at time(s) satisfactory to Licensor, and so as to eliminate or minimize any impact on or interference with the safe use and operation of Licensor's property and appurtenances thereto.

3.4 In the installation, maintenance, repair and/or removal of said Facilities, Licensee shall not use explosives of any type or perform or cause any blasting without the separate express written consent of Licensor. As a condition to such consent, a representative will be assigned by Licensor to monitor blasting, and Licensee shall reimburse Licensor for the entire cost and/or expense of furnishing said monitor.

3.5 Any repairs or maintenance to the Facilities, whether resulting from acts of Licensee, or natural or weather events, which are necessary to protect or facilitate Licensor's use of its property, shall be made by Licensee promptly, but in no event later than thirty (30) days after Licensee has notice as to the need for such repairs or maintenance.

3.6 Licensor, in order to protect or safeguard its property, rail operations, equipment and/or employees from damage or injury, may request immediate repair or renewal of the Facilities, and if the same is not performed, may make or contract to make such repairs or renewals, at the sole risk, cost and expense of Licensee.

3.7 Neither the failure of Licensor to object to any work done, material used, or method of construction or maintenance of said Encroachment, nor any approval given or supervision exercised by Licensor, shall be construed as an admission of liability or responsibility by Licensor, or as a waiver by Licensor of any of the obligations, liability and/or responsibility of Licensee under this Agreement.

3.8 All work on the Encroachment shall be conducted in accordance with Licensor's safety rules and regulations.

3.9 Licensee hereby agrees to reimburse Licensor any loss, cost or expense (including losses resulting from train delays and/or inability to meet train schedules) arising from any failure of Licensee to make repairs or conduct maintenance as required by Section 3.5 above or from improper or incomplete repairs or maintenance to the Facilities or Encroachment.

3.10 In the event it becomes necessary for the Licensee to deviate from the approved Exhibit, Licensee shall seek prior approval from CSXT, or when applicable, an official field representative of CSXT permitted to approve changes, authorizing the necessary field changes and Licensee shall provide CSXT with complete As-Built Drawings of the completed work. As-Built Drawings shall be submitted to Licensor in either electronic or hard copy form upon the substantial completion of the project and upon Licensor's request.

3.11 In the event of large scale maintenance/construction work to railroad bridges Licensee is required to protect power lines with insulated covers or comparable safety devices at their costs during construction/maintenance for safety of railroad employees.

4. PERMITS, LICENSES:

4.1 Before any work hereunder is performed, or before use of the Encroachment for the contracted purpose, Licensee, at its sole cost and expense, shall obtain all necessary permit(s) (including but not limited to zoning, building, construction, health, safety or

environmental matters), letter(s) or certificate(s) of approval. Licensee expressly agrees and warrants that it shall conform and limit its activities to the terms of such permit(s), approval(s) and authorization(s), and shall comply with all applicable ordinances, rules, regulations, requirements and laws of any governmental authority (State, Federal or Local) having jurisdiction over Licensee's activities, including the location, contact, excavation and protection regulations of the Occupational Safety and Health Act (OSHA) (29 CFR 1926.651(b)), et al., and State "One Call" - "Call Before You Dig" requirements.

4.2 Licensee assumes sole responsibility for failure to obtain such permit(s) or approval(s), for any violations thereof, or for costs or expenses of compliance or remedy.

5. MARKING AND SUPPORT:

5.1 With respect to any subsurface installation or maintenance upon Licensor's property, Licensee, at its sole cost and expense, shall:

(A) support track(s) and roadbed in a manner satisfactory to Licensor;

(B) backfill with satisfactory material and thoroughly tamp all trenches to prevent settling of surface of land and roadbed of Licensor; and

(C) either remove any surplus earth or material from Licensor's property or cause said surplus earth or material to be placed and distributed at location(s) and in such manner Licensor may approve.

5.2 After construction or maintenance of the Facilities, Licensee shall:

(A) Restore any track(s), roadbed and other disturbed property; and

(B) Erect, maintain and periodically verify the accuracy of aboveground markers, in a form approved by Licensor, indicating the location, depth and ownership of any underground Facilities or related facilities.

5.3 Licensee shall be solely responsible for any subsidence or failure of lateral or subjacent support in the Encroachment area for a period of three (3) years after completion of installation.

6. TRACK CHANGES:

6.1 In the event that rail operations and/or track maintenance result in changes in grade or alignment of, additions to, or relocation of track(s) or other facilities, or in the event future use of Licensor's rail corridor or property necessitate any change of location, height or depth in the Facilities or Encroachment, Licensee, at its sole cost and expense and within thirty (30) days after notice in writing from Licensor, shall make changes in the Facilities or Encroachment to accommodate such track(s) or operations.

6.2 If Licensee fails to do so, Licensor may make or contract to make such changes at Licensee's cost.

7. FACILITY CHANGES:

7.1 Licensee shall periodically monitor and verify the depth or height of the Facilities or Encroachment in relation to the existing tracks and facilities, and shall relocate the Facilities or change the Encroachment, at Licensee's expense, should such relocation or change be necessary to comply with the minimum clearance requirements of Licensor.

7.2 If Licensee undertakes to revise, renew, relocate or change in any manner whatsoever all or any part of the Facilities (including any change in voltage or gauge of wire or any change in circumference, diameter or radius of pipe or change in materials transmitted in and through said pipe), or is required by any public agency or court order to do so, plans therefor shall be submitted to Licensor for approval before such change. After approval, the terms and conditions of this Agreement shall apply thereto.

8. INTERFERENCE WITH RAIL FACILITIES:

8.1 Although the Facilities/Encroachment herein permitted may not presently interfere with Licensor's railroad or facilities, in the event that the operation, existence or maintenance of said Facilities, in the sole judgment of Licensor, causes: (a) interference (including, but not limited to, physical or interference from an electromagnetic induction, or interference from stray or other currents) with Licensor's power lines, communication, signal or other wires, train control system, or electrical or electronic apparatus; or (b) interference in any manner, with the operation, maintenance or use of the rail corridor, track(s), structures, pole line(s), devices, other property, or any appurtenances thereto; then and in either event, Licensee, upon receipt of written notice from Licensor of any such interference, and at Licensee's sole risk, cost and expense, shall promptly make such changes in its Facilities or installation, as may be required in the reasonable judgment of the Licensor to eliminate all such interference. Upon Licensee's failure to remedy or change, Licensor may do so or contract to do so at Licensee's sole cost.

8.2 Without assuming any duty hereunder to inspect the Facilities, Licensor hereby reserves the right to inspect same and to require Licensee to undertake repairs, maintenance or adjustments to the Facilities, which Licensee hereby agrees to make promptly, at Licensee's sole cost and expense.

9. RISK, LIABILITY, INDEMNITY:

With respect to the relative risk and liabilities of the parties, it is hereby agreed that:

9.1 To the fullest extent permitted by State law (constitutional or statutory, as amended), Licensee hereby agrees to, defend, indemnify, and hold Licensor harmless from and against any and all liability, loss, claim, suit, damage, charge or expense which Licensor may suffer, sustain, incur or in any way be subjected to, on account of death of or injury to any person

whomsoever (including officers, agents, employees or invitees of Licensor), and for damage to or loss of or destruction of any property whatsoever, arising out of, resulting from, or in any way connected with the construction, repair, maintenance, replacement, presence, existence, operations, use or removal of the Facilities or any structure in connection therewith, or restoration of premises of Licensor to good order or condition after removal, EXCEPT when proven to have been caused solely by the willful misconduct or gross negligence of Licensor. HOWEVER, to the fullest extent permitted by State law, during any period of actual construction, repair, maintenance, replacement or removal of the Facilities, wherein agents, equipment or personnel of Licensee are on the railroad rail corridor, Licensee's liability hereunder shall be absolute, irrespective of any joint, sole or contributory fault or negligence of Licensor.

9.2 Use of Licensor's rail corridor involves certain risks of loss or damage as a result of the rail operations. Notwithstanding Section 9.1, Licensee expressly assumes all risk of loss and damage to Licensee's Property or the Facilities in, on, over or under the Encroachment, including loss of or any interference with use or service thereof, regardless of cause, including electrical field creation, fire or derailment resulting from rail operations. For this Section, the term "Licensee's Property" shall include property of third parties situated or placed upon Licensor's rail corridor by Licensee or by such third parties at request of or for benefit of Licensee.

9.3 To the fullest extent permitted by State law, as above, Licensee assumes all responsibility for, and agrees to defend, indemnify and hold Licensor harmless from: (a) all claims, costs and expenses, including reasonable attorneys' fees, as a consequence of any sudden or nonsudden pollution of air, water, land and/or ground water on or off the Encroachment area, arising from or in connection with the use of this Encroachment or resulting from leaking, bursting, spilling, or any escape of the material transmitted in or through the Facilities; (b) any claim or liability arising under federal or state law dealing with either such sudden or nonsudden pollution of air, water, land and/or ground water arising therefrom or the remedy thereof; and (c) any subsidence or failure of lateral or subjacent support of the tracks arising from such Facilities leakage.

9.4 Notwithstanding Section 9.1, Licensee also expressly assumes all risk of loss which in any way may result from Licensee's failure to maintain either required clearances for any overhead Facilities or the required depth and encasement for any underground Facilities, whether or not such loss(es) result(s) in whole or part from Licensor's contributory negligence or joint fault.

9.5 Obligations of Licensee hereunder to release, indemnify and hold Licensor harmless shall also extend to companies and other legal entities that control, are controlled by, subsidiaries of, or are affiliated with Licensor, as well as any railroad that operates over the rail corridor on which the Encroachment is located, and the officers, employees and agents of each.

9.6 If a claim is made or action is brought against Licensor, and/or its operating lessee, for which Licensee may be responsible hereunder, in whole or in part, Licensee shall be

notified to assume the handling or defense of such claim or action; but Licensor may participate in such handling or defense.

9.7 Notwithstanding anything contained in this Agreement, the limitation of liability contained in the state statutes, as amended from time to time, shall not limit Licensor's ability to collect under the insurance policies required to be maintained under this Agreement.

10. INSURANCE:

10.1 Prior to commencement of surveys, installation or occupation of premises pursuant to this Agreement, Licensee shall procure and shall maintain during the continuance of this Agreement, at its sole cost and expense, a policy of

(i) Statutory Worker's Compensation and Employers Liability Insurance with available limits of not less than ONE MILLION AND 00/100 U.S. DOLLARS ($1,000,000.00), which must contain a waiver of subrogation against CSXT and its Affiliates;

(ii) Commercial General Liability coverage (inclusive of contractual liability) with available limits of not less than FIVE MILLION AND 00/100 U.S. DOLLARS ($5,000,000.00), naming Licensor, and/or its designee, as additional insured and in combined single limits for bodily injury and property damage and covering the contractual liabilities assumed under this Agreement. The evidence of insurance coverage shall be endorsed to provide for thirty (30) days' notice to Licensor, or its designee, prior to cancellation or modification of any policy. Mail CGL certificate, along with agreement, to CSX Transportation, Inc., Speed Code J180, 500 Water Street, Jacksonville, FL 32202. On each successive year, send certificate to RenewalCOI@csx.com.

(iii) Business automobile liability insurance with available limits of not less than ONE MILLION AND 00/100 U.S. DOLLARS ($1,000,000.00) combined single limit for bodily injury and/or property damage per occurrence;

(iv) Such other insurance as Licensor may reasonably require.

10.2 If Licensee's existing CGL policy(ies) do(es) not automatically cover Licensee's contractual liability during periods of survey, installation, maintenance and continued occupation, a specific endorsement adding such coverage shall be purchased by Licensee. If said CGL policy is written on a "claims made" basis instead of a "per occurrence" basis, Licensee shall arrange for adequate time for reporting losses. Failure to do so shall be at Licensee's sole risk.

10.3 Licensor, or its designee, may at any time request evidence of insurance purchased by Licensee to comply with this Agreement. Failure of Licensee to comply with Licensor's request shall be considered a default by Licensee.

10.4 Securing such insurance shall not limit Licensee's liability under this Agreement, but shall be security therefor.

10.5 (A) In the event Licensee finds it necessary to perform construction or demolition operations within fifty feet (50') of any operated railroad track(s) or affecting any railroad bridge, trestle, tunnel, track(s), roadbed, overpass or underpass, Licensee shall: (a) notify Licensor; and (b) require its contractor(s) performing such operations to procure and maintain during the period of construction or demolition operations, at no cost to Licensor, Railroad Protective Liability (RPL) Insurance, naming Licensor, and/or its designee, as Named Insured, written on the current ISO/RIMA Form (ISO Form No. CG 00 35 01 96) with limits of FIVE MILLION AND 00/100 U.S. DOLLARS ($5,000,000.00) per occurrence for bodily injury and property damage, with at least TEN MILLION AND 00/100 U.S. DOLLARS ($10,000,000.00) aggregate limit per annual policy period, with Pollution Exclusion Amendment (ISO CG 28 31 11 85) if an older ISO Form CG 00 35 is used. The original of such RPL policy shall be sent to and approved by Licensor prior to commencement of such construction or demolition. Licensor reserves the right to demand higher limits.

(B) At Licensor's option, in lieu of purchasing RPL insurance from an insurance company (but not CGL insurance), Licensee may pay Licensor, at Licensor's current rate at time of request, the cost of adding this Encroachment, or additional construction and/or demolition activities, to Licensor's Railroad Protective Liability (RPL) Policy for the period of actual construction. This coverage is offered at Licensor's discretion and may not be available under all circumstances.

10.6 Notwithstanding the provisions of Sections 10.1 and 10.2, Licensee, pursuant to State Statute(s), may self-insure or self-assume, in any amount(s), any contracted liability arising under this Agreement, under a funded program of self-insurance, which fund will respond to liability of Licensee imposed by and in accordance with the procedures established by law.

11. GRADE CROSSINGS; FLAGGING:

11.1 Nothing herein contained shall be construed to permit Licensee or Licensee's contractor to move any vehicles or equipment over the track(s), except at public road crossing(s), without separate prior written approval of Licensor.

11.2 If Licensor deems it advisable, during any construction, maintenance, repair, renewal, alteration, change or removal of said Facilities, to place watchmen, flagmen, inspectors or supervisors for protection of operations of Licensor or others on Licensor's rail corridor at the Encroachment, and to keep persons, equipment or materials away from the track(s), Licensor shall have the right to do so at the expense of Licensee, but Licensor shall not be liable for failure to do so.

12. LICENSOR'S COSTS:

12.1 Any additional or alternative costs or expenses incurred by Licensor to accommodate Licensee's continued use of Licensor's property as a result of track changes or wire changes shall also be paid by Licensee.

12.2 Licensor's expense for wages ("force account" charges) and materials for any work performed at the expense of Licensee pursuant hereto shall be paid by Licensee within thirty (30) days after receipt of Licensor's bill therefor. Licensor may, at its discretion, request an advance deposit for estimated Licensor costs and expenses.

12.3 Such expense shall include, but not be limited to, cost of railroad labor and supervision under "force account" rules, plus current applicable overhead percentages, the actual cost of materials, and insurance, freight and handling charges on all material used. Equipment rentals shall be in accordance with Licensor's applicable fixed rate. Licensor may, at its discretion, require advance deposits for estimated costs of such expenses and costs.

13. DEFAULT, BREACH, WAIVER:

13.1 The proper and complete performance of each covenant of this Agreement shall be deemed of the essence thereof, and in the event Licensee fails or refuses to fully and completely perform any of said covenants or remedy any breach within thirty (30) days after receiving written notice from Licensor to do so (or within forty-eight (48) hours in the event of notice of a railroad emergency), Licensor shall have the option of immediately revoking this Agreement and the privileges and powers hereby conferred, regardless of encroachment fee(s) having been paid in advance for any annual or other period. Upon such revocation, Licensee shall make removal in accordance with Article 14.

13.2 No waiver by Licensor of its rights as to any breach of covenant or condition herein contained shall be construed as a permanent waiver of such covenant or condition, or any subsequent breach thereof, unless such covenant or condition is permanently waived in writing by Licensor.

13.3 Neither the failure of Licensor to object to any work done, material used, or method of construction or maintenance of said Encroachment, nor any approval given or supervision exercised by Licensor, shall be construed as an admission of liability or responsibility by Licensor, or as a waiver by Licensor of any of the obligations, liability and/or responsibility of Licensee under this Agreement.

14. TERMINATION, REMOVAL:

14.1 All rights which Licensee may have hereunder shall cease upon the date of (a) termination, (b) revocation, or (c) subsequent agreement, or (d) Licensee's removal of the Facility from the Encroachment. However, neither termination nor revocation of this Agreement shall affect any claims and liabilities which have arisen or accrued hereunder, and which at the time of termination or revocation have not been satisfied; neither party, however, waiving any third party defenses or actions.

14.2 Within thirty (30) days after revocation or termination, Licensee, at its sole risk and expense, shall (a) remove the Facilities from the rail corridor of Licensor, unless the parties hereto agree otherwise, (b) restore the rail corridor of Licensor in a manner satisfactory to

Licensor, and (c) reimburse Licensor any loss, cost or expense of Licensor resulting from such removal.

15. NOTICE:

15.1 Licensee shall give Licensor at least thirty (30) days written notice before doing any work on Licensor's rail corridor, except that in cases of emergency shorter notice may be given. Licensee shall provide proper notification as follows:

a. For non-emergencies, Licensee shall submit online via the CSX Property Portal from Licensor's web site, via web link: https://propertyportal.csx.com/pub_ps_res/ps_res/jsf/public/index.faces

b. For emergencies, Licensee shall complete all of the steps outlined in Section 15.1 a. above, and shall also include detailed information of the emergency. Licensee shall also call and report details of the emergency to Licensor's Rail Operations Emergency Telephone Number: 1-800-232-0144. In the event Licensor needs to contact Licensee concerning an emergency involving Licensee's Facility(ies), the emergency phone number for Licensee is: 912-651-6573.

15.2 All other notices and communications concerning this Agreement shall be addressed to Licensee at the address above, and to Licensor at the address shown on Page 1, c/o CSXT Contract Management, J180; or at such other address as either party may designate in writing to the other.

15.3 Unless otherwise expressly stated herein, all such notices shall be in writing and sent via Certified or Registered Mail, Return Receipt Requested, or by courier, and shall be considered delivered upon: (a) actual receipt, or (b) date of refusal of such delivery.

16. ASSIGNMENT:

16.1 The rights herein conferred are the privileges of Licensee only, and Licensee shall obtain Licensor's prior written consent to any assignment of Licensee's interest herein; said consent shall not be unreasonably withheld.

16.2 Subject to Sections 2 and 16.1, this Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors or assigns.

16.3 Licensee shall give Licensor written notice of any legal succession (by merger, consolidation, reorganization, etc.) or other change of legal existence or status of Licensee, with a copy of all documents attesting to such change or legal succession, within thirty (30) days thereof.

16.4 Licensor expressly reserves the right to assign this Agreement, in whole or in part, to any grantee, lessee, or vendee of Licensor's underlying property interests in the Encroachment, upon written notice thereof to Licensee.

16.5 In the event of any unauthorized sale, transfer, assignment, sublicense or encumbrance of this Agreement, or any of the rights and privileges hereunder, Licensor, at its option, may revoke this Agreement by giving Licensee or any such assignee written notice of such revocation; and Licensee shall reimburse Licensor for any loss, cost or expense Licensor may incur as a result of Licensee's failure to obtain said consent.

17. TITLE:

17.1 Licensee understands that Licensor occupies, uses and possesses lands, rights-of-way and rail corridors under all forms and qualities of ownership rights or facts, from full fee simple absolute to bare occupation. Accordingly, nothing in this Agreement shall act as or be deemed to act as any warranty, guaranty or representation of the quality of Licensor's title for any particular Encroachment or segment of Rail Corridor occupied, used or enjoyed in any manner by Licensee under any rights created in this Agreement. It is expressly understood that Licensor does not warrant title to any Rail Corridor and Licensee will accept the grants and privileges contained herein, subject to all lawful outstanding existing liens, mortgages and superior rights in and to the Rail Corridor, and all leases, licenses and easements or other interests previously granted to others therein.

17.2 The term "license," as used herein, shall mean with regard to any portion of the Rail Corridor which is owned by Licensor in fee simple absolute, or where the applicable law of the State where the Encroachment is located otherwise permits Licensor to make such grants to Licensee, a "permission to use" the Rail Corridor, with dominion and control over such portion of the Rail Corridor remaining with Licensor, and no interest in or exclusive right to possess being otherwise granted to Licensee. With regard to any other portion of Rail Corridor occupied, used or controlled by Licensor under any other facts or rights, Licensor merely waives its exclusive right to occupy the Rail Corridor and grants no other rights whatsoever under this Agreement, such waiver continuing only so long as Licensor continues its own occupation, use or control. Licensor does not warrant or guarantee that the license granted hereunder provides Licensee with all of the rights necessary to occupy any portion of the Rail Corridor. Licensee further acknowledges that it does not have the right to occupy any portion of the Rail Corridor held by Licensor in less than fee simple absolute without also receiving the consent of the owner(s) of the fee simple absolute estate. Further, Licensee shall not obtain, exercise or claim any interest in the Rail Corridor that would impair Licensor's existing rights therein.

17.3 Licensee agrees it shall not have nor shall it make, and hereby completely and absolutely waives its right to, any claim against Licensor for damages on account of any deficiencies in title to the Rail Corridor in the event of failure or insufficiency of Licensor's title to any portion thereof arising from Licensee's use or occupancy thereof.

17.4 Licensee agrees to fully and completely indemnify and defend all claims or litigation for slander of title, overburden of easement, or similar claims arising out of or based upon the Facilities placement, or the presence of the Facilities in, on or along any Encroachment(s), including claims for punitive or special damages.

17.5 Licensee shall not at any time own or claim any right, title or interest in or to Licensor's property occupied by the Encroachments, nor shall the exercise of this Agreement for any length of time give rise to any right, title or interest in Licensee to said property other than the license herein created.

17.6 Nothing in this Agreement shall be deemed to give, and Licensor hereby expressly waives, any claim of ownership in and to any part of the Facilities.

17.7 Licensee shall not create or permit any mortgage, pledge, security, interest, lien or encumbrances, including without limitation, tax liens and liens or encumbrances with respect to work performed or equipment furnished in connection with the construction, installation, repair, maintenance or operation of the Facilities in or on any portion of the Encroachment (collectively, "Liens or Encumbrances"), to be established or remain against the Encroachment or any portion thereof or any other Licensor property.

17.8 In the event that any property of Licensor becomes subject to such Liens or Encumbrances, Licensee agrees to pay, discharge or remove the same promptly upon Licensee's receipt of notice that such Liens or Encumbrances have been filed or docketed against the Encroachment or any other property of Licensor; however, Licensee reserves the right to challenge, at its sole expense, the validity and/or enforceability of any such Liens or Encumbrances.

18. GENERAL PROVISIONS:

18.1 This Agreement, and the attached specifications, contains the entire understanding between the parties hereto.

18.2 Neither this Agreement, any provision hereof, nor any agreement or provision included herein by reference, shall operate or be construed as being for the benefit of any third person.

18.3 Except as otherwise provided herein, or in any Rider attached hereto, neither the form of this Agreement, nor any language herein, shall be interpreted or construed in favor of or against either party hereto as the sole drafter thereof.

18.4 This Agreement is executed under current interpretation of applicable Federal, State, County, Municipal or other local statute, ordinance or law(s). However, each separate division (paragraph, clause, item, term, condition, covenant or agreement) herein shall have independent and severable status for the determination of legality, so that if any separate division is determined to be void or unenforceable for any reason, such determination shall have no effect upon the validity or enforceability of each other separate division, or any combination thereof.

18.5 This Agreement shall be construed and governed by the laws of the state in which the Facilities and Encroachment are located.

18.6 If any amount due pursuant to the terms of this Agreement is not paid by the due date, it will be subject to Licensor's standard late charge and will also accrue interest at eighteen percent (18%) per annum, unless limited by local law, and then at the highest rate so permitted.

18.7 Licensee agrees to reimburse Licensor for all reasonable costs (including attorney's fees) incurred by Licensor for collecting any amount due under the Agreement.

18.8 The provisions of this License are considered confidential and may not be disclosed to a third party without the consent of the other party(s), except: (a) as required by statute, regulation or court order, (b) to a parent, affiliate or subsidiary company, (c) to an auditing firm or legal counsel that are agreeable to the confidentiality provisions, or (d) to Lessees of Licensor's land and/or track who are affected by the terms and conditions of this Agreement and will maintain the confidentiality of this Agreement.

18.9 Within thirty (30) days of an overpayment in a cumulative total amount of One Hundred Dollars ($100.00) or more by Licensee to Licensor, Licensee shall notify Licensor in writing with documentation evidencing such overpayment. Licensor shall refund the actual amount of Licensee's overpayment within 120 days of Licensor's verification of such overpayment.

18.10 This Agreement may be executed in any number of counterparts, and such counterparts may be exchanged by electronic transmission. Upon execution by the parties hereto, each counterpart shall be deemed an original and together shall constitute one and the same instrument. A fully executed copy of this Agreement by electronic transmission shall be deemed to have the same legal effect as delivery of an original executed copy of this Agreement for all purposes.

[Signatures on the following page]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate (each of which shall constitute an original) as of the effective date of this Agreement.

Witness for Licensor:

Flavn Rosa

CSX TRANSPORTATION, INC.

By: _____

Print/Type Name: Catherine Adkins

Print/Type Title: Sr. Mgr - Real Estate

Attest:

Mark Massey, Clerk of Council

MAYOR AND ALDERMAN OF THE CITY OF SAVANNAH

By: Patrick C. Monahan

Who, by the execution hereof, affirms that he/she has the authority to do so and to bind the Licensee to the terms and conditions of this Agreement.

Print/Type Name: Pat Monahan

Print/Type Title: City Manager

Tax ID No.: _____

Authority under Ordinance or

Resolution
No._____,

Dated
_____.

SW534

Atlanta Gas Light

Atlanta Gas Light Company

ENCROACHMENT AGREEMENT

ROW-FORM: EN04
VER. 02112020

Ten Peachtree Place
Atlanta, GA 30309
ATTN. Department 1355

404.584.4000 phone
www.atlantagaslight.com

November 2, 2020

ENCROACHMENT NO.: ROWSOP-4970-321
CROSS REF.: AGL FILE#8934

ATLANTA GAS LIGHT COMPANY, hereinafter called Grantor, hereby consents for **City of Savannah,** hereinafter called Grantee, to use an area within Grantor's right of way (12" West Chatham Line) described as being One hundred feet (100') in width and extending in part through the 8th G.M.D., Chatham County, Georgia, as shown on Exhibit "A", a copy of said Exhibit being attached hereto and made a part hereof.

The use of the area by Grantee of Grantor's right of way, pursuant to this consent shall be limited to the construction, installation, and maintenance of:

a. Installation of one (1) Effluent 30" Force Main by method of open trench.

Said 30" force Main shall maintain a minimum of two feet (2') separation from Grantor's facilities. **A shielding material should be used on all metal pipes across the entire easement area**. It is specifically understood that no buildings, power or lighting poles, communication pedestals, power transformers, water hydrants, water meters, valves, drainage structures or any other obstructions of any type will be permitted on the subject right of way.

The plans and specifications as submitted by Grantee meet Grantor's approval provided Grantee conforms to the following terms and conditions:

1. Grantee agrees to obtain all necessary rights from the owners of the lands crossed by Grantor's right of way in the event Grantor does not own said lands and rights.

2. Grantee agrees to use said area within Grantor's right of way in such a manner as will not interfere with Grantor's facilities installed thereon. Grantee shall install said encroachment(s) with the minimum cover and or clearance specifications required by Grantor.

3. Grantee agrees that the use of Grantor's right of way as herein provided shall in no way affect the validity of Grantor's easements and shall in no way modify or restrict the use or rights of Grantor, its successors or assigns, in and to the area to be used. Grantee acknowledges Grantor's right and title to said easements and the priority of Grantor's right of use and hereby agrees not to resist or assail said priority.

4. The use of said area within said right of way by Grantee shall be at the sole risk and expense of Grantee, and Grantor is specifically relieved of any responsibility for damage to the encroaching facilities resulting or occurring from the use of said right of way by Grantor. Grantee covenants not to sue Grantor in that instance.

5. Grantee hereby agrees and covenants not to use and will prohibit agents, employees and contractors of Grantee from using on said right of way any tools, equipment or machinery in such a manner as will do damage to Grantor's facilities.

6. Notwithstanding anything contained herein, the Grantee agrees to reimburse Grantor for all cost and expense for any damage to Grantor's facilities resulting from the use by Grantee of said area within said right of way. Also, Grantee agrees that if in the opinion of Grantor, it becomes necessary, as a result of the exercise of the permission herein granted, to relocate, rearrange, change, raise or lower any of Grantor's facilities, to promptly reimburse Grantor for all cost and expense involved in such relocation, rearrangement, change, raising or lowering, of said facilities.

7. Grantee shall restore all areas affected by the construction within said area to as near as possible to the conditions and original lay of the land prior to said activities.

8. Grantee agrees to notify, or have its contractor notify, Grantor's Right of Way Department, located at Ten Peachtree Place N. E., Atlanta Georgia 30309, phone 404-584-3839 or ***preferably*** Promes Life, the area Asset Protection representative, phone 912-577-1243 at least five (5) business days prior to actual construction on Grantor's right of way.

9. **To the extent permitted by Georgia law**, Grantee hereby agrees to defend, indemnify, and hold harmless the Grantor from the payment of any sum of money to any person whomsoever on account of claims or suits growing out of injuries to persons (including death) or damage to property (including damage to property of Grantor) attributable to or arising out of the use of said rights of way by Grantee, its agents, employees, contractors or any combination of these including but without limitation all liens, garnishments, attachments, claims, suits, judgments, costs, attorney's fees, cost of investigation and of defense. Provided, however, that the Grantee shall not be responsible to defend, indemnify or hold harmless the Grantor for losses or damages caused by or resulting from the sole negligence of the Grantor, its agents or employees. Grantor shall have the right, but not the obligation, to defend any suit against Grantor for which Grantee is obligated to indemnify Grantor. Grantee hereby agrees to cooperate with such defense. Upon Grantor's request, Grantee shall attend hearings and trials and shall assist in effecting settlements, securing and giving evidence, obtaining the attendance of witnesses and in the conduct of any such suit.

ADDITIONAL REQUIREMENTS

A. No construction equipment or materials (if applicable) shall rest directly on top of pipeline(s).
B. All equipment used during encroachment activity shall not change from the equipment listed on the attached SCG Contractor Equipment Information form.
C. Grantee agrees to abide by the attached (if applicable) Stress Analysis findings regarding added matting, soil, etc. to protect the pipeline.

[Signatures on Following Page]

ATLANTA GAS LIGHT COMPANY

BY: Steven M. Murphy

Steven M. Murphy

TITLE: VP, Engineering & Construction

DATE: November 5, 2020

Grantee hereby accepts the foregoing consent subject to the terms and conditions set forth above and in the event Grantee fails to perform as herein provided or fails to fully execute this document by December 11, **2020**, this agreement shall become void and no use of Grantor's right of way as herein provided for shall be made.

CITY OF SAVANNAH

BY: Michael B. Brown

Signature

Michael Brown

Print Name

TITLE: City Manager

DATE: 11/9/2020

Mark Massey

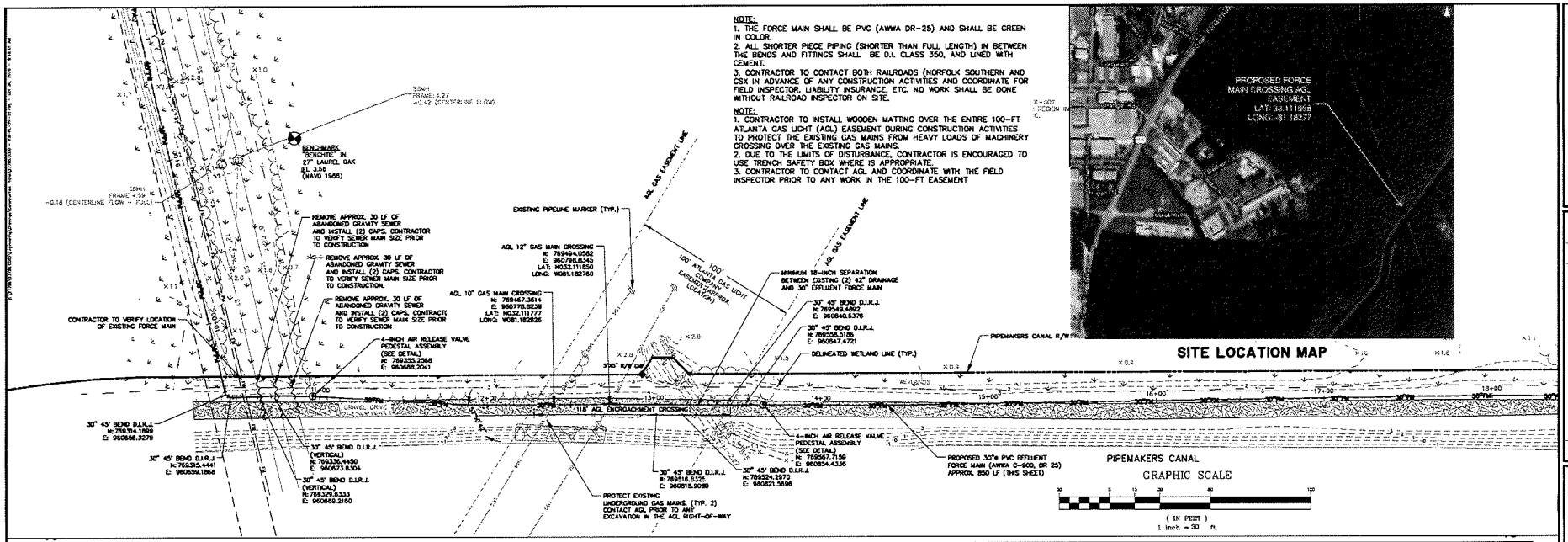
Mark Massey
Clerk of Council

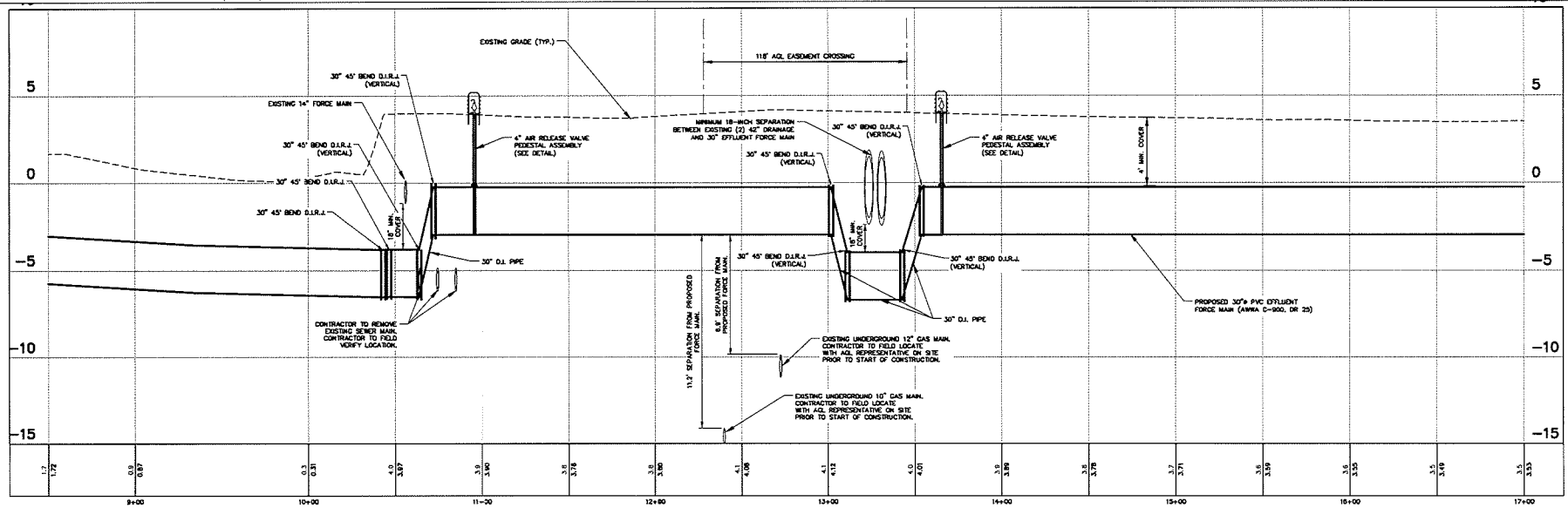
CITY OF SAVANNAH GEORGIA

NOTE:
1. THE FORCE MAIN SHALL BE PVC (AWWA DR-25) AND SHALL BE GREEN IN COLOR.
2. ALL SHORTER PIECE PIPING (SHORTER THAN FULL LENGTH) IN BETWEEN THE BENDS AND FITTINGS SHALL BE D.I. CLASS 350, AND LINED WITH CEMENT.
3. CONTRACTOR TO CONTACT BOTH RAILROADS (NORFOLK SOUTHERN AND CSX IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES AND COORDINATE FOR FIELD INSPECTOR, LIABILITY INSURANCE, ETC. NO WORK SHALL BE DONE WITHOUT RAILROAD INSPECTOR ON SITE.

NOTE:
1. CONTRACTOR TO INSTALL WOODEN MATTING OVER THE ENTIRE 100-FT ATLANTA GAS LIGHT (AGL) EASEMENT DURING CONSTRUCTION ACTIVITIES TO PROTECT THE EXISTING GAS MAINS FROM HEAVY LOADS OF MACHINERY CROSSING OVER THE EXISTING GAS MAINS.
2. DUE TO THE LIMITS OF DISTURBANCE, CONTRACTOR IS ENCOURAGED TO USE TRENCH SAFETY BOX WHERE IS APPROPRIATE.
3. CONTRACTOR TO CONTACT AGL AND COORDINATE WITH THE FIELD INSPECTOR PRIOR TO ANY WORK IN THE 100-FT EASEMENT

SITE LOCATION MAP





TRAVIS FIELD FORCE MAIN ALIGNMENT-01

STATIONS: 8+50 - 17+00
SCALE: HORZ.: 1" = 30'
VERT.: 1" = 3'

THOMAS & HUTTON

SAVANNAH

JOB NO:
DATE:
DRAWN:
DESIGNED:
REVIEWED:
APPROVED:
SCALE:

C

Atlanta Gas Light

Contractor Equipment Information Form

Ver. 091417

Date: 6/29/2020

Project or Development Name: Travis Field Water Reclamation Facility

Construction Contractor Name or Logo: TBD

Construction Contractor Contact Name & Phone #: TBD

Machine	Model	Weight	# Axels	# Tracks/ Tires	Track Width	Track Length
Komatsu Excavator	PC390LC-11	87,867 lbs.	N/A	2 Tracks	28"	17'
Komatsu Excavator	PC200LC-7L	44,110 lbs.	N/A	2 Tracks	31.5"	13.5'
Komatsu Excavator	PC450LC-8	96,430 lbs.	N/A	2 Tracks	32"	17.5'
Komatsu Dozer	D51PXI-22	27,778 lbs.	N/A	2 Tracks	10"	17'
Komatsu Wheel Loader	WA270-7	25,410 lbs.	2	4	N/A	N/A
Volvo Articulated Truck	A30F	51,800 lbs.	3	6	N/A	N/A
Caterpillar Compactor	815B	44,200 lbs.	2	4	N/A	N/A

Please fill in the above information and return to the Land Services Department via email to Mary Jo Diana mdiana@southernco.com and Melissa Vickery mvickery@southernco.com or via regular mail to the following address:

Atlanta Gas Light Company
Dept. 1355
Ten Peachtree Place
Atlanta, GA 30309

Thank you,

Atlanta Gas Light Company
Land Services Department

Project		
Travis Field 30" FM		TECHNICAL TOOLBOXES
Location	Date	
Savannah SC - Near Darque Rd	7/31/2020	

Track Load Analysis

PIPE AND OPERATIONAL DATA:

Pipe Outside Diameter [in.]	10.75	Operating Weight (Object with Tracks)[lbs]	120000
Pipe Wall Thickness [in.]	0.219	Width of Standard Track Shoe [in.]	32
Specified Minimum Yield Strength [psi]	52,000	Length of the Track on the Ground [ft.]	17.5
Design Class Location	3	Bending Coefficient	0.235
Operating Class	4	Deflection Coefficient	0.108
Maximum Allowable Internal Stress [%]	50	Pipe Internal Pressure [psi]	300
Maximum Allowable Combined Stress [%]	62	H - Vertical Depth of the Soil Cover [ft.]	17
Soil Type: Saturated Clay		B - Trench Width [ft.]	2
Construction Type: Open Cut		Longitudinal Bending Stress Included:	No
Friction Force Coefficient	0.110	X - Longitudinal Distance [ft.]	0.0
Weight per Unit of Backfill [lbs/ft^3]	130	Y - Vertical Deflection [in.]	0.0
Impact Factor	1.5		

RESULTS OF CALCULATION:

Load Coefficient	3.845	Hoop Stress [psi]	7,363
Load due to Overburden [lbs/in.]	166.55	Total Circumferential Stress [psi]	27,496
m - Influence Factor	0.1	Total Combined Stress [psi]	27,496
n - Influence Factor	0.5	Percent of SMYS	52.88
Influence Coefficient f(m,n)	0.079	SAFE TO CROSS PIPELINE	
Max. Static Pressure [lbs/ft^2]	101.57		
Total Track Load [lbs/in.]	11.37		
Total Load [lbs/in.]	177.92		
Longitudinal Bending Stress [psi]	0		
Circumferential Stress [psi]	20,133		

Notes: used Class 3 Location and 120k concentrated loading (96k on tracks)

Reference: ASME B31.8 and "Evaluation of Buried Pipe Encroachments", Battelle Petroleum Technology

Prepared By Joey White	Approved By Joey White	Revision: 10.0.0