FULTON COUNTY

INVITATION TO BID #16ITB110716K-DB

JOHNS CREEK REUSE MAIN

FOR

THE DEPARTMENT OF PUBLIC WORKS

OF

FULTON COUNTY GOVERNMENT

BID ISSUANCE DATE: Thursday, November 10, 2016
BID DUE DATE AND TIME: Monday, December 12, 2016 11:00 A.M.
PRE-BID CONFERENCE DATE: Tuesday, November 29, 2016 10:00 A.M.
PURCHASING CONTACT: Darlene A. Banks at 404-612-7879
E-MAIL: darlene.banks@fultoncountyga.gov

LOCATION: FULTON COUNTY DEPARTMENT OF PURCHASING
130 PEACHTREE STREET, S.W., SUITE 1168
ATLANTA, GA 30303

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INVITATION TO BID
BID NUMBER #16ITB110716K-DB
JOHNS CREEK REUSE MAIN

Sealed Bids for furnishing all materials, labor, tools, equipment and appurtenances necessary for the Johns Creek Reuse Main consisting of 24,000 linear feet of 24-inch DIP reuse main and 5,300 linear feet of 20-inch reuse main will be received by the Fulton County Department of Purchasing and Contract Compliance at 130 Peachtree Street, S.W. Suite 1168 Atlanta, GA 30303, **no later than 11:00 a.m**., local time, on **Monday, December 12, 2016**.

SCOPE OF WORK

The work for the Johns Creek Reuse Main project includes, but is not limited to; provide all labor, equipment, materials, incidentals, supervision, tests, erosion and sedimentation control measures, traffic control and safety measures, and all associated activities necessary to construct and install approximately 24,000 Linear Feet (LF) of new 24–inch diameter (dia.) Ductile Iron Pipe (D.I.P), and 5,300 Linear Feet of new 20–inch diameter D.I.P Reuse Main. Generally the new Reuse Main will start from Johns Creek Environmental Campus (JCEC) to the existing 20–inch diameter Reuse Main stub–out along Old Alabama Road, and the new 20-inch diameter Reuse Main from the existing 20-inch Reuse Main near the intersection of the tributary and Chattahoochee River to the existing 20-inch diameter Reuse Main stub–out near Boles and Bell Roads Round–about and intersection. The Project total work activities are divided into Three (3) Phases: **Phase One (1); the installation of 8,000 LF. 24 - Inches dia. D I P and 300 LF. 20 – Inches D I P; Phase Two (2); the installation of 16,000 LF. 24 – Inches dia. D I P; Phase Three (3); the installation of 5,000 LF. 20 – Inches dia. D I P.**

All work shall be in conformance with the contract documents, drawings and Fulton County Standards and Specifications.

METHOD OF SOURCE SELECTION

This procurement is being conducted and the specific method of source selection in accordance with all applicable provisions of the Georgia Local Public Works Construction Law, O.C.G.A. §36-91-1 through 36-91-95 when a public works construction project cost exceeds $100,000.

PERMITS [Required]

It will be the responsibility of the Contractor to obtain and pay for any permits or approvals from entities having jurisdiction over aspects of the project. Processing time for obtaining permits has been taken into consideration and included in the contract duration. As such, Contractor shall take this in consideration when developing the construction schedule. The Contractor will be responsible for procuring a Land Disturbance Permit from the City of Johns Creek and the City of Roswell. Additional permits will be required from the Georgia Department of Transportation. Fulton County is in the process of obtaining preliminary approval of all plans prior to the awarding of the Contract.

RIGHTS OF WAY/EASEMENTS [Required]

All work is to be constructed within the existing Fulton County treatment plant realty, The City of Johns Creek right-of-way, the City of Roswell right-of-way, the Georgia Department of Transportation right-of-way, the right-of-way within a private development and existing easements. No permanent Rights-of-Way or Easements will be required to be obtained.

TEMPORARY RIGHTS-OF-WAY AND EASEMENTS

The Contractor may independently secure temporary Easements and Rights of-Way for their use and convenience. The Contractor shall pay for any rights of-way or easements obtained. The Contractor shall submit written documentation to the Construction Manager for any Contractor secured Easements across privately held property. The Easement agreement shall specify terms and conditions of use and provisions for site restoration agreeable to the property owner. A written release from the property owner certifying that all terms of the easement agreement have been met by the Contractor shall be required and shall be furnished to the Construction Manager prior to final payment.

BID DOCUMENTS

This document and supporting documents can be downloaded at the Fulton County Website, http://www.fultoncountyga.gov under "Bid Opportunities".

The Drawings for this project may be obtained at a cost of $10.00 for a CD of the Drawings at the following location:

Fulton County Government
Department of Public Works
Attn: Maureen Hill
Fulton County Administration Building
141 Pryor Street, S.W., Suite 6001
Atlanta, GA 30303

A viewing copy **(FOR VIEWING PURPOSES ONLY) of the Drawings** will be available in the Department of Purchasing & Contract Compliance Plan Room located at 130 Peachtree Street, S.W. Suite 1168, Atlanta, Georgia 30303.

PURCHASING CONTACT

Information regarding the bid or bid requirements, either procedural or technical, may be obtained by submitting questions in writing to:

Fulton County Government
Department of Purchasing & Contract Compliance
Attn: Darlene A. Banks
Fulton County Public Safety Building
130 Peachtree Street, S.W. Suite 1168
Atlanta, GA 30303
Email: darlene.banks@fultoncountyga.gov

Fax: 404-893-1745
Reference Bid #16ITB110716K-DB
Johns Creek Reuse Main

PRE-BID CONFERENCE

Date: Tuesday, November 29, 2016
Time: 10:00 A.M.
Location: 130 Peachtree Street, S.W., Suite 1168, Atlanta, GA 30303

The pre-bid conference will be at the Fulton County Government Department of Purchasing & Contract Compliance at 130 Peachtree Street, S.W., Suite 1168, Atlanta, GA 30303. A site visit will not be held but it is recommended that the Contractors perform their own site visit along the route of the reuse main following the pre-bid conference. ***Inquiries regarding the solicitation either technical or otherwise may be submitted in writing prior to the pre-bid conference and will be addressed at the pre-bid conference.***

Any additional questions asked at the Pre-Bid Conference must be submitted in written form at the Pre-Bid conference and will be responded to in the form of an addendum with the County's official responses.

The Pre-Bid Conference will be conducted for the purpose of explaining the County's bid process, the specifications/technical documents, and to provide non-binding verbal responses to questions concerning these bid specifications and to discuss issues from the Bidders perspective. However, no verbal response provided at the Pre-Bid Conference binds the County. Only those responses to written questions that are responded to by the County in written communications will be official.

Fulton County does not discriminate on the basis of disability in the admission or access to its programs or activities. Any requests for reasonable accommodations required by individuals to fully participate in any open meeting, program or activity of Fulton County Government should be directed to Rholanda Stanberry, Contract Compliance Administrator at (404) 612-6304 or email: rholanda.stanberry@fultoncountyga.gov.

BONDING REQUIREMENTS

Each Bid must be accompanied by a Bid Bond, prepared on the Bid Bond provided in this Bid Document or a Surety Company's Standard Bid Bond, duly executed by the Bidder as principal and having as surety, a surety company licensed to do business in the State of Georgia by the Georgia Insurance Commissioner and listed in the latest issue of U.S. Treasury Circular 570, in the amount of fiver percent of the Bid.

The successful Bidder for this Contract will be required to furnish a satisfactory Performance and Payment Bond each in the amount of 100 percent of the Bid, and proof of insurance in accordance with the requirements set forth in Section 5 of this Bid Document.

END OF SECTION

OWNER - CONTRACTOR AGREEMENT

#16ITB110716K-DB
JOHNS CREEK REUSE MAIN

Contractor: _____ Project No. _____

Address: _____ Telephone: _____

Contact: _____ Facsimile: _____

THIS AGREEMENT is effective as of the _____ day of _____, 20 , by and between Fulton County, a political subdivision of the State of Georgia (hereinafter called the "County"), and the above named CONTRACTOR in accordance with all provisions of this Construction Agreement ("Contract"), which consists of the following: Owner-Contractor Agreement, Owner's invitation for bid, instructions to bidders, bid form, performance bond, payment bond, acknowledgments, general conditions, special conditions, scope of work and specifications, plans, drawings, exhibits, addenda, Purchasing forms, Office of Contract Compliance Forms, Risk Management insurance provisions forms and written change orders.

The specific Exhibits of this Contract are as follows:

Exhibit A: General Conditions
Exhibit B: Special Conditions (if applicable)
Exhibit C: Addenda
Exhibit D: Bid Form
Exhibit E: Bonds (Bid, Payment & Performance)
Exhibit F: Scope of Work and Technical Specifications
Exhibit G: Exhibits
Exhibit H: Purchasing Forms
Exhibit I: Office of Contract Compliance Forms
Exhibit J: Risk Management Insurance Provisions Forms

WITNESSETH: That the said Contractor has agreed, and by these present does agree with the said County, for and in consideration of a Contract Price of **[INSERT CONTRACT AMOUNT IN WORDS],** ($**[INSERT CONTRACT AMOUNT IN NUMBERS]**) and other good and valuable consideration, and under the penalty expressed on Bonds hereto attached, to furnish all equipment, tools, materials, skill, and labor of every description necessary to carry out and complete in good, firm, and workmanlike manner, the Work specified, in strict conformity with the Drawings and the Specifications hereinafter set forth, which Drawings and Specifications together with the bid submittals made by the Contractor, General Conditions, Special Provisions, Detailed Specifications, Exhibits, and this Construction Agreement, shall all form essential parts of this Contract. The Work covered by this Contract includes all Work indicated on Plans and Specifications and listed in the Bid entitled:

Project Number: **#16ITB110716K-DB**

JOHNS CREEK REUSE MAIN

The Contractor, providing services as an Independent Contractor, shall commence the Work with adequate force and equipment within 10 days from receipt of Notice to Proceed ("NTP") from the County, and shall complete the work within 306 calendar days from the Notice to Proceed or the date work begins, whichever comes first. The Contractor shall remain responsible for performing,

in accordance with the terms of the Contract, all work assigned prior to the expiration of the said calendar days allowed for completion of the work even if the work is not completed until after the expiration of such days. The Contractor shall agree that in the performance of this Contract he will comply with all lawful agreements, if any, which the contractor has made with any association, union or other entity, with respect to wages, salaries and working conditions, so as to cause inconvenience, picketing or work stoppage.

For each calendar day that any work remains uncompleted after the time allowed for completion of the work, the Contractor shall pay the County the sum of $ 500.00 not as a penalty but as liquidated damages, which liquidated damages the County may deduct from any money due the contractor. At the County's convenience and not to it prejudice the County may provide written notice of the commencement of the assessment of liquidated damages].

As full compensation for the faithful performance of this Contract, the County shall pay the Contractor in accordance with the General Conditions and the prices stipulated in the Bid, hereto attached.

It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and the Surety Bonds hereto attached for its faithful performance, the County shall deem the surety or sureties upon such bonds to be unsatisfactory, or, if, for any reason, such bonds cease to be adequate to cover the performance of the Work, the Contractor shall, at his expense, within five days after receipt of notice from the County so to do, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the County. In such event no further payment to the Contractor shall be deemed to be due under this Agreement until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the County.

The Contractor hereby assumes the entire responsibility and liability for any and all injury to or death of any and all persons, including the Contractor's agents, servants, and employees, and in addition thereto, for any and all damages to property caused by or resulting from or arising out of any act or omission in connection with this contract or the prosecution of work hereunder, whether caused by the Contractor or the Contractor's agents, Servants, or employees, or by any of the Contractor's subcontractors or suppliers, and the Contractor shall indemnify and hold harmless the County, the Construction Manager, County's Commissioners, officers, employees, successors, assigns and agents, or any of their subcontractors from and against any and all loss and/or expense which they or any of them may suffer or pay as a result of claims or suits due to, because of, or arising out of any and all such injuries, deaths and/or damage, irrespective of County or Construction Manager negligence (except that no party shall be indemnified for their own sole negligence). The Contractor, if requested, shall assume and defend at the Contractor's own expense, any suit, action or other legal proceedings arising there from, and the Contractor hereby agrees to satisfy, pay, and cause to be discharged of record any judgment which may be rendered against the County and the Construction Manager arising there from.

In the event of any such loss, expense, damage, or injury, or if any claim or demand for damages as heretofore set forth is made against the County or the Construction Manager, the County may withhold from any payment due or thereafter to become due to the Contractor under the terms of this Contract, an amount sufficient in its judgment to protect and indemnify it and the Construction Manager, County's Commissioners, officers, employees, successors, assigns and agents from any and all claims, expense, loss, damages, or injury; and the County, in its discretion, may require the Contractor to furnish a surety bond satisfactory to the County providing for such protection and indemnity, which bond shall be furnished by the Contractor within five (5) days after written demand has been made therefore. The expense of said Bond shall be borne by the Contractor. **[See General Conditions for similar provision]**

This Contract constitutes the full agreement between the parties, and the Contractor shall not sublet, assign, transfer, pledge, convey, sell or otherwise dispose of the whole or any part of this

Contract or his right, title, or interest therein to any person, firm or corporation without the previous consent of the County in writing. Subject to applicable provisions of law, this Contract shall be in full force and effect as a Contract, from the date on which a fully executed and approved counterpart hereof is delivered to the Contractor and shall remain and continue in full force and effect until after the expiration of any guarantee period and the Contractor and his sureties are finally released by the County.

This agreement was approved by the Fulton County Board of Commissioner on [Insert approval date and item number].

[SIGNATURES NEXT PAGE]

IN WITNESS THEREOF, the Parties hereto have caused this Contract to be executed by their duly authorized representatives as attested and witnessed and their corporate seals to be hereunto affixed as of the day and year date first above written.

OWNER:

FULTON COUNTY, GEORGIA

John H. Eaves, Commission Chair
Board of Commissioners

ATTEST:

Mark Massey
Clerk to the Commission (Seal)

APPROVED AS TO FORM:

Office of the County Attorney

APPROVED AS TO CONTENT:

[Insert Department Head Name]
[Insert Department Head Title]

CONTRACTOR:

[Insert Contractor COMPANY NAME]

[Insert Name & Title of person authorized to sign contract]

ATTEST:

Secretary/
Assistant Secretary

(Affix Corporate Seal)

END OF SECTION

INSTRUCTIONS TO BIDDERS

1. CONTRACT DOCUMENTS

The Contract Documents include the Contract Agreement, Contractor's Bid (including all documentation accompanying the Bid and any post-Bid documentation required by the County prior to the Notice of Award), Bonds, all Special Conditions, General Conditions, Supplementary Conditions, Specifications, Drawings and addenda, together with written amendments, change orders, field orders and the Construction Manager's written interpretations and clarifications issued in accordance with the General Conditions on or after the date of the Contract Agreement.

Shop drawing submittals reviewed in accordance with the General Conditions, geotechnical investigations and soils report and drawings of physical conditions in or relating to existing surface structures at or contiguous to the site are not Contract Documents.

The Contract Documents shall define and describe the complete work to which they relate.

2. BID PREPARATION

Bidders shall **SUBMIT ONE (1) ORIGINAL, SIGNED AND DATED, AND THREE (3) COPIES** on the forms provided in the Bid Document.

All bids must be made on the bid forms contained herein and shall be subject to all requirements of the Agreement Documents. All bids must be regular in every respect and no interlineations, excisions, or special conditions shall be made or included in the bid by the Bidder.

Lump sum, unit price and extensions of unit prices must be entered in the appropriate spaces provided on the Bid Schedule/Bid Form. Unit prices shall include an appropriate allocation of overhead and other indirect costs so that the summation of unit price extensions and lump sum items represents the total bid amount. All blank spaces must be typed or hand written in blue ink on the “Original”. All dollar amounts must be BOTH in writing and figures and represent prices for the published scope of work without exceptions.

The County may, in its sole discretion, reject any bid determined as irregular, a conditional bid or any bid on which there is an alteration of, or departure from the Bid Schedule attached.

Erasures or other changes in the bids must be explained or noted over the signature of the Bidder. All corrections to any entry must be lined out and initialed by the Bidder. Please do not use correction tapes or fluid. Failure to do so shall render the Bidder as non-responsive and cause rejection of the bid.

Failure to execute the Bid Schedule/Bid Form documents may result in Bidder being deemed non-responsive and cause rejection of the bid.

3. RECIEPT AND OPENING OF BIDS

Sealed bids will be received by the Fulton County Department of Purchasing & Contract Compliance at Fulton County Public Safety Building, 130 Peachtree Street, S.W., Suite 1168 Atlanta, Georgia 30303. All submitted bids shall be time and date stamped according to the clock at the front desk of the Fulton County Department of Purchasing & Contract Compliance. The original signed Bid with three (3) copies shall be submitted in a sealed envelope, addressed to the Department of Purchasing and Contract Compliance and labeled **#16ITB110716K-DB Johns Creek Reuse Main.**

REQUIRED SUBMITTALS: The bidder **must complete and execute** the following:

1. Bid Form
2. Acknowledgement of each Addendum
3. Bid Bond
4. Purchasing Forms (See Submittal Check List at end of this Section), fully executed
5. Contract Compliance Forms (See Submittal Check List at end of this Section), fully executed
6. Risk Management Insurance Provisions Form

Any bids received after the stated time and date will not be considered. It shall be the sole responsibility of the bidder to have his/her bid delivered to the Fulton County Department of Purchasing and Contract Compliance for receipt on or before the stated time and date. If a bid is sent by U.S. Mail, the bidder shall be responsible for its timely delivery to the Purchasing Department. Bids delayed by mail will not be considered, shall not be opened, and arrangements shall be made for their return at the bidder's request and expense.

Bid shall be publicly opened, with only the names and total bid price of the bidders disclosed at the opening.

4. ADDENDA AND INTERPRETATIONS

No interpretations of the meaning of the Drawings, Specifications or other pre-bid documents will be made to any Bidder orally.
Bidders requiring clarification or interpretation of the Contract Documents shall make a request in writing, either by mail, hand delivery, e-mail or fax, to the Purchasing Agent at the address below. To be given consideration, requests must be received no later than 2:00 PM, December 5, 2016. The County will not respond to any requests, oral or written, received after this date. Telephone inquiries will not be accepted.

Department of Purchasing and Contract Compliance
Attn: Darlene A. Banks, Assistant Purchasing Agent

Fulton County Public Safety Building
130 Peachtree Street, S.W., 1168
Atlanta, GA 30303
Fax: (404) 893-1745
E-mail: darlene.banks@fultoncountyga.gov
Bid #16ITB110716K-DB

Only communications from firms that are in writing and signed will be recognized by the County as duly authorized expressions on behalf of proposers/bidders. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the Specifications which, if any addend are issued to this Invitation to Bid.

Failure of Bidders to receive or acknowledge any Addendum shall not relieve them of any obligation under the Bid. All Addenda shall become part of the Contract Documents.

5. SITE EXAMINATION

There will not be a scheduled site visit for this project. However, bidders are encouraged to visit the project site on their own.

6. BIDDER'S MODIFICATION AND WITHDRAWAL OF BIDS

A Bidder may modify or withdraw its bid by written request, provided that the request is received by the County prior to the bid due date and time at the address to which bids are to be submitted. Provided further, that in case of an electronic request (i.e. facsimile, e-mail, etc.) a written confirmation thereof over the authorized signature of the Bidder must be received by the County at the address to which original Bids are to be submitted within three (3) calendar days after issue of the electronic message. Following withdrawal of its bid, the Bidder may submit a new bid, providing delivery is affected prior to the established bid opening date and time. **No bid may be withdrawn after bid due date for sixty (60) calendar days.**

7. BID AND CONTRACT SECURITY

A Bid Bond for an amount equal to five percent (5%) of the bid amount must accompany each Proposal. The bid bond shall be submitted in a separate, sealed envelope marked "Bid Bond".

Bids must be accompanied by a bid bond or certified check in an amount of five percent (5%) of the TOTAL AMOUNT of the base bid. The bid bond or certified check shall apply ONLY TO THIS BID. The bid name and contract number must appear on the security instrument. The bond must remain in full force and effect until the Bidder executes the final Contract. Bids not satisfying the bonding requirements of this project will be declared non-responsive.

Any bid bond, performance bond, payment bond, or security deposit required for public works construction contract shall be approved and filed with purchasing agent. At the option of the County, if the surety named in the bond is other than a surety company authorized by law to do business in this state pursuant to a current certificate of authority to transact surety business by the Commissioner of Insurance, such bond shall not be approved and filed unless such surety is on the United States Department of Treasury's list of approved bond sureties.

A Purchasing Agent shall approve as to form and as to the solvency of the surety any bid bond, performance bond, or payment bond required by this. In the case of a bid bond, such approval shall be obtained prior to acceptance of the bid or proposal. In the case of payment bonds and performance bonds, such approval shall be obtained prior to the execution of the contract.

Whenever, in the judgment of the County:

(1) Any surety on a bid, performance, or payment bond has become insolvent;
(2) Any corporation surety is no longer certified or approved by the Commissioner of Insurance to do business in the state; or
(3) For any cause there are no longer proper or sufficient sureties on any or all the bonds

The County may require the contractor to strengthen any or all of the bonds or to furnish a new or additional bond or bonds within ten days. Thereupon, if so ordered by the County, all work on the contract shall cease unless such new or additional bond or bonds are furnished. If such bond or bonds are not furnished within such time, the County may terminate the contract and complete the same as the agent of and at the expense of the contractor and his or her sureties.

As a condition of responsiveness the bidder must contain a Bid Bond for an amount equal to 5% of the bid amount. The Bid Bond shall be included in a separate envelope marked on the outside "Bid Bond". Checks or letters of credit of any type will not be accepted. A certified cashier's check will be acceptable. Provide a completed and fully executed Bid Bond. When the bidder's package is opened, a purchasing agent will verify the presence of the Bid Bond and remove it from the Proposal Package.

If the bidder withdraws its bid from the competition after the selection of its bid for a reason not authorized by Georgia law, the County will proceed on the Bid Bond, along with any other available remedies.

The Surety of the Bid Bond shall be from a surety company authorized to do business in the State of Georgia, shall be listed in the Department of Treasury Circular 570, and shall have an underwriting limitation in excess of 100% of the bid amount. The Bonds and Surety shall be subject to approval by the County Attorney.

Attorneys-in-fact for bidders who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

8. SURETY BONDS

The submission of surety bonds subsequent to the Bid submission shall be:

a. Any surety bond submitted in accordance with the Bid or Agreement requirements must be issued by a corporate surety company satisfactory to the Commission and authorized to act as such in the State of Georgia;

b. Such bonds shall conform to the forms provided with the Bid Documents and be completed in accordance with the instructions thereon; and

c. In accordance with Georgia law, and upon award of the Agreement, separate performance and payment bonds shall be required of the successful Bidder, each in an amount not less than the total amount payable under the Agreement. The performance bond shall remain in effect for one (1) year after final acceptance of the Work or the guaranty period under the Agreement, whichever is the larger.

The payment bond shall remain in effect for the period required under Georgia law for the payment bonds on public construction agreements. Reference is made to the bond forms and the Agreement Documents for additional particulars of the terms required in the bonds. In the case of any inconsistency between the Bond Forms and Georgia law, the law shall control. Alterations, extension of the time allowed for performance, extra and additional Work, and other changes authorized under the Agreement may be made without notice to or consent of the surety or sureties.

9. INSURANCE REQUIREMENTS

The Contractor shall procure and maintain during the life of this Agreement, Workmen's Compensation, Public Liability, Property Damage, Automobile Liability insurance and any other insurance necessary to satisfy the requirements of the Agreement Documents. At the time of award, a copy of the successful Bidder's Certificate of Insurance must be provided through the County's online insurance compliance system.

The County has implemented an online insurance compliance system designed to make the experience of submitting and retrieval of insurance information quick and easy. This system is designed to be used by insurance brokers and agents on behalf of their insurance clients for submittal of Certificates of Insurance ("COI") directly to the Fulton County Department of Purchasing. Instructions will be provided to the successful bidder.

10. RIGHT TO REJECT BIDS

The County reserves the right to reject any or all bids and to waive informalities. No bids will be received after the time set for opening bids. Any unauthorized conditions, limitations or provisions attached to the Bid, except as provided herein, will render it informal and may cause its rejection. Unbalanced bids will be subject

to rejection. Any bidder may withdraw his/her bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for receipt of bids. Telegraphic or written requests for withdrawal must be in the possession of the County prior to the closing time for receipt of bids.

11. APPLICABLE LAWS

All applicable laws and regulations of the State of Georgia and ordinances and regulations of Fulton County shall apply. Protestors shall seek resolution of their complaints in the manner provided in the Fulton County Purchasing Code §102-488 et. seq., which is incorporated by reference herein.

12. EXAMINATION OF CONTRACT DOCUMENTS

Prospective bidders shall examine the contract documents and before submitting a bid, shall make a written request to the County for an interpretation or correction of any ambiguity, in consistency or error therein which could be discovered by a bidder. At the bid opening each bidder shall be presumed to have read and be familiar with the contract documents.

13. BID EVALUATION

a. Each Bid timely received and in the County's hands at the time set forth for the Bid opening shall constitute an offer to perform the Agreement on the terms and conditions thereof, in strict accordance with the Agreement documents, and all other requirements, all for the Bid total. For good cause and valuable consideration, the sufficiency of which is acknowledged by submittal of a Bid, each Bidder promises and agrees that its Bid shall be irrevocable for a period of ***sixty calendar days*** after the Bid opening and will not be withdrawn or modified during that time. The County may accept any Bid by giving the Bidder Written Notice of acceptance during that time. If necessary, the period of time specified may be extended by written agreement between the County and the Bidder or Bidders concerned.

b. After the Bids have been opened and before any award is made, the County will evaluate the Bid process, the Bid total, the supplements to the Bid form, Bidder's experience, proposed Subcontractors and equipment manufacturers and other data relating to Bidders' responsibility and qualifications to perform the Agreement satisfactorily.

c. All extension of the unit prices shown and the subsequent addition of extended amounts may be verified by the County. In the event of a discrepancy between the unit price bid and the extension, the unit price will be deemed intended by the Bidder and the extension shall be adjusted. In the event of a discrepancy between the sum of the extended amounts and the bid total, the sum of the extended amounts shall govern.

d. Bidder may be required to submit, in writing, the addresses of any proposed Subcontractors or Equipment manufacturers listed on the Bid, and to submit other material information relative to proposed Subcontractors or Equipment manufacturers. The County reserves the right to disapprove any proposed

Subcontractor or Equipment manufacturers whose technical or financial ability or resources or whose experience are deemed inadequate.

e. The County reserves the right to reject any Bid the prices of which appear to be unbalanced, and to reject any or all Bids, or parts thereof, if it determines, in its sole discretion, that such rejection is in the best interest of the County. Where only a single responsible and responsive Bid is received, the County may in its sole discretion, elect to conduct a price or cost analysis of the Bid. Such Bidder shall cooperate with such analysis and provide such supplemental information as may be required. The determination whether to enter into an Agreement with such sole Bidder shall be solely within the County's discretion and not dependent upon performance of a price or cost analysis.

f. Bids will be evaluated on the basis of determining the lowest Bid total of a Bidder, not including alternates, whose Bid is responsive to the Invitation to Bid and who is determined to be technically, financially and otherwise responsible to perform the Agreement satisfactorily, and to meet all other requirements of the Bidding Documents relating thereto. Any Bid may be rejected if it is determined by the County to be non-responsive, provided, however, that the Commission reserves the right to waive any irregularities or technicalities which it determines, within its sole discretion, to be minor in nature and in the interest of the public. Furthermore, any Bid may be rejected if it is determined by the County, in its sole discretion, that the Bidder is not capable of performing the Agreement satisfactorily based upon review of its experience and technical and financial capabilities, or the failure of such bidder to provide information requested relating to such determination. Additionally, the County reserves the right to disqualify Bids, before and after the bid opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of any Bidder(s).

g. The County intends to award the Agreement at the earliest practicable date to the lowest responsive, responsible Bidder(s), provided that the Bid is within the funds available for the project. In addition, the County reserves the right to reject all Bids if it determines, in its sole discretion, that the public interest will be best served by doing so.

h. A Pre-award Conference may be conducted with the apparent low Bidder(s) to review general requirements of the Bidding Documents.

14. AWARD CRITERIA

Award will be made after evaluating the prices, responsiveness and responsibility of each Bidder.

A. **Responsiveness:** The determination of responsiveness will be determined by the following:

a. The completeness of all material, documents and/or information required by the County;

b. Whether the bidder has submitted a complete Bid form without irregularities, excisions, special conditions, or alternative bids for any item unless specifically requested in the Bid form.

B. **Responsibility:** The determination of the bidder's responsibility will be determined by the following

a. The ability, capacity and skill of the Bidder to perform and/or provide the Work required;
b. The County reserves the right to reject any bid if the evidence submitted by, or investigation of, the bidder fails to satisfy the County that he/she is properly qualified to carry out the obligations of the Contract;
c. The character, integrity, reputation, judgment, experience and efficiency of the Bidder;
d. The quality of performance of work on previous contracts or work; Maintains a permanent place of business individually or in conjunction with the prime contractor.
e. Has the appropriate and adequate technical experience necessary to perform the Work;
f. Has adequate personnel and equipment to do the Work expeditiously;
g. Has suitable financial means to meet obligations incidental to the work.

C. **Statement of Bidder's Qualifications and Safety Record Form, Section 000900:** These forms are to be submitted with the Bid. This information is not intended to be used in evaluation of the Bid; however, the County reserves the right to use this information for evaluation purposes.

15. DISQUALIFICATION OF BIDDERS

Any of the following may be considered as sufficient for disqualification of a Bidder and the rejection of the Bid:

a. Submission of more than one Bid for the same work by an individual, firm, partnership or Corporation under the same of different name(s);

b. Evidence of collusion among Bidders;

c. Previous participation in collusive bidding on Work for the County;

d. Submission of an unbalanced Bid, in which the prices quoted for same items are out of proportion to the prices for other items;

e. Lack of competency of Bidder. The Agreement will be awarded only to a Bidder(s) rated as capable of performing the Work.

16. BASIS OF AWARD

The Contract, if awarded, will be awarded to the lowest responsive and responsible bidder. No bid may be withdrawn for a period of sixty (60) days after the date of

bid opening except as permitted by O.C.G.A., §36-91-41 et seq., as amended. Each Bid must be accompanied by a Bid Bond in accordance with the Bid Bond Requirements provided in the Contract Documents, on a Surety Company's Standard Bid Bond Form acceptable to the County in an amount no less than 5% of the amount bid. The successful bidder will be required to furnish a Performance Bond and Payment Bond, **on or before** the issuance of Notice to Proceed, each in the amount of 100% of the Contract Amount. All other required Contract Documents must be fully completed and executed by the Contractor and his/her Surety, and submitted to the Owner **on or before** the issuance of the Notice to Proceed.

17. PROFESSIONAL LICENSES *(NON-APPLICABLE)*

The State of Georgia requires that the following professions are required by state law to be licensed:

1. Electricians
2. Plumbers
3. Conditioned Air Contractors
4. Low voltage Contractors

Bidders and any sub-contractors performing any of the above described work must provide a copy of their license for the work they will perform on this project. Bidders must complete Form C3: Georgia Professional License Certification in Section 6, Purchasing Forms Failure to provide the required license may deem your bid non-responsive.

18. WAGE CLAUSE

Pursuant to 102-413, Each Contractor shall agree that in the performance of the Contract he will comply with all lawful agreements, if any, which the Contractor had made with any association, union, or other entity, with respect to wages, salaries, and working conditions, so as not to cause inconvenience, picketing, or work stoppage.

19. NOTICE OF AWARD OF CONTRACT

As soon as possible, and within sixty (60) days after receipt of bids, the County shall notify the successful Bidder of the Award of Contract.

The award shall be made by the Board of Commissioners of Fulton County to the lowest responsive, responsible bidder(s) as soon as possible after receipt of bids, taking into consideration price and the responsiveness to the requirements set forth in the Invitation for Bid. In such case, no claim shall be made by the selected Contractor(s) for loss of profit if the contract is not awarded or awarded for less work than is indicated and for less than the amount of his bid. The total of the awarded contract shall not exceed the available funds allocated for this project.

Should the County require additional time to award the contract, the time may be extended by mutual agreement between the County and the successful bidder. If

an Award of Contract has not been made within sixty (60) days from the bid date or within the extension mutually agreed upon, the Bidder may withdraw the Bid without further liability on the part of either party.

Any award made by the Board of Commissioners as a result of this bid will begin from the date of the notice to proceed. The Bidder agrees hereby to commence work under this Contract, with adequate personnel and equipment, on a date to be specified in a written order from the user department. The contract shall become effective on the Contract Date and shall continue in effect until the end of the term of the contract or until the project has been closed-out unless earlier terminated pursuant to the termination provisions of the contract.

20. EXECUTION OF CONTRACT DOCUMENTS

Upon notification of Award of Contract, the County shall furnish the Contractor the conformed copies of Contract Documents for execution by the Contractor and Contractor's surety.

Within ten (10) days after receipt the Contractor shall return all the documents properly executed by the Contractor and the Contractor's surety. Attached to each document shall be an original power-of-attorney for the person executing the bonds for the surety and certificates of insurance for the required insurance coverage.

After receipt of the documents executed by the Contractor and his surety with the power-of-attorney and certificates of insurance, the County shall complete the execution of the documents. Distribution of the completed documents will be made upon completion.

Should the contractor and/or surety fail to execute the documents within the time specified, the County shall have the right to proceed on the Bid Bond accompanying the bid.

If the County fails to execute the documents within the time limit specified, the Contractor shall have the right to withdraw the Contractor's bid without penalty.

Should an extension of any of the time limits stated above be required, this shall be done only by mutual agreement between both parties.

Any agreement or contract resulting from the acceptance of a bid shall be on a County approved document form. The County reserves the right to reject any agreement that does not conform to the Invitation for Bid and any County requirements for agreements and contracts. The County reserves the right to modify the agreement resulting from this bid upon the recommendation of the County Attorney.

21. INVOICES AND PAYMENT TERMS

Invoices are to be mailed to the County department specified on the resulting purchase order or master agreement. All invoices must include the purchase order number or master agreement number. Failure to comply may result in delayed payments. The County payment terms are Net 30 days unless a cash discount is allowed for payment within not less than twenty (20) days. The payment term shall begin on the date the merchandise is inspected, delivered and accepted by the County.

Submittal of Invoices: Invoices shall be submitted as follows:

Via Mail:
Fulton County Government
141 Pryor Street, SW
Suite 7001
Atlanta, Georgia 30303
Attn: Finance Department – Accounts Payable

OR

Via Email:
Email: Accounts.Payable@fultoncountyga.gov

At minimum, original invoices must reference all of the following information:

1) Vendor Information
   a. Vendor Name
   b. Vendor Address
   c. Vendor Code
   d. Vendor Contact Information
   e. Remittance Address

2) Invoice Details
   a. Invoice Date
   b. Invoice Number (uniquely numbered, no duplicates)
   c. Purchase Order Reference Number
   d. Date(s) of Services Performed
   e. Itemization of Services Provided/Commodity Units

3) Fulton County Department Information (needed for invoice approval)
   a. Department Name
   b. Department Representative Name

22. EQUAL EMPLOYMENT OPPORTUNITY ("EEO") IN PURCHASING AND CONTRACTING

To be eligible for award of this Agreement, the Bidder must certify and fully comply with the requirements, terms, and conditions of the County's Non Discrimination in Contracting and Procurement.

23. JOINT VENTURE

Any Bidder intending to respond to this solicitation as a joint venture must submit an executed joint venture agreement with its offer. The agreement must designate those persons or entities authorized to execute documents or otherwise bind the joint venture in all transactions with Fulton County, or be accompanied by a document, binding upon the joint venture and its constituent members, making such designation. Offers from joint ventures that do not include these documents will be rejected as being non-responsive.

24. NON-COLLUSION

By submitting a signed Bid, Bidder certifies and attests that there has been no collusion with any other Bidder. Reasonable grounds for believing Bidder has an interest in more than one Bid will result in rejection of all Bids in which the Bidder has an interest. Any party to collusion may not be considered in future Bids for the same or similar work.

25. GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT

This Invitation to Bid is subject to the Georgia Security & Immigration Compliance Act. Effective July 1, 2013, bidders and proposers are notified that all bids/proposals for services that are to be physically performed within the State of Georgia must be accompanied by proof of their registration with and continuing and future participation in the E-Verify program established by the United States Department of Homeland Security. Physical performance of services means any performance of labor or services for a public employer using a bidding process or by contract wherein the labor or services exceed $2,499.99 99 (except for services performed by an individual who is licensed pursuant to Title 26, Title 43, or the State Bar of Georgia).

A completed affidavit must be submitted on the top of the bid/proposal at the time of submission, prior to the time for opening bids/proposals. Under state law, the County cannot consider any bid/proposal which does not include a completed affidavit. It is not the intent of this notice to provide detailed information or legal advice concerning the Georgia Security & Immigration Compliance Act. All bidders/proposers intending to do business with the County are responsible for independently apprising themselves and complying with the requirements of that law and its effect on County procurements and their participation in those procurements. For additional information on the E-Verify program or to enroll in the program, go to: https://e-verify.uscis.gov/enroll.

The Director of Purchasing & Contract Compliance is authorized to conduct random audits of a contractor's or subcontractors' compliance with the Illegal Immigration Reform and Enforcement Act and the rules and regulations of the Georgia Department of Labor.

See Section 00420, Purchasing Forms & Instructions for declarations and affidavits.

26. SUBCONTRACTING OPPORTUNITIES

Potential prime contractors submitting a bid on this project for Fulton County and are seeking subcontractors and/or suppliers can advertise those subcontracting opportunities on the County's website, http://www.fultoncountyga.gov under "Subcontracting Bid Opportunities".

27. TERM OF CONTRACT

The term of the Agreement shall be for a period of three hundred and eight calendar days, or as may be amended under the Agreement to comprise the Agreement Time. Contractor shall commence the Work within ten calendar days after receipt of Notice to Proceed and shall complete the Work within three hundred and six (306) calendar days from issuance of the Notice to Proceed.

28. NO CONTACT PROVISION

It is the policy of Fulton County that the evaluation and award process for County contracts shall be free from both actual and perceived impropriety, and that contacts between potential vendors and County officials, elected officials and staff regarding pending awards of County contracts shall be prohibited.

A. No person, firm, or business entity, however situated or composed, obtaining a copy of or responding to this solicitation, shall initiate or continue any verbal or written communication regarding this solicitation with any County officer, elected official, employee, or designated County representative, between the date of the issuance of this solicitation and the date of the County Manager's recommendation to the Board of Commissioners for award of the subject contract, except as may otherwise be specifically authorized and permitted by the terms and conditions of this solicitation.

B. All verbal and written communications initiated by such person, firm, or entity regarding this solicitation, if same are authorized and permitted by the terms and conditions of this solicitation, shall be directed to the Purchasing Agent.

C. Any violation of this prohibition of the initiation or continuation of verbal or written communications with County officers, elected officials, employees, or designated County representatives shall result in a written finding by the Purchasing Agent that the submitted Bid or proposal of the person, firm, or entity in violation is "non-responsive", and same shall not be considered for award.

29. AUTHORIZATION TO TRANSACT BUSINESS

If the Contractor is a corporation or corporations combined to form a joint venture, the corporation or members of the joint venture team, prior to Agreement execution, must submit documentary evidence from the Secretary of State that the corporation is in good standing and that the corporation is authorized to transact business in the State of Georgia.

30. PRE-CONSTRUCTION CONFERENCE

A pre-construction conference may be held with the successful Bidder and all known Subcontractors at a time and place set by the County.

31. SUBSTITUTIONS

See Special Conditions Article.

32. RIGHT TO PROTEST

Any actual bidder or offeror that has submitted a bid/proposal for a particular procurement and is aggrieved in connection with the solicitation or award of the contract shall protest in writing to the purchasing agent after the date that the specific bid or proposal is submitted. No protest will be accepted or considered prior to the date the specific bid or proposal is submitted; it will be considered untimely. All protests shall set forth in full detail the factual and legal bases for the protest and specific relief sought by the protestor. Protests arising from factual or legal bases that the protestor knew or should have known prior to the submission of the bid/proposal must be submitted within three business days of the submission of the bid/proposal. Protests arising from factual or legal bases that the protestor knew or should have known subsequent to the date the bid/proposal was submitted must be submitted within ten business days after the protestor knew or should have known of such bases, but in no event shall any protest be submitted more than ten business days after the award of the contract. Untimely protests will not be considered by the purchasing agent and will be simply denied as untimely. Decisions on timeliness by the purchasing agent are not appealable. An oral protest or a protest to an official, employee, User Department, or other person apart from the Director of Purchasing & Contract Compliance does not comply.

33. CERTIFICATE OF ACCEPTANCE

By responding to this Bid, Bidder acknowledges that he/she has read this solicitation document, including any addenda, exhibits, attachments, and/or appendices in its entirety, and agrees that no pages or parts of the document have been omitted, that he/she understands, accepts and agrees to fully comply with the requirements therein.

Bidder also certifies and attests that the Bidder has reviewed the form Fulton County contract included in this solicitation and agrees to be bound by its terms, or that the Bidder certifies that it is submitting any proposed modification(s) to the contract terms with its proposal in accordance with Section 2.26, Exceptions to the County's Contract. The Bidder further certifies that the failure to submit proposed modifications with the Bid waives the Bidder's right to submit proposed modifications later. The Bidder also acknowledges that the indemnification and insurance provisions of Fulton County's contract included in this solicitation document are non-negotiable and that proposed modifications to said terms may be reason to declare the Bidder's Bid as non-responsive.

34. EXCEPTIONS TO THE COUNTY'S CONTRACT

If Bidder takes exception to any term or condition set forth in the Owner-Contractor Agreement, and any of its exhibits, appendices or attachments, said exceptions must be clearly identified in the response to this Bid. Exceptions or modifications to any of the terms and conditions must be submitted as a separate document accompanying the Bidder's Bid clearly marked as "Exceptions."

The County shall be the sole determiner of the acceptability of any exception(s).

35. CERTIFICATION REGARDING DEBARMENT

By responding to this Bid, Bidder certifies that neither it or its subcontractors is presently debarred, suspended, proposed for debarment, declared ineligible, or otherwise excluded from doing business with any government agency. Any such exclusion may cause prohibition of your firm from participating in any procurement by the County. Section 102-449 of the Fulton County Code of Laws, which is incorporated as if fully set forth herein, establishes the procedure for the debarment of contractors.

36. BID GENERAL CONDITIONS

1. A Bid may be withdrawn upon receipt of a written request prior to the stated due date and time. If a firm seeks to withdraw a nif after the due date and time, the firm must present a notarized statement indicating that an error was made, with an explanation of how it occurred. The withdrawal request must be accompanied by documentation supporting the claim. Prior to approving or disapproving the request, an opinion will be obtained from the County Attorney's Office indicating whether the firm is bound by its Bid.

   Bids for projects that are solicited pursuant to the Georgia Local Government Public Works Construction Law (O.C.G.A. § 36-91-1 et seq.) may be withdrawn as follows:

   The County must advise Bidders in the solicitation of the number of days that Offerors will be required to honor their Bid. If an Bidder is not selected within 60 days of opening the Bids, any Bidder that is determined by the governmental entity to be unlikely of being selected for contract award will be released from the Bid.

2. Fulton County shall be the sole judge of the quality and the applicability of all Bids. Design, features, overall quality, local facilities, terms and other pertinent considerations will be taken into account in determining acceptability.

3. The successful Bidder must assume full responsibility for delivery of all goods and services proposed.

4. The successful Bidder must assume full responsibility for replacement of all defective or damaged goods and/or performance of contracted services

within thirty (30) days' notice by the County of such defect, damage or deficiency.

5. The successful Bidder must assume full responsibility for providing warranty service on all goods, materials, or equipment provided to the County with warranty coverage. Should a vendor be other than the manufacturer, the vendor and not the County is responsible for contacting the manufacturer. The Offeror is solely responsible for arranging for the service to be performed.

6. The successful Bidder shall be responsible for the proper training and certification of personnel used in the performance of the services proposed.

7. The successful Bidder shall not assign, transfer, convey, sublet, or otherwise dispose of any contract resulting from the Bid or of any of its rights, title or interest therein without prior written consent of the Fulton County Board of Commissioners.

8. In case of default by the successful Bidder, Fulton County may procure the articles or services from another source and hold the successful Bidder responsible for any resultant excess cost.

9. All proposals and Bids submitted to Fulton County are subject to the Georgia "Open Records Act", Official Code of Georgia, Annotated (O.C.G.A.) § 50-18-70 et seq.

10. All proposals and Bids submitted to Fulton County involving Utility Contracting are subject to the Georgia law governing licensing of Utility Contractors, O.C.G.A. §43-14-8.2(h).

37 SUBMITTALS

The following submittals must be completed and submitted with the Bid Submittal. This checklist is provided to ensure that the Bidder submits certain required information with its Bid.

	Bid Submittal Check Sheet	Check (√)
1.	Georgia Security and Immigration Contractor Affidavit(s) and Agreements	
2.	Georgia Security and Immigration Subcontractor Affidavit(s)	
3.	Bid Form	
4.	Acknowledgment of Addenda	
5.	Bid Bond	
6.	Georgia Utility Contractor's License (applicable)	
7.	Georgia General Contractors License (non-applicable)	
8.	Georgia Professional License (non-applicable)	
9.	Office of Contract Compliance Requirements (submitted in a separate envelope)	
10.	Proof of Insurance Coverage	

END OF SECTION

BID FORM

Submitted To: Fulton County Government

Submitted By: _____

For: **#16ITB110716K-DB**
Johns Creek Reuse Main

Submitted on _____, 20__.

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Bid as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this Bid or in the Contract to be entered into; that this Bid is made without connection with any other person, company or parties making a Bid; and that it is in all respects fair and in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the place where the work is to be done; that he has examined the Drawings and Specifications for the work and contractual documents relative thereto, and has read all instructions to Bidders and General Conditions furnished prior to the openings of bids; that he has satisfied himself relative to the work to be performed.

The Bidder proposes and agrees, if this Bid is accepted, to contract with the Board of Commissioners of Fulton County, Atlanta, Georgia, in the form of contact specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary, and to complete the construction of the work in full and complete accordance with the shown, noted, and reasonably intended requirements of the Specifications and Contract Documents to the full and entire satisfaction of the Board of Commissioners of Fulton County, Atlanta, Georgia, with a definite understanding that no money will be allowed for extra work except as set forth in the attached General Conditions and Contract Documents for the following prices.

THE BASE BID IS THE AMOUNT UPON WHICH THE BIDDER WILL BE FORMALLY EVALUATED AND WHICH WILL BE USED TO DETERMINE THE LOWEST RESPONSIBLE BIDDER.

The base bid may not be withdrawn or modified for a period of sixty (60) days following the receipt of bids.

BASE BID AMOUNT

$_____
(Dollar Amount In Numbers)

_____
(Dollar Amount in Words)

The Bidder agrees hereby to commence work under this Contract, with adequate personnel and equipment, on a date to be specified in a written “Notice to Proceed” from the County.

The Bidder declares that he understands that the quantities shown for the unit prices items are subject to either increase or decrease, and that should the quantities of any of the items of work be increased, the Bidder proposes to do the additional work at the unit prices stated herein; and should the quantities be decreased, the Bidder also understands that payment will be made on the basis of actual quantities at the unit price bid and will make no claim for anticipated profits for any decrease in quantities; and that actual quantities will be determined upon completion of work, at which time adjustments will be made to the contract amount by direct increase or decrease.

BASE BID AMOUNT

PHASE 1 (STA 142+55 – STA 211+43)					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL PRICE
ITEM B-1 - EROSION AND SEDIMENTATION CONTROL					
1.	Silt Fence (Type-S)	100	L.F.		
2.	Silt Fence (Type-NS)	2,000	L.F.		
3.	Hay Bale Check Dam	5	Each		
4.	Curb Inlet Filter	30	Each		
5.	Grassing (Ds3)	500	S.Y.		
6.	Mulching & Temp Grassing (Ds1, Ds2)	5,000	S.Y.		
7.	Inlet Sediment Trap	8	Each		
8.	Rip Rap	5	C.Y.		
ITEM B-2 - DUCTILE IRON PIPE WATER MAIN					
9.	24-Inch DIP, Class 250	4,000	L.F.		
10.	20-Inch DIP, Class 300	100	L.F.		
11.	6-Inch DIP, Class 350	1,100	L.F.		
12.	24-Inch DIP, Class 250, RJP	4,000	L.F.		
13.	20-Inch DIP, Class 300, RJP	200	L.F.		
14.	6-Inch DIP, Class 350, RJP	100	L.F.		
15	2-Inch Type K Copper Service Tubing	200	L.F.		
16.	Electronic Locator Balls	10	Each		
17.	Electronic Locator Full Range	100	Each		
ITEM B-3 - FITTINGS					
18.	Fittings, DIP, RJ, MJ, All sizes	20	Tons		
ITEM B-4 - CONCRETE					
19.	Concrete (Thrust Block / Collar, Misc. Concrete)	500	C.Y.		
ITEM B-5 - VALVES					
20.	24” Butterfly Valve	8	Each		
21.	20” Butterfly Valve	2	Each		
22.	6” Gate Valve	2	Each		
23.	2” Gate Valve	8	Each		
ITEM B-6 – VALVE VAULT					
24.	ARV Vault, Offset from Main	3	Each		
25.	ARV Vault, On top of Main	10	Each		
26.	Valve Vault	10	Each		

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL PRICE
ITEM B-7 - CONNECT TO EXISTING WATER MAINS					
27.	Connection to Existing 20" Reuse Main @ Station 211+43 (Tie-in off Old Alabama Road)	1	Each		
ITEM B-8 – AIR RELEASE / BLOW-OFF VALVE ASSEMBLY					
28.	ARV Assembly Complete, 4”	10	Each		
29.	Blow-Off Assembly Complete	2	Each		
ITEM B-9 – BORE AND JACK CASING					
30.	36-Inch Steel Casing Pipe (Bore and Jack)	200	L.F.		
ITEM B-10 - REMOVE AND REPLACE PAVEMENT					
31.	Mill / Overlay of Asphalt Roadway	40,000	S.Y.		
32.	Asphalt Roadway	40,000	S.Y.		
33.	Asphalt Driveway	100	S.Y.		
34.	Concrete Driveway	100	S.Y.		
35.	Gravel Driveway	100	S.Y.		
ITEM B-11 - REMOVE AND REPLACE CURB AND GUTTER					
36.	Concrete Curb and Gutter	3,000	L.F.		
ITEM B-12 – REMOVE AND REPLACE SIDEWALK					
37.	Concrete Sidewalk	500	L.F.		
ITEM B-13 – PIPE ENCASEMENT					
38.	Polyethylene Encasement, 24"	2,000	L.F.		
39.	Polyethylene Encasement, 20"	100	L.F.		
ITEM B-14 – TRAFFIC CONTROL (AS APPROVED BY OWNER)					
40.	Misc. Maintenance of Traffic Efforts (cleaning, resetting, etc.)	1	Lump Sum		
41.	Certified Flagman	1,500	Hours		
42.	Signage, channelizing devices, barricades	1	LS		
43.	Traffic Control Police Cruiser	500	HR		
ITEM B-15 – SPEED HUMP REPLACEMENT					
44.	Replace speed hump	15	Each		
ITEM B-16 – EXISTING GATE / DAMAGED PROPERTY REPLACEMENT					
45.	CCOS Maintenance Entrance	1	Lump Sum		
46.	CCOS Club House Entrance	1	Lump Sum		
ITEM B-17 – FIELD DENSITY TESTS					
47.	Field Density /	20	Each		

	Compaction Tests				
ITEM NO.	**DESCRIPTION**	**ESTIMATED QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL PRICE**
*** * * * * ADDITIONAL WORK IF ORDERED BY THE OWNER OR ENGINEER * * * * ***					
ITEM B-18 – CONCRETE ENCASEMENT					
48.	Concrete Encasement	400	C.Y.		
ITEM B-19 - TRENCH ROCK EXCAVATION					
49.	Trench Rock Excavation	4,000	C.Y.		
ITEM B-20 - TRENCH STABILIZATION					
50.	Beyond Bedding	300	C.Y.		
ITEM B-21 – TREE PROTECTION					
51.	Orange Safety Fence	800	L.F.		
PHASE 1 SUBTOTAL – ITEMS 1 THRU 51					

PHASE 2 (STA 0+00 – STA 142+55)					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL PRICE
ITEM B-1 - EROSION AND SEDIMENTATION CONTROL					
52.	Silt Fence (Type-S)	800	L.F.		
53.	Silt Fence (Type-NS)	3,000	L.F.		
54.	Hay Bale Check Dam	1	Each		
55.	Curb Inlet Filter	5	Each		
56.	Grassing (Ds3)	15,000	S.Y.		
57.	Mulching & Temp Grassing (Ds1, Ds2)	115,000	S.Y.		
58.	Inlet Sediment Trap	3	Each		
59.	Rip Rap	1	C.Y.		
ITEM B-2 - DUCTILE IRON PIPE WATER MAIN					
60.	24-Inch DIP, Class 250	8,000	L.F.		
61.	8-Inch DIP, Class 350	100	L.F.		
62.	6-Inch DIP, Class 350	100	L.F.		
63.	24-Inch DIP, Class 250, RJP	8,000	L.F.		
64.	8-Inch DIP, Class 350, RJP	100	L.F.		
65.	6-Inch DIP, Class 350, RJP	400	L.F.		
66.	2-Inch Copper Service Tubing	100	L.F.		
67.	Electronic Locator Balls	12	Each		
68.	Electronic Locator Full Range	300	Each		
ITEM B-3 - FITTINGS					
69.	Fittings, DIP, RJ, MJ, All sizes	30	Tons		
ITEM B-4 - CONCRETE					
70.	Concrete (Thrust Block / Collar, Misc. Concrete)	500	C.Y.		
ITEM B-5 - VALVES					
71.	24” Butterfly Valve	15	Each		
72.	8” Gate Valve	2	Each		
73.	6” Gate Valve	3	Each		
74.	2” Gate Valve	2	Each		
ITEM B-6 – VALVE VAULT					
75.	ARV Vault, Offset from Main	1	Each		
76.	ARV Vault, On top of Main	3	Each		
77.	Valve Vault	12	Each		
ITEM B-7 - CONNECT TO EXISTING WATER MAINS					
78.	Connection to Existing 24" Reuse Main @ Station 0+00	1	Each		

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL PRICE
79.	Connection to Phase 1 24" Reuse Main @ Station 142+55	1	Each		
ITEM B-8 – AIR RELEASE / BLOW-OFF VALVE ASSEMBLY					
80.	ARV Assembly Complete, 4"	3	Each		
81.	Blow-Off Assembly Complete	2	Each		
ITEM B-9 – BORE AND JACK CASING					
82.	36-Inch Steel Casing Pipe (Bore and Jack)	100	L.F.		
ITEM B-10 - REMOVE AND REPLACE PAVEMENT					
83.	Mill / Overlay of Asphalt Roadway	30,000	S.Y.		
84.	Asphalt Roadway	30,000	S.Y.		
85.	Asphalt Driveway	300	S.Y.		
86.	Concrete Driveway	300	S.Y.		
87.	Gravel Driveway	300	S.Y.		
ITEM B-11 - REMOVE AND REPLACE CURB AND GUTTER					
88.	Concrete Curb and Gutter	500	L.F.		
ITEM B-12 – REMOVE AND REPLACE SIDEWALK					
89.	Concrete Sidewalk	2,000	L.F.		
ITEM B-13 – PIPE ENCASEMENT					
90.	Polyethylene Encasement, 24"	3,500	L.F.		
ITEM B-14 – TRAFFIC CONTROL (AS APPROVED BY OWNER)					
91.	Misc. Maintenance of Traffic Efforts (cleaning, resetting, etc.)	1	Lump Sum		
92.	Certified Flagman	3,000	Hours		
93.	Signage, channelizing devices, barricades	1	Lump Sum		
94.	Electronic Message Board	50	Days		
95.	Traffic Control Police Cruiser	1500	HR		
ITEM B-15 – SPEED HUMP REPLACEMENT					
N/A					
ITEM B-16 – EXISTING GATE / DAMAGED PROPERTY REPLACEMENT					
96.	Rivermont Property	1	Lump Sum		
ITEM B-17 – FIELD DENSITY TESTS					
97.	Field Density / Compaction Tests	40	Each		
*** * * * * ADDITIONAL WORK IF ORDERED BY THE OWNER OR ENGINEER * * * * ***					
ITEM B-18 – CONCRETE ENCASEMENT					
98.	Concrete Encasement	300	C.Y.		
ITEM B-19 - TRENCH ROCK EXCAVATION					

99.	Trench Rock Excavation	5,000	C.Y.		
ITEM NO.	**DESCRIPTION**	**ESTIMATED QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL PRICE**
ITEM B-20 - TRENCH STABILIZATION					
100.	Beyond Bedding	500	C.Y.		
ITEM B-21 – TREE PROTECTION					
101.	Orange Safety Fence	3,000	L.F.		
ITEM B-22 – PVC CONDUIT					
102.	2-inch PVC Conduit	10,500	L.F.		
PHASE 2 SUBTOTAL – ITEMS 52 THRU 102					

PHASE 3 (STA 0+00 – STA 44+98)					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL PRICE
ITEM B-1 - EROSION AND SEDIMENTATION CONTROL					
103.	Silt Fence (Type-S)	4,000	L.F.		
104.	Silt Fence (Type-NS)	2,000	L.F.		
105.	Hay Bale Check Dam	1	Each		
106.	Curb Inlet Filter	3	Each		
107.	Grassing (Ds3)	5,300	S.Y.		
108.	Mulching & Temp Grassing (Ds1, Ds2)	5,300	S.Y.		
109.	Inlet Sediment Trap	1	Each		
110.	Rip Rap	70	C.Y.		
ITEM B-2 - DUCTILE IRON PIPE WATER MAIN					
111.	20-Inch DIP, Class 300	2,000	L.F.		
112.	6-Inch DIP, Class 350	100	L.F.		
113.	20-Inch DIP, Class 300, RJP	3,000	L.F.		
114.	6-Inch DIP, Class 350, RJP	150	L.F.		
115.	Electronic Locator Balls	10	Each		
116.	Electronic Locator Full Range	100	Each		
ITEM B-3 - FITTINGS					
117.	Fittings, DIP, RJ, MJ, All sizes	15	Tons		
ITEM B-4 - CONCRETE					
118.	Concrete (Thrust Block / Collar, Misc. Concrete)	250	C.Y.		
ITEM B-5 - VALVES					
119.	20” Butterfly Valve	5	Each		
120.	6” Gate Valve	1	Each		
ITEM B-6 – VALVE VAULT					
121.	ARV Vault, Offset from Main	1	Each		
122.	ARV Vault, On top of Main	2	Each		
ITEM B-7 - CONNECT TO EXISTING WATER MAINS					
123.	Wet Cut-In to Existing 20” Reuse Main @ Station 0+00 (Tie-in in Woodward Property)	1	Each		
124.	Connection to Existing 20" Reuse Main @ Station 44+98 (Tie-in at Boles/Bell intersection)	1	Each		
ITEM B-8 – AIR RELEASE / BLOW-OFF VALVE ASSEMBLY					
125.	ARV Assembly Complete, 4”	3	Each		

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL PRICE
126.	Blow-Off Assembly Complete	1	Each		
ITEM B-9 – BORE AND JACK CASING					
N/A					
ITEM B-10 - REMOVE AND REPLACE PAVEMENT					
127.	Mill / Overlay of Asphalt Roadway	9,000	S.Y.		
128.	Asphalt Roadway	9,000	S.Y.		
129.	Asphalt Driveway	200	S.Y.		
130.	Concrete Driveway	200	S.Y.		
131.	Gravel Driveway	100	S.Y.		
ITEM B-11 - REMOVE AND REPLACE CURB AND GUTTER					
132.	Concrete Curb and Gutter	400	L.F.		
ITEM B-12 – REMOVE AND REPLACE SIDEWALK					
133.	Concrete Sidewalk	200	L.F.		
ITEM B-13 – PIPE ENCASEMENT					
134.	Polyethylene Encasement, 20"	1,000	L.F.		
ITEM B-14 – TRAFFIC CONTROL (AS APPROVED BY OWNER)					
135.	Misc. Maintenance of Traffic Efforts (cleaning, resetting, etc.)	1	Lump Sum		
136.	Certified Flagman	720	Hours		
137.	Signage, channelizing devices, barricades	1	Lump Sum		
138.	Electronic Message Board	50	Days		
139.	Traffic Control Police Cruiser	1000	HR		
ITEM B-15 – SPEED HUMP REPLACEMENT					
N/A					
ITEM B-16 – EXISTING GATE / DAMAGED PROPERTY REPLACEMENT					
140.	Woodward Property	1	Lump Sum		
ITEM B-17 – FIELD DENSITY TESTS					
141.	Field Density / Compaction Tests	15	Each		
*** * * * * ADDITIONAL WORK IF ORDERED BY THE OWNER OR ENGINEER * * * * ***					
ITEM B-18 – CONCRETE ENCASEMENT					
142.	Concrete Encasement	100	C.Y.		
ITEM B-19 - TRENCH ROCK EXCAVATION					
143.	Trench Rock Excavation	4,000	C.Y.		
ITEM B-20 - TRENCH STABILIZATION					
144.	Beyond Bedding	300	C.Y.		
ITEM B-21 – TREE PROTECTION					
145.	Orange Safety Fence	3,000	L.F.		
PHASE 3 SUBTOTAL – ITEMS 103 THRU 145					

CASH ALLOWANCES (OWNER to pre-approve and approve)		
ITEM NO.	**DESCRIPTION**	**TOTAL PRICE**
146.	**OWNER CONTROLLED CONTINGENCY** Soils, Concrete, Asphalt and Materials Testing; Construction Verification Surveying; Blasting Monitoring; Additional Landscaping (Not shown on Drawings); Utility Conflict Resolution; Unforeseen Site Conditions; Work to be directed by Owner; Utility Relocation; Public Information Meetings; Tree Removal; Unforeseen Rock Excavation, Blasting & Monitoring	1,080,000.00
TOTAL BASE BID AMOUNT (ITEM NO. 1 – 51, 52 – 102, 103 – 145, 146)		

The Bidder furthermore agrees that, in the case of a failure on his part to execute the Contract Agreement and Bonds within ten days after receipt of conformed contract documents for execution, the Bid Bond accompanying his bid and the monies payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure.

Enclosed is a Bid Bond in the approved form, in the sum of:

_____Dollars

($_____) according to the conditions of "Instructions to Bidders" and provisions

thereof.

The undersigned acknowledges receipt of the following addenda (list by the number and date appearing on each addendum) and thereby affirms that its Bid considers and incorporates any modifications to the originally issued Bidding Documents included therein.

ADDENDUM # _____ DATED _____

ADDENDUM # _____ DATED _____

ADDENDUM # _____ DATED _____

ADDENDUM # _____ DATED _____

BIDDER: _____

Signed by: _____
[Type or Print Name]

Title: _____

Business Address: _____

_____

_____

Business Phone: _____

Note: If the Bidder is a corporation, the Bid shall be signed by an officer of the corporation; if a partnership, it shall be signed by a partner. If signed by others, authority for signature shall be attached.

The full name and addresses of persons or parties interested in the foregoing Bid, as principals, are as follows:

Name	Address

END OF SECTION

BID BOND

No bid for a contract in Fulton County for work to be done shall be valid for any purpose unless the Contractor shall give a Bid Bond with good and sufficient surety payable to, in favor of, and for the protection of Fulton County. The Bid Bond shall not be less than 5% of the total amount payable by the terms of the Contract. No bid shall be read aloud or considered if a proper bid bond has not been submitted.

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

Attestation for the corporation must be by the corporate officer; for a partnership by another partner; for an individual by a notary with the corporate seal.

BID BOND

#16ITB110716K-DB
JOHNS CREEK REUSE MAIN
FULTON COUNTY GOVERNMENT

KNOW ALL MEN BY THESE PRESENTS, THAT WE_____

_____

hereinafter called the PRINCIPAL, and _____

_____

hereinafter call the SURETY, a corporation chartered and existing under the laws of the State of _____and duly authorized to transact Surety business in the State of Georgia, are held and firmly bound unto the Fulton County Government (COUNTY), in the penal sum of _____ _____Dollars and Cents ($_____) good and lawful money of the United States of America, to be paid upon demand of the COUNTY, to which payment well and truly to be made we bind ourselves, our heirs, executors, and administrators and assigns, jointly and severally and firmly by these presents.

WHEREAS the PRINCIPAL has submitted to the COUNTY, for **#16ITB110716K-DB Johns Creek Reuse Main,** a Bid;

WHEREAS the PRINCIPAL desires to file this Bond in accordance with law:

NOW THEREFORE: The conditions of this obligation are such that if the Bid be accepted, the PRINCIPAL shall within ten (10) calendar days after receipt of written notification from the COUNTY of the award of the Contract execute the Contract in accordance with the Bid and upon the terms, conditions and prices set forth therein, in the form and manner required by the COUNTY, and execute sufficient and satisfactory Performance and Payments Bonds payable to the COUNTY, each in the amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to said COUNTY, then this obligation to be void; otherwise, to be and remain in full force and virtue in law; and the SURETY shall upon failure of the PRINCIPAL to comply with any or all of the foregoing requirements within the time specified above immediately pay to the COUNTY, upon demand the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

In the event suit is brought upon this Bond by the COUNTY and judgment is recovered, the SURETY shall pay all costs incurred by the COUNTY in such suit, including attorney's fees to be fixed by the Court.

Enclosed is a Bid Bond in the approved form, in the amount of _____ _____Dollars ($_____) being in the amount of five percent (5%) of the Contract Sum. The money payable on this bond shall be paid to the COUNTY, for the failure of the Bidder to execute a Contract within ten (10) days after receipt of the Contract and at the same time furnish a Payment Bond and Performance Bond.

(SIGNATURES ON NEXT PAGE)

IN TESTIMONY THEREOF, the PRINCIPAL and SURETY have caused these presents to be duly signed and sealed this _____day of _____, 20__

ATTEST:

_____
PRINCIPAL

_____ BY_____

(SEAL)

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the Corporation named as principal in the within bond; that _____, who signed the said bond of said corporation; that I know this signature, and his/her signature thereto is genuine; and that said bond was duly signed, sealed and attested for in behalf of said Corporation by authority of its governing body.

_____
SECRETARY

(CORPORATE SEAL)

_____
SURETY

_____ BY_____
(SEAL)

END OF SECTION

PAYMENT BOND

No Contract with Fulton County for work to be done shall be valid for any purpose unless the Contractor provides a Payment Bond with good and sufficient surety payable to Fulton County for the use and protection of all sub-contractors and all persons supplying labor, materials, machinery, and equipment in the prosecution of the work provided for in the Contract. The Payment Bond shall be in the amount of 100% of the total contract amount, payable by the terms of the Contract, and shall be written on the following form.

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

Attestation for the corporation must be by the corporate officer; for a partnership by another partner; for an individual by a notary with the corporate seal.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that ***[insert name of contractor]*** (hereinafter called the "Principal") and ***[insert name of surety]*** (hereinafter called the "Surety"), are held and firmly bound unto **FULTON COUNTY**, a political subdivision of the State of Georgia (hereinafter called the "Owner"), its successors and assigns as obligee, in the penal sum of [100% of contract amount], lawful money of the United States of America, for the payment of which the Principal and the Surety bind themselves, their administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered, or is about to enter, into a certain written contract with the Owner, dated [insert date of contract], which is incorporated herein by reference in its entirety (hereinafter called the "Contract"), for construction-type services of a project known as [insert name of project], as more particularly described in the Contract (hereinafter called the "Project");

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to all persons working on or supplying labor or materials under the Contract, and any amendments thereto, with regard to labor or materials furnished and used in the Project, and with regard to labor or materials furnished but not so used, then this obligation shall be void; but otherwise it shall remain in full force and effect.

1. A "Claimant' shall be defined herein as any subcontractor, person, party, partnership, corporation or the entity furnishing labor, services or materials used, or reasonably required for use, in the performance of the Contract, without regard to whether such labor, services or materials were sold, leased or rented, and without regard to whether such Claimant is or is not in privity of contract with the Principal or any subcontractor performing work on the Project, including, but not limited to, the following labor, services, or materials: water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. In the event a Claimant files a lien against the property of the Owner, and the Principal fails or refuses to satisfy or remove it promptly, the Surety shall satisfy or remove the lien promptly upon written notice from the Owner, either by bond or as otherwise provided in the Contract.

3. The Surety hereby waives notice of any and all modifications, omissions, additions, changes, alterations, extensions of time, changes in the payment terms, and any other amendments in or about the Contract and agrees that the obligations undertaken by this Bond shall not be impaired in any manner by reason of any such modifications, omissions, additions, changes, alterations, extensions of time, changes in payment terms, and amendments.

4. The Surety hereby agrees that this Bond shall be deemed amended automatically and immediately, without formal or separate amendments hereto, upon any amendment or modifications to the Contract, so as to bind the Principal and Surety, jointly and severally, to the full payment of any Claimant under the Contract, as amended or modified, provided only that the Surety shall not be liable for more than the penal sum of the Bond, as specified in the first paragraph hereof.

5. This Bond is made for the use and benefit of all persons, firms, and corporations who or which may furnish any materials or perform any labor for or on account of the construction-type services to be performed or supplied under the Contract, and any amendments thereto, and they and each of them may sue hereon.

6. No action may be maintained on this Bond after one (1) year from the date the last services, labor, or materials were provided under the Contract by the Claimant prosecuting said action.

7. This Bond is intended to comply with O.C.G.A. Section 13-10-1, and shall be interpreted so as to comply with the minimum requirements thereof. However, in the event the express language of this Bond extends protection to the Owner beyond that contemplated by O.C.G.A. Section 13-10-1, or any other statutory law applicable to this Project, then the additional protection shall be enforced in favor of the Owner, whether or not such protection is found in the applicable statutes. **IN WITNESS WHEREOF,** the Principal and Surety have hereunto affixed their corporate seals and caused this obligations to be signed by their duly authorized representatives this _____of _____, _____.

_____(SEAL)
(Principal)

By:_____

Attest:

_____
Secretary

_____(SEAL)
(Surety)

By: _____

Attest:

_____
Secretary

_____
(Address of Surety's Home Office)

_____
(Resident Agent of Surety)

PERFORMANCE BOND

No contract with Fulton County for work to be done shall be valid for any purpose unless the Contractor provides a Performance Bond with good and sufficient surety payable to, in favor of, and for the protection of Fulton County. The Performance Bond shall be in the amount of 100% of the total contract amount, payable by the terms of the Contract, and shall be written on the following form.

Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business as a surety in Georgia.

Attestation for the corporation must be by the corporate officer; for a partnership by another partner; for an individual by a notary with the corporate seal.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that _____
(Insert name of Contractor)
(hereinafter called the "Principal") and _____(hereinafter called the
(Insert name of Surety)
"Surety"), are held and firmly bound unto **FULTON COUNTY**, a political subdivision of the State of Georgia (hereinafter called the "Owner"), its successors and assigns, in the penal sum of _____*[100% of Contract amount]*, lawful money of the United States of America, for the payment of which the Principal and the Surety bind themselves, their administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered, or is about to enter, into a certain written contract with the Owner, dated _____, which is incorporated herein by reference in its entirety (hereinafter called the "Contract"), for construction-type services of a project known as **Johns Creek Reuse Main**, as more particularly described in the Contract (hereinafter called the "Project");

NOW, THEREFORE, the conditions of this obligation are as follows, that if the Principal shall fully and completely perform all the undertakings, covenants, terms, conditions, warranties, and guarantees contained in the Contract, including all modifications, amendments, changes, deletions, additions, and alterations thereto that may hereafter be made, then this obligation shall be void; otherwise it shall remain in full force and effect.

Whenever the Principal shall be, and declared by the Owner to be, in default under the Construction-Type Contract, the Surety shall promptly remedy the default as follows:

1. Complete the Contract in accordance with its terms and conditions; or, at the sole option of the Owner,

2. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the Surety and the Owner of the lowest responsible bidder, arrange for a contract between such bidder and Owner and make available as the work progresses (even though there should be a default or succession of defaults under the Contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the penal sum set forth in the first paragraph hereof, as may be adjusted, and the Surety shall make available and pay to the Owner the funds required by this Paragraph prior to the payment of the Owner of the balance of the contract price, or any portion thereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by the Owner to the Contractor under the Contract, and any amendments thereto, less the amount paid by the Owner to the Contractor; or, at the sole option of the Owner,

3. Allow Owner to complete the work and reimburse the Owner for all reasonable costs incurred in completing the work.

In addition to performing as required in the above paragraphs, the Surety shall indemnify and hold harmless the Owner from any and all losses, liability and damages, claims, judgments, liens, costs and fees of every description, including reasonable attorney's fees, litigation costs and expert witness fees, which the Owner may incur, sustain or suffer by reason of the failure or default on the part of the Principal in the performance of any or all of the terms, provisions, and requirements of the Contract, including any and all amendments and modifications thereto, or

incurred by the Owner in making good any such failure of performance on the part of the Principal.

The Surety shall commence performance of its obligations and undertakings under this Bond promptly and without delay, after written notice from the Owner to the Surety.

The Surety hereby waives notice of any and all modifications, omissions, additions, changes, alterations, extensions of time, changes in payment terms, and any other amendments in or about the Contract, and agrees that the obligations undertaken by this Bond shall not be impaired in any manner by reason of any such modifications, omissions, additions, changes, alterations, extensions of time, change in payment terms, and amendments.

The Surety hereby agrees that this Bond shall be deemed amended automatically and immediately, without formal or separate amendments hereto, upon any amendment to the Contract, so as to bind the Principal and the Surety to the full and faithful performance of the Contract as so amended or modified, and so as to increase the penal sum to the adjusted Contract Price of the Contract.

No right of action shall accrue on this Bond to or for the use of any person, entity or corporation other than the Owner and any other obligee named herein, or their executors, administrators, successors or assigns.

This Bond is intended to comply with O.C.G.A. Section 36-91-1 et seq., and shall be interpreted so; as to comply with; the minimum requirements thereof. However, in the event the express language of this Bond extends protection to; the Owner beyond that contemplated by O.C.G.A. Section 36-91-1 et seq. and O.C.G.A. Section 13-10-1, as amended, or any other statutory law applicable to this Project, then the additional protection shall be enforced in favor of the Owner, whether or not such protection is found in the applicable statutes.

IN WITNESS WHEREOF the undersigned have caused this instrument to be executed and their respective corporate seals to be affixed and attested by their duly authorized representatives this _____ day of _____, _____.

_____(SEAL)
(Principal)

By_____

Attest:

_____
Secretary

_____(SEAL)
(Surety)

By:_____

Attest:

_____
Secretary

_____

(Address of Surety's Home Office)

_____
(Resident Agent of Surety)

END OF SECTION

SECTION 4

SCOPE OF WORK AND TECHNICAL SPECIFICATIONS

The work for the Johns Creek Reuse Main project includes, but is not limited to; provide all labor, equipment, materials, incidentals, supervision, tests, erosion and sedimentation control measures, traffic control and safety measures, and all associated activities necessary to construct and install approximately 24,000 Linear Feet (LF) of new 24–inch diameter (dia.) Ductile Iron Pipe (D.I.P), and 5,300 Linear Feet of new 20–inch diameter D.I.P Reuse Main. Generally the new Reuse Main will start from Johns Creek Environmental Campus (JCEC) to the existing 20–inch diameter Reuse Main stub–out along Old Alabama Road, and the new 20-inch diameter Reuse Main from the existing 20-inch Reuse Main near the intersection of the tributary and Chattahoochee River to the existing 20-inch diameter Reuse Main stub–out near Boles and Bell Roads Round–about and intersection. The Project total work activities are divided into Three (3) Phases: **Phase One (1); the installation of 8,000 LF. 24 - Inches dia. D I P and 300 LF. 20 – Inches D I P; Phase Two (2); the installation of 16,000 LF. 24 – Inches dia. D I P; Phase Three (3); the installation of 5,000 LF. 20 – Inches dia. D I P.**

All work shall be in conformance with the contract documents, drawings and Fulton County Standards and Specifications.

JOHNS CREEK REUSE MAIN

Technical Specification List

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SECTION 01010

SUMMARY OF WORK

Part 1 General

1.01 Description

A. The proposed work will consist of providing all labor, equipment, materials, and including appurtenances, as shown on the Project Drawings, necessary to construct and install, approximately **29,300 Linear Feet** (LF) of new Reuse Water Main. The total Project activities are divided into three phases. These are: **Phase One (1):** the installation of **8,000 LF**. **24 inch diameter (dia.) Ductile Iron Pipe (D.I.P) and 300 LF 20 inch diameter (dia.) Ductile Iron Pipe (D.I.P.); Phase Two (2):** the installation **of 16,000 LF. 24 inch dia. D.I.P;** and **Phase Three (3): the** installation of **5,000 LF**. **20 inch dia. D.I.P.**

B. All work shall be in conformance with the Contract Documents, Drawings, and Fulton County Standards and Specifications, and the relevant government agencies Standards and Specifications.

1.02 Project Location

The proposed total Project will be located within the cities of Roswell and Johns Creek, Fulton County, Georgia, and a section Georgia DOT Right – of - Way**. Phase One (1):** The reuse will enter Country Club of the South (CCOS), through their Maintenance Entrance Gate Road, off Barnwell Road; then is routed along the maintenance road and the west side of Old Southwick Pass, crossing Merriweather Woods, the turning right and following the east side of Cherbury Lane to the Cherbury Lane Cul –de – sac into the tennis and through the Club House Entrance; then is routed through the parking lot near Club House; under the existing decorative rock wall, and exit onto Old Alabama Road Right – of –Way; then eastward along Old Alabama Road shoulder or Right – of – Way, passes the CCOS gated entrance at Cherbury Lane, opposite Autry Mill Middle School on Old Alabama Road, to be connected to the existing 20 inch diameter Reuse Main located in Old Alabama Road R/W. **Phase Two (2**): The reuse main will be pumped from the Johns Creek Environmental Campus (JCEC) located in Fulton County at 8100 Holcomb Bridge Road (SR 140), Alpharetta, Georgia 30022. The proposed reuse pipeline leaves the fenced JCEC area, and will be routed northward, on the west side of Holcomb Bridge Road, to near the end of JCEC property, where it then crosses under, routed north, on the east side of Holcomb Bridge Road; to Barnwell Road and Holcomb Bridge Road intersection; and then routed along Barnwell Road east side all the way to the Country Club of the South Maintenance Road entranc**e** gate on Barnwell Road.

Phase Three (3): The proposed reuse main will be connected to the twenty (20) inch diameter reuse main near intersection of the tributary and Chattahoochee River: then follow along the existing gravity sanitary sewer easement to Boles Road; at Boles Road the proposed reuse main will turn eastward and northward along the east bound side of Boles Road, will connect to the existing reuse main stub – out near the Bell Road and Boles Road Round – a – bout and Boles Road and Bell Road intersection.

All the work shall be performed within the existing right – of – way, and/or permanent easements, and as shown on the Project Drawings. All required temporary easements or construction easements are the responsibility of the Contractor.

1.03 Quantities

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

1.04 Partial Owner Occupancy

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

1.05 Coordination of Work

A. The Contractor shall coordinate the work with third parties (such as power, natural gas, or telephone companies, etc.) in areas where such parties may have rights to underground property or facilities.

B. The Contractor shall request from involved third parties maps or other descriptive information, as to the nature and location of such underground facilities or property. The Contractor shall make all necessary investigations to determine the existence and location of underground utilities.

C. The Contractor will be held responsible for any damage to and for maintenance and protection of existing utilities and structures.

D. The Contractor shall coordinate the work with owners of private and public property where access is required for the performance of the work. Legal access will be acquired and provided by the Owner.

1.06 Working Hours

The Contractor working hours shall be as required by the authorize government, City and the County. In order to comply with the authorize government Traffic Control regulations, and Noise Ordinance.

END OF SECTION

SECTION 01011

UNIQUE REQUIREMENTS

Part 1 General

1.01 Scope

The scope of this Section is to convey to the Contractor unique and unusual stipulations and requirements which have established for this Project. Some of the stipulations and requirements are as a result of negotiations with various entities and organizations which have an interest in this Project. Some requirements are based on technical aspects of the Project, which are not otherwise conveyed to the Contractor. The provisions of this Section may supersede the provisions of the Specifications, but shall not supersede the bidding Requirements, Contract Forms or Conditions of the Contract.

1.02 Standards

Existing pavement, sidewalks and curb and gutter, drive ways or storm sewer, if affected by the construction, shall be replaced, in accordance with the relevant City and/or the Georgia Department of Transportation specifications and standards to match existing conditions at a minimum.

1.03 Submittals

A. Sequence Submittal

1. Submit a proposed sequence for construction in accordance with Section 01340, with appropriate times of starting and completion of tasks to the Construction Project Manager for review.
2. The Contractor may propose alternatives to the sequencing constraints to that shown in this Section in an attempt to reduce the disruption to the community or streamline the tasks associated with this Contract. The Construction Project Manager is not obligate to accept any of these alternatives.

B. All requested submittals must be approved by the Owner or Construction Manager, prior to any on site work. This includes, but is not limited to the construction sequencing schedule, Erosion and Sedimentation Control Plan, Tree Protection Plan, Traffic Management Plan, product shop drawings, and health and safety and loss prevention programs.

1.04 Existing Service Operations

A. All existing services and continuity of water service must be maintained during the time construction activities are in progress.

B. The Contractor shall coordinate all work with the Construction Project Manager, so that the construction will not be restrain or hinder the operation of the existing services. If, at any time, any portion of the existing service will be interrupted, the Contractor must obtain approval from the Construction Project Manager, five (5) days in advance, as to the date, time and length of time that portion of the services will be interrupted, until the services are restored.

C. After having coordinated all work with the Construction Project Manager, the Constructor shall prepare a submittal, in accordance with Section 01340 to include the time, time limits and methods of each connection or alteration and have the approval of the Construction Project Manager, before any work is undertaken on the connections or alterations.

D. The Contractor shall comply with the stipulations contained in permits obtained from the relevant or applicable government entity, pertaining to work hours, lane closures, noise pollution, traffic detours, and road closures.

E. Before driveways are interrupted, the Contractor is responsible to coordinate their work activities with the property residence, so that construction will not hinder excess to the property.

1.05 Sequencing and Constraints

A. General

1. The Contractor is responsible for all construction activities sequencing, unless adjustment to any construction activity sequencing, is due the Project's constraint, and/or requested by Construction Project Manager.

2. The completion of specific preliminary sequencing tasks will be required, prior to any construction activities.

3. The Contractor is responsible to verify the project's existing topography, prior to the procurement and delivery of pipe materials.

4. The Contractor is responsible to keep the road fully operational and functional, during the execution of the Project, unless approval is given by the relevant governing authority.

B. The Contractor shall notify the Construction Project Manager in writing at least 72 hours, prior to starting work that will require taking existing facilities out of service.

C. The Contractor may utilize multiple crews to construct the pipeline concurrently at various locations with the approval of the Construction Project Manager, in order to maintain the Project's completion schedule, or as required by the Construction Project Manager.

D. The Contractor is responsible to make their own assessment and determination of requirements that affect or may affect the work progress and sequencing.

E. Prior to the procurement of the proposed water line materials, the Contractor is responsible to field locate the starting and ending, tie-in points and connections locations of existing water pipe line. Field stake the horizontal center line of the proposed reuse pipe line, in order to better procure the total amount of proposed reuse line linear footage.

F. The Contractor is responsible to provide, as an attachment to their Progress Payment Request Submittals, the applicable to date As-Built progress drawing of the installed water line that will support linear footage reuse main, to be approved for payment.

1.06 Site Physical Conditions

A. The Contractor shall field verify the locations of existing subsurface structures, utilities, services, and depth of underground facilities, prior to the start of excavation and construction.

B. The Contractor is responsible to identify, locate, and make the necessary exploratory excavations where existing underground utilities, services, and structures may potentially conflict with propose construction. All exploratory excavations shall be conducted sufficiently ahead to avoid possible delays to the Contractor's proposed reuse main installation schedule, and project's Contract Time.

C. The Contractor is responsible to field locate accurately and document, prior to start of work, the existing site condition of all landscaping features, walls, sidewalk, and curb and gutter alignment, including any existing features that may be impacted by the proposed construction.

1.07 Traffic Control

A. The Contractor is responsible to furnish the necessary traffic flagmen and/or escorts to direct traffic in the roadway areas affected by their construction operations, whenever and wherever, in the opinion of the Construction Project Manager traffic is sufficiently congested or public safety is endangered.

B. Under the Contract Terms, the employment or presence of traffic flagmen or escort, shall not in way relieve the Contractor of their responsible and/or liability.

1.08 CONSTRUCTION STAKING

A. The Project Construction Drawings show the alignment of the reuse water main, and the location of valves, washouts, and other appurtenances.

B. The base line shall be defined as the centerline to which the location of the reuse water line is referenced, or survey line. The Contractor shall be responsible for performing all survey work required for constructing the reuse water main, including the establishment of its base line and/or centerline, and any details surveys needed for the reuse water main installation and construction. This work shall include the staking out of permanent and temporary easements, to ensure that the Contractor is not deviating from the designated easements.

C. The reuse water main level of detail of survey shall be that the correct location, as described on the Construction Drawings or as laid out in the field can be established for construction and can be verified in the field by the Construction Project Manager.

D. Reference Points:

1. The Contractor shall take all precautions necessary, which includes, but not limited to, installing reference points, in order to protect and preserve the centerline or baseline established.
2. Reference points shall be placed at or no more than three (3) from the outside of the construction easement or right - of – way. The location of the reference points shall be recorded in a log with a copy provided to the Construction Project Manager, prior to reference point locations verification. The distances between reference points and the reuse water main centerline shall be accurately measured to 0.01 foot.
3. The Contractor shall give the Construction Project Manager reasonable notice to field verify the set reference points.

END OF SECTION

SECTION 01016

OCCUPANCY

Part 1 General

1.01 Partial Occupancy by Owner

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

END OF SECTION

SECTION 01025

MEASESUREMENT AND PAYMENT

Part 1 General

1.01 Scope

A. The Bid lists each item of the Project for which payment will be made. No payment will be made for any items other than those listed in the Bid. Final payment shall be based on the actual work or service performed, calculated, and field measured, using the united prices set forth in the Contract Document.

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

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

1.02 Descriptions

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

B. The final payment for quantities shall be determined from actual quantities installed and measured in the field. Final quantities to be paid for items not shown on the Project Drawings, for example silt fencing, shall be based on the Bid Unit Price, and quantity approved by the Owner or Construction Project Manager.

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

D. Unless otherwise stated in individual sections of the Specifications or in the Bid, or as approved in writing by the Construction Project Manager, prior to beginning the work, no separate payment shall be made for any item of work, materials, parts, equipment, supplies or related items required to perform and complete the work. The costs for all such items required shall be included in the Unit Price Bid for item of which it is a part.

E. Payment will be made by extending the Unit Prices multiplied by quantities provided, and then summing the extended prices to reflect actual work. Such price and payment shall constitute full compensation to the Contractor for furnishing all labor, equipment, tools, services, and materials not furnished by

the Owner and for performing all operations required to provide to the Owner the entire Project, complete in place, as specified and as indicated on the Project Drawings and Specifications.

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

G. "Provide" shall mean furnish and install.

1.03 Non Payments

A. No separate payment shall be made for property restoration; and the repair of damaged properties, due to the Contractor work execution. Property and the cost shall be included in the Bid Unit Prices, for the execution of the work, and each particular item of work, unless specifically noted otherwise.

B. No separate payment shall be made for excavation, disposal of rubbish and debris, pipe bedding, backfill, and dewatering of trench. All testing required for the execution of the work shall be included as part of the Bid Item Unit Price for the item of work.

C. No separate payment shall be made for any traffic control, work area protection, recording, safety measures, set-up of equipment and set-up of staging area. Payment for these items shall be part of the Bid Unit Price for each particular item of work.

D. No separate payment shall be made for providing detail field survey needed for construction; survey work to be performed by Contractor in the establishment of reference points, construction staking to establish and/or confirm the location of reference points, temporary and permanent, bench marks, proposed reuse line center line, or baseline, right – of – way, and easements limits. The Contractor shall be responsible for all the costs of reestablishing the existing bench marks, reference points and stakes.

E. No separate payment shall be made for delay or extra cost encountered by the Contractor, due to protection, avoidance, or relocation of existing utilities, mains, or services shown or not shown on the Project Construction Drawings.

F. No separate payment shall be made for glands, lock ring or harnessing. The cost shall be included in the Bid Unit Price for each particular item of work.

G. No separate payment shall be made for thrust collars and blocks. All cost shall be included in the Bid Unit Price for each particular item of work, and as shown on the Project Construction Drawings.

H. No separate payment shall be made for abandoning and/or removal of any existing materials from the project area or work site. The cost of such work and materials shall be included in the Bid Unit Price for each particular item.

I. No separate payments shall be made for existing pavement removal and replacement associated with the construction of the Project. The cost of such work and materials shall be included in the Bid Unit Price for each particular item.

J. Not separate payments shall be made for saw cutting existing pavement, any cutting activities necessary to install the proposed work, and including beveling of pipes.

K. No separate payments shall be made for the installation of electronic markers. The cost of such work and materials shall be included in the Bid Unit Price for each particular item.

L. No separate payments shall be made for temporary and/or permanent Erosion and Sedimentation Controls, except as noted on the Project Drawings, or as directed and approved by the Owner.

M. No separate payments shall be made for any portion of the Project for which temporary Erosion and Sedimentation controls are not property maintained.

N. No separate or additional payments shall be made for the Project area where the Contractor need to reseed: due to inadequate watering and maintenance; the loss of seeds caused by site erosion, e.g. wind and rain; inadequate germination of seeds; inadequate coverage and/or density; providing permanent species at the appropriate season, after temporary grassing has been performed.

O. No separate or additional payments shall be made for providing temporary species of grass, where the seasonal limitations does not allow for the proper germination of a permanent species of grass. The cost for sowing or planting temporary species shall be included in the Unit Price Bid for the item it pertains.

P. Not separate or additional payments shall be made for materials that were not installed, the replacement of defective materials, any section of the Project activity which does not pass the applicable tests, or if the area has not been clean up to the satisfaction of the Construction Project Manager.

Q. No separate or additional payments shall be made for maintaining traffic flow, on and /or near or through the Project’s area detour, roadways, streets, driveways, and work segment impacted by the construction activities.

R. No separate or additional payments shall be made for existing rock or pipe line soil excavation, for the Project’s construction. The cost shall be included in the particular work item Bid Unit Price.

S. No separate or additional payment shall be made for removing and replacing the damaged pre - construction area condition adjacent to the Project's site; damaged curb and gutter, driveway areas, and pavements, caused by Contractor working on the Project.

T. No payments shall be made for restoration and the regrading of easements. The cost shall be included in the particular work item Bid Unit Price.

U. No payment shall be made for fittings provided, due to the Contractor's sequence of construction, layout problems, or repairs, except for those shown on the Project Drawings or as specified.

V. No separate payment shall be made for the support of existing pipe, when installing new reuse main over or under existing utilities. All costs for support shall be included in the Unit Price Bid for the reuse main.

W. No separate or additional payments shall be made for temporary measures required or necessary to make the road passable and drivable, including backing to the top of the trench temporarily with crusher run or granular material or placing a temporary asphalt topping surface.

X. No separate or additional payments for Trench Excavation, Backfill and trench stabilization, shall be made for any special or unique method, means, techniques, or equipment necessary for the Contractor's compliance with Specifications, regulatory requirements, permits, and laws or regulations, applicable to the Project.

Y. No separate payments shall be made for trench excavation. All costs shall be included in the Unit Price Bid for the item to which pertains.

Z. No separate payments shall be made for providing any sheeting, bracing, and shoring. All costs shall be included in the Unit price Bid for item to which it pertains.

1.04 Contractor Mobilization/Demobilization

All costs associated with mobilization and demobilization of all required resources shall be included in the Project's one – time Unit Price Bid for CONTRACTOR MOBILIZATION/DEMOBILIZATION.

1.05 Water Mains and Accessories

A. Existing Utilities and Obstructions

1. Horizontal Conflict: No separate payments shall be made for charging the horizontal alignment of the reuse main to avoid a horizontal conflict, with existing utilities, except where additional fittings and/or additional lengths of pipe, as approved by the Construction Project

Manager. The said payment shall be made at the Bid Unit Price, given in the Bid Document.

2. Vertical Conflict: No separate payments shall be made for changing or lowering the vertical alignment of the reuse main to avoid vertical conflict, with existing utilities, except where authorized for additional fittings, concrete encasement or steel casing, as required and is approved by the Construction Project Manager. The said payment shall be made at the Bid Unit Price for which it pertains.

B. Location and Grade:

1. The Construction Verification Surveying cash allowance is solely for the use of the Construction Project Manager, for the verification of Contractor's reference points, centerlines, and work performed. This cash allowance, in no way relieves the contractor of the responsibility of, including, but not limited to installing the required Project reference points, centerlines, temporary and permanent bench marks, or verifying that their work has been performed accurately.

C. Construction along Highways, Streets and Roadways:

1. The Bid Unit Price shall include the cost of erecting and maintaining barriers, Signs, lights, traffic control measures and channelization devices, flagmen, and whatever is necessary to provide a safe work zone, and to protect the public safety, in accordance with the Traffic control Plan, and the current Manual on Uniform Traffic Control Devices for Streets and Highways.

D. Ductile Iron Pipe Reuse Water Main

1. Payment for reuse main installation shall be made at the Unit Price Bid, for the quantities and type provided.

2. Measurement for payment at the Unit Price shall be made along the centerline of the pipe, through valves and fittings.

3. The Unit Price Bid for Reuse Main shall include all installation costs including, but not limited to, materials, labor, trench excavation, dewatering, shoring, shoring, bedding, haunching, backfill utilizing the excavated material as backfill material, soil compaction, clean-up, pressure testing, and all other related items not listed as separate Bid items.

E. Thrust Restraint:

1. The payment for concrete thrust and collars shall be made at the Unit Price Bid for Concrete Thrust Collars.

F. Fittings

1. The Unit Price Bid for FITTINGS shall include the costs of fittings and all joint accessories and the cost of all related blocking. The weight of fittings used for payment shall be AWWA C110 standard weight for all fittings, mechanical joints ends, or AWWA C153 standard weight for all fittings, and shall not include the weight of bolts, glands, or cement lining.

2. Weight of fittings for payment for diameters 24 inches and larger shall be manufacturer's standard weight and shall not include weight of bolts, glands or cement lining.

3. Anchor couplings, not included in a fire hydrant assembly will be paid for at the Unit Price Bid for FITTINGS and shall not be included in the quantities measured for water main. Weight for payment of anchor couplings will be determined from the manufacturer's standard weight, including the coupling and rotating split gland.

4. Hydrant tees not included in a fire hydrant assembly will be paid for at the Unit Price Bid for FITTINGS. Weight for payment of anchor couplings will be determined from the manufacturer's standard weight.

G. Fire Hydrants

1. Payment for fire hydrants shall be made for the actual quantity installed at the Unit Price Bid for FIRE HYDRANT ASSEMBLY - Complete. The Unit Price Bid for fire hydrant assembly shall include all costs for associated valve, valve box, hydrant lead piping and anchor couplings, and a complete fire hydrant assembly, related blocking, gravel drain, grade – lock fitting, anchor couplings, hydrant tee, and all associated labor and materials. All FITTINGS will be paid for separately at the Unit Price Bid for FITTINGS.

2. Payment for hydrant lead piping and blow off piping will be made at the Unit Price Bid for 6-inch WATER MAIN, except when anchor couplings are used.

3. Fittings for blow off and air release hydrant leads will be paid for at the Unit Price Bid for FITTINGS.

4. Payment for hydrant extension sections where the depth of bury of fire hydrants is greater than 4.5 feet shall be made to the nearest half foot at the Unit Price Bid for HYDRANT EXTENSION. No distinction shall be made between the additional barrel lengths provided by measuring and ordering the proper depth of bury for the hydrants and the additional barrel length provided by adding extension kits after the hydrant is ordered. The Unit Price Bid for HYDRANT EXTENSION shall include the cost of valve extension stems.

H. Valves: The Unit Price Bid for VALVES shall include the cost of providing the valve, extension stem, valve box, valve marker, all joint accessories, and all other related items. For valves in a vault, the vault and associate piping, equipment, structures, etc. will be included in the VALVE VAULT Bid item Unit Price.

I. Valve Adjustments in Pavement - The Unit Price Bid for VALVE ADJUSTMENTS IN PAVEMENT (0'-5') shall include the cost of providing the new valve box and lid or 6 inch ductile iron pipe, excavation, backfill, concrete pad, pavement repair and all other related items.

J. Solid Sleeves: Payment for solid sleeves or restrained sleeves shown on the Project Drawings and specifications shall be made at the Unit Price Bid for FITTINGS. No payment shall be made for fittings provided due to the Contractor's sequence of construction, layout problems or repairs, except for those shown on the Drawings or specified.

1.06 Connections to Existing Water Lines

A. The Unit Price Bid for CUT IN CONNECTION shall include the cost of locating and cutting the existing line and making the connection of the new line to the existing line, including all labor, materials, and tools required for a complete installation. All required fittings, valves, ductile iron water main, and thrust blocking will be paid for at the Unit Price Bid for the item to which it pertains.

B. The Unit Price Bid for STRAIGHT CONNECTION OR CONNECTING TO EXISTING LINE, shall include the cost of locating the existing line, removing existing plugs, or other fittings, and/or cutting the existing line, making connection of the new line to the existing line (i.e. with solid sleeve, coupling or as necessary), includes all labor, materials, and tools required for a complete installation. All required fittings, valves, ductile iron pipe, and thrust blocking will be paid for at the Unit Price Bid for the item to which it pertains.

1.07 Removal/Addition of Plug of Cap or Tie - in Existing Water Main

A. Cut and Plug/Deadman Restraint: The Unit Price Bid for CUT AND PLUG / DEADMAN RESTRAINT shall include all costs associated with cutting and/or plugging or capping of the existing water line, including field locating the existing plugged line beginning and ends, excavation, dewatering, cutting the line as necessary to remove or plug or cap and connect to the existing pipe, and as directed by the Construction Project Manager, providing all anchors, rods, straps, and all other related items. Payment will be made for the quantity installed at the Unit Price Bid for the appropriate size water line.

B. Payment for Plugs, Caps and the Reuse Main tie - in activities shall be included in Unit Price Bid for Plugs and/or Caps or Tie - in.

C. Payment for concrete thrust blocking or thrust collars will be made at the Unit Price Bid for TRUST BLOCKING. The quantities shall be determined from the

dimensions shown on the Project Drawings for each size and type of fitting for which the blocking is installed. The Contractor shall bear the costs for quantities in excess of the scheduled amount, as may be required, due to over excavation or other reasons.

1.08 Clean-Up, Testing, and Disinfection

A. No separate payment will be made for clean-up, pressure testing, and disinfection. All costs associated with clean up, pressure testing and disinfection of reuse main shall be included in the Unit Price Bid for WATER MAIN. No payment shall be made for tests that fail to verify required results.

1.09 Vault

A. Measurement for VAULT shall be at the Unit Price Bid. All the cost to completely install a VAULT shall be included in Unit Price Bid.

B. Payments for the construction of VAULT at the station indicated on the Project Drawings, shall include concrete vault, hatch, and/or manhole cover, sump, ladder, miscellaneous fittings, and other work necessary to complete the vault, as specified, and shown on the Project Drawings. The actual vault shall be paid for under the associated item..

1.10 Air Release Valves

A. Measures for AIR RELEASE VALVES shall be the Unit Price Bid. All the cost to provide and construct the air release valve, at the station indicated on the Project Drawings, shall be included in the Unit Price Bid.

B. Payment for AIR RELEASE VALVES shall be at the Unit Price provided in the Bid under Air Release Valves, at stations indicated on the Project Drawings. The Unit Price for AIR RELEASE VALVE shall include full payment for the Air Valve, piping, tapping, fittings, manhole, frame and cover, stone and all related items, as called for on the Project Drawings and Specifications.

1.11 Bore and Jack - Casings

A. The Unit Price Bid for BORE AND JACK shall include all costs associated with installation of the casing and carrier pipe, but not limited to excavation, shoring, dewatering, backfilling, compaction, steel casing pipe, ductile iron carrier pipe, spacers, end seals, grout, and other accessories, for installing the pipe complete in place.

B. Payment for casing shall be made only at the completion of all work specified for the casing installation. No partial payment shall be made for the construction of the casing without carrier pipe.

C. Measurement for payment shall be made along the centerline of the pipe line to the limits of Jack and Bore.

D. Casing pipe may be included in Partial Payment Requests as stored materials, if the casing pipe is stored at the Project site. Casing pipe which has been properly installed, but has not yet been paid for as installed casing, may also be included as stored materials.

E. Payment for pipe in the casing shall be made only at the Unit Price Bid for the BORE AND JACK CASING.

F. In the event that rock is encountered during the installation of the pipe casing, and the installation penetration pressure exceed 6,000 psi, which in the opinion of the Project Construction Manager cannot be removed through the casing, then the Project Construction Manager may authorize the Contractor to complete the crossing by another method. Payment for rock shall be compensated for under the item to which it pertains.

G. No additional payment shall be made for rock and/or soil excavation through the casing.

1.12 Asphalt Pavement Replacement

A. Payment for removing and replacing pavement shall be based on the measured quantity replaced, at the Unit Price Bid for ASPHALT PAVEMENT REPLACING. The Unit Price Bid shall include all the costs associated with removing and replacing pavement, including providing sub – base material and selected backfill, if necessary, and as required by and approved by Construction Project Manager, and the relevant specification.

B. Payment shall be made only for the installation, placement, and construction of the actual field verifiable and measurement, as approved by the Construction Project Manager.

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C. Payment for road resurfacing shall be made at the Unit Price Bid for ASPHALT PAVEMENT REPLACEMENT. The limits eligible for payment shall be based on actual field measured area width and length, relevant Municipality Standard and Specification, Project Drawings, as approved by Construction Project Manager. The Unit Price Bid shall include all costs associated with road resurfacing, labor, materials, tools, equipment, bituminous tack coat, replacing existing stripping and traffic devices, raising existing water valves, or manholes, potholes repair, replacing items affected by the resurfacing activity, and restoring the road to its pre-construction condition.

D. Payment for Utility Cut, associated with Reuse Main installation shall be made at the Unit Price Bid for ASPHALT PAVEMENT REPLACEMENT. The Unit Price shall include all costs associated with trench cutting, existing asphalt pavement saw cut, labor, materials, tools, equipment, removing and disposing existing materials, placement of temporary GAB, placement of temporary measures installation to make its surface drivable and passable, including ten (10) thick concrete cap, bituminous tack coat,

all required items, and/or as required by the applicable Municipality Standard and Detail, and Specification, Project Drawings Details, and/or approved by the Construction Project Manager. Payment shall be made for the actual field measured area, length and width cut, for which the pipeline is constructed or installed within the roadway, as approved by the Construction Project Manager.

E. All payments for road surface milling shall be made at Unit Price Bid for ASPHALT PAVEMENT REPLACEMENT. The Unit Price shall include all costs associated with the milling activity, such as the lowering of existing water valves or manholes, milling the existing pavement to the required thickness, disposing all waste materials, and all related items, and/or as required by the Municipality Standard Detail and Specification, and/or the Construction Project Manager. Payment shall be made for the actual field measured road surface area length and width milled or overlaid, as approved by the Construction Project Manager.

1.14 Erosion and Sedimentation Control

A. General

1. No separate payment shall be made for erosion and sedimentation controls, except as noted below. All other erosion and sedimentation control costs shall be included in the Unit Price Bid for the item to which it pertains. Payment shall be made only for the actual field measured and installed quantity.

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

3. All quantities for payment shall be based upon actual quantity installed and measured, by the Contractor, and approved by the Construction Project Manager.

B. Construction Exit and Entrance: All costs for construction exits, including installation, maintenance, repair, and removal, shall be included in the Unit Price Bid for CONSTRUCTION EXIT AND ENTRANCE. The Unit Price shall include geotextile under liner, stone, and all incidental costs associated with maintaining the construction exit and entrance, per Fulton County Standards and Specifications.

1. If the action of the construction vehicles traveling over the gravel pad does not sufficiently remove mud and debris, the vehicle tires shall be washed prior to allowing vehicles to enter public right-of-way. No additional payment will be made for the cost of washing tires.

2. No payment will be made for construction exits that are improperly constructed or use materials that are not approved.

C. Reinforced Silt Fence: All the costs for Type C silt fence shall including material, installation, maintenance, repair, replacement, and removal, in the Unit Price Bid for REINFORCED SILT FENCE.

D. Hay Bale Check Dams: All costs for hay bale check dams, including hay bales, and necessary earthwork, staking, periodic maintenance and repair, and removal of sediment, and hay bales following establishment of permanent erosion control measures shall be included in the Unit Price Bid for HAY BALE CHECK DAMS.

E. Stone Check Dams: All costs for stone check dams, including stone, geotextile under liner and, necessary earthwork, periodic maintenance and repair, and removal of sediment and stone following establishment of permanent erosion control measures, shall be included in the Unit Price Bid for STONE CHECK DAM. Measurement for payment will be made to the limits allowed in accordance with the Standard Details and Specifications, and/or the Construction Project Manager.

F. Curb Inlet Filter and Protection: All costs for temporary fabric, blocks, wires, and the furnishing of all labor, material, equipment and tools for installation, maintenance, repair and removal, shall be included in the Unit Price Bid for CURB INLET FILTER. Payment shall be based on the actual field quantity installed.

G. Inlet Sediment Traps: All costs for temporary inlet sediment traps (silt box) shall include installation, maintenance, repair, and removal, as required by the Standard Details and Specifications in the Unit Price Bid for INTET SEDIMENT TRAPS.

H. Rip Rap with Filter Fabric Underlay: All costs for rip rap, including filter fabric, installation, maintenance, repair and removal, as required by the Standard Details and Specifications, and/or as directed by the Construction Project Manager, shall be included in the Unit Price Bid for RIP RAP.

I. Tree Protection Fence: All costs for either passive or active tree protection fence, also known as orange mesh safety fence, shall include installation, maintenance, repair and removal, in the Unit Price Bid for TREE PROTECTION FENCE.

1.15 Vegetation Restoration

A. Temporary Seeding: Temporary seeding and mulching shall be applied to all disturbed area to be left exposed for a period greater than 14 days, or as ordered by the Construction Project Manager. The Unit Price Bid for TEMPORARY SEEDING shall include all costs associated with spreading fast growing seed, mulching, watering, maintenance and repair until permanent grassing is established.

B. Permanent Seeding: All costs for permanent seeding, including fine grading, raking, soil preparation (removal of rocks and other objectionable materials), sewing the appropriate type of grass seed, fertilizing, mulching, watering,

temporary protective measures, maintenance and repair until permanent grassing is established, shall be included in the Unit Price Bid for PERMANENT SEEDING. Permanent seed will be applied only after final grading and dress-up of disturbed area have been completed to the satisfaction of the Construction Project Manager.

C. Sod Grassing: Where ordered by the Construction Project Manager, sod shall be provided at the Unit Price Bid for SOD GRASSING for any type. All costs for proper installation, including preparation of surface, installation, rolling, compacting, watering, maintenance, repair, and any temporary measures required to protect the sod until establishment, shall be included in the Unit Price Bid for SOD GRASSING.

D. In no case shall any one area be paid more than once for temporary grassing or for permanent grassing.

E. If an area is temporarily grassed, and as directed by the Construction Project Manager, the area will be left that way permanently, No additional payment will be made for permanent grassing.

F. Measurement for payment will be made by square yard, for the field verified measured area width and length, installed by the Contractor, as approved by the Construction Project Manager, and is allowed by the Standard Details and Specifications.

1.16 Temporary Stream Crossing

A. Temporary Stream Crossing: All costs for constructing temporary stream crossings, whether for contractor access to the work or for work crossing streams, shall be included in the Unit Price Bid for TEMPORARY STREAM CROSSING. All labor and materials including temporary culverts, stone, filter fabric underlay, check dams, bypassing, necessary earthwork, periodic maintenance and repair, and removal of sediment and all materials placed by the Contractor, following the end of the usefulness of the temporary crossing, shall be included in the Unit Prices Bid for TEMPORARY STREAM CROSSING.

B. Stream Crossings shall be constructed as shown in the Project Drawings and Details and Specifications. Any other areas at streams or ditches disturbed, due to the Project's construction, by the Contractor, that may require rip rap, shall be ripped rap at no additional cost to the Owner.

1.17 Trench Excavation, Backfill, and Stabilization

A. Dewatering Excavations: All costs of equipment, labor and materials required for dewatering shall be included in the Unit Price Bid for the item to which it pertains.

B. Trench Foundation and Stabilization

1. No payment for trench stabilization shall be authorized until after the trench has been dewatered. After field verification, and site inspection of

the unsuitable material, if the pipe is installed in an inadequately prepared trench bottom, the Construction Project Manager shall notify the Contractor in writing of the deficiency, and will not authorize payment for that portion of that length of pipe which was improperly installed.

2. Payment for trench stabilization shall be made on the basis of the amount pre- authorized, authorized, and field verified by Construction Project Manager and is in the Unit Price Bid for TRENCH STABILIZATION. Payment shall include all costs for the removal and disposal of unsuitable material and replacement of suitable material, including filter fabric. No additional payment will be made for material required for specified bedding.

C. Bedding and Haunching

1. The Unit Price Bid for pipe for REUSE MAIN, shall include excavation of the trench to the depth below the pipe necessary to provide specified bedding, and to lay the reuse water line to grade. Measurements for payment will be made only to the pipe invert.

2. No separate payment will be made for material used to provide specified bedding. The cost of all bedding materials shall be included in the Unit Price Bid for the item to which it relates, except for trench stabilization.

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

D. Trench Rock Excavation

1. Rock excavation shall be paid for in addition to payment for normal pipe excavation accounted for in the Unit Price Bid for REUSE WATER MAIN. Payment will be made for the measured quantity of rock excavated, at the Unit Price for Trench Rock Base Cost and Trench Rock Premium Cost, if applicable.

2. The Unit Price for Trench Rock Base Cost shall include the normally anticipated cost of rock excavation, the cost of additional bedding and/or any additional backfill material, as specified and all costs incidental thereto.

3. The Unit Price Bid for Trench Rock Premium Cost shall be for all additional costs for rock excavation which, in the opinion of the Contractor, and as approve by Construction Project Manager are in excess of the Base Cost, including but not limited to extra blasting protection, closer grouping of blasting holes, more detonator caps, more caution, etc. The Contractor shall not bid less than zero (bid deduct) for the Trench Rock Premium Cost. Any Bids containing a deduct will be declared non-responsive and rejected by the Owner.

4. Where rock is encountered in trenches for pipeline, excavate to the minimum depth which will provide clearance below the pipe barrel of twelve (12) inches. The maximum allowable volume of rock excavation for payment shall be based on a trench width equal to the outside diameter of the pipe barrel plus 18 inches, or to the specified bottom of the trench to maintain the require cover above the pipe, and the depth of rock along the pipe centerline, utilizing the average top of the rock elevation.

5. The Construction Project Manager and/or Owner representative must be given reasonable notice to measure all rock. Payment will not be made for excavated rock that was not measured and approved by the Construction Project Manager, prior to removal.

6. No allowance shall be made for excavating to extra widths for construction of manholes or other appurtenances, for excavating to sloping sides, or for excavations made necessary by the physical limitations of the Contractor's equipment. Cost of such additional rock excavation shall be included in the Unit Price Bid for the item to which it pertains.

7. Payment for blasting monitoring shall be made from the BLASTING MONITORING cash allowance. A fee must be agreed upon by the Construction Projector Manager, prior to the Contractor employing an independent, qualified specialty subcontractor to monitor the blasting. If the Contractor employs the specialty subcontractor, prior to the Construction Project Manager’s approval of the fee, all such costs are subject to non-reimbursement.

E. Initial Backfill

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

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

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

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

F. Concrete Encasement: Payment for concrete encasement shall be at the Unit Price Bid for CONCRETE ENCASEMENT.

G. Final Trench Backfilling

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

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

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

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

5. Backfill material cost for none excavated trench material, shall be included in the Unit Price Bid for TRENCH BACKFILL, with #57 stone and/or as specify by the Project Drawings, and/or as approved by the Construction Project Manager, per onsite current condition, and/or the issuing Permit authority specification. The Unit Price shall include removing and disposing of existing excavated trench materials , traffic control, placing temporary measures to make surface passable and drivable, including backfilling to the top of the trench temporarily with crushing run and/or GAB or granular material, or placing a temporary asphalt topping, or as approved by the Construction Project Manager. Payment and measurement shall be made base on the actual material placed, from the bottom of the concrete top, as specify in the Project Drawings Asphalt Pavement Replacement Detail and for the trench length and width of which the pipeline is installed.

6. Backfill Density testing for compacted Trench material placed, shall be included in the Unit Price Bid item BACKFILL DENSITY TEST. The Unit Price shall include, but not limited to; labor, equipment, lab cost, cost incidentals, and/or related items, and the relevant specification. Field measurement cost shall be based on a density test per 500 linear feet interval, along installed pipe length, and the Contractor and sub-contractor are responsible to provide documentation and/or daily record of the actual number of field tests, as approved by The Construction Project Manager.

H. Additional Material: No separate payment will be made for additional earth or fill materials imported to the Project site.

1.18 Easement Clearing and Grubbing

A. The Unit Price Bid for EASEMENT CLEARING AND GRUBBING shall include all costs associated with clearing a 20-foot wide easement on the Project Drawings, as approved by the Construction Project Manager, prior to clearing, including but not limited to removal and disposal of trees, stumps, roots, undergrowth, debris, or other objectionable matter.

B. LIGHT CLEARING shall be defined by an easement that is dense with shrubs, brush, and trees up to one foot in diameter.

C. MEDIUM CLEARING shall be defined by an easement that is dense with shrubs, brush, and trees averaging one to two feet in diameter.

D. HEAVY CLEARING shall be defined by an easement that is dense with shrubs, brush, and trees averaging over two feet in diameter, including specimen trees.

E. The cost of moving and reestablishing landscape features, including labor and materials, shall be included in the Unit Price Bid for the item to which it pertains.

F. No payment will be made for clearing and grubbing in grassed areas and in areas with non-established vegetation. The costs associated with such clearing shall be included in the Unit Price Bid for the item to which it pertains.

G. No separate cost shall be made for clearing and grubbing. All costs shall be included in the Unity Price Bid for CLEARING AND GRUBBING.

1.19 Remove, Repair and Replace Driveway, Curb and Gutter, and Sidewalk

A. General:

1. Payment for removing, repairing and replacing Concrete Driveway shall be made based on the actual measured quantity replaced, for the type pavement, at the Unit Price Bid, for REMOVE AND REPLACE PAVEMENT. The Unit Price Bid shall include all costs associated with cutting, removing, and disposing of existing materials, replacing and compacting materials for base, subbase, and all related items as required, including providing select backfill if necessary, all traffic control and temporary measures for maintaining traffic, and access, in accordance with the Project Drawings Standard Details and Specifications and/or per the applicable jurisdiction Standard Details and Specifications.

2. Payment shall be made only for driveways affected and/or damaged by the reuse pipeline construction.

3. Payment for driveways soils testing shall be made from the SOILS, CONCRETE, ASPHALT, AND MATERIALS TESTING cash allowance, only if requested, pre – approved and approved by the Construction Project Manager. No payment shall be made for tests that fail to verify required results.

4. No additional payment will be made for removing and replacing damaged adjacent pavement.

5. No additional payment will be made for saw cutting of driveways or curbs.

B. Payment for removing and replacing existing Curb and Gutter shall be made based on the actual field measured quantity replaced, and the Standard Details and Specifications, at the Unit Price Bid for REMOVE AND REPLACE CURB AND GUTTER. The Unit Price Bid shall include all costs associated with cutting,

removing, replacing, and displacing existing materials, and all related items as required, including all traffic control measures.

C. Payment for removing and replacing Concrete Sidewalk shall be made based on the field measured quantity replaced, at the Unit Price Bid for SIDEWALK. The Unit Price Bid shall include all costs associated with cutting, removing existing sidewalk, removing, replacing, displacing existing materials, and compacting placement material, and all other items as required, completing the sidewalk repair, including all traffic control measures, and temporary measures for maintaining sidewalk capability, in accordance with the Project Drawings Sidewalk Standard Details and Specifications, and/or per the applicable jurisdiction specification.

D. Payment for removing and replacing Asphalt Driveways will be made based on the actual field measured quantity replaced, at the Unit Price Bid for RESIDENTIAL ASPHALT DRIVEWAY. The Unit Price Bid shall include all costs associated with cutting, removing and disposing existing materials, replacing and compacting material for base, sub base, and all related items as required for a completing driveway repair, including all traffic control and temporary measures for maintaining traffic and access, in accordance with the Project Drawing Standard Detail and Specifications and/or per the applicable jurisdiction Specifications. .

E. The Unit Price Bid for removing, disposal and replacing existing Sidewalk, shall include, but not limited to base, bricks, concrete, forms, curing, finishing, labor, materials, tools, and appliances, and all related items necessary to complete the work, and/or per the applicable jurisdiction Standard Detail and Specification.

F. It is anticipated that existing Curb inlets and storm sewer Catch Basins can be avoided during construction. However, if the Contractor encounters a situation where the proposed pipeline cannot be installed without the removal of an existing Curb Inlet or Catch Basin, or their affected parts, then the Construction Project Manager shall be notified. If approved by the Construction Project Manager, the removal and replacement of the Curb Inlet and/or Catch Basin or the affected parts shall be paid for from the Utility Relocation or Utility Conflict resolution cash allowance.

1.20 Pavement Marking and Striping

The Unit Price Bid for PAVEMENT MARKING AND STRIPING shall include all costs associated with applying standard DOT striping and paint as listed in the Bid and/or the relevant Government Authority, and as ordered by the Construction Project Manager. All required materials, labor, tools, equipment, and traffic control shall be included in the Unit Price Bid.

1.21 Traffic Control

A. All costs for providing traffic control in compliance with the Manual on Uniform Traffic Control Devices (MUTCD) and Georgia Department of Transportation (GDOT) Specifications shall be included in the Unit Price Bid for the item to which it pertains. No additional payment will be made for complying with MUTCD or GDOT requirements.

B. Payment for TRAFFIC CONTROL, as indicated in the Bid will be made only for additional traffic control devices, as approved by the Construction Project Manager.

C. The Unit Price Bid for STANDARD DOT CONCRETE BARRIER shall include all costs for providing, installing and removing a standard DOT concrete barrier, as directed by the Construction Project Manager.

1. No excavation in or near roadways will be left open overnight. Therefore, all concrete barriers will be required to be removed from the roadway and moved to a location where vehicular and pedestrian traffic are not obstructed. The cost of moving the barriers as such shall be included in the Unit Price Bid.

2. Measurement for payment shall be made based on the actual linear footage of barrier installed, per day, approved by the Construction Project Manager and serving the purpose for which it was intended. Payment will not be made for excess barriers stored by the Contractor in any location.

D. The Unit Price Bid for MUTCD STANDARD SAFETY BARREL shall include all costs for providing, installing and removing a standard MUTCD safety barrel, as directed by the Construction Project Manager. Only safety barrels directed and approved by the Construction Project Manager, in addition to those required by the MUTCD and GDOT, shall be paid for separately.

E. The Unit Price Bid for POLICE CRUISER shall include all costs for providing a police cruiser for additional traffic control. Payment will be made for hours spent on site, which may be a portion of a standard work day. Payment shall be made only for hours documented by the Contractor and approved by the Construction Project Manager.

F. The Unit Price Bid for CERTIFIED FLAGMAN shall include all costs for providing a flagman for additional traffic control, as directed and approve by the Construction Project Manager, in addition to the requirements of MUTCD and GDOT.

1. The flagman shall be certified and dedicated to maintaining and directing traffic flow. An individual who works part time as a flagman and part time as a laborer or acts in dual capacity will not be approved for payment

under this item. Proof of certification can be required by the Construction Project Manager, prior to acceptance for payment.

2. Payment will be made for actual hours spent on Project site performing dedicated flagman duties, which may be a portion of a standard work day. Payment shall be made only for hours documented by Contractor and approved by the Construction Project Manager.

G. The Unit Price Bid for LIGHT PLANT shall include all costs for providing a light plant, including generator and lighting system, for night work, as directed and approved by the Construction Project Manager .

H. The Unit Price Bid for ELECTRONIC MESSAGE BOARD shall include all costs for providing an electronic message board, as directed and approved by the Construction Project Manager.

1.22 Remove and Replace Existing Fence

The Unit Price Bid for REMOVE AND REPLACE EXISTING FENCE shall include all costs associated with removing, and replacing existing fence of the type and material listed in the Bid, including disposing of waste materials, restoration of site to original condition, and all other associated work for a complete installation.

1.23 Cast in Place Concrete

A. Structural Concrete: The Unit Price Bid for STRUCTURAL CONCRETE shall include all costs associated with placing concrete as directed and approved by the Construction Project Manager, including excavation, dewatering, formwork, placing of concrete, and all associated labor, tools, and materials. This item will not be utilized for concrete piers for stream crossings.

B. Reinforcing Steel: The Unit Price Bid for REINFORCING STEEL shall include all costs associated with providing reinforcing steel for structural concrete, including providing steel as directed and approved by the Construction Project Manager and all labor, tools, and materials required.

C. Concrete Thrust Collars: The Unit Price Bid for CONCRETE THRUST COLLARS shall include all associated costs including high early strength concrete, reinforcing, forming and weld on collar or split retainer gland as directed and approved by the Construction Project Manager. Measurement for payment shall be made at the Unit Price Bid for the quantity of installed concrete for the appropriate size pipe.

D. Payment for CONCRETE THRUST BLOCKING AND ENCASEMENT shall be made at the Unit Price Bid for the measured quantity installed. The Unit Price Bid shall include all associated costs including high early strength concrete, reinforcing, forming, and all related items. Limits shall be determined from dimensions shown on the Project Drawings for each size and type of fitting for which blocking is installed, or as directed and approved by the Construction

Project Manager. The Contractor shall bear all costs for quantities in excess of the scheduled amount, as required, due to over excavation or other reasons.

1.24 Programmable Electronic Marking Devices

The Unit Price Bid for PROGRAMMABLE ELECTRONIC MARKING DEVICES shall include the cost of providing the marking devices including programmer/locator as specified, including programming the devices and placing them along the pipe centerline at 100 Linear Feet intervals and excavation. Measurement for payment will be based on the actual field install and documented quantities and as approved by the Construction Project Manager.

1.25 Utility Location – Excavation and Backfill

A. Soft Dig Hydro Excavation: The Unit Price Bid for SOFT DIG HYDRO EXCAVATION shall include all costs associated with locating the assigned existing Fulton County utility, excavating to directly above the existing pipe, measuring the depth, diameter and type of the pipe, backfilling and compacting the hole up to two feet from existing grade with soil, encoding a 3M ID marker device, installing the marker above the pipe at a depth of two feet, and backfilling with soil and dressing the disturbed area with like surrounding materials. Measurement for payment shall be based on the actual field number of locations, only when directed and approved by the Construction Project Manager. prior to any soft dig excavation.

B. Where location for Fulton County utility is performed in roadways or sidewalks, other materials may be required for backfill. Select materials will be paid for at the Unit Prices Bid for TRENCH STABILIZATION. Measurement for payment will be made on the actual quantity of material used for backfill of the hole where the marker ball is installed.

C. Exploratory Excavation: The Unit Price Bid for EXPLORATORY EXCAVATION shall include all costs associated with excavation of an area by machine and by hand where necessary with the intent of locating a Fulton County utility, as ordered and approved by the Construction Project Manager, including all equipment, tools, and labor. The costs associated with removal and replacement of roadway, driveway, sidewalk, or curb and gutter or other materials, shall be included under the appropriate pay item. Measurement for payment will be based on the actual amount of excavation required to locate a Fulton County utility, only when ordered by the Construction Project Manager, prior to any excavation. This item shall not be used for standard locating of utilities as required to perform the work.

D. No payment will be made for excavation that does not locate Fulton County utility, or where the marker ball is not installed directly above the pipe.

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

1.26 Cash Allowances

A. General

1. The Contractor shall include in the Bid Total all allowances stated in the Contract Documents. These allowances should cover the net cost of the services provided by a firm selected by the Owner. The Contractor's handling costs, labor, overhead, profit and other expenses contemplated for the original allowance shall be included in the Unit Price Bid items to which they pertain and not in allowances.

2. No payment will be made for nonproductive time on the part of testing personnel due to the Contractor's failure to properly coordinate testing activities with the work schedule or the Contractor's problems with maintaining equipment in good working condition. The Contractor shall make all necessary excavations and shall supply any samples of materials necessary for conducting compaction and density tests.

3. No payment shall be provided for services that fail to verify required results.

B. Documentation

1. Submit copies of the invoices, by the Contractor with each periodic payment request from the firm or company which provides the services.

2. Submit, by the Contractor, all results of services provided which verify the required results.

C. Schedule of Cash Allowances

i.

1. **Unforeseen Conditions:** Allow the amount specified in the Bid to resolve unforeseen project situations and/or site conditions during construction, to be pre – approved and approved by Construction Project Manager, prior to the start of work activity.

2. **Soils, Concrete, Asphalt, Materials, and Water Quality Testing:** This allowance amount specified in the Bid, is for additional testing services not included in the Unit Price Bid for the item to which it relates, and for services not specifically required in the applicable authorized Specifications, for the services of a geotechnical engineering firm or testing laboratory to verify soils conditions, including trench excavation and backfill, asphalt coring and density tests, testing of concrete cylinders for poured in place concrete, pipe

materials, water quality and similar issues, but is requested or directed and for approval by the Construction Project Manager, prior to the start of work activity.

3. **Utility Conflict Resolution:** Allow the amount specified in the Bid to resolve any unforeseen utility conflicts, which may accrue during **the** Project's construction, including its relocation and/or replacement, as directed and approved by the Construction Project Manager.

   a. Known on site located utility which was not shown or accurately field marked by Fulton County water locators, but is necessary to be relocated to accommodate the installation of the proposed pipeline.

   b. Unknown on site located utility which was not marked by Fulton County water locators, but requires significant relocation work, prior to the start of the proposed pipeline installation.

4. **Large Tree Removal:** Allow the amount specified in the Bid for the services of a **tree removal specialist** to remove individual trees, for additional tree removal, not included in the Unit Price Bid under EASEMENT CLEARING AND GRUBBING, as directed and approved by the Construction Project Manager. Services will be reimbursed at direct cost plus 10%, and the Contractor must provide the tree removal specialist invoices to the Construction Project Manager for approval, prior to the start of work.

5. **Survey and/ or Inspection and Blasting Monitoring**: Allow the amount provided in the Bid for the services of an independent, qualified specialty subcontractor to monitor the blasting, as directed and approved by the Construction Project Manager. The services will be reimbursed at direct cost with no mark – up. The Contractor must provide an estimated invoice for services or activities to be performed, for pre-approval and, approval, by the Construction Project Manager, prior to the start of work.

6. **Additional Landscaping, not shown on the Project Drawings**: Allow for the amount specified in the Bid for additional existing or current landscaping replacement, not shown on the Project Drawings, or specified, but is affected by the Project construction. The Contractor must provide an estimate invoice for activities to be performed, for pre – approval and approval, by the Construction Project Manager, prior to the start of work activity.

7. **Construction Verification Surveying:**

   a. Allow the amount provided in the Bid for Project construction field staking surveying of the proposed pipeline horizontal centerline alignment, depth of cover checks throughout installation of

pipeline, and as – built verification and accuracy of pipe line, if deemed necessary by the Construction Project Manager. The Construction Project Manager shall pre – approve and approve the independent surveying firm selection by the Contractor. The Contractor must provide an estimate invoice from the approved selected survey firm to perform the work activity, prior to the start of work.

b. This allowance shall only be utilized by the Owner or Construction Project Manager, for field verification of the Contractor's reference points, proposed pipeline centerline, and project activities performed by the Contractor. This cash allowance does not in any way relieves the Contractor of their responsibilities, for installing the necessary project reference points, field staking the proposed pipeline horizontal centerline, field checking, or verifying the installed pipeline required minimum depth of cover, installing temporary and permanent bench marks, and field verifying the accuracy of the Contractor's work activities performed, including as – built drawings.

8. **Exploratory Excavation:** Allow the amount provided in Bid for subsurface investigation to field locate and identify existing water lines size, depth, pipe type, within the Project's pipeline installation limit, where there is no as – built or record drawings. The Construction Project Manager shall per – approved and approved all exploratory excavation locations, the number of locations, and exploratory excavation request by Contractor, including estimated cost, prior to the start of work.

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

Part 1 General

1.01 Scope

A. Permits and Responsibilities: The Contractor shall, without additional expense to the Owner, be responsible for obtaining all necessary licenses and permits, for complying with any applicable federal, state, county and municipal laws, codes and regulations, in connection with the prosecution of the Work activities.

1. In addition, the applicable Cities Permits, Right of Way Encroachment permits, and similar type permits, and all appropriate licenses are the responsibility of the Contractor.

2. If land disturbance permits, DOT permits, or easements are required, they can be applied for, as a part of the Project design process, by the County.

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

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

END OF SECTION

SECTION 01091

CODES AND STANDARDS

Part 1 General

1.01 Description

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

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

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

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

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

1.02 Standard Organizations

A. Piping and Valves

ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
DIPRA	Ductile Iron Pipe Research Association
FCI	Fluid Controls Institute
MSS	Manufacturers Standardization Society
NCPI	National Clay Pipe Institute
NSF	National Sanitation Foundation
PPI	Plastic Pipe Institute
Uni-Bell	PVC Pipe Association

B. Materials

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

C. Painting and Surface Preparation

NACE	National Association of Corrosion Engineers
SSPC	Steel Structures Painting Council

D. Electrical and Instrumentation

AEIC	Association of Edison Illuminating Companies
AIEE	American Institute of Electrical Engineers
EIA	Electronic Industries Association
ICEA	Insulated Cable Engineers Association
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	ISA – The Instrumentation, Systems, and Automation Society
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
REA	Rural Electrification Administration
TIA	Telecommunications Industries Association
UL	Underwriter's Laboratories
VRCI	Variable Resistive Components Institute

E. Aluminum

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association

F. Steel and Concrete

ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
CRSI	Concrete Reinforcing Steel Institute
NRMA	National Ready Mix Association
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute

G. Welding

ASME	American Society of Mechanical Engineers
AWS	American Welding Society

H. Government and Technical Organizations

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

I. General Building Construction

AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AITC	American Institute of Timber Construction
APA	American Parquet Association, Inc.
APA	American Plywood Association
BHMA	Builders Hardware Manufacturers Association
BIFMA	Business and Institutional Furniture Manufacturers Association
DHI	Door and Hardware Institute
FM	Factory Mutual Fire Insurance Company
HPMA	Hardwood Plywood Manufacturers Association
HTI	Hand Tools Institute

IME	Institute of Makers of Explosives
ISANTA	International Staple, Nail and Tool Association
ISDSI	Insulated Steel Door Systems Institute
IWS	Insect Screening Weavers Association
MBMA	Metal Building Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NAGDM	National Association of Garage Door Manufacturers
NCCLS	National Committee for Clinical Laboratory Standards
NFPA	National Fire Protection Association
NFSA	National Fertilizer Solutions Association
NKCA	National Kitchen Cabinet Association
NWMA	National Woodwork Manufacturers Association
NWWDA	National Wood Window and Door Association
RMA	Rubber Manufacturers Association
SBC	SBCC Standard Building Code
SDI	Steel Door Institute
SIA	Scaffold Industry Association
SMA	Screen Manufacturers Association
SPRI	Single Ply Roofing Institute
TCA	Tile Council of America
UBC	Uniform Building Code

J. Roadways

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

K. Plumbing

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

L. Refrigeration, Heating, and Air Conditioning

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

SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SMC	SBCC Standard Mechanical Code
TEMA	Tubular Exchangers Manufacturers Association

M. Equipment

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

1.03 Symbols

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

END OF SECTION

SECTION 01200

PROJECT MEETINGS

Part 1 General

1.01 Scope

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

B. The scheduling and Administration of pre-construction meeting and project progress meetings, by Construction Project Manager, includes, but not limited to the following:

1. Agenda preparation;

2. The making of physical arrangements for the meetings.

3. Presiding over the meetings.

4. The recording of meeting minutes, including significant meeting proceedings and decisions.

5. The distribution of meeting minutes copies to participants.

1.02 Preconstruction Meeting

A. The Construction Project Manager will schedule the pre - construction meeting, prior to the Contractor mobilizing and the start of any Project activities and the issuance of the Notice to Proceed. This meeting goal includes reviewing the construction drawings, key elements of contract documents, projection administration requirements, and projection mobilization procedures.

B. The meeting location will be determined by the Construction Project Manager.

C. Representatives or participants may include:

1. Owner, including the Construction Project Manager, any other Owner Representative(s).

2. The Project design Engineer, if necessary.

3. The Contractor’s Project Manager, Project superintendent.

4. The Project’s Major subcontractors, as appropriate.

5. Representatives of governmental or regulatory agencies, when appropriate.

6. The appropriate Owner Maintenance and Operation Staff.

D. The agenda for the pre - construction meeting will consist of the following, as a minimum:

1. Distribution and discussion of major subcontractors and tentative construction schedule, and project phasing requirements.

2. Critical work sequencing, special conditions, and coordination.

3. The Project communications path, project construction progress meetings frequency, designation of responsible personnel and emergency telephone numbers.

4. The approval and processing of field decisions or changes.

5. Adequacy of distribution of Contract Documents.

6. Project overall schedule, Contractor's Construction Progress Schedule, and submittal of shop drawings, product data and samples.

7. Pay request format, submittal cutoff date, pay date and retainage.

8. Procedures for maintaining record documents, project as – built drawings,

9. Use of premises, including office and storage areas and Owner's requirements.

10. Major equipment deliveries and priorities.

11. Safety and first aid procedures.

12. Security procedures.

13. Housekeeping procedures and waste management.

14. Work hours.

1.03 Project Coordination Meetings

A. Project construction coordination meetings will be held monthly or at regular intervals, as appropriate, or as requested at the direction of the Construction Project Manager, throughout the duration of the Projection construction. The party requesting the meeting shall

provide the other parties with as much notice as possible, including a written agenda for such meeting.

B. Hold meetings as the Project construction progress dictates.

C. The meeting will be held at a location indicated by the Construction Project Manager.

D. The Contractor's Project Manager, Project Superintendent, and the relevant sub- contractor representative will attend.

E. The minimum meeting agenda include, but is not limited to:

1. The review and approval of previous meeting minutes.

2. The review of short term work schedule, overall work schedule, submittal schedule, construction progress, and Contractor's corrective measures, and procedures to regain project's planned schedule, or progress.

3. The identification of possible construction, installation problems, conflicts, field changes and/or adjustments which can impede the Project's short term and overall construction work schedules, the relevant field construction observations and decisions .

4. Review work quality and control, standard, and project as – built Drawings.

5. Identify and track actions items for all parties, in order to maintain a running list of action items with specific designation for parties responsible and expected completion dates.

F. Other meetings may be required by the Owner/Construction Project Manager, as warranted during the construction and prior the start of Construction. All relevant parties shall attend such meeting.

END OF SECTION

SECTION 01210

INSPECTION OF WORK

Part 1 General

1.01 Scope

A. The work covered by this Section includes the Construction Project Manager's and Contractor's responsibilities and obligations regarding inspection of the Work performed.

1.02 Construction Manager Inspection or Representative

A. The Construction Project Manager shall have the right of access to inspect the work at all times. All materials, equipment, and products shall be subject to the Construction Project Manager review, as specified herein.

B. The Construction Project Manager and/or assign inspector is responsible for general surveillance of the work on behalf of the Owner. The Construction Project Manager and/or assign inspector is not responsible for construction means, methods, sequences, or procedures or for safety precautions and programs in connection with the work. The Construction Project Manager and /or assign inspector is not for supervision of the work and shall not give instruction to the Contractor's failure to carry out the work in accordance with the Contract Documents.

1.03 Contractor's Duties

A. The Contractor is responsible for all materials, equipment, methods, and procedures in execution of the work.

B. The Contractor shall correct to the satisfaction of the Construction Project Manager and/or assign Inspector any work or material found to be defective or of deficient quality. Such corrections shall be made by the Contractor at no additional expense to the Owner.

1.04 Right of Entry

A. Representative of the County, the relevant government entity, the Environmental Protection Division of the Georgia Department of Natural Resources, and others identified by the Owner, shall have access to the work, wherever it is in preparation or progress. The Contractor shall provide proper facilities for such access and inspection.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULING

Part 1 General

1.01 Scope

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

B. The purpose of the schedule is to demonstrate that the Contractor can complete the overall Project and each Phase within the Contract Time and the specific assigned Phase Construction Time, and meet all required interim milestones. The schedule also provides a basis for determining the progress status of each phase and the Project relative to specific dates and completion time.

1.02 Submittals

A. Overall Project Schedule (OPS)

1. The Contractor shall submit the OPS schedule within ten (10) days after date of the Notice of Proceed.

2. The OPS schedule shall identify various critical project milestones, in order to address the public and activities within the project's area.

3. The Construction Project Manager will review the schedule and return it within 10 work days after receipt.

4. If required, resubmit within 10 work days after receipt of a returned copy.

B. Near Term Schedule (NTS)

1. The Contractor shall submit the first thirty (30) project work days Near Term Schedule, within ten (10) days of the Notice to Proceed (NTP).

2. The Construction Projector Manager will review the schedule and return it within ten (10) project work days after receipt.

C. The Contractor shall submit an updated OPS and NTS with each Progress Payment Request.

D. The Contractor shall submit the number of copies required, plus four copies to be retained by the Owner.

1.03 Approval

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

1.03 Overall Project Schedule (OPS)

A. The Contractor shall submit to the Construction Project Manager, for approval detailed Overall Project Schedule of the Contractor's proposed operations for the duration of the Project or Contract Time. The OPS may be in the form of a Gantt chart or Bar Chart, or as approved by the Construction Project Manager.

B. Gantt Chart or Bar Chart Schedule:

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

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

3. The schedule shall include activities drawing review; fabrication delivery and installation of materials and equipment on site.

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

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

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

7. The schedule shall be printed on a minimum 11 x17 inch size paper.

1.04 Near Term Schedule (NTS)

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

B. The Near Tern Schedule can be in the form of Gantt chart or Bar Chart and shall include a written narrative description of all activities to be performed, and describe corrective action to be taken for activities that are behind schedule.

1.06 Updating Schedule

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

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

C. The Contractor shall provide a written narrative project report at each Project's Coordination Meeting. The report shall include the following:

1. A description of the overall project status and comparison to the Overall Project Schedule.
2. Identify the activities which are behind schedule and describe corrective action to be taken.

3. Describe any changes or revisions to the Project and their effect on the Overall Project Schedule.

4. Describe all the Near Term Schedule activities that are to be completed during the next thirty (30) days. The report shall include a description of all activities requiring participation by the Contractor and Owner.

END OF SECTION

SECTION 01320

CONSTRUCTION PHOTOGRAPHS AND VIDEOS

Part 1 General

1.01 Scope

A. The Contractor shall furnish all equipment and labor materials required to provide the Owner with digital construction photographs of the Project. Photographs shall be provided on a compact disk.

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

1.02 Pre and Post Construction Photographs

A. Prior to the commencement of work on the site, the Contractor shall take project pre-construction photographs and video of the work area or site to record existing conditions.

B. Following completion of the work, photos shall be made showing the same areas and features as in the pre- construction photographs. This documentation shall be digital, and shall indicate date, project name, direction in which the images were taken and the location where the images were taken. The Contractor shall document the entire area of proposed construction site and site entries and access roads from multiple perspectives.

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

D. The pre- construction photographs shall be submitted to the Construction Project Manager within 25 calendar days after the date of receipt by the Contractor of Notice to Proceed.

E. The Contractor shall provide post - construction photographs, video, digital copies of photographs of the entire pipeline route and construction site, and a minimum of three (3) CD, Including Project's as-built construction drawings, prior the Project's retainage payment is approved, and final acceptance of the project by the Owner.

F. Project's Substantial completion: The Contractor shall provide one (1) set of complete photographs and digital photographs at the Project's Substantial Completion to the Construction Project Manager, as documentation.

1.03 Progress Photographs and Submittals

A. The Contractor shall provide digital construction images showing the progress of the work on a monthly basis. Also progress photograph files shall be provided on compact discs' as well as hard copies. Documentation shall indicate where the images were taken, the date, time taken, name of project, and the direction in which the images were taken, and description of work shown. The photographs shall be taken to document completely the ongoing construction activities.

B. Starting immediately after the date of the pre-construction documentation and continuing as long as the work and/or construction activities are in progress construction photographs shall be taken.

C. A minimum of 10 photographs shall be submitted with each request for payment. The view selection will be as agreed to with the Construction Project Manager. One copy of each photograph shall be submitted. Failure to include photographs may be cause for rejection of the payment request.

END OF SECTION

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

Part 1 General

1.01 Scope

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

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

C. Definitions: Submittals are categorized as follows:

1. Shop Drawings

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

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

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

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

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

f. Minimum Scale:

i. Assembly Drawings Sheet, Scale: 1 inch = 30 feet.

ii. Detail Sheet, Scale: 1/4 inch = 1 foot.

2. Product Data

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

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

3. Samples

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

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

4. Miscellaneous submittals related directly to the Work (non administrative) warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the Work but not processed as shop drawings, product data or samples.

1.02 Specific Category Requirements

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

1. The date of submittal and the dates of any previous submittals.

2. The Project title.

3. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.

4. The Names of:

   a. Contractor

   b. Supplier

   c. Manufacturer

5. Identification of the product, with the Specification section number, permanent equipment tag numbers and applicable Drawing No.

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Notification to the Engineer in writing, at time of submissions, of any deviations on the submittals from requirements of the Contract Documents.

10. Identification of revisions on resubmittals.

11. An 8 x 3 inch blank space for Contractor and Engineer stamps.

12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the Work and of Contract Documents.

13. Submittal sheets or drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

1.03 Routing of Submittals

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

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

Part 2 Products

2.01 Shop Drawings

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

B. Submit all shop drawings in the form of six hard copies and one pdf file.

C. One reproducible for all submittals larger than 11 x 17 inches and no more than three prints of other submittals will be returned to the Contractor.

2.02 Manufacturer's Literature

A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.

B. Submit the number of copies which are required to be returned (not to exceed three) plus three copies which will be retained by the Engineer.

2.03 Samples

A. Samples shall illustrate materials, equipment or workmanship and established standards by which completed work is judged.

B. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.

C. Submit all samples in the quantity which is required to be returned plus one sample which will be retained by the Engineer.

2.04 Colors

A. Unless the precise color and pattern is specifically described in the Contract Documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.

B. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

Part 3 Execution

3.01 Contractor's Coordination of Submittals

A. Prior to submittal for the Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:

1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.

2. Coordinate as required with all trades and all public agencies involved.

3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this Section.

4. Clearly indicate in a letter or memorandum on the manufacturer's or fabricator's letterhead, all deviations from the Contract Documents.

B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement.

C. The Owner may back charge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a “No Exceptions Taken” mark.

D. Grouping of Submittals

1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items.

2. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to the Engineer along with Contractor's comments as to compliance, non-compliance or features requiring special attention.

E. Schedule of Submittals

1. Within 30 days of Contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the

estimated date of submittal and the desired approval date for each shop drawing anticipated. A reasonable period shall be scheduled for review and comments. Time lost due to unacceptable submittals shall be the Contractor's responsibility and sometime allowance for resubmittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.02 Timing of Submittals

A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.

B. In scheduling, allow sufficient time for the Construction Project Manager review following the receipt of the submittal.

3.03 Reviewed Shop Drawings

A. Engineer Review

1. Allow a minimum of 30 days for the Construction Project Manager initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The Construction Project Manager will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Construction Project Manager on each submittal as to whether processing time is critical to progress of the Work, and therefore the Work would be expedited if processing time could be foreshortened.

2. Acceptable submittals will be marked “No Exceptions Taken”. A minimum of three copies will be retained by the Construction Project Manager and the Owner's use and the remaining copies will be returned to the Contractor.

3. Submittals requiring minor corrections before the product is acceptable will be marked “Make Corrections Noted”. The Contractor may order, fabricate and ship the items included in the submittals, provided the indicated corrections are made. Drawings must be resubmitted for review and marked “No Exceptions Taken” prior to installation or use of products.

4. Submittals marked “Amend and Resubmit” must be revised to reflect required changes and the initial review procedure repeated.

5. The “Rejected See Remarks” notation is used to indicate products which are not acceptable. Upon return of a submittal so

marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.

6. Only two copies of items marked “Amend and Resubmit” and “Rejected See Remarks” will be reviewed and marked. One copy will be retained by the Construction Project Manager and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.

B. No work or products shall be installed without a drawing or submittal bearing the “No Exceptions Taken” notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.

C. Substitutions: In the event the Contractor obtains the Engineer's approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor's own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.

D. Use of the “No Exceptions Taken” notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer's review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

3.04 Resubmission Requirements

A. Shop Drawings

1. Revise initial drawings as required and resubmit as specified for initial submittal, with the resubmittal number shown.

2. Indicate on drawings all changes which have been made other than those requested by the Engineer.

B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with the resubmittal number shown.

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

Part 1 General

1.01 Scope

A. This Section includes testing which the Owner may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.

B. This work also includes all testing required by the Owner to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength and slump testing, soil compaction, etc.

C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer, e.g., testing of pipe.

D. The testing laboratory or laboratories will be selected by the Owner. The testing laboratory or laboratories will work for the Owner.

1.02 Payment for Testing Services

A. The cost of testing services required by the Contract and Specifications to be provided by the Contractor shall not be paid for by the Owner through the CASH ALLOWANCE, i.e., concrete testing, soil compaction, and asphalt testing.

B. The cost of additional testing services not specifically required in the Specifications, and Contract or Bid Item, but is requested by the Owner or Construction Project Manager, shall be paid for by the Owner through the CASH ALLOWANCE.

C. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the Price Bid for that item and shall not be paid for by the Owner.

D. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor. Retesting shall be performed by the testing laboratory working for the Owner.

1.03 Laboratory Duties

A. Cooperate with the Owner, Construction Project Manager and Contractor.

B. Provide qualified personnel promptly on notice.

C. Perform specified inspections, sampling and testing of materials.

1. Comply with specified standards, ASTM, other recognized authorities, and as specified.

2. Ascertain compliance with requirements of the Contract Documents.

D. Promptly notify the Construction Project Manager and Contractor of irregularity or deficiency of work which are observed during performance of services.

E. Promptly submit three copies (two copies to the Construction Project Manager, and one copy to the Contractor) of report of inspections and tests in addition to those additional copies required by the Contractor with the following information included:

1. Date issued

2. Project title and number

3. Testing laboratory name and address

4. Name and signature of inspector

5. Date of inspection or sampling

6. Record of temperature and weather

7. Date of test

8. Identification of product and Specification section

9. Location of Project

10. Type of inspection or test

11. Results of test

12. Observations regarding compliance with the Contract Documents

F. Perform additional services as required.

G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the Work.

1.04 Contractor Responsibilities

A. Cooperate with laboratory personnel; provide access to Work and/or manufacturer's requirements.

B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.

C. Furnish copies of mill test reports.

D. Furnish required labor and facilities to:

1. Provide access to Work to be tested;
2. Obtain and handle samples at the site;

3. Facilitate inspections and tests;

4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.

E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Construction Project Manager, and shipped to the laboratory by the Contractor at Contractor's expense.

G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Construction Project Manajer.

1.05 Quality Assurance

Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.06 Product Handling

Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.

1.07 Furnishing Materials

The Contractor shall be responsible for furnishing all materials necessary for testing.

1.08 Code Compliance Testing

Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of, and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.09 Contractor's Convenience Testing

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.10 Schedules for Testing

A. Establishing Schedule

1. The Contractor shall, by advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.

2. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back charged to the Contractor and shall not be borne by the Owner.

1.11 Taking Specimens

Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory.

1.12 Transporting Samples

The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

END OF SECTION

SECTION 01510

TEMPORARY FACILITIES

Part 1 General

1.01 Scope

A. Temporary facilities required for this work include, but are not necessarily limited to:

1. Temporary utilities such as water and electricity.

2. First aid facilities.

3. Sanitary facilities.

4. Potable water.

5. Temporary enclosures and construction facilities.

1.02 General

A. First aid facilities, sanitary facilities and potable water shall be available on the Project site on the first day that any activities are conducted on site. The other facilities shall be provided as the schedule of the Project warrants.

B. Maintenance: Use all means necessary to maintain temporary facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, immediately make all repairs and replacements necessary, at no additional cost to the Owner.

C. Removal: Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

1.03 Temporary Utilities

A. General

1. Provide and pay all costs for all water, electricity and other utilities required for the performance of the Work.

2. Pay all costs for temporary utilities until Project completion.

3. Costs for temporary utilities shall include all power, water and the like necessary for testing equipment as required by the Contract Documents.

B. Temporary Water: Provide all necessary temporary piping, and upon completion of the Work, remove all such temporary piping. Provide and remove water meters.

C. Temporary Electricity

1. Provide all necessary wiring for the Contractor's use.

2. Furnish, locate and install area distribution boxes such that the individual trades may use, their own construction type extension cords to obtain adequate power, and artificial lighting at all points where required by inspectors and for safety.

1.04 First Aid Facilities

The Contractor shall provide a suitable first aid station, equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. All first aid facilities and emergency ambulance service shall be made available by the Contractor to the Owner and other approved personnel, by the Construction Project Manager.

1.05 Sanitary Facilities

Prior to starting the Work, the Contractor shall furnish, for use of Contractor's personnel on the job, all necessary toilet facilities which shall be secluded from public observation. These facilities shall be either chemical toilets or shall be connected to the Owner's sanitary sewer system. All facilities, regardless of type, shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the area in which the Work is performed. Adequacy of these facilities will be subject to the Construction Project Manager’s review and maintenance of same must be satisfactory to the Construction Project Manaager at all times.

1.06 Potable Water

The Contractor shall be responsible for furnishing a supply of potable drinking water for employees, subcontractors, inspectors, Construction Project Manager and the Owner who are associated with the Work.

1.07 Enclosures and Construction Facilities

Furnish, install and maintain for the duration of construction, all required storage, scaffolds, tarpaulins, canopies, steps, bridges, platforms and other temporary construction necessary for proper completion of the Work in compliance with all pertinent safety and other regulations.

1.08 Parking Facilities

Parking facilities for the Contractor's and Contractor's subcontractors' personnel shall be the Contractor's responsibility. The storage and work facilities provided by the Owner will not be used for parking by the Contractor's or subcontractor's personnel.

END OF SECTION

SECTION 01540

JOB SITE SECURITY

Part 1 General

1.01 Barricades, Lights and Signals

A. The Contractor shall furnish and erect such barricades, fences, lights and danger signals and shall provide such other precautionary measures for the protection of persons or property and of the Work as necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one light at each barricade and sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any Work under construction.

B. The Contractor will be held responsible for all damage to the Work due to failure of barricades, signs and lights and whenever evidence is found of such damage, the Contractor shall immediately remove the damaged portion and replace it at Contractor's cost and expense. The Contractor's responsibility for the maintenance of barricades, signs and lights shall not cease until the Project has been accepted by the Owner.

END OF SECTION

SECTION 01562

DUST CONTROL

Part 1 General

1.01 Scope

Limit blowing dust caused by construction operations by applying water or employing other appropriate means or methods to maintain dust control, subject to the approval of the Owner. As a minimum, this may require the use of a water wagon twice a day to suppress dusty conditions.

1.02 Protection of Adjacent Property

A. The Contractor shall visit the site and note the buildings, landscaping, roads, parking areas and other facilities near the Work site that may be damaged by their operations. The Contractor shall make adequate provision to fully protect the surrounding area and will be held fully responsible for all damages resulting from Contractor's operations.

B. Protect all existing facilities (indoors or out) from damage by dust, fumes, spray or spills (indoors or out). Protect motors, bearings, electrical gear, instrumentation and building or other surfaces from dirt, dust, welding fumes, paint spray, spills or droppings causing wear, corrosion, malfunction, failure or defacement by enclosure, sprinkling or other dust palliatives, masking and covering, exhausting or containment.

END OF SECTION

SECTION 01630

SUBSTITUTIONS AND OPTIONS

Part 1 General

1.01 Scope

This Section outlines the restrictions and requirements for substitutions, product and manufacturer options, and construction method options.

1.02 Definitions

A. For the purposes of these Contract Documents, a “substitute item” shall be defined as one of the following:

1. A product or manufacturer offered as a replacement to a specified product or manufacturer.

2. A product or manufacturer offered in addition to a specified product or manufacturer.

B. For the purposes of these Contract Documents, a “substitute construction method” shall be defined as one of the following:

1. A mean, method, technique, sequence or procedure of construction offered as a replacement for a specified mean, method, technique, sequence or procedure of construction.

2. A mean, method, technique, sequence or procedure of construction offered in addition to a specified mean, method, technique, sequence or procedure of construction.

1.03 General

A. An item or construction method, which is offered where no specific product, manufacturer, mean, method, technique, sequence or procedure of construction is specified or shown on the Drawings, shall not be considered a substitute and shall be at the option of the Contractor, subject to the provisions in the Contract Documents for that item or construction method.

B. For products specified only by a referenced standard, the Contractor may select any product by any manufacturer, which meets the requirements of the Specifications, unless indicated otherwise in the Contract Documents.

C. If the manufacturer is named on the Drawings or in the Specifications as an acceptable manufacturer, products of that manufacturer meeting all requirements of the Specifications and Drawings are acceptable.

D. Whenever the Engineer's design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or listed first in the list of approved manufacturers in the Specifications. Any Bidder intending to furnish products of other than the first listed manufacturer, or furnish substitute items, shall

1. Verify that the item being furnished will fit in the space allowed, perform the same functions and have the same capabilities as the item specified.

2. Include in its Bid the cost of all accessory items which may be required by the other listed substitute product,

3. Include the cost of any architectural, structural, mechanical, piping, electrical or other modifications required, and

4. Include the cost of required additional work by the Engineer, if any, to accommodate the item.

E. Whenever a product is identified on the Drawings or in the Specifications by reference to manufacturers or vendors names, trade names, catalog numbers, etc., it is intended only to denote the quality standard of product desired and that they do not restrict Bidders to a specific brand, make, manufacturer or specific name. These listings and citations are used only to set forth and convey to Bidders the general style, type, character and quality of product desired. Equivalent products will be acceptable, subject to the substitution provisions of this Section.

1.04 Approvals

Approval, of a substitution as an acceptable manufacturer, of the Engineer is dependent on determination that the product offered is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, service life and other criteria to that on which the design is based; and will require no major modifications to structures, electrical systems, control systems or piping systems.

1.05 Substitutions and Options

A. No substitutions will be considered for the manufacturers listed in the Bid Form.

B. After Notice to Proceed

1. Substitute items will be considered only if the term “equal to” precedes the names of acceptable manufacturers in the Specification.

2. Where items are specified by referenced standard or specified as indicated in Article 1.03, Paragraph A. above, such items shall be submitted to the Construction Project Manager for review.

3. The Contractor shall submit shop drawings on the substitute item for the Construction Project Manager's review in accordance with the Section 01340.

C. Prior to Opening of Bids

1. No consideration or approvals will be made for products specified by a referenced standard, or specified as indicated in Article 1.02, Paragraph A. above. Such consideration may occur only after the Notice to Proceed.

2. No consideration or approvals will be made for products being offered where the term "equal to" precedes the name of an approved product. Such substitution consideration may occur only after the Notice to Proceed.

3. If the term "or equal" follows the names of acceptable manufacturers, then other manufacturers desiring approval as an acceptable manufacturer may submit the product information to the Engineer for approval during the bidding phase, as indicated below. With the exception of where the phrase "no substitutions" is associated with a list of manufacturers, where a list of acceptable manufacturers is not preceded by the phrase "equal to", the list of acceptable manufacturers shall be considered as having the phrase "or equal" following the list, and the list being subject to the "or equal" provisions of this section.

4. The manufacturer shall include the following items in its "or equal" submittal:

a. Descriptive literature including information on materials used, minimum design standards, standard design features, manufacturing processes and facilities, and similar information which will indicate experience and expertise in the manufacture of the product being evaluated.

b. Performance specifications applicable to the manufacturer's standard design which indicates the level of performance to be expected from the product.

c. A complete set of submittal drawings of similar products which have been completed and placed into operation.

d. A list of existing installations of products similar in type and size, information required to satisfy specified experience

requirements, or a copy of the bond to be submitted in lieu of experience.

e. Evidence of technical ability of the manufacturer to design and manufacture products meeting Project requirements.

f. Evidence submitted shall include, as a minimum, descriptions of engineering and manufacturing staff capabilities.

g. A copy of the manufacturer's most recent annual business report. Include a statement comparing the present net worth of the manufacturer in comparison to the total value of all products proposed to be furnished. Net worth must exceed the total value of all products proposed.

h. A complete description of field service capabilities, including the location of field service facilities which would serve the proposed facility and the number and qualifications of personnel working from that location.

i. A complete list of all requirements of the Drawings and Specifications with which the manufacturer cannot conform, including reasons why alternate features are considered equivalent.

j. If descriptive literature or drawings illustrate standard products with design features or materials not in compliance with Project requirements then these exceptions must be specifically listed. Failure to do so will indicate intent by the manufacturer to modify design features and alter materials to meet Project requirements.

k. Where additional information is submitted to supplement the submittal, all changes to the list of exceptions shall be specifically noted.

l. All other information necessary to fully evaluate the product for consideration.

5. This “or equal” submittal shall reach the Construction Project Manager no later than 14 days prior to the Bid date. Submittals which do not include a complete list of exceptions to Project requirements, or the statement “No exceptions to the Specifications will be taken”, will automatically be rejected by the Construction Project Manager. Manufacturers will be advised of approval or rejection in writing no later than 10 days prior to the Bid date. Rejected submittals may be supplemented with additional information and resubmitted no later than five days prior to the Bid date. Manufacturers making supplementary submittals

will be advised of approval or rejection in writing no later than one day prior to the Bid date.

6. Bids based on products which have not received the approval of the Construction Project Manager may be determined non-responsive by the Owner and rejected.

END OF SECTION

SECTION 01710

CLEANING

Part 1 General

1.01 Scope

This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

1.02 Quality Assurance

A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.

B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.03 Hazardous Material and Waste

A. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in approved landfills as applicable.

B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.

C. Burning or burying rubbish and waste materials on the site shall not be allowed.

D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.

1.04 Disposal of Surplus Materials

Unless otherwise shown on the Drawings, specified or directed, the Contractor shall legally dispose off the site all surplus materials and equipment from demolition and shall provide suitable off site disposal site, or utilize a site designated by the Owner.

Part 2 Products

2.01 Cleaning Materials and Equipment

Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.02 Compatibility

Use only the cleaning materials, methods and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

Part 3 Execution

3.01 Progress Cleaning

A. General

1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this Work.

2. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.

3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.

2. Restack materials stored on site weekly.

3. At all times maintain the site in a neat and orderly condition which meets the approval of the Engineer.

3.02 Final Cleaning

A. Definitions: Unless otherwise specifically specified, “clean” for the purpose of this Article shall be interpreted as the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.

B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 3.01 above.

C. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.

E. Post Construction Cleanup: All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, as directed by the Engineer.

F. Restoration of Landscape Damage: Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. The Engineer will decide what method of restoration shall be used.

G. Timing: Schedule final cleaning as approved by the Engineer to enable the Owner to accept the Project.

3.03 Cleaning During Owner's Occupancy

Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Engineer in accordance with the Supplementary Conditions of the Contract Documents.

END OF SECTION

SECTION 01720

RECORD DOCUMENTS

Part 1 General

1.01 Scope

A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording and submitting of project record documents as herein specified.

B. Record documents include, but are not limited to:

1. Drawings;

2. Specifications;

3. Change orders and other modifications to the Contract;

4. Construction Project Manager Field orders or written instructions, including Requests for Information (RFI) and Clarification Memorandums;

5. Reviewed shop drawings, product data and samples;

6. Test records.

7. CADD Files, as required by the Construction Project Manager

C. The Contractor shall maintain on the Project site throughout the Contract Time up to date set of Record Drawings.

1.02 Maintenance of Documents and Samples

A. Storage

1. Store documents and samples in the Contractor's field office, apart from documents used for construction.

2. Provide files and racks for storage of documents.

3. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with format of these Specifications.

C. Maintenance

1. Maintain documents in a clean, dry, legible condition and in good order.

2. Do not use record documents for construction purposes.

3. Maintain at the site for the Owner one copy of all record documents.

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

E. Failure to maintain the Record Documents in a satisfactory manner may be cause for withholding of a certificate for payment.

1.03 Quality Assurance

A. Unless noted otherwise, Record Drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.

B. Unless noted otherwise, Record Drawings shall provide elevations to the nearest 0.01 foot for all pertinent items constructed by the Contractor.

1.04 Recording

A. Label each document “Project Record” in neat, large printed letters.

B. Recording

1. Record information concurrently with construction progress.

2. Do not conceal any work until required information is recorded.

1.05 Record Drawings

A. The Contractor shall provide one set of the Contract drawings, with all changes recorded in that one set.

B. Legibly mark drawings to record actual construction, including:

1. All Construction

a. Changes of dimension and detail.

b. Changes made by Requests for Information (RFI), field order, clarification memorandums or by change order.

c. Details not on original Drawings.

2. Site Improvements, Including Underground Utilities

   a. Horizontal and vertical locations of all exposed and underground utilities and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.

   b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.

   c. The locations shall be referenced to at least two easily identifiable, permanent landmarks (e.g., power poles, valve markers, etc.) or benchmarks.

   d. The Record Drawings shall include the horizontal angle and distance between manhole covers.

3. Structures

   a. Depths of various elements of foundation in relation to finish first floor datum or top of wall.

   b. Location of internal and buried utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

1.06 Specifications

A. Legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

2. Changes made by Requests for Information (RFI), field order, clarification memorandums, or by change order.

1.07 Submittal

A. At contract closeout, deliver Record Documents to the Engineer for the Owner.

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

1. Date

2. Project title and number

3. Contractor's name and address

4. Title and number of each record document

5. Signature of Contractor or Contractor's authorized representative

1.08 CAD Files

A. All water as-built plans submitted to the Fulton County Department of Public Works must be provided in electronic computer aided design (CAD) format. CAD files to be submitted in accordance with provisions stated at http://www.fultoncountyga.gov/fcwr-developer-information. The provisions are shown on the following pages.

Fulton County As-Built CAD Standards
Effective Date: JANUARY 01, 2010
Version 0.2
Revised: 20Feb2009

As of *01 JANUARY 2010*, all water and wastewater as-built plans submitted to the Fulton County Department of Public Works must be provided in electronic computer aided design (CAD) format. The following standards must be followed for all plans. Construction will not be approved until these standards are met.

Template (or seed) drawing file available at http://www.fultoncountyga.gov/county/dpw under Developer Information on the left side-bar.

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1) General Requirements

a) All as-built drawings must be georeferenced to the US State Plane coordinate system, NAD 83, GA West Zone, US Survey Feet. All drawings must contain two reference pins (i.e. property corners), which are labeled and tied to the Fulton County (FULCO) GPS monument network (please identify referenced GPS monuments with the monument number and coordinates). Reference pins must be able to be field verified using GPS and must be easily accessible (i.e., must not be in a creek). The survey method (GPS or conventional) used to place the reference pins should be identified in the HORIZONTAL_AND_VERTICAL_TEXT layer. Information on the FULCO GPS survey monuments can be found using the FULCO Monument Locator map application web site at: http://wms.co.fulton.ga.us/ms/gps/ or may be obtained in person at the Fulton County Government Center, Department of Public Works.

b) All features depicted in the as-built drawings must be surveyed *after* construction. FULCO will spot check all coordinates to ensure accuracy. Table 1 specifies the features that must be surveyed. Water system features must be surveyed at a horizontal accuracy of ≤ 0.3 ft and vertical accuracy of ≤ 0.5 ft. Sewer system features

must be surveyed at a horizontal accuracy of ≤ 0.5 ft and a vertical accuracy of ≤ 0.1 ft.

c) The following feature geometry types must be shot directly using the survey instrument and tied to the FULCO GPS monument network:
   1) All point features (hydrants, valves, sewer manholes, etc.),
   2) All line features at all endpoints, bends, and turns (pipes, etc.),
   3) All polygon features at all corners and bends (project boundaries, lots, right-of-ways, etc.)

d) The following feature types are acceptable: Lines, Polylines, Text, Insert/Blocks. The Leaders as feature types must not be used. Where there is a need for Leaders they shall be drawn using *Line* features and must be put on a text layer. For example, the leader for the diameter of a water pipe should be on the WATER_LINE_TEXT layer, not the WATER_LINE layer.

e) A template (or seed) drawing file, file containing the required FULCO blocks and AutoCAD tool pilot will be provided through the Department of Public Works website http://www.fultoncountyga.gov/county/dpw.

f) The project boundary must be labeled on the PROJECT_BOUNDARY_TEXT layer, and the label must be within the extent of the project boundary.

2) Layers:

a) Layer names for required layers must appear exactly as in Table 1.

b) All required layers listed in FULCO CAD layers must contain only the features that are described for that layer. For example, the BOUNDARY_LINE layer must only contain the boundary line and not such features as north arrows or parcels.

c) All required layers must be present in the drawing except for features that do not pertain to a particular project. For example, some commercial projects or apartment complexes may not contain sewer taps as part of the construction and should not be included in the drawing.

d) All layers must be clearly differentiated from each other.
   1) Two layers having the names "WATER_LINE" and "WATER_LINES" should not exist in the same drawing.
   2) SEWER_LINE_TEXT and SEWER_TEXT should not exist in the same drawing.

e) All text must appear on separate layers from the layers they annotate. For example, text describing a sewer line must be on the SEWERLINE_TEXT layer, not the SEWER_LINE layer.

3) Drawing

a) All layers must conform to the proper geometry type (insert/block, line, polygon, text) as indicated in Table 1 below.

Table 1: Layer Names and Geometry Types

Layer Name	*Type*	*Layer Contents*	*Surveyed*
ADDRESS_TEXT	Text	Street postal address number	No
BLOCK_LETTER_TEXT	Text	Indicates the block letter of a subdivision	No
CITY_BOUNDARY	Line	City boundary line	No
CITY_BOUNDARY_TEXT	Text	City names associated with the CITY_BOUNDARY	No
COUNTY_BOUNDARY	Line	County boundary lines	No
COUNTY_BOUNDARY_TEXT	Text	County Names for the COUNTY_BOUNDARY layer	No
CONTOUR	Line	Topological delineation information	
CONTOUR_TEXT	Text	Description info for contour layer	
CORNER_POINTS	Point	Establishing Reference points	
FIRE_HYDRANT	Insert	Fire Hydrants	Yes
FIRE_HYDRANT_TEXT	Text	Text Associated with FIRE_HYDRANT layer	No
FLOODPLAIN_100YR	Line	Existing floodplain delineation	
FLOODPLAIN_100YR_FUTURE	Line	Proposed floodplain delineation	
FLOODPLAIN_100YR_FUTURE_TEXT	Text	Text for proposed floodplain delineation	
FLOODPLAIN_100YR_TEXT	Text	Text for existing floodplain delineation	
FLOW_ARROW	Insert	Sewer line flow arrows	No
GABION_WALL	block	Any retaining type wall construction	
GREASE_TRAPS	block	Grease traps	
HORIZONTAL_AND_VERTICAL_CONTROL_POINT	Point	Survey control points (rebar or monuments) with x,y,z	Yes
HORIZONTAL_AND_VERTICAL_TEXT	Text	Corresponding text (coordinate values, monument number, survey method etc.).	No
LAND_LOT_LINE	Line	Layer Contents	
LAND_LOT_LINE_TEXT	Text	Land lot numbers and other text.	No
LOT_NUMBER_TEXT	Text	Individual lot numbers	No
PROJECT_BOUNDARY	Poly	The boundary line of the subdivision or property.	Yes
PROJECT_BOUNDARY_TEXT	Text	Project (Development) Name	No

PROPERTY_ID_TEXT	Text	Property Information	
PROPERTY_LINE	Poly	Property Lines (parcel lines)	Yes
PUMP_STATION	Point	Represents the centermost point of a pump station	Yes
PUMP_STATION_TEXT	Text	Text associated with PUMP_STATION	No
RAILROAD_LINE	Line	Railroad Lines	Yes
RAILROAD_TEXT	Text	Text Associated with RAILROAD	No
ROAD_EDGE_OF_PAVEMENT	Poly	Street Edge of Pavement (not back of curb); this layer should not include parking lots or curbing	Yes
ROAD_TEXT	Text	Road Names	No
ROAD_RIGHT-OF-WAY	Poly	Road Right-of-Way	Yes
ROAD_RIGHT-OF-WAY_TEXT	Text	Text relating to the road right of way layer	No
SEWER_END-OF-LINE	Insert	End of sewer line.	Yes
SEWER_END-OF-LINE_TEXT	Text	Text associated with SEWER_END-OF-LINE	No
SEWER_EXISTING	Line	Sewer lines present before the subdivision/project	Yes
SEWER_EXISTING_TEXT	Text	Text associated with the SEWER_EXISTING layer	No
SEWER_MANHOLE_EXISTING	Block	Existing Sewer Manholes	Yes
SEWER_MANHOLE_EXISTING_TEXT	Text	Text for the SEWER_MANHOLE EXISTING layer	No
SEWER_FORCE_MAIN	Line	Sewer force mains	Yes
SEWER_FORCE_MAIN_TEXT	Text	Text associated with SEWER_FORCE_MAIN	No
SEWER_LINE	Line	Sewer lines built as part of the subdivision/project.	Yes
SEWER_LINE_TEXT	Text	Text associated with the SEWER_LINE layer.	No
SEWER_MANHOLE	Block	Sewer Manholes	Yes
SEWER_MANHOLE_TEXT	Text	Text associated with the SEWER_MANHOLE layer	No
SEWER_SEPTIC_TANK	Line	Septic tank	
SEWER_TAP	Line	Sewer taps	Yes
SEWER_TAP_TEXT	Text	Distance between taps in feet	Yes
SEWER_TUNNEL	Line	Subsurface Sewer tunnel construction	
STORM_BMP	Poly	Engineered structures designed to improve management of Stormwater system (see section e-I)	
STORM_BMP_TEXT	Text	Label showing the BMP_ID (see section e-II)	No
STORM_BMP_EXISTING	Poly	Engineered structures designed to improve	No
		management of Stormwater system (see section e-I)	
STORM_BMP_EXISTING_TEXT	Text	Text associated with the STORM_BMP_EXISTING	No
STORM_CULVERT	Poly	A polygon representing the extent of pipe culvert or box culvert structure (see section e-III)	Yes
STORM_CULVERT_TEXT	Text	Label for the features ID (see section e-III)	No
STORM_CULVERT_EXISTING	Poly	A polygon representing the extent of a culvert structure (see section e-III), prior to construction	Yes
STORM_CULVERT_EXISTING_TEXT	Text	Label for the features (see section e-III)	No

STORM_CULVERT_CHART	n/a	Describes the required parameters (e-III)	n/a
STORM_DROPINLET	Block	Stormwater drop inlet. (see section e-IV)	Yes
STORM_DROPINLET_TEXT	Text	Text describing layer (i.e. Invert Elevation)	No
STORM_DROPINLET_EXISTING	Block	Stormwater drop inlet (see section e-IV) that existed prior to construction	Yes
STORM_DROPINLET_EXISTING_TEXT	Text	Text describing layer	No
STORM_FLUME	Line	The centerline drawn in flow direction (see section V)	Yes
STORM_FLUME_TEXT	Text	Text for: material (lining), slope (see section e-VI)	No
STORM_FLUME_EXISTING	Line	The centerline that existed prior to construction Must be drawn in flow direction (see section V).	Yes
STORM_FLUME_EXISTING_TEXT	Text	Text associated with layer (see section e-VI)	No
STORM_HEADWALL	Block	Proposed new placement point of construction	
STORM_HEADWALL_TEXT	Text	Text associated with new headwall	
STORM_HEADWALL_EXISTING	Block	Headwall which existed prior to construction	
STORM_HEADWALL_EXISTING_TEXT	Text	Text associated which existed prior to construction	
STORM_JUNCTION_BOX	Insert	Block in the location of a Stormwater Junction Box	Yes
STORM_JUNCTION_BOX_TEXT	Text	Text for layer that must at least show: Rim Elevation,	No
		Invert Elevation, and Junction Box material.	
STORM_JUNCTION_BOX_EXISTING	Insert	Pre-existing block for the Storm Junction Box	Yes
STORM_JUNCTION_BOX_EXISTING_TEXT	Text	Text for layer that must at least show: Rim Elevation, material, Invert Elevation, and Junction Box	No
STORM_LINE	Line	Pipe (i.e. Pipe line or driveway pipe) (see section e-VII)	Yes
STORM_LINE_TEXT	Text	Text for layer (i.e. slope, diameter, material)	No
STORM_LINE_EXISTING	Line	Pre-existing stormwater line (pipe line or driveway pipe) drawn in the direction of flow (see section e-VII)	Yes
STORM_LINE_EXISTING_TEXT	Text	Text associated with layer (i.e. slope, diameter, material)	No
STORM_OPEN_CHANNEL	Line	Centerline drawn in the direction of flow (see section e-V)	Yes
STORM_OPEN_CHANNEL_TEXT	Text	Text layer: material (lining), slope (see section e-VI)	No
STORM_OPEN_CHANNEL_EXISTING	Line	Centerline of structure. Must be drawn in the direction of flow (see section e-V)	Yes
STORM_OPEN_CHANNEL_EXISTING_TEXT	Text	Text associated with layer (see section e-VI)	No
STORM_LINE_END	Insert	The structure at the Line End or a node representing the bare end of pipe (see section e-VIII)	Yes
STORM_LINE_END_TEXT	Text	Text layer (i.e. slope, diameter, material)	No
STORM_LINE_END_EXISTING	Insert	The structure at the Line End or a node representing the	Yes
		bare end of pipe (see section e-VIII)	
STORM_LINE_END_EXISTING_TEXT	Text	Text associated with layer	No
STRUCTURE	Line	Above ground construction (Buildings, apartments, etc.)	
STRUCTURE_TEXT	Text	Name, or other information associated with the structure	

TANK_PROPOSED	Line	Any proposed tank construction	
TRASH_RACKS	Block	Trash Racks	
UTILITY_EASEMENT	Poly	Utility line easements	Yes
UTILITY_EASEMENT_TEXT	Text	Text Associated with Utility Easements	No
WATER_CAP	Insert	Cap at the end of water line.	Yes
WATER_CAP_TEXT	Text	Text associated with WATER_CAP_TEXT	No
WATER_EXISTING	Line	Water lines before the subdivision/project was built	Yes
WATER_EXISTING_TEXT	Text	Text associated with WATER_EXISTING	No
WATER_LINE	Line	Water lines built as part of the subdivision/project.	Yes
WATER_LINE_TEXT	Text	Text associated with WATER_LINE	No
WATER_METER	Insert	Customer water meters	Yes
WATER_METER_TEXT	Text	Text associated with WATER_METER	No
WATER_REDUCER	Insert	Water line reducer	Yes
WATER_REDUCER_TEXT	Text	Text associated with WATER_REDUCER	No
WATER_SERVICE	Line	Water service lines	Yes
WATER_SERVICE_TEXT	Text	Text associated with WATER_SERVICE	No
WATER_STORAGE_SYSTEM	Block	Water Storage System construction	
WATER_STORAGE_SYSTEM_TEXT	Text	Text for Water Storage System construction	
WATER_VALVE_EXISTING	Insert	Existing water valves	Yes
WATER_VALVE_EXISTING_TEXT	Text	Text associated with WATER_VALVE_EXISTING	No
WATER_VALVE	Insert	Water valves	Yes
WATER_VALVE_TEXT	Text	Text associated with WATER_VALVE	No
WATER_VAULT	Insert	Large meter or fire connection vault	Yes
WATER_VAULT_TEXT	Text	Text associated with WATER_VAULT	No
WETLAND	Line	Wetland area	
WETLAND_TEXT	Text	Text associated with the Wetland	

b) All Polygon type features must be completely closed. Lines may need to be duplicated on more than one layer.

1) Subdivision/project parcels must to be closed figures on their layer (not closed with the subdivision/project boundary).

2) Road edge-of-pavement and road right-of-way must be drawn as closed polygons.

3) Where a polygon feature extends beyond the edge of the plan, the property boundary (repeated on the polygon feature's layer) will be used to close the polygon.

4) All edges on polygon features must be snapped together at the vertices. Gaps in polygon boundaries will not be accepted.

c) Sewer Features

1) Sewer Lines and Sewer Taps need to be digitized with proper directionality: lines must be drawn from the uphill node to the downhill node or flipped after the lines have been digitized.

2) All tangents between sewer manholes need to be drawn with a single line. Lines must not continue for more than one tangent.

3) All tangents must be snapped at endpoints intersecting at the exact center of the manhole. No gaps should exist between tangents.

4) Manholes need to be symbolized consistently with an insert centered and snapped on the tangent endpoints.

5) Sewer tap locations must be snapped to the sewer tangent and accurately placed. Placement shall be based on the televising reports. FULCO will verify tap placement against the televising report. The as-built engineer is responsible for obtaining the televising report.

d) Water Features

1) Water lines must be digitized with all straight-line pipes consisting of only two end points. Straight-line pipes will begin and end at the following features (nodes): hydrants, valves, meters, pumps, tees, crosses, and valves. Polylines should be used wherever a water line contains elbows or bends (i.e., when the line does make a straight run from node to node).

2) Curves may be digitized with enough vertices to capture the curve geometry, but they must be single, continuous lines. Curves or arcs may also be used to designate curved pipe.

3) Hydrants must be shown in their true, surveyed location, and must be connected to the water main via a valved fire hydrant line.

4) All water lines must be continuous, with pipe endpoints snapped to each other at endpoints (nodes).

5) End-of-line caps must be drawn to differentiate end-of-lines from lines that extend beyond the extent of the drawing. Caps should be drawn for lines that are to be permanently capped when the project is complete, not for lines that are temporarily capped pending inspection.

e) Stormwater Features

1) The entire BMP must be represented on the Storm_BMP layer using a polygon. The following are the examples of BMPs: Enhanced Swale, Stormwater Pond, Stormwater Wetland, Sand Filter, Bioretention Cell, Infiltration Trench, Filter Strip, Gravity Oil-Grit Separator, Proprietary Structural Control, Underground Detention, Porous Concrete, Modular Porous Paver System. Please consult with the FULCO water resources engineer for a list of currently accepted BMPs.

2) A BMP_ID is going to be assigned to each STORM_BMP feature by the FULCO engineer during the plan review process. The contractor must clearly mark every BMP feature with the assigned BMP_ID in the STORM_BMP_TEXT layer of the asbuilt.

3) In the STORM_CULVERT and STORM_CULVERT_EXISTING layers, the structures must be drawn as polygons to show their length, width, location, and orientation. All the corners of the culvert extents must be surveyed. All culverts must be labeled in the corresponding STORM_CULVERT_TEXT or STORM_CULVERT_EXISTING_TEXT layer with the number matching the culvert chart shown on the asbuilt. The storm culvert chart shall be put in the STORM_CULVERT_CHART layer. For Culvert Chart contents see the Stormwater Development Guidelines.

4) In the STORM_DROPINLET and STORM_DROPINLET_EXISTING layers, the structures shall be drawn with different inserts (blocks) according to the type of the Drop Inlet: Single Wing Catch Basin, Double Wing Catch Basin, Square Catch Basin, Rectangular Catch Basin, Grate Cover Inlet, Catch Basin with Grate, Curb Inlet, Circular Weir Inlet, Rectangular Weir Inlet. The contractor must only use the blocks provided by FULCO for these features.

5) In the STORM_OPEN_CHANNEL, STORM_OPEN_CHANNEL-EXISTING, STORM_FLUME and STORM_FLUME_EXISTING layers, the feature shall be represented by a line reflecting the centerline of the structure and must be drawn in the direction of flow. The lines shall be broken at any point where the slope percent changes. All endpoints (including the points of slope changes) shall be surveyed.

6) STORM_OPEN_CHANNEL_TEXT, STORM_OPEN_CHANNEL_EXISTING_TEXT, STORM_FLUME_TEXT and STORM_FLUME_EXISTING TEXT layers shall contain a label indicating the percent slope and a type of material (lining) of the corresponding open channel or flume.

7) In the STORM_LINE or STORM_LINE_EXISTING layers, the features must be drawn in the direction of flow. This feature must be digitized with all straight-line pipes consisting of only two end points. Straight-line pipes will begin and/or end at the following features: STORM_LINE_END, STORM_JUNCTION_BOX, STORM_DROP_INLET.

8) In the STORM_LINE_END and STORM_LINE_END_EXISTING layers, the structures must be drawn with different inserts (blocks) according to the type: Straight Headwall, U-type Headwall, Tapered Headwall, L-Type Headwall, Flared-End Section, Straight Wingwall, Angled Wingwall, Bare End and BMP Outlet. STORM_LINE_END and STORM_LINE_END_EXISTING features must be snapped to the ends of the STORM_LINE or STORM_LINE _EXISTING or the centers of STORM_CULVERT or STORM_CULVERT_EXISTING openings. The contractor must only use the blocks provided by FULCO for these features (see section 4) Symbolization)

4) Table Specifications

a) A table with the following attribute data for each **sewer line**

1) Unique identifier matching the identifier in the as-built drawing
2) Unique identifier matching upstream manhole identifier in the as-built drawing
3) Upstream Measure Down - Distance from the upstream manhole lid top to invert of pipe as measured in feet
4) Upstream Invert – Elevation (z) of the invert of the upstream end of the pipe
5) Unique identifier matching downstream manhole identifier in the as-built drawing
6) Downstream Measure Down - Distance from downstream manhole lid top to invert of pipe as measured in feet
7) Downstream Invert – Elevation (z) of the invert of the downstream end of the pipe
8) Pipe diameter measured in inches
9) Pipe Material (CI, DI, PVC, VC, RCP, UNK, IRON, TRAN, PE, TR)
10) Pipe Length measured in feet

Example Table: Sewer Line

Pipe ID	Upstr MH ID	Upstr Measure Down	Upstr Invert	Downstr MH ID	Downstr Measure Down	Downstr Invert	Pipe Diameter	Pipe Material	Pipe Length
Pipe#1	SSMH#1	6.1	906.78	Pump Station	10.2	906.06	8	PVC	201
Pipe#2	SSMH#2	7.1	908.33	SSMH#1	6.06	906.83	8	PVC	238
Pipe#3	SSMH#3	8	908.78	SSMH#2	7.1	908.03	8	PVC	94

b) A table with the following attribute data for each **water line**

1) Unique identifier matching the identifier in the as-built drawing
2) Pipe diameter measured in inches
3) Pipe Material (CI, PVC, DI, GV, PB, CO, UNK, TRAN,CP, SC.)
4) Pipe Length measured in feet
5) End1 ID (Valve, Meter, Reducer, etc.)
6) End2 ID (Valve, Meter, Reducer, etc.)

Example Table: Water Line

Pipe ID	Pipe Diameter	Pipe Material	Pipe Length	End1 ID	End2 ID
WL #1	8	PVC	291	WV #2	FH #23
WL #2	8	PVC	238	WM #43	WV #2
WL #3	8	PVC	64	WV #2	WV #54

c) A table with the following attribute data for each **storm line**

1) Unique identifier matching the identifier in the as-built drawing
2) Unique identifier matching upstream structure identifier in the as-built drawing
3) Upstream Measure Down - Distance from the upstream structure elevation to invert of pipe measured in feet
4) Upstream Invert – Elevation (z) of the invert of the upstream end of the pipe
5) Unique identifier matching downstream structure identifier in the as-built drawing
6) Downstream Measure Down - Distance from downstream structure elevation to invert of pipe measured in feet
7) Downstream Invert – Elevation (z) of the invert of the downstream end of the pipe
8) Pipe Shape (Box, Elliptical, Circular, etc.)
9) Pipe height measured in inches
10) Pipe width measured in inches
11) Pipe Material (BCCMP, RCP, HDPE, CMP.)
12) Pipe Length measured in feet

Example Table: Storm Line

Pipe ID	Upstr-ID	Upstr Measure Down	Upstr Invert	Downstr-ID	Downstr Measure Down	Downstr Invert	Pipe Shape	Pipe Height	Pipe Width	Pipe Material	Pipe Length
Pipe #1	CI #1	6.1	906.78	JB #3	10.2	906.06	Circular	24	24	BCCMP	291
Pipe #2	CB #2	7.1	908.33	FES #1	8.05	908.83	Pipe	38	24	BCCMP	238
Pipe #3	HW #1	0	908.78	HW #2	0	908.33	Box	60	84	RCP	64

5) Symbolization

a) Symbols must be standardized according to examples provided in the FULCO template file. The following "point" features must be symbolized using standard FULCO CAD symbols and drawn as inserts:

1) Vault
2) Valve
3) Hydrant
4) Manhole
5) Meter
6) End of Line/Cap
7) Reducer
8) Junction Box
9) Grease Traps
10) Trash Racks
11) Water Cap

b) All blocks used in the STORM layers must be drawn as inserts. The blocks must be standard and symbolized using only FULCO CAD blocks provided on the FULCO CAD Digital Data Submission Standards template available through the Department of Public Works website http://www.fultoncountyga.gov/county/dpw.

1) Single Wing Catch Basin
2) Double Wing Catch Basin
3) Square Catch Basin
4) Rectangular Catch Basin
5) Grate Cover Inlet
6) Catch Basin with Grate
7) Curb Inlet
8) Circular Weir Inlet
9) Rectangular Weir Inlet
10) Straight Headwall
11) U-type Headwall
12) Tapered Headwall
13) L-type Headwall
14) Flared-End Section
15) Straight Wingwall
16) Angled Wingwall
17) Bare End

18) BMP Outlet
19) Junction Box
20) Rectangular Weir Inlet

6) Annotations

a) Any non-standard water and sewer lines must be annotated as such. Line diameter, material, ownership, etc. that does not conform to standard practice should be noted in the corresponding annotation layer. For example, standard subdivision sewer lines are 8" in diameter. Any other diameter must be annotated on the SEWER_LINE_TEXT layer.
b) All addresses and lot numbers must be number data type (that is no text or symbols: #, -, ft, _, ", ', etc.). If the lot does not have a number, this layer should be blank.
c) All required text must be single line text. Project (Development) name shall be on one line.
d) All annotation for polyline (polygon) features must be bounded by the polyline it annotates. For example, the project name must be within the project boundary, and not extend beyond it.

7) File naming and revisions

a) File names should correspond exactly to the subdivision or project name and should be consistent from one version to the next. The file name should contain the drawing revision date (in YYMMDD format) as part of the name. There should be no blanks spaces in the name, only underscores. An example file name for the May 12, 2008 revision for the third phase of the Peaceful Valley subdivision is: "Peaceful_Valley_3_080512". If a development name changes from that of indicated in the originally approved plans, the original name shall also be provided with the submittal of the as-built.

b) File revision dates should only be updated by the contractor/developer and not by FULCO or Fulton County.

8) Deliverable Format

a) All files will be delivered on single disk media in AutoCAD (release 14 or higher), DXF or DWG format (for projects created in Microstation). CDs, 3½" floppies, and Zip disks are all acceptable media. Files should not be spanned over more than one disk.

b) All deliverables will be labeled with the file name, company name, contact name, and phone number. A transmission letter restating this information along with a statement requesting as-built review will also accompany the disk.

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

Part 1 General

1.01 Project Maintenance and Warranty

A. Maintain and keep in good repair the Work covered by these Drawings and Specifications until acceptance by the Owner.

B. The Contractor shall warrant for a period of one year from the date of Owner's written acceptance of certain segments of the Work and/or Owner's written final acceptance of the Project, as defined in the Contract Documents, that the completed Work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.

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

D. In the event of multiple failures of major consequences prior to the expiration of the one year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non serviceable as a consequence of the failure shall be replaced. A new 12 month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over or under lubrication and using maintenance procedures not conforming with published maintenance instructions, shall be exempted from the scope of

the one year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be disassembled, inspected, modified or replaced as necessary and rewarranted for one year.

F. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.

G. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.

H. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.

I. In the event the Contractor fails to proceed to remedy the defects upon notification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.

J. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.

K. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION

SECTION 02110

CLEARING AND GRUBBING

Part 1 General

1.01 Scope

A. Clearing and grubbing includes, but is not limited to, removing from the Project site, trees, stumps, roots, brush, structures, abandoned utilities, trash, debris and all other materials found on or near the surface of the ground in the construction area and understood by generally accepted engineering practice not to be suitable for construction of the type contemplated. Precautionary measures that prevent damage to existing features including trees, to remain is part of the Work.

B. Clearing and grubbing operations shall be coordinated with temporary and permanent erosion and sedimentation control procedures.

1.02 Quality Assurance

A. The Contractor shall comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction over the Project. All required permits of a temporary nature shall be obtained for construction operations by the Contractor.

B. Open burning, if allowed, shall first be permitted by the local authority having jurisdiction. The Contractor shall notify the local fire department and abide by fire department restrictions.

1.03 Job Conditions

Location of the Work: The area to be cleared and grubbed is shown schematically on the Drawings or specified below. It includes all areas designated for construction, which is limited to no more than 6-feet width along the water main alignment.

Part 2 Products

2.01 Equipment

The Contractor shall furnish equipment of the type normally used in clearing and grubbing operations including, but not limited to, tractors, trucks, loaders and root rakes.

Part 3 Execution

3.01 Scheduling of Clearing

A. The Contractor shall clear at each construction site only that length of the right-of-way, permanent or construction easement which would be the equivalent of two week's pipe laying. This length shall be determined from the Contractor's Progress Schedule.

B. The Construction Project Manager may permit clearing for additional lengths of pipe line, provided that temporary erosion and sedimentation controls are in place and a satisfactory stand of temporary grass is established. Should a satisfactory stand of grass not be possible, no additional clearing shall be permitted beyond that specified above.

C. A satisfactory stand of grass shall have no bare spots larger than one square yard. Bare spots shall be scattered and the bare area shall not comprise more than one percent of any given area.

3.02 Clearing and Grubbing

A. Clear and grub no more than 3 feet on each side of the pipeline before excavating. Remove all trees, growth, debris, stumps and other objectionable matter. Clear the construction easement or road right-of-way only if necessary.

B. Materials to be cleared, grubbed and removed from the Project site include, but are not limited to, all trees, stumps, roots, brush, trash, organic matter, paving, miscellaneous structures, houses, debris and abandoned utilities.

C. Grubbing shall consist of completely removing roots, stumps, trash and other debris from all graded areas so that topsoil is free of roots and debris. Topsoil is to be left sufficiently clean so that further picking and raking will not be required.

D. All stumps, roots, foundations and planking embedded in the ground shall be removed and disposed of. Piling and butts of utility poles shall be removed to a minimum depth of two feet below the limits of excavation for structures, trenches and roadways or two feet below finish grade, whichever is lower.

E. Landscaping features shall include, but are not necessarily limited to, fences, cultivated trees, cultivated shrubbery, property corners, man-made improvements, subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.

F. Surface rocks and boulders shall be grubbed from the soil and removed from the site if not suitable as rip rap.

G. Where the tree limbs interfere with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the utility.

H. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.

I. All fences adjoining any excavation or embankment that, in the Contractor's opinion, may be damaged or buried, shall be carefully removed, stored and replaced. Any fencing that, in the Engineer's opinion, is significantly damaged shall be replaced with new fence material.

J. The Contractor shall exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, etc. situated within the limits of the construction area but not directly within excavation and/or fill limits. The Contractor shall be held liable for any damage the Contractor's operations have inflicted on such property.

K. The Contractor shall be responsible for repairs and/or replacement of all damages to existing improvements resulting from Contractor's operations.

3.03 Disposal of Debris

A. The debris resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the Contractor and shall be disposed of in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except with written consent of the property owner. In no case shall any material or debris be left on the Project, shoved onto abutting private properties or buried on the Project.

END OF SECTION

SECTION 02125

EROSION AND SEDIMENTATION CONTROL

Part 1 General

1.01 Scope

A. The Work specified in this Section consists of providing and maintaining temporary and permanent erosion and sedimentation controls as shown on the Drawings. This Section also specifies the subsequent removal of temporary erosion and sedimentation controls.

B. Temporary and permanent erosion and sedimentation controls include grassing and mulching of disturbed areas and structural barriers at those locations which will ensure that erosion during construction will be maintained within acceptable limits. Acceptable limits are as established by the Georgia Erosion and Sedimentation Control Act of 1975, as amended, Section 402 of the Federal Clean Water Act, and applicable codes, ordinances, rules, regulations, and laws of local, state, and municipal authorities having jurisdiction.

C. Land disturbance activity shall not commence until the Land Disturbance Permit has been issued.

1.02 Submittals

Submit product data in accordance with the requirements of Section 01340 of these Specifications.

1.03 Quality Assurance

A. The temporary and permanent erosion and sedimentation control measures shown on the Drawings are minimum suggested requirements. Any additional erosion and sedimentation control measures required by the Contractor's means, methods, techniques, and sequence of operation will be installed by the Contractor at no additional cost to the Owner.

B. Perform all Work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated in these Specifications. Where provisions of pertinent rules and regulations conflict with these Specifications the more stringent provisions shall govern.

C. Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Georgia Erosion and Sedimentation Control Act of 1975 as amended (OCGA §12-7-1, et. seq.), local ordinances, other permits, local enforcing agency guidelines, and these Specifications.

D. Basic Principles:

1. Coordinate the land disturbance activities to fit the topography, soil types, and conditions.

2. Minimize the disturbed area and the duration of exposure to erosive elements.

3. Provide temporary or permanent stabilization to disturbed areas immediately after rough grading is complete.

4. Safely convey run-off from the site to a stable outlet to prevent flooding and damage to downstream facilities resulting from increased runoff from the site.

5. Retain sediment on-site that was generated on-site.

6. Minimize encroachment upon watercourses.

E. Implementation:

1. The Contractor is solely responsible for the control of erosion within the Project site and the prevention of sedimentation from leaving the Project site or entering waterways.

2. The Contractor shall install temporary and permanent erosion and sedimentation controls which will ensure that runoff from the disturbed area of the Project site shall pass through a filter system before exiting the Project site.

3. The Contractor shall provide temporary and permanent erosion and sedimentation control measures to prevent silt and sediment from entering the waterways and designated wetland areas. The Contractor shall maintain an undisturbed vegetative buffer a minimum of 25 feet from the top of the bank.

4. The Contractor shall limit land disturbance activity to those areas shown on the Drawings.

5. The Contractor shall maintain erosion and sedimentation control measures within disturbed areas on the entire site at no additional cost to the Owner until the final acceptance of the Project. Maintenance shall include mulching, re-seeding, clean-out of sediment barriers and sediment ponds, replacement of washed-out or undermined rip rap and erosion control materials, to the satisfaction of the Owner and Engineer.

6. All fines imposed for improper erosion and sedimentation control shall be paid by the Contractor.

Part 2 Products

2.01 Sediment Barrier

A. Silt Fence:

1. Type C Silt Fence is a combination of Type A silt Fence with woven wire reinforcement. Type C Silt Fence reinforcement shall meet the requirements of Section 171 of Georgia D.O.T. Specifications.

2. Silt fence fabric shall be an approved product on the Georgia DOT Qualified Product List No. 36, latest edition.

B. Hay Bales: Hay bales shall be clean, seed-free cereal hay, rectangular in shape, and contain five cubic feet or more of material.

C. Concrete Blocks: Concrete blocks shall be hollow, non-load-bearing type.

2.02 Construction Exit Stone

Use sound, tough, durable stone resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Aggregate size shall be in accordance with the National Stone Association Size R-2 (1.5 to 3.5-inch stone) or Type 3 rip rap stone conforming to Section 805.01 of the Georgia Department of Transportation Standard Specifications.

2.04 Rip Rap

A. Stone Rip Rap: Use sound, tough, durable stones resistant to the action of air and unless noted otherwise, stone rip rap shall be Type 1.

1. Type 1 Rip Rap: Rip rap size and gradation shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specification for Type 1 Stone Dumped Rip Rap.

2. Type 3 Rip Rap: Rip rap size and gradation shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specifications for Type 3 Stone Dumped Rip Rap.

B. Sand Cement Bag Rip Rap: Sand cement bag rip rap shall conform to the Georgia Department of Transportation Standard Specifications, Section 603.

2.05 Plastic Filter Fabric

A. Plastic filter fabric shall conform to the Georgia Department of Transportation Standard Specifications, Section 881, for filter fabrics.

B. Plastic filter fabric shall be an approved product on the Georgia Department of Transportation Qualified Product List No. 28, latest edition.

2.06 Grassing

A. Grassing materials shall meet the requirements of the Georgia Department of Transportation Standard Specifications, latest edition; as shown in the table:

Material	Section No.
Topsoil	893.01
Seed and Sod	890
Fertilizer	891.01
Agricultural Lime	882.02
Mulch	893.02
Inoculants	893.04

B. Seed species shall be provided as shown on the Drawings.

C. Mulch Binder: Mulch on slopes exceeding 3 (horizontal) to 1 (vertical) shall be held in place by the use of a mulch binder, as approved by the Engineer. The mulch binder shall be non-toxic to plant and animal life and shall be approved by the Engineer.

D. Water: Water shall be free of excess and harmful chemicals, organisms, and substances which may be harmful to plant growth or obnoxious to traffic. Salt or brackish water shall not be used. Water shall be furnished by the Contractor.

Part 3 Execution

3.01 General

A. Temporary and permanent erosion and sedimentation control measures shall prevent erosion and prevent sediment from exiting the site. If, in the opinion of the Construction Project Manager, or State or City inspector, the Contractor's temporary erosion and sedimentation control measures are inadequate, the Contractor shall provide additional maintenance for existing measures or additional devices to control erosion and sedimentation on the site at no additional cost to the Owner.

B. All erosion and sedimentation control devices and structures shall be inspected by the Contractor at least once a week and immediately after each rainfall occurrence. Any device or structure found to be damaged shall be repaired or replaced by the end of the day.

C. All erosion and sedimentation control measures and devices shall be constructed and maintained as indicated on the Drawings or specified herein until adequate permanent disturbed area stabilization has been provided and accepted by the Construction Project Manager. Once

adequate permanent stabilization has been provided and accepted by the Construction Project Manager, all temporary erosion and sedimentation control structures and devices shall be removed.

3.02 Sediment Control

A. Construction Exit:

1. Construction exit(s) shall be placed as shown on the Drawings and as directed by the Construction Project Manager. A construction exit shall be located at any point traffic will be leaving a disturbed area to a public right-of-way, street, alley, sidewalk, or parking area.

2. Placement of Construction Exit Material: The ground surface upon which the construction exit material is to be placed shall be prepared to a smooth condition free from obstructions, depressions or debris. The plastic filter fabric shall be placed to provide a minimum number of overlaps and a minimum width of one foot of overlap at each joint. The stone shall be placed with its top elevation conforming to the surrounding ground elevations. The stone shall be dropped from no more than a three feet height during construction.

3. Construction Exit Maintenance: The Contractor shall regularly maintain the exit with the top dressing of stone to prevent tracking or flow of soil onto public rights-of-way and paved surfaces as directed by the Construction Project Manager.

4. Construction Exit Removal: Construction exit(s) shall be removed and properly disposed of when the disturbed area has been properly stabilized, the tracking or flow of soil onto public rights-of-way or paved surfaces has ceased and as directed by the Construction Project Manager.

B. Sediment Barriers:

1. Sediment barriers shall include, but are not necessarily limited to, silt fences, hay bales, and any device which prevents sediment from exiting the disturbed area.

2. Silt fences and hay bales shall not be used in any flowing stream, creek, or river.

3. Sediment barriers shall be installed as shown on the Drawings and as directed by the Construction Project Manager.

4. Sediment barriers shall be maintained to ensure the depth of impounded sediment is no more than one-half of the original height of the barrier or as directed by the Construction Project

Manager. Torn, damaged, destroyed, or washed-out barriers shall be repaired, reinforced, or replaced with new material and installed as shown on the Drawings and as directed by the Construction Project Manager.

5. Accumulated sediment shall be removed from the barrier and replaced and stabilized on-site as directed by the Construction Project Manager.

6. Sediment barrier shall be removed once the disturbed area has been stabilized with a permanent vegetative cover and the sediment barrier is no longer required as directed by the Construction Project Manager.

7. All non-biodegradable parts of the barrier shall be disposed of properly.

8. The disturbed area created by barrier removal shall be permanently stabilized.

C. Sediment Boxes: All inlet grates shall be covered with sediment boxes during grading operations and shall remain so covered until all open areas are permanently stabilized against erosion.

3.03 Erosion Control

A. Rip Rap

1. Rip rap shall be placed as shown on the Drawings and as directed by the Construction Project Manager. Rip rap shall be placed at all points where natural vegetation is disturbed on the banks of active streams. Compact backfill and place rip rap to prevent subsequent settlement and erosion. This requirement applies equally to construction alongside a stream as well as crossing a stream or drainage ditch.

2. When trenching across a stream or drainage ditch, place rip rap over the entire disturbed area upstream and downstream of the trench excavation. Place rip rap across creek bottom, across creek banks, and extend rip rap placement five feet beyond the top of each creek bank.

3. Preparation of Foundations: The ground surface upon which the rip rap is to be placed shall be brought to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers. Unless at creek banks or otherwise shown or specified, rip rap shall begin in a toe ditch constructed in original ground around the toe of the fill or the cut slope. The toe ditch shall be two feet deep in original ground, and the side next to

the fill or cut shall have that same slope. After the rip rap is placed, the toe ditch shall be backfilled and the excess dirt spread neatly on the site.

4. Placement of Plastic Filter Fabric:

   a. Plastic filter fabric shall be placed under all rip rap unless shown or specified otherwise.

   b. Filter fabric shall not be placed under rip rap on stream or drainage ditch crossings.

   c. The surface to receive filter fabric shall be prepared to a smooth condition free from obstructions, depressions, and debris. The filter fabric shall be installed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The fabric shall be placed to provide a minimum width of one foot of overlap at each joint. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3-inches of the centerline of the overlap. The fabric shall be placed loosely to avoid stretching and tearing during placement of the stone. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals, or other contaminants. Contaminated fabric or fabric damaged during installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no additional cost to the Owner.

5. Placement of Rip Rap: Rip rap shall be placed on a 6-inch layer of soil, crushed stone or sand overlaying the filter fabric. Rip rap shall be placed with its top elevation conforming with the finished grade or the natural existing slope of the stream bank and stream bottom. The stone shall be dropped from no more than a three foot height during construction. Stone rip rap shall be placed to provide a uniform surface to the thickness shown on the Drawings. The thickness tolerance for the course shall be –3 inches and +6 inches.

B. Grassing:

1. Temporary Stabilization: Temporary stabilization shall be provided as shown on the Drawings and conforming to these Specifications to control erosion on the site. Temporary stabilization shall be provided to any area that will not receive permanent stabilization within the next 14 calendar days. Partial

payment requests may be withheld for those portions of the Project not complying with this requirement.

2. Permanent Stabilization:

   a. Permanent stabilization shall be provided as shown on the Drawings and conforming to these Specifications to control erosion on the site. Permanent stabilization shall be provided to all areas of land disturbance within seven calendar days of the completion of land disturbance for any area greater than 0.25 acre.

   b. Where permanent stabilization cannot be immediately established because of an inappropriate season, the Contractor shall provide temporary stabilization. The Contractor shall return to the site at the appropriate season to provide permanent stabilization in areas that received only temporary stabilization.

3. Grassing shall meet the requirements of Section 700 of the Georgia Department of Transportation Standard Specifications, latest edition, unless specified otherwise.

4. Seed rate, fertilization and other requirements shall be provided as shown on the Drawings.

3.04 Clean-Up

A. Dispose of all excess erosion and sedimentation control materials in a manner satisfactory to the Construction Project Manager.

B. Final clean-up shall be performed in accordance with the requirements of these Specifications and to the satisfaction of the Construction Project Manager.

END OF SECTION

SECTION 02225

TRENCH EXCAVATION AND BACKFILL

Part 1 General

1.01 Scope

A. The work under this Section consists of furnishing all labor, equipment and materials and performing all operations in connection with the trench excavation and backfill required to install the water lines as shown on the Drawings and as specified.

B. Excavation shall include the removal of any trees, stumps, brush, debris or other obstacles which remain after the clearing and grubbing operations, which may obstruct the work, and the excavation and removal of all earth, rock or other materials to the extent necessary to install the pipeline and appurtenances in conformance with the lines and grades shown on the Drawings and as specified.

C. Backfill shall include the refilling and compaction of the fill in the trenches and excavations up to the surrounding ground surface or road grade at crossing.

D. The trench is divided into five specific areas:

1. Foundation: The area beneath the bedding, sometimes also referenced to as trench stabilization.

2. Bedding: The area above the trench bottom (or foundation) and below the bottom of the barrel of the pipe.

3. Haunching: The area above the bottom of the barrel of the pipe up to a specified height above the bottom of the barrel of the pipe.

4. Initial Backfill: The area above the haunching material and below a plane 18 inches above the top of the barrel of the pipe.

5. Final Backfill: The area above a plane 18-inches above the top of the barrel of the pipe.

E. The choice of method, means, techniques and equipment rests with the Contractor. The Contractor shall select the method and equipment for trench excavation and backfill depending upon the type of material to be excavated and backfilled, the depth of excavation, the amount of space available for operation of equipment, storage of excavated material, proximity of man-made improvements to be protected, available easement or right-of-way and prevailing practice in the area.

1.02 Quality Assurance

A. Density: All references to “maximum dry density” shall mean the maximum dry density defined by the “Maximum Density-Optimum Moisture Test”, ASTM D 698, except that for non-cohesive materials “maximum dry density” shall mean the maximum index density as determined by the “Maximum Index Density of Soils Using a Vibratory Table”, ASTM D 4253. Determination of the density of foundation, bedding, haunching, or backfill materials in place shall meet with the requirements of ASTM D 1556, “Density of Soil In Place by the Sand Cone Method”, ASTM D 2937, “Density of Soil In Place by the Drive-Cylinder Method” or ASTM D 2922, “Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)”.

B. Sources and Evaluation Testing: Testing of materials to certify conformance with the Specifications shall be performed by an independent testing laboratory in accordance with Section 01410 of these Specifications. All imported fill materials shall meet the requirements of on-site fill materials.

1.03 Safety

Perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P “Excavation, Trenching & Shoring” as described in OSHA publication 2226.

Part 2 Products

2.01 Trench Foundation Materials

A. Crushed stone shall be utilized for trench foundation (trench stabilization) and shall meet the requirements of the Georgia Department of Transportation Specification 800.2.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

2.02 Bedding and Haunching Materials

A. Unless specified otherwise, bedding and haunching materials shall be crushed stone as specified below.

B. Crushed stone utilized for bedding and haunching shall meet the requirements of the Georgia Department of Transportation Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

C. Earth materials utilized for bedding and haunching shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2-inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, earth bedding and haunching materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as bedding or haunching material, provide select material conforming to the requirements of this Section at no additional cost to the Owner.

D. Filter Fabric Woven Type

1. Filter fabric associated with bedding shall be a polypropylene woven fabric. The fabric shall be a high modulus type with good separation capabilities. The fabric shall be inert to biological degradation and naturally occurring chemicals, alkalies and acids.

2. The fabric shall have an equivalent opening size EOS of 20 to 45. The fabric shall also conform to the minimum property values listed in the following table:

Fabric Property	Unit	Test Method	Minimum Value
Grab Tensile Strength	lbs.	ASTM D 4632	200
Grab Tensile Elongation	%	ASTM D 4632	30 (max.)
Mullen Burst Strength	psi	ASTM D 3786	400
Trapezoid Tear Strength	lbs.	ASTM D 4533	75
Puncture Strength	lbs.	ASTM D 3787	75

3. If ordered by the Engineer, the filter fabric manufacturer shall furnish the services of a competent factory representative to supervise and/or inspect the installation of pipe. This service will be furnished for a minimum of 10 days during initial pipe installation.

4. Filter fabric shall be Mirafi 500X, Amoco 2002 or Exxon GTF-200.

2.03 Initial Backfill

A. Initial backfill material shall be crushed stone or earth materials as specified for bedding and haunching materials.

B. When necessary, initial backfill materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as initial backfill material, provide select material conforming to the requirements of this Section at no additional cost to the owner.

2.04 Final Backfill

A. Final backfill material shall be general excavated earth materials, shall not contain rock larger than 2-inches at its greatest diameter, cinders, stumps, limbs, man-made wastes and other unsuitable materials. If materials excavated from the trench are not suitable for use as final backfill material, provide select material conforming to the requirements of this Section.

2.05 Select Backfill

Select backfill shall be materials which meet the requirements as specified for bedding, haunching or initial backfill materials, including compaction requirements.

2.06 Concrete

A. Concrete for bedding, haunching, initial backfill or encasement shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

Part 3 Execution

3.01 Trench Excavation

A. Topsoil and grass shall be stripped a minimum of 6-inches over the trench excavation site and stockpiled separately for replacement over the finished grading areas.

B. Trenches shall be excavated to the lines and grades shown on the Drawings with the centerlines of the trenches on the centerlines of the pipes and to the dimensions which provide the proper support and protection of the pipe and other structures and accessories.

C. Trench Width for Pipelines

1. The sides of all trenches shall be vertical to a minimum of one foot above the top of the pipe. Unless otherwise indicated on the Drawings, the maximum trench width shall be equal to the sum of the outside diameter of the pipe plus two feet. The minimum trench width shall be that which allows the proper consolidation of the haunching and initial backfill material.

2. Excavate the top portion of the trench to any width within the construction easement or right-of-way which will not cause unnecessary damage to adjoining structures, roadways, pavement, utilities, trees or private property. Where necessary to accomplish this, provide sheeting and shoring.

3. Where rock is encountered in trenches, excavate to remove boulders and stones to provide a minimum of 9-inches clearance between the rock and any part of the pipe barrel or manhole.

4. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the next higher Class or Type of bedding and haunching as shown on the Drawings for the full trench width as actually cut. The excessive trench width may be due to unstable trench walls, inadequate or improperly placed bracing and sheeting which caused sloughing, accidental over-excavation, intentional over-excavation necessitated by the size of the Contractor's tamping and compaction equipment, intentional over-excavation due to the size of the Contractor's excavation equipment, or other reasons beyond the control of the Engineer or Owner.

D. Depth

1. The trenches shall be excavated to the required depth or elevation which allow for the placement of the pipe and bedding to the dimensions shown on the Drawings.

2. Where rock is encountered in trenches for pipelines, excavate to the minimum depth which will provide clearance below the pipe barrel of 8-inches for pipe 21-inches in diameter and smaller and 12-inches for larger pipe, valves and manholes.

E. Excavated Materials

1. Excavated materials shall be placed adjacent to the work to be used for backfilling as required. Top soil shall be carefully separated and lastly placed in its original location.

2. Excavated material shall be placed sufficiently back from the edge of the excavation to prevent caving of the trench wall, to permit safe

access along the trench and not cause any drainage problems. Excavated material shall be placed so as not to damage existing landscape features or man-made improvements.

3.02 Sheeting, Bracing and Shoring

A. Sheeting, bracing and shoring shall be installed in the following instances:

1. Where sloping of the trench walls do not adequately protect persons within the trench from slides or cave-ins.

2. in caving ground.

3. in wet, saturated, flowing or otherwise unstable materials.

4. Where necessary to prevent damage to adjoining buildings, structures, roadways, pavement, utilities, trees or private properties which are required to remain.

5. Where necessary to maintain the top of the trench within the available construction easement or right-of-way.

B. In all cases, excavation protection shall strictly conform to the requirements of the Occupational Safety and Health Act of 1970, as amended.

C. Timber: Timber for shoring, sheeting, or bracing shall be sound and free of large or loose knots and in good, serviceable condition. Size and spacing shall be in accordance with OSHA regulations.

D. Steel Sheeting and Sheet Piling: Steel sheet piling shall be the continuous interlock type. The weight, depth and section modulus of the sheet piling shall be sufficient to restrain the loads of earth pressure and surcharge from existing foundations and live loads. Procedure for installation and bracing shall be so scheduled and coordinated with the removal of the earth that the ground under existing structures shall be protected against lateral movement at all times. The Contractor shall provide closure and sealing between sheet piling and existing facilities.

E. Trench Shield: A trench shield or box may be used to support the trench walls. The use of a trench shield does not necessarily preclude the additional use of bracing and sheeting. When trench shields are used, care must be taken to avoid disturbing the alignment and grade of the pipe or disrupting the haunching of the pipe as the shield is moved. When the bottom of the trench shield extends below the top of the pipe, the trench shield will be raised in 6-inch increments with specified backfilling occurring simultaneously. At no time shall the trench shield be “dragged” with the bottom of the shield extending below the top of the pipe or utility.

F. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the pipe and adjacent property. Leave sheeting in place when in the opinion of the Engineer it cannot be safely removed or is within three feet of an existing structure, utility, or pipeline. Cut off any sheeting left in place at least two feet below the surface.

G. Sheet piling within three feet of an existing structure or pipeline shall remain in place, unless otherwise directed by the Engineer.

3.03 Rock Excavation

A. Definition of Rock: Any material which cannot be excavated with conventional excavating equipment, and is removed by drilling and blasting, and occupies an original volume of at least one-half cubic yard.

B. Blasting: Provide licensed, experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all buildings and structures from the effects of the blast. Repair any resulting damage. If the Contractor repeatedly uses excessive blasting charges or blasts in an unsafe or improper manner, the Engineer may direct the Contractor to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.

C. Removal of Rock: Dispose of rock off site that is surplus or not suitable for use as rip rap or backfill.

D. The Contractor shall notify the Engineer prior to any blasting. Additionally, the Contractor shall notify the Engineer and local fire department before any charge is set.

E. Following review by the Engineer regarding the proximity of permanent buildings and structures to the blasting site, the Engineer may direct the Contractor to employ an independent, qualified specialty sub- contractor, approved by the Engineer, to monitor the blasting by use of seismograph, identify the areas where light charges must be used, conduct pre-blast and post-blast inspections of structures, including photographs or videos, and maintain a detailed written log.

3.04 Dewatering Excavations

A. Dewater excavation continuously to maintain a water level two feet below the bottom of the trench.

B. Control drainage in the vicinity of excavation so the ground surface is properly pitched to prevent water running into the excavation.

C. There shall be sufficient pumping equipment, in good working order, available at all times, to remove any water that accumulates in excavations. Where the utility crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Provision shall be made for the satisfactory disposal of surface water to prevent damage to public or private property.

D. In all cases, accumulated water in the trench shall be removed before placing bedding or haunching, laying pipe, placing concrete or backfilling.

E. Where dewatering is performed by pumping the water from a sump, crushed stone shall be used as the medium for conducting the water to the sump. Sump depth shall be at least two feet below the bottom of the trench. Pumping equipment shall be of sufficient quantity and/or capacity to maintain the water level in the sump two feet below the bottom of the trench. Pumps shall be a type such that intermittent flows can be discharged. A standby pump shall be required in the event the operating pump or pumps clog or otherwise stop operation.

F. Dewater by use of a well point system when pumping from sumps does not lower the water level two feet below the trench bottom. Where soil conditions dictate, the Contractor shall construct well points cased in sand wicks. The casing, 6 to 10-inches in diameter, shall be jetted into the ground, followed by the installation of the well point, filling casing with sand and withdrawing the casing.

3.05 Trench Foundation and Stabilization

A. The bottom of the trench shall provide a foundation to support the pipe and its specified bedding. The trench bottom shall be graded to support the pipe and bedding uniformly throughout its length and width.

B. If, after dewatering as specified above, the trench bottom is spongy, or if the trench bottom does not provide firm, stable footing and the material at the bottom of the trench will still not adequately support the pipe, the trench will be determined to be unsuitable and the Engineer shall then authorize payment for trench stabilization.

C. Should the undisturbed material encountered at the trench bottom constitute, in the opinion of the Engineer, an unstable foundation for the pipe, the Contractor shall be required to remove such unstable material and fill the trench to the proper subgrade with crushed stone as directed by the Engineer.

D. Where the replacement of unsuitable material with crushed stone does not provide an adequate trench foundation, the trench bottom shall be excavated to a depth of at least two feet below the specified trench bottom. Place filter fabric in the bottom of the trench and support the

fabric along the trench walls until the trench stabilization, bedding, haunching and pipe have been placed at the proper grade. The ends of the filter fabric shall be overlapped by one foot above the pipe.

E. Where trench stabilization is provided, the trench stabilization material shall be compacted to at least 90 percent of the maximum dry density, unless shown or specified otherwise.

3.06 Bedding and Haunching

A. Prior to placement of bedding material, the trench bottom shall be free of any water, loose rocks, boulders or large dirt clods.

B. Bedding material shall be placed to provide uniform support along the bottom of the pipe and to place and maintain the pipe at the proper elevation. The initial layer of bedding placed to receive the pipe shall be brought to the grade and dimensions indicated on the Drawings. All bedding shall extend the full width of the trench bottom. The pipe shall be placed and brought to grade by tamping the bedding material or by removal of the excess amount of the bedding material under the pipe. Adjustment to grade line shall be made by scraping away or filling with bedding material. Wedging or blocking up of pipe shall not be permitted. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted. Each pipe section shall have a uniform bearing on the bedding for the length of the pipe, except immediately at the joint.

C. At each joint, excavate bell holes of ample depth and width to permit the joint to be assembled properly and to relieve the pipe bell of any load.

D. After the pipe section is properly placed, add the haunching material to the specified depth. The haunching material shall be shovel sliced, tamped, vigorously chinked or otherwise consolidated to provide uniform support for the pipe barrel and to fill completely the voids under the pipe, including the bell hole. Prior to placement of the haunching material, the bedding shall be clean and free of any water, loose rocks, boulders or dirt clods.

E. Water Mains

1. Ductile Iron Pipe

a. Unless otherwise shown on the Drawings or specified, utilize earth materials for bedding and haunching. Type 2, 3, 4 and 5 bedding shall be as detailed on the Drawings.

b. Unless specified or shown otherwise, bedding shall meet the requirements for Type 2 Pipe Bedding. Unless specified or shown otherwise for restrained joint pipe and

fittings, bedding shall meet the requirements for Type 4 Pipe Bedding.

c. Where the depth of cover over the piping exceeds 9 feet, the pipe bedding shall meet the requirements of Type 4 Pipe Bedding. Where the depth of cover over the piping exceeds 14 feet, the pipe bedding shall meet the requirements of Type 5 Pipe Bedding.

d. Type 4 or Type 5 Pipe Bedding called for on the Drawings, specified or ordered by the Engineer, shall meet requirements for Type 4 or Type 5 Pipe Bedding, utilizing crushed stone bedding and haunching material.

F. Manholes: Excavate to a minimum of 12-inches below the planned elevation of the base of the manhole. Place and compact crushed stone bedding material to the required grade before installing the manhole.

G. Excessive Width and Depth

1. Water Mains: If the trench is excavated to excess width, provide the next higher type or class of pipe bedding, but a minimum of Type 4, as detailed on the Drawings.

2. If the trench is excavated to excessive depth, provide crushed stone to place the bedding at the proper elevation or grade.

H. Compaction: Bedding and haunching materials under pipe, manholes and accessories shall be compacted to a minimum of 90 percent of the maximum dry density, unless shown or specified otherwise.

3.07 Initial Backfill

A. Initial backfill shall be placed to anchor the pipe, protect the pipe from damage by subsequent backfill and ensure the uniform distribution of the loads over the top of the pipe.

B. Place initial backfill material carefully around the pipe in uniform layers to a depth of at least 18-inches above the pipe barrel or duct bank. Layer depths shall be a maximum of 6-inches for pipe 18-inches in diameter and smaller and a maximum of 12-inches for pipe larger than 18-inches in diameter.

C. Backfill on both sides of the pipe simultaneously to prevent side pressures.

D. Compact each layer thoroughly with suitable hand tools or tamping equipment.

E. Initial backfill shall be compacted to a minimum 90 percent of the maximum dry density, unless shown or specified otherwise.

F. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.

3.08 Concrete Encasement for Pipelines

Where concrete encasement is shown on the Drawings for pipelines, excavate the trench to provide a minimum of 6-inches clearance from the bell of the pipe. Lay the pipe to line and grade on concrete blocks. In lieu of bedding, haunching and initial backfill, place concrete to the full width of the trench and to a height of not less than 12-inches above the pipe bell. Do not backfill the trench for a period of at least 24 hours after concrete is placed.

3.09 Final Backfill

A. Backfill carefully to restore the ground surface to its original condition.

B. The top 6-inches shall be topsoil obtained as specified in “Trench Excavation” of this Section.

C. Excavated material which is unsuitable for backfilling, and excess material, shall be disposed of, at no additional cost to the Owner, in a manner approved by the Engineer. Surplus soil may be neatly distributed and spread over the site, if approved by the Construction Project Manager. If such spreading is allowed, the site shall be left in a clean and sightly condition and shall not affect pre-construction drainage patterns. Surplus rock from the trenching operations shall be removed from the site.

D. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.

E. After initial backfill material has been placed and compacted, backfill with final backfill material. Place backfill material in uniform layers, compacting each layer thoroughly as follows:

1. In 6-inch layers, if using light power tamping equipment, such as a “jumping jack”.

2. In 12-inch layers, if using heavy tamping equipment, such as hammer with tamping feet.

3. In 24-inch layers, if using a hydra-hammer.

F. Settlement: If trench settles, re-fill and grade the surface to conform to the adjacent surfaces.

G. Final backfill shall be compacted to a minimum 90 percent of the maximum dry density, unless specified otherwise.

3.10 Additional Material

Where final grades above the pre-construction grades are required to maintain minimum cover, additional fill material will be as shown on the Drawings. Utilize excess material excavated from the trench, if the material is suitable. If excess excavated materials are not suitable, or if the quantity available is not sufficient, provide additional suitable fill material at no cost to the owner.

3.11 Backfill under Roads

The compacted backfill underlying pavement and sidewalks, and backfill under dirt and gravel roads to a minimum 95 percent of the maximum dry density. The top 12-inches shall be compacted to a minimum of 98 percent of the maximum dry density.

3.12 Backfill within Georgia DOT Right-of-Way

Backfill within the Georgia DOT right-of-way shall meet the requirements stipulated in the “Utility Accommodation Policy and Standards”, published by the Georgia Department of Transportation.

3.13 Backfill along Restrained Joint Pipe

Backfill along restrained joint pipe shall be compacted to a minimum 90 percent of the maximum dry density.

3.14 Testing and Inspection

A. The soils testing laboratory is responsible for the following:

1. Compaction tests in accordance with Article 1.02 of this Section.

2. Field density tests for each two feet of lift, one test for each 5000 feet of pipe installed or more frequently if ordered by the Construction Project Manager.

3. Inspecting and testing stripped site, subgrades and proposed fill materials.

B. The Contractor's duties relative to testing include:

1. Notifying laboratory of conditions requiring testing.

2. Coordinating with laboratory for field testing.

3. Paying costs for additional testing performed beyond the scope of that required and for re-testing where initial tests reveal non-conformance with specified requirements.

4. Providing excavation as necessary for laboratory personnel to conduct tests.

C. Inspection

1. Earthwork operations, acceptability of excavated materials for bedding or backfill, and placing and compaction of bedding and backfill is subject to inspection by the Construction Project Manager.

D. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

END OF SECTION

SECTION 02229

BORE AND JACK CASINGS

Part 1 General

1.01 Scope

A. The work covered by this Section includes furnishing all labor, materials and equipment required to bore and jack casings and to properly complete pipeline construction as described herein and/or shown on the Drawings.

B. Supply all materials and perform all work in accordance with applicable American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI) or other recognized standards. Latest revisions of all standards are applicable. If requested by the Engineer, submit evidence that manufacturer has consistently produced products of satisfactory quality and performance over a period of at least two years.

1.02 Submittals

A. Submit shop drawings, product data, and experience in accordance with the requirements of Section 01340 of these Specifications.

B. Material Submittals: The Contractor shall provide shop drawings and other pertinent specifications and product data as follows:

1. Shop drawings for casing pipe showing sizes and connection details.

2. Design mixes for concrete and grout.

3. Casing Spacers.

C. Experience Submittals

1. Boring and jacking casings is deemed to be specialty contractor work. If the Contractor elects to perform the work, the Contractor shall provide evidence as required by the General Conditions. A minimum of five continuous years of experience in steel casing construction is required of the casing installer. Evidence of this experience must be provided with the shop drawings for review by the Construction Project Manager.

1.03 Storage and Protection

All materials shall be stored and protected in accordance with the manufacturer's recommendations and as approved by the Construction Project Manager.

Part 2 Products

2.01 Materials and Construction

A. Casing

1. The casing shall be new and unused pipe. The casing shall be made from steel plate having a minimum yield strength of 35,000 psi. The steel plate shall also meet the chemical requirements of one of the following: ASTM A36; ASTM A139, Grade B, C, D or E; ASTM A53, Type S or Type E, Grade A or B.

2. The outside and inside of the casing pipe shall be coated with coal tar epoxy having a minimum dry film thickness of 16 mils. Surface preparation shall be SSPC-SP-10. Epoxy shall have a minimum solids content of 65 percent by volume and shall be air or airless spray applied; minimum drying time shall be seven days. Brushing shall be permitted in small areas only. All coating and recoating shall be done in strict accordance with the manufacturer's recommendations. Epoxy shall be Tnemec, Carboline or Valspar.

3. The thicknesses of casing shown in paragraph B. below are minimum thicknesses. Actual thicknesses shall be determined by the casing installer, based on an evaluation of the required forces to be exerted on the casing when jacking. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to the Owner.

4. The diameters of casing shown in paragraph B. below, and as shown on the Drawings are the minimum. Larger casings, with the Construction Project Manager’s approval, may be provided at no additional cost to the Owner, for whatever reasons the Contractor may decide, whether casing size availability, line and grade tolerances, soil conditions, etc.

B. Casing Sizes

UNDER ROADWAYS		
Pipe Diameter, inches	Casing Diameter, inches	Wall Thickness, inches
6	12	0.250
8	16	0.250
10	18	0.250
12	20	0.250
14	22	0.250
16	24	0.250
18	30	0.312
20	30	0.312
24	36	0.375

C. Casing Spacers: Casing spacers shall meet one of the following requirements:

1. Casing spacers shall be flanged, bolt-on style with a two-section stainless steel shell lined with a PVC liner, minimum 0.09-inch thick also having a hardness of 85-90 durometer. Runners shall be attached to stainless steel risers which shall be properly welded to the shell. The height of the runners and risers shall be manufactured such that the pipe does not float within the casing.

2. Casing spacers shall be a two-section, flanged, bolt on style constructed of heat fused PVC coated steel, minimum 14 gauge band and 10 gauge risers, with 2-inch wide glass reinforced polyester insulating skids, heavy duty PVC inner liner, minimum 0.09-inch thick having a hardness of 85-90 durometer, and all stainless steel or cadmium plated hardware.

3. Casing spacers shall be equal to Cascade Waterworks Manufacturing Company, Pipeline Seal and Insulator, Inc., or Advance Products and Systems, Inc.

D. Grout: Grout may be used for filling the void between the casing pipe and the carrier pipe. Cement shall conform to ASTM C 150, Type I or Type II. Grout shall have a minimum compressive strength of 100 psi attained within 24 hours.

E. Carrier Pipe: Carrier pipes shall meet requirements as specified in Section 02665 of these Specifications.

F. Surface Settlement Markers: Surface settlement markers within pavement areas shall be P.K. nails. Surface settlement markers within non-paved areas shall be wooden hubs.

2.02 Equipment

A. A cutting head shall be attached to a continuous auger mounted inside the casing pipe.

Part 3 Execution

3.01 General

A. Interpretation of soil investigation reports and data, investigating the site and determination of the site soil conditions prior to bidding is the sole responsibility of the Contractor. Any subsurface investigation by the Bidder or Contractor must be approved by the appropriate authority having jurisdiction over the site. Rock and/or water, if encountered, shall not entitle the Contractor to additional compensation.

B. Casing construction shall be performed so as not to interfere with, interrupt or endanger roadway surface and activity thereon, and minimize subsidence of the surface, structures, and utilities above and in the vicinity of the casing. Support the ground continuously in a manner that will prevent loss of ground and keep the perimeters and face of the casing, passages and shafts stable. The Contractor shall be responsible for all settlement resulting from casing operations and shall repair and restore damaged property to its original or better condition at no cost to the Owner.

C. Face Protection: The face of the excavation shall be protected from the collapse of the soil into the casing.

D. Casing Design: Design of the bore pit and required bearing to resist jacking forces are the responsibility of the Contractor. The excavation method selected shall be compatible with expected ground conditions. The lengths of the casing shown on the Drawings are the minimum lengths required. The length of the casing may be extended for the convenience of the Contractor, at no additional cost to the Owner. Due to restrictive right-of-way and construction easements, boring and jacking casing lengths less than the nominal 20 foot length may be necessary.

E. Roadway Crossings

1. The Contractor shall be held responsible and accountable for the coordinating and scheduling of all construction work within the roadway right-of-way.

2. Work along or across the roadway department rights-of-way shall be subject to inspection by such roadway department.

3. All installations shall be performed to leave free flows in drainage ditches, pipes, culverts or other surface drainage facilities of the roadway, street or its connections.

4. No excavated material or equipment shall be placed on the pavement or shoulders of the roadway without the express approval of the roadway department.

5. In no instance will the Contractor be permitted to leave equipment (trucks, backhoes, etc.) on the pavement or shoulder overnight. Construction materials to be installed, which are placed on the right-of-way in advance of construction, shall be placed in such a manner as not to interfere with the safe operation of the roadway.

6. The Contractor shall be responsible for providing the Owner sufficient information to obtain a blasting permit in a timely manner.

3.02 Groundwater Control

A. The Contractor shall control the groundwater throughout the construction of the casing.

B. Methods of dewatering shall be at the option and responsibility of the Contractor. Maintain close observation to detect settlement or displacement of surface facilities due to dewatering. Should settlement or displacement be detected, notify the Engineer immediately and take such action as necessary to maintain safe conditions and prevent damage.

C. When water is encountered, provide and maintain a dewatering system of sufficient capacity to remove water on a 24 hour basis keeping excavations free of water until the backfill operation is in progress. Dewatering shall be performed in such a manner that removal of soil particles is held to a minimum. Dewater into a sediment trap and comply with requirements specified in Section 02125 of these Specifications.

3.03 Safety

A. Provide all necessary bracing, 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 the roadbed or interfere with normal traffic over it.

B. Observe all applicable requirements of the regulations of the authorities having jurisdiction over this site. Conduct the operations in such a manner that all work will be performed below the level of the roadbed.

C. Perform all activities in accordance with the Occupational Safety and Health Act of 1970 (PL-596), as amended, applicable regulations of the Federal Government, OSHA 29CFR 1926 and applicable criteria of ANSI A10.16-81, “Safety Requirements for Construction of Tunnel Shafts and Caissons”.

3.04 Surface Settlement Monitoring

A. Provide surface settlement markers, placed as specified and as directed by the Engineer. The Contractor shall place settlement markers outside of pavement area, along the centerline of the casing at 20 foot intervals and offset 10 feet each way from the centerline. Markers shall also be placed at each shoulder of the roadway, at each edge of pavement, at the centerline of the pavement and at 10 and 25 feet in each direction from the centerline of the casing. Tie settlement markers to bench marks and indices sufficiently removed as not to be affected by the casing operations.

B. Make observations of surface settlement markers, placed as required herein, at regular time intervals acceptable to the Construction Project Manager. In the event settlement or heave on any marker exceeds 1-inch, the Contractor shall immediately cease work and using a method approved by the Construction Project Manager and the authority having jurisdiction over the project site, take immediate action to restore surface elevations to that existing prior to start of casing operations.

C. Take readings and permanently record surface elevations prior to start of dewatering operations and/or shaft excavation. The following schedule shall be used for obtaining and recording elevation readings: all settlement markers, once a week; all settlement markers within 50 feet of the casing heading, at the beginning of each day; more frequently at the Construction Project Manager’s direction if settlement is identified. Make all elevation measurements to the nearest 0.01 foot.

D. The Contractor shall cooperate fully with jurisdictional personnel. Any settlement shall be corrected by, and at the expense of, the Contractor.

E. Promptly report any settlement and/or horizontal movement immediately to the Construction Project Manager and take immediate remedial action.

3.05 Boring and Jacking

A. Shaft

1. Conduct boring and jacking operations from a shaft excavated at one end of the section to be bored. Where conditions, and accessibility are suitable, place the shaft on the downstream end of the bore.

2. The shaft shall be rectangular and excavated to a width and length required for ample working space. If necessary, sheet and shore shaft properly on all sides. Shaft sheeting shall be timber or steel piling of ample strength to safely withstand all structural loadings of whatever nature due to site and soil conditions. Keep preparations dry during all operations. Perform pumping operations as necessary.

3. The bottom of the shaft shall be firm and unyielding to form an adequate foundation upon which to work. In the event the shaft bottom is not stable, excavate to such additional depth as required and place a gravel sub-base or a concrete sub-base if directed by the Construction Project Manager, due to soil conditions.

B. Jacking Rails and Frame

1. Set jacking rails to proper line and grade within the shaft. Secure rails in place to prevent settlement or movement during operations. The jacking rails shall cradle and hold the casing pipe on true line and grade during the progress of installing the casing.

2. Place backing between the heels of jacking rails and the rear of the shaft. The backing shall be adequate to withstand all jacking forces and loads.

3. The jacking frame shall be of adequate design for the magnitude of the job. Apply thrust to the end of the pipe in such a manner to impart a uniformly balanced load to the pipe barrel without damaging the joint ends of the pipe.

C. Boring and jacking of casing pipes shall be accomplished by the dry auger boring method without jetting, sluicing or wet boring.

D. Auger the hole and jack the casing through the soil simultaneously.

E. Bored installations shall have a bored-hole diameter essentially the same as the outside diameter of the casing pipe to be installed.

F. Execute boring ahead of the casing pipe with extreme care, commensurate with the rate of casing pipe penetration. Boring may proceed slightly in advance of the penetrating pipe and shall be made in such a manner to prevent any voids in the earth around the outside perimeter of the pipe. Make all investigations and determine if the soil conditions are such as to require the use of a shield.

G. As the casing is installed, check the horizontal and vertical alignment frequently. Make corrections prior to continuing operation.

H. Any casing pipe damaged in jacking operations shall be repaired, if approved by the Construction Project Manager, or removed and replaced at Contractor's own expense.

I. Lengths of casing pipe, as long as practical, shall be used except as restricted otherwise. Joints between casing pipe sections shall be butt joints with complete joint penetration, single groove welds, for the entire joint circumference, in accordance with AWS recommended procedures. Prior to welding the joints, the Contractor shall ensure that both ends of the casing sections being welded are square.

J. The Contractor shall prepare a contingency plan which will allow the use of a casing lubricant, such as bentonite, in the event excessive frictional forces jeopardize the successful completion of the casing installation.

K. Once the jacking procedure has begun, it should be continued without stopping until completed, subject to weather and conditions beyond the control of the Contractor.

L. Care shall be taken to ensure that casing pipe installed by boring and jacking method will be at the proper alignment and grade.

M. The Contractor shall maintain and operate pumps and other necessary drainage system equipment to keep work dewatered at all times.

N. Adequate sheeting, shoring and bracing for embankments, operating pits and other appurtenances shall be placed and maintained to ensure that work proceeds safely and expeditiously. Upon completion of the required work, the sheeting, shoring and bracing shall be left in place, cut off or removed, as designated by the Construction Project Manager.

O. Trench excavation, all classes and type of excavation, the removal of rock, muck, debris, the excavation of all working pits and backfill requirements of Section 02225 are included under this Section.

P. All surplus material shall be removed from the right-of-way and the excavation finished flush with the surrounding ground.

Q. Grout backfill shall be used for unused holes or abandoned pipes.

R. Any replacement of carrier pipe in an existing casing shall be considered a new installation, subject to the applicable requirements of these Specifications.

3.06 Free Boring

A. Where ordered by the Construction Project Manager, the Contractor shall install the pipe by the free bore method. The allowed free bore method will be dry auger boring, without jetting, sluicing, or wet boring.

B. The diameter of the free bore shall not exceed the pipe bell outside diameter or the pipe barrel outside diameter plus 1-inch, whichever is greater.

C. The Contractor shall be responsible for any settlement of the surface (roadway, driveway, or otherwise) caused by the free bore construction activities.

D. Where ordered to use the free bore method to install a segment of pipe, the Contractor may elect to install the pipe by the conventional bore and jack casing method instead.

E. If the Contractor elects to free bore, and an acceptable installation does not result for any reason, the Contractor shall install a casing pipe by the bore and jack method at no additional cost to the Owner.

F. The Contractor may elect to free bore other portions of the project in lieu of open cut installation. However, no additional payment for free bore will be made if the Contractor exercises this option.

3.07 Directional Drilling

A. Where ordered by the Construction Project Manager, the Contractor shall install the pipe by directional drilling. The directional drilling construction method consists of drilling a small diameter pilot hole within the designated tolerances followed by enlargement of the hole to accommodate the ductile iron pipeline to be installed.

B. The contractor shall provide all materials and equipment required, including but not limited to drilling equipment, water pumps, hoses, fittings, storage tanks, filters, hay bales, silt fences, drilling fluids including containment, collection, cleaning and disposal of, fuel and lubricants, bentonite and related mixing equipment, hydrostatic testing equipment and materials, side booms, cranes, backhoes, trucks, and other equipment or materials necessary to load and unload pipe, and to support and smoothly transition the pipe while being pulled into the reamed hole.

C. The Contractor shall submit to the Construction Project Manager a detailed installation plan including operational sequences, details of the guidance or grade and alignment control system, and a plan and profile of

the bore path. The bore path shall ensure that the pipe joints do not deflect more than 50 percent of the manufacturer's recommended maximum deflection for ductile iron pipe.

D. The drilling operation shall be conducted in a manner to eliminate the discharge of water, drilling mud, and cuttings to areas not involved in the construction process. The Contractor shall immediately contain and clean-up any inadvertent returns. The Contractor shall also provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste disposal. Proper disposal of water, drilling fluids, drilling mud, cuttings and muck is the Contractor's responsibility.

E. Ductile iron pipe and fittings, inspection and testing shall be as specified in Section 02665.

3.08 Ventilation and Air Quality

Provide, operate and maintain for the duration of casing project a ventilation system to meet safety and OSHA requirements.

3.09 Rock Excavation

A. In the event that rock is encountered during the installation of the casing pipe which, in the opinion of the Construction Project Manager, cannot be removed through the casing, the Construction Project Manager may authorize the Contractor to complete the crossing by a method established in a change directive.

B. At the Contractor's option, the Contractor may continue to install the casing and remove the rock through the casing at no additional cost to the Owner.

3.10 Installation of Pipe

A. After construction of the casing is complete, and has been accepted by the Construction Project Manager, install the pipeline in accordance with the Drawings and Specifications.

B. Check the alignment and grade of the casing and prepare a plan to set the pipe at proper alignment, grade and elevation, without any sags or high spots.

C. The carrier pipe shall be held in the casing pipe by one of the following methods:

1. The carrier pipe shall be held in the casing pipe by the use of hardwood blocks spaced radially around the pipe and secured together so that they remain firmly in place. The spacing of such

blocks longitudinally in the casing pipe shall not be greater than 10 feet.

2. The pipe shall be supported within the casing by use of casing spacers sized to limit radial movement to a maximum of 1-inch. Provide a minimum of two casing spacers per nominal length of pipe. Casing spacers shall be attached to the pipe at maximum 9 to 10 foot intervals.

D. Fill the void between the carrier pipe and casing pipe with grout. Measures shall be taken by the Contractor to prevent floatation and other movement of the pipe as the grout is filling the void.

E. Close the ends of the casing with 4-inch brick walls.

3.11 Sheeting Removal

Remove sheeting used for shoring from the shaft and off the job site. The removal of sheeting, shoring and bracing shall be done in such a manner as not to endanger or damage either new or existing structures, private or public properties and also to avoid cave-ins or sliding in the banks.

END OF SECTION

SECTION 02528

PAVEMENT PATCHING

Part 1 General

1.01 Scope

A. The extent of pavement patching consists of the repair of all pavement removed or damaged in the course of constructing the Project.

B. Pavement patching includes repair of paved roads, streets, highways, walkways, driveways, patios, slabs on grade, and parking lots together with walls, curbing, gutters and headers, and other pavements and appurtenances. Pavement referred to under this Section, refers to asphaltic, Cementous, brick, cobble or other large stone pavement materials together with underlying construction, irrespective of its composition.

1.02 Job Conditions

A. Traffic Control: Schedule and conduct Work in a manner which will minimize inconvenience to vehicular and pedestrian traffic. Provide flaggers, barricades, warning signs, warning lights, and other warning means as appropriate.

B. Weather Limitations: Conduct all operations during weather conditions appropriate to the Work being performed.

C. Grade Control: Establish and maintain lines and elevations which will assure finished pavement patch having desirable appearance, function and strength.

1.03 Submittals

Submit detailed material descriptions when requested by the Engineer.

Part 2 Products

2.01 Materials

A. General: For products not described below, use materials and gradations which have locally exhibited a satisfactory record of previous usage, and which for finished visible surfaces will permit obtaining appearance, color and texture reasonably matching remaining adjacent pavement of the same type.

B. Asphalt Concrete: Bituminous plant mixture of asphalt cement and aggregates complying with 12.5mm Super pave hot plant mix of Section

828 of the Georgia Department of Transportation "Standard Specifications for Road and Bridge Constructions".

C. Graded Aggregate Base: Uniform graded aggregate material complying with Section 815 of the Georgia Department of Transportation "Standard Specifications for Road and Bridge Construction".

D. Bituminous Prime: Cutback asphalt complying with Section 821 of the Georgia Department of Transportation "Standard Specifications for Road and Bridge Construction".

E. Bituminous Tack Coat: Asphalt material complying with Section 413, topics 413.01 through 413.04 of the Georgia Department of Transportation "Standard Specifications for Road and Bridge Construction".

F. Portland Cement Concrete: Concrete mix of Portland cement, aggregates, water, and air entraining admixture to produce the following properties: 3500 psi minimum compressive strength at 28 days per ASTM C39, 4 inches maximum slump per ASTM C143, and air content between 3% and 6%.

G. Cold Mix: Uniform bituminous mixture of aggregate, asphaltic material and, if it is required, mineral filler complying with 12.5mm Super pave cold mix of Section 401 of the Georgia Department of Transportation "Standard Specifications for Road and Bridge Construction".

Part 3 Execution

3.01 Pavement Cuts

Saw cut trench edges in paved areas to neat, straight lines before starting to break the pavement slab. Contractor should completely backfill the open half before opening the other half of pavement.

3.02 Backfill Placement

Place trench backfill materials in layers not more than six inches compacted thickness. Commence backfill immediately after utility is installed. Complete new replacement base construction immediately after trench backfill.

3.03 Inspection

Examine areas and conditions under which pavement patching will be conducted, giving special attention to stability of subbase. Do not proceed with pavement patching work until unsatisfactory conditions have been corrected.

3.04 Preparation

Saw cut any ragged edges of existing pavement, or in the case of concrete work, remove existing pavement to nearest joint. Remove all loose material from underlying and adjacent surfaces.

3.05 Strength and Stability

Use materials and construction techniques as necessary to obtain strength, stability and durability of pavement patch at least equal to that of remaining adjacent pavement of the same type. As a minimum, conform to pavement patch details, if any, required elsewhere by the Contract Documents; and where such details are not provided, accomplish pavement patching utilizing strengths, thicknesses, etc. not less than that of remaining adjacent pavement of the same type.

3.06 Placing

A. Construct pavement using methods and equipment in general use for the type of work being performed.

B. Immediately after new base construction, cover pavement cut with steel plates or similar devices of sufficient thickness to span the cut without noticeable deflection. Maintain plates in place for not less than 24 hours and not more than 7 days and until the concrete base (if used) has gained sufficient strength to withstand traffic loads. Traffic may resume after installation of metal plates.

C. Upon removal of the metal plates or similar devices, provide new pavement surface in accordance with one of the following options:

1. Immediately apply new permanent pavement surface materials indicated

2. Immediately apply bituminous cold mixture over bond breaker paper over new base. Monitor performance and repair or replace materials regularly to maintain smooth traffic surface until placement of permanent pavement surface materials. At Contractor's time selection prior to substantial completion, remove cold mix and bond breaker paper and provide new permanent pavement surface materials. If performance or maintenance of cold mix patch is unsatisfactory in the opinion of the Construction Project Manager, remove materials and provide new permanent pavement surface materials within 72 hours of notice by the Construction Project Manager.

D. Traffic control devices in lieu of cover plates are permitted for pavement patching longitudinal to the street centerline in excess of 20 feet. Use traffic barricades, warning signs and lights, flagmen, and other means as appropriate to continuously control traffic 24 hours per day. Use devices

such that at least 12 feet wide, one-way through traffic access is provided at all times. Upon removal of traffic control devices, install permanent pavement surface.

E. Contractor assumes all responsibility for maintaining repairing and or replacing concrete base that may be damaged during curing period.

F. For existing surface of Portland cement concrete, furnish new Portland cement concrete structure thickness, including base and pavement surface, of not less than eight inches; except for driveways and sidewalks which shall be not less than four inches thick.

G. Provide not less than eight inches thickness of new graded aggregate base for replacement of asphalt concrete pavement at driveways, sidewalks and parking lots.

H. For repair of asphalt concrete pavement, clean base and adjacent surfaces and apply bituminous tack coat or bituminous prime (as appropriate) to such surfaces before placing new asphalt concrete surface.

3.07 Finish

A. Accomplish pavement patching using materials and techniques which result in visible, finished surfaces having appearance, color, and texture reasonably matching remaining adjacent pavement of the same type. Do not permit the finished surface to have dips, objectionable roughness or discontinuity or non-draining areas. Do not create any unsafe pavement condition.

3.08 Repairs

A. If pavement patch or adjacent pavement settles or shows evidence of other distress resulting from the Work, cut pavement out, repair subgrade, and reconstruct patch. Do not place additional pavement material on top of unsatisfactory previously repaired surfaces. At expense of Contractor, repair any pavement which he damages beyond that minimum amount necessary to construct the Work.

END OF SECTION

SECTION 02575

REMOVING AND REPLACING PAVEMENT

Part 1 General

1.01 Scope

The work to be performed under this Section shall consist of removing and replacing existing pavement, sidewalks and curbs in paved areas where necessary for construction of sewers, manholes and all other sewer appurtenances and structures.

1.02 Submittals

A. Certificates: Provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the asphalt producer and the Contractor.

B. Traffic paint manufacturer's application instructions and a description and other data relative to the Contractor's application equipment and methods shall be submitted to the Construction Project Manager for approval.

1.03 Conditions

A. Weather Limitations

1. Apply bituminous prime and tack coats only when the ambient temperature has been at least 55 degrees F for 12 hours immediately prior to application.

2. Do not conduct paving operations when surface is wet or contains excess of moisture which would prevent uniform distribution and required penetration.

3. Construct asphaltic courses only when atmospheric temperature in the shade is above 40 degrees F, when the underlying base is dry and when weather is not rainy.

4. Place base course when air temperature is above 35 degrees F and rising.

B. Grade Control: Establish and maintain the required lines and grades for each course during construction operations.

Part 2 Products

2.01 Materials and Construction

A. Graded Aggregate Base Course: Graded aggregate base course shall be of uniform quality throughout and shall meet the requirements of Section 815.01 of the Georgia Department of Transportation Standard Specifications.

B. Black Base: Black base course shall be of uniform quality throughout and shall conform to the requirements of Section 828 of the Georgia Department of Transportation Standard Specifications.

C. Binder Course: The binder course of all paved roadways shall conform to the requirements of Section 400, Type 19mm Super pave of the Georgia Department of Transportation Standard Specifications.

D. Surface Course: The surface course for all pavement, including prime or tack coat when required by the Construction Project Manager, shall conform to the requirements of Section 400, Type 12.5mm Super pave of the Georgia Department of Transportation Standard Specifications.

E. Concrete: Provide concrete and reinforcing for concrete pavement or base courses in accordance with the requirements of the Georgia Department of Transportation Standard Specifications, Section 430. Concrete shall be of the strength classifications shown on the Drawings.

F. Special Surfaces: Where driveways or roadways are disturbed or damaged which are constructed of specialty type surfaces, e.g., brick or stone, these driveways and roadways shall be restored utilizing similar, if not original, materials. At the locations, where the nature of these surfaces dictates, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

2.02 Types of Pavements

A. General: All existing pavement removed, destroyed or damaged by construction shall be replaced with the same type and thickness of pavement as that existing prior to construction, unless otherwise directed by the Construction Project Manager. Materials, equipment and construction methods used for paving work shall conform to the Georgia Department of Transportation specifications applicable to the particular type required for replacement, repair or new pavements.

B. Aggregate Base: Aggregate base shall be constructed in accordance with the requirements of Section 310 of the Georgia Department of Transportation Standard Specifications. The maximum thickness to be

laid in a single course shall be 6-inches compacted. If the design thickness of the base is more than 6-inches, it shall be constructed in two or more courses of approximate equal thickness. After the material placed has been shaped to line, grade and cross-section, it shall be rolled until the course has been uniformly compacted to at least 100 percent of the maximum dry density when Group 2 aggregate is used, or to at least 98 percent of maximum dry density when Group 1 aggregate is used.

C. Concrete Pavement: Concrete pavement or base courses shall be replaced with concrete. The surface finish of the replaced concrete pavement shall conform to that of the existing pavement. The surface of the replaced concrete base course shall be left rough. The slab depth shall be equivalent to the existing concrete pavement or base course, but in no case less than 6-inches thick. Transverse and longitudinal joints removed from concrete pavement shall be replaced at the same locations and to the same types and dimensions as those removed. Concrete pavements or concrete base courses shall be reinforced.

D. Asphaltic Concrete Base, Binder and Surface Course: Asphaltic concrete base, binder and surface course construction shall conform to Georgia Department of Transportation Standard Specifications, Section 400. The pavement mixture shall not be spread until the designated surface has been previously cleaned and prepared, is intact, firm, properly cured, and dry and the tack coat has been applied. Apply and compact the base in maximum layer thickness by asphalt spreader equipment of design and operation approved by the Construction Project Manager. After compaction, the black base shall be smooth and true to established profiles and sections. Apply and compact [binder and] the surface course in a manner approved by the Construction Project Manager. Immediately correct any high, low or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.

E. Surface Treatment Pavement: Bituminous penetration surface treatment pavement shall be replaced with a minimum thickness of 1-inch conforming to Section 424, Georgia Department of Transportation Standard Specifications.

F. Gravel Surfaces: Existing gravel road, drive and parking area replacement shall meet the requirements of graded aggregate base course. This surfacing may be authorized by the Construction Project Manager as a temporary surface for paved streets until replacement of hard surfaced pavement is authorized.

G. Temporary Measures: During the time period between pavement removal and complete replacement of permanent pavement, maintain highways, streets and roadways by the use of steel running plates anchored to prevent movement. The backfill above the pipe shall be compacted, as specified in Section 02225 of these Specifications, up to the existing pavement surface to provide support for the steel running

plates. All pavement shall be replaced within seven calendar days of its removal.

Part 3 Execution

3.01 Locations for Pavement Replacement

Pavement shall be removed and replaced with similar type and thickness as the original pavement, for the entire length of pipe laying and up to required trench width as per details shown on drawings.

3.02 Removing Pavement

A. General: Remove existing pavement as necessary for installing the pipe line and appurtenances.

B. Marking: Before removing any pavement, mark the pavement neatly paralleling pipe lines and existing street lines. Space the marks the width of the trench.

C. Breaking: Break asphalt pavement along the marks using pavement shearing equipment, jack hammers or other suitable tools. Break concrete pavement along the marks by scoring with a rotary saw and breaking below the score by the use of jack hammers or other suitable tools.

D. Machine Pulling: Do not pull pavement with machines until the pavement is completely broken and separated from pavement to remain.

E. Damage to Adjacent Pavement: Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.

F. Sidewalk: Remove and replace any sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.

G. Curbs: Tunnel under or remove and replace any curb disturbed by construction to the nearest undisturbed joint.

3.03 Replacing Pavement

A. Preparation of Subgrade: Upon completion of backfilling and compaction of the backfill, arrange to have the compaction tested by an independent testing laboratory approved by the Construction Project Manager. After compaction testing has been satisfactorily completed, replace all pavements, sidewalks and curbs removed.

1. The existing street pavement or surface shall be removed along the lines of the work for the allowable width specified for the

trench or structure. After the installation of the sewerage or water works facilities and after the backfill has been compacted suitably, the additional width of pavement to be removed, as shown on the Drawings, shall be done immediately prior to replacing the pavement.

2. Trench backfill shall be compacted for the full depth of the trench as specified in Section 02225 of these Specifications.

3. Temporary trench backfill along streets and driveways shall include 6-inches of crushed stone or cherty clay as a temporary surfacing of the trenches. This temporary surface shall be maintained carefully at grade and dust-free by the Contractor until the backfill of the trench has thoroughly compacted in the opinion of the Construction Project Manager and permission is granted to replace the street pavement.

4. When temporary crushed stone or chert surface is considered by the Construction Project Manager to be sufficient surface for gravel pavement, the surface shall be graded smooth and to an elevation that will make the final permanent surfacing level with the adjacent surfacing that was undisturbed.

B. Pavement Replacement

1. Prior to replacing pavement, make a final cut in concrete pavement 12-inches back from the edge of the damaged pavement with a concrete saw. Remove asphalt pavement 12-inches back from the edge of the damaged pavement using pavement shearing equipment, jack hammers or other suitable tools.

2. Replace all street and roadway pavement as shown on the Drawings. Replace driveways, sidewalks and curbs with the same material, to nearest existing undisturbed construction joint and to the same dimensions as those existing.

3. If the temporary crushed stone or chert surface is to be replaced, the top 6-inches shall be removed and the crushed stone surfacing for unpaved streets or the base for the bituminous surface shall be placed.

4. Following this preparation, the chert or crushed stone base shall be primed with a suitable bituminous material and surfaced with the proper type of bituminous surface treatment.

5. Where the paved surface is to be replaced with asphaltic concrete pavement, concrete pavement or with a concrete base and a surface course, the temporary chert or crushed stone surface and any necessary backfill material, additional existing paving and new

excavation shall be removed to the depth and width shown on the Drawings. All edges of the existing pavement shall be cut to a straight, vertical edge. Care shall be used to get a smooth joint between the old and new pavement and to produce an even surface on the completed street. Concrete base slabs and crushed stone bases, if required, shall be placed and allowed to cure for three days before bituminous concrete surface courses are applied. Expansion joints, where applicable, shall be replaced in a manner equal to the original joint.

6. Where driveways or roadways, constructed of specialty type surfaces, e.g., brick or stone are disturbed or damaged, these driveways and roadways shall be restored utilizing similar materials. At the locations, where the nature of these surfaces dictates, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

C. Pavement Resurfacing: Certain areas to be resurfaced are specified or noted on the Drawings. After all pipe line installations are complete and existing pavement has been removed and the trench route has been repaired, mill entire area to be resurfaced 1-1/2 inches, then apply tack coat and 1-1/2 inches of Type 12.5mm SuperPave surface course as specified.. Where pavement to be resurfaced has been damaged with potholes, the Contractor shall remove all existing loose pavement material and fill the hole with black base, as specified, to the level of the existing pavement.

D. Pavement Striping: Pavement striping removed or paved over shall be replaced with the same type, dimension and material as original unless directed otherwise by the Construction Project Manager.

3.04 Sidewalk and Curb Replacement

A. Construction

1. All concrete sidewalks and curbs shall be replaced with concrete.

2. Preformed joints shall be 1/2-inch thick, conforming to the latest edition of AASHTO M59 for sidewalks and AASHTO M 123 for curbs.

3. Forms for sidewalks shall be of wood or metal, shall be straight and free from warp, and shall be of sufficient strength, when in place, to hold the concrete true to line and grade without springing or distorting.

4. Forms for curbs shall be metal and of an approved section. They shall be straight and free from distortions, showing no vertical

variation greater than 1/8-inch in 10 feet and no lateral variation greater than 1/4-inch in 10 feet from the true plain surface on the vertical face of the form. Forms shall be of the full depth of the structure and constructed such to permit the inside forms to be securely fastened to the outside forms.

5. Securely hold forms in place true to the lines and grades indicated on the Drawings.

6. Wood forms may be used on sharp turns and for special sections, as approved by the Construction Project Manager. Where wooden forms are used, they shall be free from warp and shall be the nominal depth of the structure.

7. All mortar and dirt shall be removed from forms and all forms shall be thoroughly oiled or wetted before any concrete is deposited.

B. When a section is removed, the existing sidewalk or curb shall be cut to a neat line, perpendicular to both the centerline and the surface of the concrete slab. Existing concrete shall be cut along the nearest existing construction joints; if such joints do not exist, the cut shall be made at minimum distances shown on the Drawings.

C. Existing concrete sidewalks and curbs that have been cut and removed for construction purposes shall be replaced with the same width and surface as the portion removed. Sidewalks shall have a minimum uniform thickness of 4-inches. The new work shall be neatly jointed to the existing concrete so that the surface of the new work shall form an even, unbroken plane with the existing surfaces.

D. The subgrade shall be formed by excavating to a depth equal to the thickness of the concrete, plus 2-inches. Subgrade shall be of such width as to permit the proper installation and bracing of the forms. Subgrades shall be compacted by hand tamping or rolling. Soft, yielding or unstable material shall be removed and backfilled with satisfactory material. Place 2-inches of porous crushed stone under all sidewalks and curbs and compacted thoroughly, then finish to a smooth, unyielding surface at proper line, grade and cross section.

E. Joint for Curbs

1. Joints shall be constructed as indicated on the Drawings and as specified. Construct joints true to line with their faces perpendicular to the surface of the structure and within 1/4-inch of their designated position.

2. Thoroughly spade and compact the concrete at the faces of all joints filling all voids.

3. Install expansion joint materials at the point of curve at all street returns. Install expansion joint material behind the curb at abutment to sidewalks and adjacent structures.

4. Place contraction joints every 10 feet along the length of the curbs and gutters. Form contraction joints using steel templates or division plates which conform to the cross section of the structure. Leave the templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Contraction joint templates or plates shall not extend below the top of the steel reinforcement or they shall be notched to permit the reinforcement to be continuous through the joint. Contraction joints shall be a minimum of 1-1/2-inches deep.

F. Expansion joints shall be required to replace any removed expansion joints or in new construction wherever shown on the Drawings. Expansion joints shall be true and even, shall present a satisfactory appearance, and shall extend to within 1/2-inch of the top of finished concrete surface.

G. Finishing

1. Strike off the surface with a template and finish the surface with a wood float using heavy pressure, after which, contraction joints shall be made and the surface finished with a wood float or steel trowel.

2. Finish the face of the curbs at the top and bottom with an approved finishing tool of the radius indicated on the Drawings.

3. Finish edges with an approved finishing tool having a 1/4-inch radius.

4. Provide a final broom finish by lightly combing with a stiff broom after troweling is complete.

5. The finished surface shall not vary more than 1/8-inch in 10 feet from the established grade.

H. Driveway and Sidewalk Ramp Openings

1. Provide driveway openings of the widths and at the locations indicated on the Drawings and as directed by the Construction Project Manager.

2. Provide sidewalk ramp openings as indicated on the Drawings, in conformance with the applicable regulations and as directed by the Construction Project Manager.

I. Concrete shall be suitably protected from freezing and excessive heat. It shall be kept covered with burlap or other suitable material and kept wet until cured. Provide necessary barricades to protect the work. All damage caused by people, vehicles, animals, rain, the Contractor's operations and the like shall be repaired by the Contractor, at no additional expense to the Owner.

3.05 Maintenance

The Contractor shall maintain the surfaces of roadways built and pavements replaced until the acceptance of the Project. Maintenance shall include replacement, scraping, reshaping, wetting and rerolling as necessary to prevent raveling of the road material, the preservation of reasonably smooth surfaces and the repair of damaged or unsatisfactory surfaces, to the satisfaction of the Construction Project Manager. Maintenance shall include sprinkling as may be necessary to abate dust from the gravel surfaces.

3.06 Supervision and Approval

A. Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. Obtain agency approval of pavement restorations before requesting final payment.

B. Obtain the Construction Project Manager’s approval of restoration of pavement, such as private roads and drives that are not the responsibility of a regulatory agency.

C. Complete pavement restoration as soon as possible after backfilling.

D. Failure of Pavement: Should any pavement restoration or repairs fail or settle during the life of the Contract, including the bonded period, promptly restore or repair defects.

3.07 Cleaning

The Contractor shall remove all surplus excavation materials and debris from the street surfaces and rights-of-way and shall restore street, roadway or sidewalk surfacing to its original condition.

END OF SECTION

SECTION 02665

WATER MAINS AND ACESSORIES

Part 1 General

1.01 Scope

A. This Section describes products to be incorporated into the water mains and requirements for the installation and use of these items. Furnish all products and perform all labor necessary to fulfill the requirements of these Specifications.

B. Supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable.

1.02 Qualifications

If requested by the Construction Project Manager, submit evidence that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two years.

1.03 Submittals

Complete shop drawings, product data and engineering data for all products shall be submitted to the Construction Project Manager in accordance with the requirements of Section 01340 of these Specifications.

1.04 Transportation and Handling

A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against the pipe on the ground.

B. Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front end loader. Do not use material damaged in handling. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe.

1.05 Storage and Protection

A. Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.

B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipe in adjacent tiers.

D. Stored mechanical and push-on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

E. Mechanical-joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

1.06 Quality Assurance

The manufacturer shall provide written certification to the CONSTRUCTION Project Manager that all products furnished comply with all applicable requirements of these Specifications.

Part 2 Products

2.01 Ductile Iron Pipe (DIP)

A. Ductile iron pipe shall be manufactured in the U.S.A. in accordance with AWWA C151 – latest revision. All pipes, except specials, shall be furnished in nominal lengths of 18 to 20 feet. Sizes will be as shown on the Drawings. All pipes shall be Class 50 (thickness class) for 16-inch and smaller, and Class 51 for 18-inch and larger, unless otherwise specified or shown on the Drawings. All pipes shall have a minimum pressure rating as indicated in the following table and corresponding minimum wall thickness, unless otherwise specified or shown on the Drawings:

Pipe Sizes (inches)	Pressure Class (psi)	Thickness (inches)
4	350	0.25
6	350	0.25
8	350	0.27
10	350	0.29
12	350	0.31
14	350	0.33
16	350	0.34
18	350	0.38
20	300	0.39
24	250	0.41
30	200	0.43
36	200	0.48
42	200	0.53
48	200	0.58
54	200	0.65
60	200	0.68
64	200	0.72

B. Flanged pipe minimum wall thickness shall be equal to Special Class 53. Flanges shall be furnished by the pipe manufacturer.

C. Pipe shall be cement lined in accordance with AWWA C104. Pipe shall be furnished with a bituminous outside coating.

D. Certificates of conformance with the foregoing specifications shall be furnished with each lot of pipe supplied.

E. Fittings shall be manufactured in the U.S.A. of ductile iron and shall conform to AWWA C110 or AWWA C153 with a minimum rated working pressure of 250 psi. Fittings shall be cement lined in accordance with AWWA C104 and shall be furnished with a bituminous outside coating. In lieu of cement lining and bituminous coating, fittings may be provided with a fusion bonded coating and lining meeting the requirements of AWWA C116.

F. Galvanized pipe fittings and PVC pipe fittings shall not be used as any part of the Fulton County Water Transmission and Distribution System, nor shall it be used to join any appurtenances to the System.

G. Joints

1. Unless shown or specified otherwise, joints shall be push-on or restrained joint type for pipe and standard mechanical, push-on or restrained joints for fittings. Push-on and mechanical joints shall conform to AWWA C111.

2. Restrained joints shall be American “FLEX-RING” or “LOK-RING”, U.S. Pipe “TR FLEX” or “HP LOK”, Clow “SUPER-LOCK”, Griffin “SNAP-LOK” or equal.

3. Restraining gasket joints shall be assembled with American Fast-Grip gaskets or US Pipe FIELD LOK gaskets and may be used for pipe 12-Inches in diameter or less.

4. Retainer glands on a mechanical joint may be used as a restrained joint only where retainer glands are specifically shown on the drawings or where specifically specified.

5. Where retainer glands are allowed, in lieu of retainer glands specified elsewhere, the joint may be assembled with US Pipe MJ FIELD LOK gasket.

6. No field welding for manufactured restrained joint pipe assembly will be permitted. Where field cutting of restrained joint pipe is required, the joint shall be assembled with American Field Flex-Rings or US Pipe TR FLEX GRIPPER Rings.

7. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.

H. Provide the appropriate gaskets for mechanical and flange joints. Gaskets for flange joints shall be made of 1/8-inch thick, cloth reinforced rubber; gaskets and shall be full face type.

I. Bolts and Nuts

1. Provide the necessary bolts for connections. All bolts and nuts shall be threaded in accordance with ANSI B1.1, Coarse Thread Series, Class 2A external and 2B internal fit. All bolts and nuts shall be made in the U.S.A.

2. Bolts and nuts for mechanical joints shall be Tee Head Bolts and nuts of high strength low-alloy steel in accordance with ASTM A 242 to the dimensions shown in AWWA C111/ANSI A21.11.

3. Flanged joints shall be bolted with through stud or tap bolts of required size as directed. Bolt length and diameter shall conform to ANSI/AWWA C115 for Class 125 flanges shown in ANSI/ASME B16.1.

4. Bolts for exposed service shall be zinc plated, cold pressed, steel machine bolts conforming to ASTM A 307, Grade B. Nuts for exposed service shall be zinc plated, heavy hex conforming to ASTM A 563. Zinc plating shall conform to ASTM B 633, Type II.

5. Bolts for submerged service shall be stainless steel machine bolts conforming to ASTM A 193, Grade B8. Nuts shall be heavy hex, stainless steel conforming to ASTM A 194, Grade 8.

J. Mechanical joint glands shall be ductile iron.

K. Restrained joint pipe (RJP) on supports shall have bolted joints and shall be specifically designed for clear spans of at least 36 feet.

L. Thrust collars shall be welded-on ductile iron body type or split retainer gland type, as shown on the Drawings or directed by the Construction Project Manager, designed to withstand thrust due to 250 psi internal pressure on a dead end.

M. Tapping Saddles: Tapping saddles are not allowed.

N. Pipe outlets shall be welded-on ductile iron pipe and shall be provided in lieu of tees or saddles on mains with a diameter greater than or equal to 24-inches. Outlets shall be plain end, push-on, mechanical, or flanged joint, and shall meet the joint requirements stated in this Specification. All welding, fabrication and outlet hole drilling shall be performed by the manufacturer of the parent pipe. Outlets shall be free of burrs. Sizes shall be as indicated on the Drawings. The outlets and parent pipe shall be minimum Class 53 ductile iron pipe for parent pipe 54-inches and smaller. For pipe larger than 54-inches, parent pipe shall be Pressure Class 350. Each welded outlet shall be rated for 250 psi working pressure and hydrostatically tested at 500 psi. The maximum outlet diameters shall not exceed those listed in the table below:

Parent Pipe Diameter, Inches	Maximum Outlet Diameter, Inches
24	16
30	20
36	24
42	30
48	30
54	30
60	30
64	30

O. Acceptance will be on the basis of the Construction Project Manager inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

2.02 Copper Pipe

A. Pipe shall be rolled copper tubing, ASTM B 88, Type K. Fittings shall be sweat type wrought copper, ANSI B16.22. All copper pipe shall be made in the U.S.A.

B. Where required, sweat to screw adapters shall be cast bronze ANSI B16.18, wrought solder joint ANSI B16.22. Unions shall be cast bronze or bronze with solder connections. Joints shall be made with 95/5 solder for Type K pipe.

2.03 Valves

A. Gate Valves (GV): 6-Inches to 12-Inches in Diameter

1. Gate valves shall be resilient wedge type conforming to the requirements of AWWA C509 or AWWA C515 rated for 250 psi working pressure.

2. Valves shall be provided with two O-ring stem seals with one O-ring located above and one O-ring below the stem collar. The area between the O-rings shall be filled with lubricant to provide lubrication to the thrust collar bearing surfaces each time the valve is operated. At least one anti-friction washer shall be utilized to further minimize operating torque. All seals between valve parts, such as body and bonnet, bonnet and bonnet cover, shall be flat gaskets or O-rings.

3. The valve gate shall be made of cast or ductile iron having a vulcanized, synthetic rubber coating, or a seat ring attached to the

disc with retaining screws. Sliding of the rubber on the seating surfaces to compress the rubber will not be allowed. The design shall be such that compression-set of the rubber shall not affect the ability of the valve to seal when pressure is applied to either side of the gate. The sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

4. All internal ferrous surfaces shall be coated with epoxy to a minimum thickness of 4 mils. The epoxy shall be non-toxic, impart no taste to the water and shall conform to AWWA C550.

5. Valves shall be non-rising stem type with a 2-inch square wrench nut, except in meter vaults where hand wheels shall be installed, and shall open left. The manufacturer shall provide an affidavit of compliance with the applicable AWWA standards.

6. Gate valves shall be manufactured by American Flow Control, Mueller or M & H Valve in the U.S.A.

B. Butterfly Valves (BV) 16-Inches to 24-Inches in Diameter

1. Butterfly valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with all requirements of AWWA C504 and as modified below. Valves shall be designed for a rated working pressure of 250 psi. Class B, AWWA C504 Section 5.2 testing requirements are modified as follows:

   a. The leakage test shall be performed at a pressure of 250 psi;

   b. The hydrostatic test shall be performed at a pressure of 500 psi; and

   c. Proof of design tests shall be performed and certification of such proof of design test shall be provided to the Construction Project Manager.

2. Valve bodies shall be ductile iron conforming to ASTM A 536, Grade 65-45-12 or ASTM A 126, Grade B cast iron. Shafts and shaft hardware shall be ASTM A 564, Type 630 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A 536, Grade 65-45-12. The resilient valve seat shall be located either on the valve disc or in the valve body and shall be fully field adjustable and field replaceable.

3. Valves shall be installed with the valve shafts horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.

4. Actuators

   a. Valves shall be equipped with traveling nut, self-locking type actuators designed, manufactured and tested in accordance with AWWA C504. Actuators shall be capable of holding the disc in any position between full open and full closed without any movement or fluttering of the disc.

   b. Actuators shall be furnished with fully adjustable mechanical stop-limiting devices. Actuators that utilize the sides of the actuator housing to limit disc travel are unacceptable.

   c. Valve actuators shall be capable of withstanding a minimum of 450 foot pounds of input torque in either the open or closed position without damage.

5. Operators: Valves for buried service shall have a 2-inch square wrench nut type operator and shall be equipped with a valve box and stem extension, as required and shall open left.

6. Valve ends shall be mechanical joint type, except where joint ends are shown. Flange joints shall meet the requirements of ANSI B16.1, Class 250, but drilled and faced to Class 125 dimensions.

7. Butterfly valves shall be manufactured by Mueller, M & H Valve, DeZurik, Val-Matic, or Pratt in the U.S.A.

2.04 Fire Hydrants (FH)

A. All fire hydrants shall conform to the requirements of AWWA C502 for 150 psi working pressure. Hydrants shall be the compression type, closing with line pressure. The valve opening shall not be less than 5-1/4-inches.

B. In the event of a traffic accident, the hydrant barrel shall break away from the standpipe at a point above grade and in a manner which will prevent damage to the barrel and stem, preclude opening of the valve, and permit rapid and inexpensive restoration without digging or cutting off the water.

C. The means for attaching the barrel to the standpipe shall permit facing the hydrant a minimum of eight different directions.

D. Hydrants shall be fully bronze mounted with all working parts of bronze. Valve seat ring shall be bronze and shall screw into a bronze retainer.

E. All working parts, including the seat ring shall be removable through the top without disturbing the barrel of the hydrant.

F. The operating nut shall match those on the existing hydrants and shall open left. The operating threads shall be totally enclosed in an operating chamber, separated from the hydrant barrel by a rubber O-ring stem seal and lubricated by grease or an oil reservoir.

G. Hydrant shall be a non-freezing design and be provided with a simple, positive, and automatic drain which shall be fully closed whenever the main valve is opened.

H. Hose and pumper connections shall be breech-locked, pinned, or threaded and pinned to seal them into the hydrant barrel. Each hydrant shall have two 2-1/2-inch hose connections and one 4-1/2-inch pumper connection, all with National Standard threads and each equipped with cap and non-kinking chain.

I. Hydrants shall be furnished with a mechanical joint connection to the spigot of the 6-inch hydrant lead.

J. Minimum depth of bury shall be 4.5 feet. Provide extension section where necessary for proper vertical installation and in accordance with manufacturer's recommendations.

K. All outside surfaces of the barrel above grade shall be painted silver with Sherwin Williams KEM 400. The bonnet of hydrants installed on a 12 inch water main shall be painted Yellow; the bonnet of hydrants installed on water mains larger than 12 inch water mains shall be painted Green.

L. Hydrants shall be traffic model and shall be American Flow Control B-84-B, Mueller Super Centurion, M & H Valve 929, or US Pipe Metropolitan 250 Model M94 and manufactured in the U.S.A.

K. Fire hydrants shall be furnished with locking security caps. Locking caps shall be Captivater as provided by American Flow Control. Caps shall be provided on each hose and pumper nozzle and incorporate a “free spinning” design that provides security against unauthorized intrusion into the fire hydrant, or water theft from the hydrant. When secured, the cap spins freely until unlocked and removed through the use of a Captivater wrench. When unlocked, the cap shall open in a manner similar to a standard cap. Caps shall be similar in appearance to standard caps and shall use a center placed locking mechanism. The locking mechanism shall be hardened stainless steel and shall be protected from the elements. Caps using magnetic locks are unacceptable. All Captivater wrenches shall have unique serial numbers. Wrenches shall ship direct to owner.

2.05 Valve Boxes (VB) and Extension Stems

A. All valves shall be equipped with valve boxes. The valve boxes shall be cast iron two-piece screw type with drop covers. Valve boxes shall have a 5.25-inch inside diameter. Valve box covers shall weigh a minimum of

13 pounds. The valve boxes shall be adjustable to 6-inches up or down from the nominal required cover over the pipe. Valve boxes shall be of sufficient length that bottom flange of the lower belled portion of the box is below the valve operating nut. Ductile or cast iron extensions shall be provided as necessary. Covers shall have “WATER VALVE” or “WATER” cast into them. Valve boxes shall be manufactured in the United States.

B. All valve boxes shall have a concrete collar, minimum 9-inches thick. The collar shall be square or round and sized 24-inches square or 24-inches in diameter. Precast collars may be used, provided that they are grouted in place to the valve box. The box is to be flush with finished grade. The edge of the valve box is to be ½-inch above the edge of the concrete collar.

C. All valves shall be furnished with Type 316 stainless steel extension stems, as necessary, to bring the operating nut to within 24-inches of the top of the valve box. Connection to the valve shall be with a wrench nut coupling and a set screw to secure the coupling to the valve's operating nut. The coupling and square wrench nut shall be welded or pinned to the extension stem and shall have a centering ring. Extension stems shall be minimum 1-inch diameter. Extension stems shall be equal to Trumbull Industries, M & H Valve, or Penn-Troy Manufacturing/Troy Valve.

2.06 Valve Markers (VM)

The Contractor shall provide a concrete valve marker as detailed on the Drawings for each valve installed outside paved areas. Valve markers shall be stamped “REUSE WATER”. Valve markers shall be in accordance with County standards. In addition to concrete valve marker where street curbs are installed a saw cut ½” deep “V” notch on top of curb adjacent to water valve location is required.

2.07 Tapping Sleeves and Valves (TS&V)

Tapping sleeves shall be cast or ductile iron of the split-sleeve, mechanical joint type and shall be capable of withstanding a working pressure of 250 psi. The Contractor shall be responsible for determining the outside diameter of the pipe to be connected to prior to ordering the sleeve. Valves shall be gate valves furnished in accordance with the specifications shown above, with flanged connection to the tapping sleeve and mechanical joint connection to the branch pipe. The tapping sleeve shall be supplied by the valve manufacturer. Tapping sleeves shall be equal to American Flow Control, Mueller H-615 or M & H Valve and manufactured in the U.S.A.

2.08 Corporation Cocks and Curb Stops

Corporation cocks and curb stops shall be ball type, shall be made of bronze conforming to ASTM B 61 or B 62, and shall be suitable for the

working pressure of the system. Ends shall be suitable for compression type joint. Threaded ends for inlet and outlet of corporation cocks shall conform to AWWA C800; coupling nut for connection to flared copper tubing shall conform to ANSI B16.26. Corporation cocks shall be manufactured by Ford (FB1000-4-G) or equivalent. Curb stops shall be manufactured by Ford (BA21-444W-Full Port) or equivalent in the U.S.A.

2.09 Air Valves for Water Service

A. The air release and vacuum break valve shall be of the compact single chamber design with solid cylindrical HDPE control floats housed in a tubular stainless steel body with epoxy powder coated cast iron or steel ends secured by means of stainless steel tie rods. The valve shall have an integral "anti-shock" orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to two times valve rated working pressure. The intake orifice area shall be equal to the nominal size of the valve.

B. Large orifice sealing shall be affected by the flat face of the control float seating against a nitrile rubber O-ring housed in a dovetail groove circumferentially surrounding the orifice. Discharge of pressurized air shall be controlled by the seating and unseating of a small orifice nozzle on a natural rubber seal affixed into the control float. The nozzle shall have a flat seating land surrounding the orifice so that the damage to the rubber seal is prevented.

C. The valve construction shall be proportioned with regard to material strength characteristics, so that deformation, leaking or damage of any kind does not occur by submission to twice the designed working pressure. The valve design shall incorporate an over pressure safety feature that will fail without an explosive effect, such as is normally the case when highly compressed air is released suddenly. The feature shall consist of replaceable components such as gaskets or seals.

D. Connection to the valve inlet shall be facilitated by a flanged end conforming to ANSI B16.1 Class 125. Flanged ends shall be supplied with the requisite number of stainless steel or mild steel screwed studs inserted for alignment to the specific standard.

E. Valve orifice size shall be as shown on the Drawings.

F. Provide a 1/4-inch NPT test/bleed cock.

G. An isolation valve between the main and the air valve shall be installed in accordance with the Drawings.

H. All air valves and accessories shall be equal to Vent-o-Mat and manufactured in the U.S.A.

2.10 Manholes and Precast Concrete Products

A. Precast Concrete Sections

1. Precast concrete sections shall meet the requirements of ASTM C 478 for round shaped and ASTM C 913 for rectangular shaped precast concrete products. The minimum compressive strength of the concrete in precast sections shall be 4,000 psi. The minimum wall thickness shall be one-twelfth of the inside diameter of the base, riser or the largest cone diameter.

2. Transition slabs which convert bases larger than four feet in diameter to four foot diameter risers shall be designed by the precast concrete manufacturer to carry the live and dead loads exerted on the slab.

3. Seal joints between precast sections by means of rubber O-ring gaskets or flexible butyl rubber sealant. Butyl rubber sealants shall meet the requirements of AASHTO M-198. Sealant shall be pre-formed type with a minimum nominal diameter of 1-inch.

4. Butyl rubber sealant shall be equal to Kent Seal No. 2 or Concrete Sealants CS 202.

B. Brick and Mortar: Brick shall be whole and hard burned, conforming to ASTM C 32, Grade MS. Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet ASTM C 144.

C. Iron Castings

1. Cast iron manhole frames, covers and steps shall meet the requirements of ASTM A 48 for Class 30 gray iron and all applicable local standards. All castings shall be tough, close grained, and smooth and free from blow holes, blisters, shrinkage, strains, cracks, cold shots and other imperfections. No casting will be accepted which weighs less than 95 percent of the design weight. Shop drawings must indicate the design weight and provide sufficient dimensions to permit checking. All castings shall be thoroughly cleaned in the shop and given two coats of approved bituminous paint before rusting begins.

2. Manhole frames and covers shall be equal to the following:

Type	Design Weight	Manufacturer's Reference	
Bolt Down	400#	Neenah A-1916-F1	Vulcan V-2358

3. All frames and covers shall have machined horizontal bearing surfaces.

4. Bolt-down covers shall be equipped with four 1/2-inch stainless steel bolts and a 1/8-inch red rubber or rubber O-ring gasket. Covers shall be rotatable and interchangeable. Bolt holes shall be bored through so that debris entering the bolt hole will fall into the manhole. Bolt holes shall have the full 360 degree circle within the cover's radius when bored through the cover.

D. Plastic Steps: Manhole steps of polypropylene, molded around a steel rod, equal to products of M.A. Industries may be used.

E. Floor Door

1. Door shall be single or double leaf type as shown on the Drawings.

2. The frame shall be 1/4-inch extruded aluminum alloy 6063-T6, with built-in neoprene cushion and with strap anchors bolted to the exterior. Door leaf shall be 1/4-inch aluminum diamond plate, alloy 6061-T6, reinforced with aluminum stiffeners as required. Stainless steel hinges shall be bolted to the underside and pivot on torsion bars that counterbalance the door for easy operation. The door shall open to 90 degrees and lock automatically in that position. A vinyl grip handle shall be provided to release the cover for closing. The door shall be built to withstand a live load of 300 pounds per square foot, and shall be equipped with a snap lock and removable handle. Bituminous coating shall be applied to exterior of frame by the manufacturer. The door shall also be provided with a hasp in addition to the built-in locking mechanism.

3. The floor door shall be manufactured by The Bilco Company or Thompson Fabricating Company in the U.S.A.

F. Vents

1. Where vent pipes are shown on the Drawings, vents shall be of one-piece, welded steel construction. Vent pipes shall equal air valve size, but no less than 4-inches. The vent pipe shall be grouted into a precast hole in the vault. The discharge of the vent pipe shall be provided with a 3/16-inch PVC coated mesh screen.

2. Where vent pipes are not shown on the Drawings, the frame and cover or floor door shall be provided with 1-inch holes to provide equivalent opening as in air valve, but not less than two. The quantity for each valve size is as follows: 2-inch, 4; 3-inch, 9; 4-inch, 16; 6-inch, 36; 8-inch, 64.

2.11 Retainer Glands

A. Retainer glands for ductile iron pipe shall be Megalug Series 1100, as manufactured by EBAA Iron, Uni-Flange Series 1400, as manufactured by Ford Meter Box Company, Stargrip Series 3000, as manufactured by Star Pipe Products, or Sigma One LOK Series SLD as manufactured by Nappco-Sigma in the U.S.A.

B. Retainer glands shall be provided at all mechanical joints, including fittings, valves, hydrants and other locations as shown on the Drawings.

2.12 Hydrant Tees

Hydrant tees shall be equal to ACIPCO A10180 or U.S. Pipe U-592 made in the U.S.A.

2.13 Anchor Couplings

Lengths and sizes shall be as shown on the Drawings. Anchor couplings shall be equal to ACIPCO A 10895 or U.S. Pipe U-591 made in the U.S.A..

2.14 Hydrant Connector Pipe

The connector pipe shall be ductile iron meeting the requirements of AWWA C153 and shall be cement lined in accordance with AWWA C104. The pipe shall have a 24-inch offset design so the hydrant can be adjusted to ensure placement at the proper grade and shall have an anchoring feature at both ends so that when used with mechanical joint split glands, a restrained joint is provided. The connector pipe shall be Gradelok as manufactured by Assured Flow Sales, Inc., Sarasota, Florida made in the U.S.A.

2.15 Concrete

Concrete shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. For job mixed concrete, submit the concrete mix design for approval by the Construction Project Manager. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60. Concrete for thrust blocking and thrust collars shall be high early strength concrete.

2.16 Electronic Markers

Electronic markers shall be buried with utilities to serve as a locating device. Electronic markers shall be the active, programmable type. Each marker shall be color coded in accordance with APWA standards and produce an industry specific frequency. Each marker shall contain a passive antenna that requires no internal power source. Markers shall be

of water resistant polyethylene shells and impervious to minerals, chemicals, and underground temperature extremes. Electronic markers shall be compatible with 3M Dynatel 1420 EMS-ID Marker Locator. Contractor shall supply one Marker Locator for use during installation and shall turn over Locator to County upon project completion. Markers shall be 3M Dynatel 1423 XR/ID for water service.

Part 3 Execution

3.01 Existing Utilities and Obstructions

A. The Drawings indicate utilities or obstructions that are known to exist according to the best information available to the County. The Contractor shall call the Utilities Protection Center (UPC) (800-282-7411) as required by Georgia law (Code Section 25-9-1 through 25-9-13) and all utilities, agencies or departments that own and/or operate utilities in the vicinity of the construction work site at least 72 hours (three business days) prior to construction to verify the location of the existing utilities.

B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.

1. Provide the required notice to the utility owners and allow them to locate their facilities according to Georgia law. Field utility locations are valid for only 10 days after original notice. The Contractor shall ensure at the time of any excavation that a valid utility location exists at the point of excavation.

2. Expose the facility, for a distance of at least 200 feet in advance of pipeline construction, to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.

3. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.

4. Maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The Contractor shall provide the Construction Project Manager an updated copy of the log bi-weekly, or more frequently if required.

C. Conflict with Existing Utilities

1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed water main does not permit safe installation of the water main by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or

crossing facility. The Contractor may change the proposed alignment of the water main to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the Construction Project Manager. Where such relocation of the water main is denied by the Construction Project Manager, the Contractor shall arrange to have the utility, main, or service relocated.

2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed water main does not permit the crossing without immediate or potential future damage to the utility, main, service, or the water main. The Contractor may change the proposed grade of the water main to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the Construction Project Manager. Where such relocation of the water main is denied by the Construction Project Manager , the Contractor shall arrange to have the utility, main, or service relocated.

D. Electronic Locator: Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

E. Water and Sewer Separation

1. Water mains should maintain a minimum 10 foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the 10 foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of 18-inches above the top of the sewer. Should neither of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of 18-inches.

2. The water main, when installed below the sewer, shall be encased in concrete with a minimum 6-inch concrete depth to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.

3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

3.02 Construction along Highways, Streets and Roadways

A. Install pipe lines and appurtenances along highways, streets and roadways in accordance with the applicable regulations of, and permits issued by, the Department of Transportation and Fulton County with reference to construction operations, safety, traffic control, road maintenance and repair.

B. Traffic Control

1. The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public. Flagmen shall be certified by a Georgia DOT approved training program.

2. Construction traffic control devices and their installation shall be in accordance with the current Manual On Uniform Traffic Control Devices for Streets and Highways.

3. Placement and removal of construction traffic control devices shall be coordinated with the Georgia Department of Transportation and Fulton County a minimum of 48 hours in advance of the activity.

4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as “Flagmen Ahead”, shall be removed and replaced when needed.

5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.

6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.

7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white

background. Construction sign panels shall meet the minimum reflective requirements of the Georgia Department of Transportation and Fulton County. Sign panels shall be of durable materials capable of maintaining their color, reflective character and legibility during the period of construction.

8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current Manual on Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to insure that they are maintained in the proper position throughout their period of use.

C. Construction Operations

1. Perform all work along highways, streets and roadways to minimize interference with traffic.

2. Stripping: Where the pipe line is laid along road right-of-way, strip and stockpile all sod, topsoil and other material suitable for right-of-way restoration.

3. Trenching, Laying and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.

4. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.

5. Construction operations shall be limited to 400 feet along areas, including clean-up and utility exploration.

D. Excavated Materials: Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement in a timely manner.

E. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

F. Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.

G. Maintaining Highways, Streets, Roadways and Driveways

1. Maintain streets, highways, roadways and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work.

2. During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.

3. Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. The grader or front-end loader shall be available at all times.

4. Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the Work.

3.03 Pipe Distribution

A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.

B. No pipe shall be strung further along the route than 1,000 feet beyond the area in which the Contractor is actually working without written permission from the County. The County reserves the right to reduce this distance to a maximum distance of 200 feet in residential and commercial areas based on the effects of the distribution to the adjacent property owners.

C. No Street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.

D. No distributed pipe shall be placed inside drainage ditches.

E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.

3.04 Location and Grade

A. The Drawings show the alignment and grade of the water main and the location of valves, hydrants and other appurtenances.

B. Prior to clearing and grubbing, the Contractor will provide a temporary bench mark along the water main route and at all other locations where the alignment of the water main changes significantly.

C. Construction Staking

1. The base lines for locating the principal components of the work are shown on the Drawings. Base lines shall be defined as the line to which the location of the water main is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or survey line. The Contractor shall be responsible for performing all survey work required for constructing the water main, including the establishment of base lines and any detail surveys needed for construction. This work shall include the staking out of permanent and temporary easements to insure that the Contractor is not deviating from the designated easements.

2. The level of detail of survey required shall be that which the correct location of the water main can be established for construction and verified by the Contractor and approved by the Construction Project Manager. Where the location of components of the water main, e.g. tunnels and fittings, are not dimensioned, the establishment on the location of these components shall be based upon scaling these locations from the Drawings with relation to readily identifiable land marks, e.g., survey reference points, power poles, manholes, etc.

D. Reference Points

1. The Contractor shall take all precautions necessary, which includes, but is not necessarily limited to, installing reference points, in order to protect and preserve the centerline or baseline established by the Contractor, and approved by the Construction Project Manager.

2. Reference points shall be placed, at or no more than three feet, from the outside of the construction easement or right-of-way. The location of the reference points shall be recorded in a log with a copy provided by the Contractor, prior to verifying reference point locations and approved by the Construction Project Manager. Distances between reference points shall be accurately measured to 0.01 foot.

3. The Contractor shall give the Construction Project Manager reasonable notice that reference points are set. The reference point locations must be verified by the Contractor, and approved by Construction Project Manager, prior to commencing clearing and grubbing operations.

E. After the Contractor locates and marks the reuse main centerline or baseline, the Contractor shall perform clearing and grubbing.

F. Construction shall begin at a connection location and proceed without interruption. Multiple construction sites shall not be permitted without written authorization from the Construction Project Manager for each site.

G. The Contractor shall be responsible for any damage done to reference points, base lines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, base lines, center lines and temporary bench marks as a result of the operations.

H. Construction Verification Survey allowance: The Construction Verification Survey cash allowance is solely for the use of the Construction Project Manager for verification of the Contractor's reference points, centerlines and work performed. The presence of this cash allowance in no way relieves the Contractor of the responsibility of installing reference points, centerlines, temporary bench marks, providing as-built drawings, or verifying that the work has been performed accurately.

3.05 Laying and Jointing Pipe and Accessories

A. Water mains, valves, hydrants, and appurtenances shall be installed before the installation of the subbase course or paving or any other utilities except sanitary sewer lines.

B. Contractor should lay all pipe and fittings within the accurately tolerance in accordance with the specification to conform to the lines and grades established by the Project Construction Drawings.

C. Pipe Installation

1. Proper implements, tools and facilities shall be provided for the safe performance of the Work. All pipe, fittings, valves and hydrants shall be lowered carefully into the trench by means of slings, 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.

2. All pipes, fittings, valves, hydrants and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked by the Contractor and held for inspection by the Owner’s representative, who may prescribe corrective repairs or reject the materials.

3. 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

free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe containing dirt shall be laid.

4. 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.

5. 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 approved backfill material.

6. It is not mandatory to lay pipe with the bells facing the direction in which work is progressing.

7. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade, shall not be permitted.

D. Alignment and Gradient

1. Lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. Do not deflect any joint more than the maximum deflection recommended by the manufacturer.

2. Maintain a transit, level and accessories on the job to lay out angles and ensure that deflection allowances are not exceeded.

E. Expediting of Work: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug, either push-on, mechanical joint, restrained joint or as approved by the Construction Project Manager.

F. Joint Assembly

1. Push-on, mechanical, flange and restrained type joints shall be assembled in accordance with the manufacturer's recommendations.

2. The Contractor shall inspect each pipe joint within 1,000 feet on either side of main line valves to insure 100 percent seating of the pipe spigot, except as noted otherwise.

3. Each restrained joint shall be inspected by the Contractor to ensure that it has been “homed” 100 percent.

4. The Contractor shall internally inspect each pipe joint to insure proper assembly for pipe 24-inches in diameter and larger after the pipe has been brought to final alignment.

G. Cutting Pipe: Cut ductile iron pipe using an abrasive wheel saw. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.

H. Lining Repair: Repair cement linings and recoat spigot ends of cut pipe with cement lining and bituminous coating as specified in Part 2 of this Section and as specified below:

1. Remove all burrs and areas of loose lining materials by sanding or scraping to bare metal.

2. Remove oil and lubricants used during field cutting.

3. Lining shall be stripped back a minimum of 1-inch from the spigot end into well adhered lined areas.

4. Roughen 1 to 2-inches of good lining with a rough grade (40 grit) emery paper, rasp or small chisel, to allow an overlap between new and existing lining.

5. Apply lining repair material in the number of coats required to match the thickness requirements as specified in Part 2 of this Section and in accordance with the manufacturer's recommendations.

J. Valve and Fitting Installation

1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be corrected by the Contractor, and held for inspection by the Owner’s representative. Valves shall be closed before being installed.

2. Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in this Section for cleaning, laying and joining pipe, except that 12-inch and larger valves shall be provided with special support, such as treated timbers, 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. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads will bear on the base and not on the valve or pipe. Extension stems shall be installed where depth of bury places the operating nut in excess of 24-inches beneath finished grade so as to set the top of the operating nut 24-inches below finished grade. The valve box cover shall be flush with the surface of the finished area or such other level as approved by the Construction Project Manager.

4. 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.

5. A valve marker shall be provided for each underground valve. Unless otherwise detailed on the Drawings or directed by the Construction Project Manager, valve markers shall be installed 6-inches inside the right-of-way or easement, and buried to a depth of 30-inches. In addition to a concrete valve marker where street curbs are installed, a saw cut ½" deep "V" notch on top of curb adjacent to the water valve location is required.

6. A precast concrete vault shall be installed for 24-inch valves and larger.

K. Hydrant Installation

1. Prior to installation, inspect all hydrants for direction of opening, nozzle threading, operating nut and cap nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and cracks. Defective hydrants shall be corrected by the Contractor, and held for inspection by the Owner's representative.

2. All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the roadway, with pumper nozzle facing the roadway, except that hydrants having two-hose nozzles 90 degrees apart shall be set with each nozzle facing the roadway at an angle of 45 degrees.

3. Hydrants shall be set to the established grade, with the centerline of the lowest nozzle at least 12-inches above the ground or as directed by the Construction Projector Manager.

4. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve.

5. When a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing coarse gravel or crushed stone mixed with coarse sand from the bottom of the trench to at least 6-inches above the drain port opening in the hydrant to a distance of 12-inches around the elbow.

6. When a hydrant is set in clay or other impervious soil, a drainage pit 2 x 2 x 2 feet shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand under and around the elbow of the hydrant and to a level of 6-inches above the drain port.

7. Hydrants shall be located as shown on the Drawings or as directed by the Engineer. In the case of hydrants that are intended to fail at the ground-line joint upon vehicle impact, specific care must be taken to provide adequate soil resistance to avoid transmitting shock moment to the lower barrel and inlet connection. In loose or poor load bearing soil, this may be accomplished by pouring a concrete collar approximately 6-inches thick to a diameter of 24-inches at or near the ground line around the hydrant barrel.

8. All hydrants shall have fluorescent markings at the curb. Markings shall not be the same color as markings denoting water meters.

9. FIRE HYDRANTS SHALL NOT BE OPERATED WITH ANY TOOL EXCEPT A SPECIFICALLY DESIGNED FIRE HYDRANT WRENCH. It is the Contractor's responsibility to ensure that all new facilities are maintained in new condition until final completion of the project and acceptance by the County. Fire hydrants with damaged operating nuts shall not be accepted.

10. New fire hydrants, not yet in service, shall be bagged or tagged with appropriate "out of service" materials. All hydrant openings shall be capped, except when hydrant is being worked on.

L. Air Valve Vaults

1. Construct the vault or manhole as detailed on the Drawings.

2. The frame and cover or floor door shall be cast into the top slab or cone. The floor door drain shall be piped to vault exterior.

3. Vaults and manholes shall be constructed such that their walls are plumb.

M. Electronic markers will be provided for all water mains. Electronic markers shall be installed every 100 linear feet and as needed to establish a change in direction. Contractor shall program markers at the time of installation according to the information template specified by the County.

Markers shall be programmed prior to installation, shall be locked to prevent further programming, and shall be buried 2.5 feet below finished grade, but no more than 4 feet below finished grade. The County shall verify programming and location of all electronic markers, and if placement and/or programmed information are not satisfactory, Contractor shall be responsible for replacing and re-installing the marker.

3.06 Connections to Water Mains

A. Make connections to existing pipe lines with tapping sleeves and valves, unless specifically shown otherwise on the Drawings.

B. Tapping Sleeves

1. Holes in the new pipe shall be machine cut, either in the field or at the factory. No torch cutting of holes shall be permitted.

2. Prior to attaching the sleeve, the pipe shall be thoroughly cleaned, utilizing a brush and rag, as required.

3. Before performing field machine cut, the water tightness of the sleeve assembly shall be pressure tested. The interior of the assembly shall be filled with water. An air compressor shall be attached, which will induce a test pressure of 250 psi. No leakage shall be permitted for a period of five minutes.

4. <u>After attaching the sleeve to an existing main, but prior to making the tap, the interior of the assembly shall be disinfected. All surfaces to be exposed to potable water shall be swabbed or sprayed with a one percent hypochlorite solution.</u>

C. Connections Using Solid Sleeves: Where connections are shown on the Drawings using solid sleeves, the Contractor shall furnish materials and labor necessary to make the connection to the existing pipe line.

D. Connections Using Couplings: Where connections are shown on the Drawings using couplings, the Contractor shall furnish materials and labor necessary to make the connection to the existing pipe line, including all necessary cutting, plugging and backfill.

E. Valve Operation: Existing valves may be operated by County personnel or with the specific authorization and/or direct supervision of the County. The only exception is an emergency situation affecting public health or safety. Any Contractor found violating this provision may be subject to prosecution under the Code of Fulton County for tampering with County property. When the Contractor requires existing valves to be operated in order to perform the work, the Contractor shall request such services from the Department of Public Works at least eight working days in advance.

F. System Shutdowns and Interruption of Services

1. Shutdowns shall be coordinated directly through the County. The Contractor shall notify the Construction Project Manager in writing at least eight working days in advance when scheduling the work. When more than eight working days' notice is deemed necessary by the County, the length of such notice shall be as shown on the Drawings. Scheduling of shutdowns shall be approved at the discretion of the County. The County reserves the right to cancel the shutdown if conditions warrant (i.e. heavy rain, main break, etc.).

2. Contractor will provide "Water Line Maintenance" signs as directed by the County. Signs will be as specified in Figure 1 at the end of this Section.

3. The County does not at any time guarantee the Contractor a 100 percent complete shutdown or dry shut. Dewatering shall be the responsibility of the Contractor.

4. Shutdowns will be permitted Monday through Thursday, exclusive of County holidays. The Contractor shall perform connections to existing mains requiring shutdowns at night. Unless otherwise specified by the County, the hours of the shutdown shall be limited from 12:00 midnight to 6:00 A.M. In business districts and other areas of high water usage, circumstances may dictate limiting the hours of shutdown from 2:00 A.M. to 6:00 A.M. The excavation for the work shall be completed no later than 3:30 P.M. on the day prior to the shutdown to allow for inspection by the County.

5. The materials to be installed and the tools to be used shall be assembled and ready for inspection no later than 3:30 P.M. on the day prior to the shutdown. The inside of all water system pipe and fittings to be installed shall be cleaned and swabbed with a chlorine solution of 50 mg/L, and ends of lines shall be capped until the time of installation. All visible dirt and foreign materials shall be removed from the interior of the pipe and fittings. Immediately prior to installation of the assembly, the pipe and fittings shall again be swabbed with 50 mg/L chlorine solution. The Contractor shall review in detail his plan of operation with the Engineer at the time the excavated pipe work is inspected for readiness.

6. Excavation around the existing pipe shall be sufficient to allow the work to be performed without requiring additional excavation during the connection. Excavation shall be of sufficient depth to accommodate a minimum of 8-inches uniform depth of #57 stone which shall be placed by the Contractor over the entire bottom of the excavation. In addition, there shall be a minimum of 12-inches

clearance between the bottom of the pipe and the top of the #57 stone.

7. The Contractor shall clean and mark the locations on the existing pipe where the pipe cuts are to be made by 3:30 P.M. on the day prior to the shutdown. The Contractor shall measure the outside diameter of the pipe to be cut-in to be sure the proposed pipe and fittings are compatible with the existing pipe to be cut. All measurements shall be double-checked by the Contractor in the presence of the Construction Project Manager, just prior to cutting the existing pipe.

8. The Contractor shall have sufficient crews and equipment on hand to perform the work for each connection. All equipment to be used during the work, including, but not limited to, pump, backup pump, backhoe, at least two pipe saws, fuel, tools, generators, light towers, tanker truck, etc., shall be test run and determined to be in proper running order prior to cutting of the existing pipe. If the Contractor fails to provide adequate equipment in proper running order, the Construction Project manager has the option to cancel the work, and the Contractor shall request rescheduling when the deficiencies have been corrected.

9. The Contractor shall have available at the site of the work two full circle stainless steel repair clamps and two ductile iron mechanical joint plugs or caps as necessary for each size of pipe to be cut. If plugs or caps are used, appropriate thrust restraint shall be provided by the Contractor.

10. After an existing main has been taken out of service for the work, the Contractor shall make continuous progress toward restoring the water main to full service. The Contractor shall maintain sufficient crews, equipment, and supplies and shall not leave the work site until the water main work has been completed and restored to complete operation.

11. Any pump discharge shall be directed in such a manner as to ensure drainage away from the excavation to prevent flooding of streets or private property.

12. Hydrant service signs shall be placed by the Contractor on existing hydrants temporarily taken out of service as directed by the Engineer. Such signs shall remain in place until removal is approved by the Engineer.

G. The Contractor shall be responsible for any additional expense incurred by the Owner from his failure to comply with the aforementioned requirements. The Contractor shall anticipate the additional expense in performing the work at night and under partial shutdown conditions. No claims for additional compensation shall be made by the Contractor for

performing these operations outside normal working hours and complete shutdown conditions.

3.07 Thrust Restraint

A. Provide restraint at all points where hydraulic thrust may develop.

B. Retainer Glands: Provide retainer glands where shown on the Drawings. Retainer glands shall be installed in accordance with the manufacturer's recommendations, particularly, the required torque of the set screws. The Contractor shall furnish a torque wrench to verify the torque on all set screws which do not have inherent torque indicators.

C. Hydrants: Hydrants shall be attached to the water main by the following method:

1. The isolation valve shall be attached to the main by connecting the valve to the hydrant tee.

2. The isolation valve shall be attached to the hydrant by providing an anchor coupling between the valve and hydrant, if the hydrant and valve are less than two feet apart. Otherwise, provide ductile iron pipe with retainer glands on the hydrant and valve.

D. Thrust Collars: Collars shall be constructed as shown on the Drawings. Concrete and reinforcing steel shall meet the requirements as specified in this Section. The split gland mega lug or welded on collar shall be designed to meet the minimum allowable load shown on the Drawings. The welded-on collar shall be attached to the pipe by the pipe manufacturer.

E. Concrete Blocking

1. Provide concrete blocking for all bends, tees, valves, and other points where thrust may develop, except where other exclusive means of thrust restraint are specifically shown on the Drawings.

2. Concrete shall be as specified in this Section.

3. Form and pour concrete blocking at fittings as shown on the Drawings and as directed by the Construction Project Manager. Pour blocking against undisturbed earth. Increase dimensions when required by over excavation. The Contractor shall allow the concrete to set up for a minimum of 4-hours before backfilling.

F. Harnessing

1. Provide harness rods only where specifically shown on the Drawings or directed by the Construction Project Manager.

2. Harness rods shall be manufactured in accordance with ASTM A 36 and shall have an allowable tensile stress of no less than 22,000 psi. Harness rods shall be hot dip galvanized or field coated with bitumastic before backfilling.

3. Where possible, harness rods shall be installed through the mechanical joint bolt holes. Where it is not possible, provide 90 degree bend eye bolts or duc-lugs.

4. Eye bolts shall be of the same diameter as specified in AWWA C111 for that pipe size. The eye shall be welded closed. Where eye bolts are used in conjunction with harness rods, an appropriate size washer shall be utilized with a nut on each end of the harness rod. Eye bolts shall be of the same material and coating as the harness rods.

3.08 Inspection and Testing

A. All sections of the water main subject to internal pressure shall be pressure tested in accordance with AWWA C600. A section of main will be considered ready for testing after completion of all thrust restraint and backfilling.

B. Each segment of water main between main valves shall be tested individually.

C. Test Preparation

1. The Contractor shall supply the pumps, water, temporary support or reinforcement as necessary for testing purposes, gauges and meters calibrated within 90 days of the test, and all the necessary apparatus and labor. The Contractor shall notify the Construction Project Manager at least 24 hours in advance of the test date and perform tests in the presence of the Construction Project Manager.

2. For water mains less than 24-inches in diameter, flush sections thoroughly at flow velocities, greater than 2.5 feet per second, adequate to remove debris from pipe and valve seats. For water mains 24-inches in diameter and larger, the main shall be carefully swept clean, and mopped if directed by the Engineer. Partially operate valves and hydrants to allow the water to flush the seats.

3. Provide temporary blocking, bulkheads, flanges and plugs as necessary, to assure all new pipe, valves, and appurtenances will be pressure tested. Pressure test shall not commence until after thrust restraint has been installed, the line has been backfilled, and at least seven days has passed since the last concrete thrust blocking was poured.

4. Fill pipeline slowly with water at a velocity of approximately one foot per second. Before applying test pressure, air shall be completely expelled from the pipeline and all appurtenances. Insert corporation cocks at highpoints to expel air as main is filled with water as necessary to supplement automatic air valves. Corporation stops shall be constructed as detailed on the Drawings with a meter box.

5. Provide a suitable pump with an accurate gauge to pump the line to the specified pressure.

6. The differential pressure across a valve or hydrant shall equal the maximum possible, but not exceed the rated working pressure. Where necessary, provide temporary backpressure to meet the differential pressure restrictions.

7. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure.

8. Pressure shall be applied at intervals not to exceed 2000 feet.

D. Test Pressure: Test the pipeline at 250 psi measured at the lowest point for at least two hours. Maintain the test pressure within 5 psi of the specified test pressure for the test duration. Should the pressure drop more than 5 psi at any time during the test period, the pressure shall be restored to the specified test pressure. Provide an accurate pressure gauge with graduation not greater than 5 psi. Any exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves following the hydrostatic pressure test or leakage test shall be repaired in a manner approved by the Construction Project Manager or replaced with sound material, and the test shall be repeated until it is satisfactory to the Construction Project Manager. Allow the system to stabilize at the test pressure before conducting the leakage test.

E. Leakage

1. A leakage test shall be conducted concurrently with the hydrostatic pressure test. The leakage test shall be performed with a calibrated water meter, calibrated pressure gauge, measure container, pump and water. The Contractor shall provide certification of calibration of testing devices indicating devices were calibrated within 90 days of actual tests. All equipment shall be approved by the Construction Project Manager, prior to performance.

2. Leakage shall be defined as the sum of the quantity of water that must be pumped into the test section to maintain pressure within 5 psi of the specified test pressure for the test duration plus water required to return line to test pressure at the end of the test.

Leakage shall be the total cumulative amount measured on a water meter.

3. The County assumes no responsibility for leakage occurring through existing valves.

F. Test Results: No test section shall be accepted if the leakage exceeds the limits determined by the following formula:

$$L = \frac{SD\,(P)^{1/2}}{133{,}200}$$

Where: L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge)
As determined under Section 4 of AWWA C600.

If the water main section being tested contains lengths of various pipe diameters, the allowable leakage shall be the sum of the computed leakage for each diameter. If any test of pipe laid discloses defects due to hydrostatic pressure test or leakage greater than that specified, the Contractor shall, at his own expense, locate and make repairs in a manner approved by the Construction Project Manager and perform tests again until results are within allowable limits. All visible leaks shall be repaired regardless of leakage test results.

G. Completion: After a pipeline section has been accepted, relieve test pressure. The Contractor shall record its type, size and location of all outlets on Project's record drawings.

3.09 Disinfecting Pipeline

A. After successfully pressure testing each pipeline section, disinfect in accordance with AWWA C651 for the continuous-feed method and these Specifications.

B. Specialty Contractor: Disinfection shall be performed by an approved specialty contractor. Before disinfection is performed, the Contractor shall submit a written procedure for approval before being permitted to proceed with the disinfection. This plan shall also include the steps to be taken for the neutralization of the chlorinated water.

C. Chlorination

1. Apply chlorine solution to achieve a concentration of at least 25 milligrams per liter free chlorine in new line. Retain chlorinated water for 24 hours. Water shall be supplied from a temporary source protected by appropriate backflow prevention devices. Backflow preventer must be approved by the County prior to

connection. Chlorine shall be injected no more than ten feet from the beginning of the new main.

2. Chlorine concentration shall be recorded at every outlet along the line at the beginning and end of the 24 hour period.

3. After 24 hours, all samples of water shall contain at least 10 milligrams per liter free chlorine. Re-chlorinate if required results are not obtained on all samples.

D. Disposal of Chlorinated Water: Reduce chlorine residual of disinfection water to less than one milligram per liter if discharged directly to a body of water or to less than two milligrams per liter if discharged onto the ground prior to disposal. Treat water with sulfur dioxide or other reducing chemicals to neutralize chlorine residual. Flush all lines until residual is equal to existing system.

E. Bacteriological Testing: If applicable, will be after final flushing and before the water main is placed in service, the Contractor shall collect samples from the line and have tested for bacteriological quality, in accordance with the rules of the Georgia Department of Natural Resources, Environmental Protection Division. One set of samples shall be collected from every 1,200 feet of water main, plus one set from each end of main and one set from each branch. Testing shall be performed by the County's water laboratory. Re-chlorinate lines until required results are obtained.

3.10 Protection and Restoration of Work Area

A. General: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.

1. The Contractor shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.

2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.

4. The Department of Transportation's engineer shall be authorized to stop all work by the Contractor when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.

B. Man-Made Improvements: Protect, or remove and replace with the Construction Project Manager's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins and other improvements that may be encountered in the Work.

C. Cultivated Growth: Do not disturb cultivated trees or shrubbery unless approved by the Construction Project Manager. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.

D. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3-inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the Contractor. No stumps, wood piles, or trash piles will be permitted on the work site.

E. Disposal of Rubbish: Dispose of all materials cleared and grubbed during the construction of the Project in accordance with the applicable codes and rules of the appropriate county, state and federal regulatory agencies.

F. Swamps and Other Wetlands

1. The Contractor shall not construct permanent roadbeds, berms, drainage structures or any other structures which alter the original topographic features within the easement.

2. All temporary construction or alterations to the original topography will incorporate measures to prevent erosion into the surrounding swamp or wetland. All areas within the easement shall be returned to their original topographic condition as soon as possible after work is completed in the area. All materials of construction and other non-native materials shall be disposed by the Contractor.

3. The Contractor shall provide temporary culverts or other drainage structures, as necessary, to permit the free migration of water

between portions of a swamp, wetland or stream which may be temporarily divided by construction.

4. The Contractor shall not spread, discharge or dump any fuel oil, gasoline, pesticide, or any other pollutant to adjacent swamps or wetlands.

3.11 Abandoning Existing Water Mains

A. General: Abandon in place all existing water main segments indicated on the Drawings to be abandoned. Perform abandonment after the new water main has been placed in service and all water main services have been changed over to the new main. Salvage for the County, existing fire hydrants, valve boxes, valve markers, and other materials indicated on the Drawings or located on water mains abandoned.

B. Capping and Plugging

1. Where existing water mains are proposed for abandonment and where portions of the water distribution system must be shut down, the Contractor will only be permitted to perform cut and plug operations on Monday through Thursday between the hours of 12:00 midnight and 6:00 A.M. Furthermore, the County does not guarantee a complete shutdown of the distribution system should a shutdown be necessary. The Contractor shall anticipate cut and plug operations having to be carried out with the system under partial pressure and provide additional equipment as necessary for such an operation at no additional cost to the County.

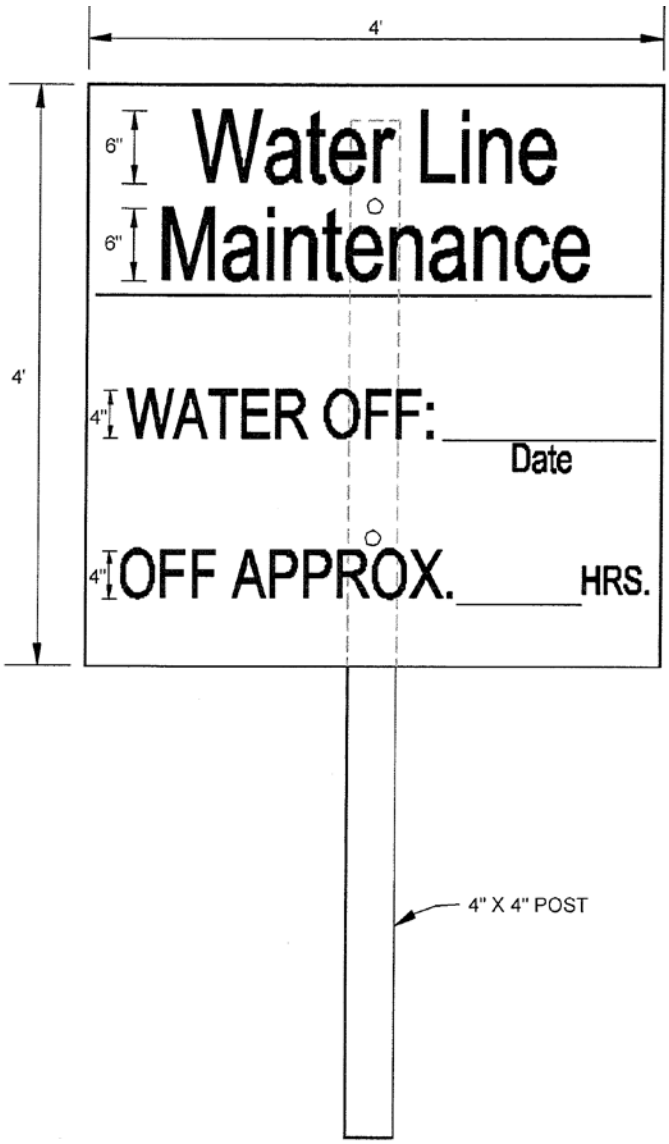
2. Disconnect by sawing or cutting and removing a segment of existing pipe where cutting and capping or plugging is shown on the Drawings or directed by the Construction Project Manager. Provide a watertight pipe cap or plug and concrete blocking for restraint to seal off existing mains indicated to remain in service. Seal ends of existing mains to be abandoned with a pipe cap or plug or with a masonry plug and minimum 6-inch cover of concrete on all sides around the end of the pipe. The Contractor shall be responsible for uncovering and verifying the size and material of the existing main to be capped or plugged.

C. Salvaging Materials: Salvage existing fire hydrants, valve boxes, valve markers and other materials as indicated on the Drawings and deliver salvaged items in good condition to the County's storage yard. Coordinate delivery and placement of salvaged materials in advance with the County.

D. Blow-Off Piping: Remove existing blow-off piping, located on segments of water mains to be abandoned, to a minimum of two feet below finished grade. Seal the end of remaining piping as specified above in paragraph B. Blow-off piping removed becomes the property of the Contractor.

E. Pavement Removal and Replacement: Perform any necessary pavement removal and replacement in accordance with the details on the Drawings and Section 02575 of these Specifications.

FIGURE 1



WATER LINE
MAINTENANCE
SIGN

END OF SECTION

SECTION 02668

WATER SERVICE CONNECTIONS

Part 1 General

1.01 Scope

A. The work covered by this Section includes furnishing all materials and equipment, providing all required labor and installing water service connections and all appurtenant work according to these Specifications and/or to the Water Connection Detail as shown schematically on the Drawings.

B. Water meters are not to be furnished nor installed. However, the water meter connection must be compatible with the water meters currently used by the Owner.

1.02 Locations

Locations shall be directed by the Construction Project Manager along the route of the water mains.

1.03 Service Compatibility

It is the intent of these Specifications that the water service connections shall duplicate those presently being provided by the County in order to be compatible with their service maintenance procedures.

1.04 Quality Control

All materials installed under this Section shall have the approval of the NSF for water services.

Part 2 Products

2.01 Materials and Construction

A. Service Line

1. No galvanized or PVC pipe or fittings shall be used on water services.

2. Copper Tubing: Tubing shall be ASTM B 88, Type K. Fittings shall be brass with flare connection inlets and outlets, ANSI B16.26. Where required, adapters shall be brass ANSI B16.18. Unions shall be cast bronze. Joints shall be flare type. All fittings shall be of bronze construction with flare type connection.

B. Meter Box for Single Family Residential (where sewer service is not present)

1. Meter boxes shall be the “Rome” type and shall be of cast iron, oval shape.

2. Minimum inside dimensions shall be 19 inches x 10 inches and at least 11-1/2 inches deep.

3. Lids shall be Fulton County standard and fit snugly on the box. Lids shall be banded together with a steel strapping and painted with black asphaltic paint before shipping. The combined weight of the box and lid shall not be less than 60 pounds.

C. Meter Box for Irrigation Meter

1. Where irrigation meters are necessary (where sewer service is present), meter boxes shall be cast iron painted black with a locking lid quad valve box. Boxes shall have nominal dimensions of 14-3/4 inches x 17 inches at bottom, 12 inches x 14 inches opening, and 12 inches tall. Meter box assemblies shall include one U-branch, four ball valves, two unions, two touch plugs with cotter pins, and two expansion connections. The entire assembly shall be configured to allow 7-1/2 inch meter and an ASSE 1024 dual check valve with a combined distance of 12-3/4 inches between inlet and outlet unions for the installation of the meter and ASSE 1024 dual check valve backflow preventer. The County will install the meter after property owner applies for it.

2. Meter boxes shall be equal to Ford Meter Box Company, Double Gulf Box Part #LDG12U-243FULTTPNA.

D. Valves and Accessories

1. Curb Stops

a. Ball valves shall be full port bronze, heavy duty type. Valve ends shall be threaded. Valves shall have a minimum 200 psi working pressure for water. Valves shall have stainless steel nut and handle. Valves shall be made in the U.S.A.

b. Curb stops shall be equal to Ford BA21-444W with padlock wings. The stops shall open left.

2. Corporation Cocks

a. Corporation cocks shall be ground key type, shall be made of bronze conforming to ASTM B61 or B62 and shall be suitable for the working pressure of the system. Ends shall be suitable for flare type joint. Coupling nut for connection to

flared copper tubing shall conform to ANSI B16.26.

b. Corporation cocks shall be equal to Ford FB600-4. The cocks shall open left.

E. 1-1/2-inch water services are saddle tapped to the water main using the following brass material certified to ANSI/NSF Standard 61:

1. Brass Saddles/W (IPT) – Ford or equal:

Pipe Size	Part No.
6”	202B-750-IP6
8”	202B-962-IP6
10”	202B-1212-IP6
12”	202B-1438-IP6
16”	202B-1840-IP6
20”	202B-2220-IP6
24"	202B-2650-IP6

2. 1 ½” Ballcorp Corporation Stop: Ford #FB1100-6-G-K or equal

3. 1 ½” Rolled Type K soft copper tubing

4. 1 ½” Meter Setter- A.Y. McDonald #20R600WWFF 666X402 or equal

5. Water meter box & lid are of a composite material, box 24x36x24, and lid with one 1 ¼” hole on top.

F. 2-inch water services are saddle tapped to the water main using the following brass material certified to ANSI/NSF Standard 61:

1. Brass Saddles/W (IPT) – Ford or equal:

Pipe Size	Part No.
6”	202B-750-IP7
8”	202B-962-IP7
10”	202B-1212-IP7
12”	202B-1438-IP7
16”	202B-1840-IP7
20”	202B-2220-IP7
24"	202B-2650-IP7

2. 2” Ballcorp Corporation Stop: Ford #FB1100-7-G-K or equal

3. 2” Rolled Type K soft copper tubing

4. 2” Meter Setter: A.Y. McDonald #20R700WWFF 777X15.62 or equal

5. Water meter box & lid are of a composite material, box 24x36x24, and lid with two 1 ¼” holes on top.

G. Detection Tape: Detection tape shall be composed of a solid aluminum foil encased in a protective plastic jacket. Tapes shall be color coded in accordance with APWA color codes with the following legends: Water Systems, Safety Precaution Blue, and “Caution Water Line Buried Below”. Colors may be solid or striped. Tape shall be permanently printed with no surface printing allowed. Tape width shall be a minimum of 2-inches when buried less than 10-inches below the surface. Tape width shall be a minimum of 3-inches when buried greater than 10-inches and less than 20-inches. Detection tape shall be equal to Line guard Type III Detectable or Allen Systems Detectatape.

2.02 Double Detector Backflow Preventer Assembly

A. Provide a double detector check (DDC) backflow preventer (BFP) assembly in a size to match that of the required fire line service piping. The DDC-BFP assembly shall be provided with an OS&Y gate valve near the inlet and outlet sides of the device.

B. The DDC device shall be provided with three brass ball valve test cocks fitted with brass or plastic threaded plugs. A fourth test cock shall be provided on the upstream side of the inlet shut-off valve.

C. The DDC device and shut-off valve bodies shall be cast iron, coated inside

and outside with a NSF-approved, fused epoxy coating and assembled with bolts that are resistant to electrolysis. All DDC device interior/exterior components shall be of materials equal in corrosion resistance to bronze and/or stainless steel to resist electrolysis.

D. Check valves shall have replaceable seats, and be accessible by top-entry only for maintenance and repair. The detector bypass line on the DDC-BFP assembly shall be of 3/4-inch copper pipe and have a bronze detector meter and a 3/4-inch DCV-BFP complete with unions and shut-off valves.

E. The DDC-BFP assembly shall be classified or listed by the Underwriters Laboratories, Factory Mutual Insurance, and bear the ASSE seal (ASSE Standard 1049). The DDC-BFP assembly shall have approval of and conform to all current requirements of the University of Southern California, Foundation for Cross-Connection Control (USC-FCCC). The DDC-BFP assembly shall be individually factory tested, shipped and installed as a unit.

F. The DDC-BFP assembly shall not be buried in earth but installed below ground in a concrete vault, and as close as practical to the property line of the premises.

G. Under no condition will any connection be allowed on the system other than for firefighting or fire protection purposes.

H. All DDC-BFP assemblies shall be tested at the time of installation and at least annually thereafter. A copy of all test and maintenance reports must be submitted to the Fulton County Water Department, Dogwood Station.

Part 3 Execution

3.01 Installation

A. Water Service Connections

1. Immediately following completion of the water main system, water service connections and meter boxes shall be installed for the properties adjacent to the water transmission mains both to the same side of the roadway (Short Side Service) and to the opposite side of the roadway (Long Side Service) as directed by the Construction Project Manager.

2. The Contractor shall be prepared to make emergency repairs to the water system, if necessary, due to damage by others working in the area. In conjunction with this requirement, the Contractor shall furnish and have available at all times, a tapping machine, for the purpose of making temporary water service taps or emergency repairs to damaged water services. The Contractor shall furnish the County a phone number of an individual with the authority to initiate emergency repair work. This number must be provided prior to starting work on the Project.

3. All services connected to water main shall be through individual 1-inch direct taps regardless of service and meter size with the exception of 1 ½" and 2" inch services and above.

4. The water main shall be tapped with a tapping machine specifically designed for that purpose. The tap shall be a direct tap into the water main through a 1-inch brass corporation cock. All taps shall be supervised by the County. All taps shall be made on the water main at a position so as not to be the top side of the pipe nor the bottom of the pipe. Distance between taps must be a minimum of 12 inches apart and not in line with each other.

5. Installation shall conform to the details for water service connections appearing schematically on the Drawings. Contractor shall provide any and all appurtenant work required to provide the intended water service connections.

B. Service Lines

1. Copper tubing between tap and water meter shall be one continuous length of pipe with no intermediate joints or connections. The service line shall be placed without sharp turns or bends from the water main to the meter box.

2. When meters are located on the opposite side of the street from the water main, new copper service lines shall be extended through a common 6-inch bore, Schedule 40 PVC conduit to the service side. Replacement of existing services may be by free bore without a casing.

3. Provide detection tape over all service lines.

4. Service lines shall have a minimum 30-inch clear cover between main and meter, shallowing to a bury of 12-inches at the meter location.

C. Meter Boxes

1. The meter box shall be located one foot from back of right of way. The meter box lid shall be set at finished grade. The meter box shall be placed on two courses of brick on a bed of gravel or crushed stone. Brick shall not be placed on top of water service lines. The bed of gravel or crushed stone shall be 3-inches thick and extend 6-inches in all directions beyond the edge of the meter box. The box shall be carefully and uniformly backfilled to prevent distortion that would cause leaks. Meter boxes shall be located in pairs within two feet of the common property lines between the lots.

2. All water meters shall have fluorescent markings at curb. Markings

shall not be the same color as markings denoting hydrants. In addition to fluorescent markings, a saw cut ½" deep "W" notch on top of curb at water service location is required.

D. Relocation of Service Lines

1. Relocate the existing meter to the new right-of-way limits as shown on the drawings or as ordered by the Engineer and reconnect to the house service. Existing meters already located at the new right-of-way limits will not need relocating.

2. Before disconnecting the existing meter, the existing corporation in the main shall be closed. All existing meters and meter boxes shall be removed if not already located at the right-of-way, reinstalled and reconnected as indicated on the Drawings.

3. Existing service lines shall be field-located by the Contractor. The Contractor shall be responsible for locating existing water meters, relocating the meters and meter boxes as necessary, and determining the existing size service line to reconnect the meters to the new water mains. All service lines installed under existing pavement, including streets, driveways and sidewalks, shall be installed by boring.

E. Transfer of Service: Immediately before connecting to the relocated or existing meter, all service lines shall be flushed to remove any foreign matter. Any special fittings required reconnecting the existing meter to the new copper service line, or the existing private service line, shall be provided by the Contractor. To minimize out of service time, the Contractor shall determine the connections to be made and have all the required pipe and fittings on hand before shutting off the existing service. After completing the connection, the new corporation stop shall be opened and all visible leaks shall be repaired.

F. Maintenance and Repairs: The tap, service line and meter box shall remain under the Contractor's maintenance responsibility for the same warranty period as the water main. The Contractor shall promptly repair any damage to the water system during the warranty period.

END OF SECTION

SECTION 02930

GRASSING

Part 1 General

1.01 Scope

A. The extent of grassing consists of those areas which are disturbed by operations of the Contractor and are not covered over by improvements, except where specifically noted otherwise, together with any additional areas shown on the Drawings or authorized by the Construction Manager or Owner.

B. Types of work required include following:

1. Fine grading and preparing of lawn areas.
2. Furnishing and applying new topsoil.
3. Furnishing and applying soil amendments.
4. Furnishing and applying fertilizers.
5. Seeding lawn areas.
6. Sodding lawn areas.
7. Planting lawn areas with plugs.
8. Reconditioning existing lawn areas.
9. Replanting unsatisfactory or damaged lawns.

C. Use stripped and saved top soil where available. For additional quantity required, furnish topsoil as specified in 2.01.

1.03 Submittals

A. General: Submit the following in accordance with applicable Municipality specifications.

B. Certification of Grass Seed: Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination rate (%), and weed seed for each grass seed species.

C. Sod Analysis: Notify Construction Manager or Owner of sod source, including name and telephone number of supplier, and seed mix of sod.

1.04 Job Conditions

Planting Time: The Contractor should sow lawn seed only during normal planting seasons for each type of lawn work required. Correlate planting with specified maintenance periods to provide required maintenance from date of substantial completion.

Specified work is minimum required, and any and all necessary materials and operations including reworking, must be performed to obtain specified results.

1.05 Warranty

Warrant grassing through specified maintenance period and until final acceptance.

Part 2 Products

2.01 New Topsoil

A. Provide topsoil that is fertile, friable, naturally loamy, surface soil; reasonably free of subsoil, clay lumps, brush, weeds, and other litter; and free of roots, stumps, stones larger than 1/2 inch in any dimension, and other extraneous or toxic matter harmful to plant growth.

B. Obtain topsoil from local sources or from areas having similar soil characteristics to that found at site of work. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

2.02 Soil Amendments

A. Lime: Natural limestone containing at least 85 percent of total carbonates, ground to such fineness that at least 90 percent passes a 10-mesh sieve and at least 50 percent passes a 100-mesh sieve.

Provide lime in form of dolomitic limestone.

B. Fertilizer: Standard commercial grade fertilizer conforming to the standards of the Association of Official Agricultural Chemists. Provide either grade 4-l2-l2,
6-l2-l2 or 5-l0-l5 at Contractor's option.

C. Nitrogen: Standard commercial grade nitrogen conforming to state fertilizer laws. Provide in either granular or liquid form at Contractor's option.

D. Peat Humus: Finely divided or granular texture and with pH of 6.0 to 7.5 composed of moss peat (other than spagnum), or peat humus, or reed-sedge peat.

E. Sawdust or Ground Bark: Provide type that is nontoxic to plants, of uniform texture, and subject to slow decomposition when mixed with soil. Provide nitrogen-treated sawdust or ground bark, or provide untreated and mix at site with at least 0.15 lbs. of ammonium nitrate or 0.25 lbs. of ammonium sulfate per cu. ft. of loose sawdust or ground bark.

2.03 Grass Materials

A. Seed, Sod, and Plugs will be the same species as the grass removed or damaged at any given location.

B. Grass Seed: Provide fresh, clean, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed of the grass species, proportions and minimum percentages of purity, germination rate (%), and maximum percentage of weed seed, as detailed on the Drawings.
Seed shall bear the growers analysis testing to 98 percent for purity and 90 percent for germination. At the discretion of the Engineer, samples of seed may be taken for verification against the grower's analysis.

C. Sod: Provide machine-cut, strongly rooted, certified turfgrass sod, at least 2 years old and free of weeds and undesirable native grasses. Provide sod capable of vigorous growth and development when planted (viable, not dormant) and complying with the following requirements:
Kentucky Bluegrass (Poa pratensis).
Bermuda grass (Cynodon dactylon).
St Augustinegrass (Stenotaphrum secundatum).
Centipedegrass (Eremochloa ophiuroides).

1. Sod Pad Size: Uniform thickness of 5/8 inch, plus or minus 1/4 inch, measured at time of cutting and excluding top growth and thatch. Provide in supplier's standard size of uniform length and width with maximum 5 percent allowable deviation in either length or width. Broken or torn pads with uneven ends are not acceptable.

2. Sod Strength: Provide sod pads capable of supporting their own weight and retaining size and shape when supplier's standard size pad is suspended vertically from a firm grasp on upper 10 percent of the pad.

D. Sod Plugs: Provide strongly rooted certified sod at least 2 years old, free of weeds and undesirable native grasses and capable of growth and development when planted (viable, not dormant). Provide in form suitable for cutting into plugs at least 4 inches thick. Provide sod plugs composed principally of the following:

Manilagrass (Zoysia matrella).
Carpetgrass (Axonopus offinis).
Centipedegrass (Eremochloa ophiuroides).

2.04 Mulch and Water

A. Antierosion Mulch: Provide clean, seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Seed Mulch: Provide peat moss in natural, shredded, or granulated form, of fine texture, with a pH of 4.0 to 6.0 and a water-absorbing capacity of 1,100 to 2,000 percent.

C. Water used to produce grass is to be free of excess and harmful chemicals, acids, alkalies and all other substances which are harmful to plant growth.

D. Asphalt: Homogeneous emulsified asphalt meeting ASTM D 977 which contains no agents harmful or toxic to plant growth.

Part 3 Execution

3.01 General

A. Minimum Operations: These Specifications set forth minimum operations and material applications which are acceptable. However, a satisfactory stand of grass must be obtained by using supplemental methods and/or materials as may be required.

B. Grassing By Private Property: Where grassing is required between curbs and sidewalks or behind sidewalks in areas adjacent to private residential or commercial property, the Engineer may change the type of grassing specified to match any type of grass which may be planted and growing on the adjacent lawn. No modifications of the Contract Unit Price will be made for this substitution.

3.02 Soil Preparation

A. Limit preparation to areas that will be planted in immediate future.

Loosen subgrade to a minimum depth of 4 inches. Remove stones bigger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.

Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to toxic to plant growth.

Mix soil amendments and fertilizers with topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of topsoil mixture within

a few days. Either mix soil before spreading or apply soil amendments on surface of spread topsoil and mix thoroughly into top 4 inches of topsoil before planting.

Mix lime with dry soil before mixing in fertilizer.
Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before tilling.
Place approximately 1/2 of total amount of topsoil mixture required. Work into top of loosened subgrade to create a transition layer, and then place remainder of topsoil mixture.

Allow for sod thickness in areas to be sodded.

B. Lime and Fertilizer Application:

Spread lime uniformly over the ground surface at the rates detailed on the Drawings.
Spread fertilizer uniformly over the ground surface at the rates detailed on the Drawings.

3.03 Seeding Lawns

A. Sow seed with a spreader or a seeding machine. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.

Do not use wet seed or seed that is moldy or otherwise damaged in transmit or storage.

Sow no less than the quantity of seed specified.

B. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

C. Protect seeded slopes against erosion with jute mesh erosion netting or other similar coverings acceptable to Construction Project Manager or Owner.

D. Protect seeded areas against erosion by spreading specified lawn mulch after completion of seeding operations. Spread uniformly to form a continuous blanket at least 1-1/2 inches loose measurement over seeded areas. Spread by hand, blower, or other suitable equipment.

Anchor mulch by spraying with asphalt emulsion at the rate of 10 to 13 gallons per 1,000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean such areas where damage occurs.

E. Protect seeded areas against hot, dry weather or drying winds by applying specified mulch within 24 hours after completion of seeding

operations. Presoak and scatter evenly to a depth of 1/8 inches to 3/16 inches thick and roll to a smooth surface. Do not mound.

3.04 Hydroseeding Lawns

A. Mix specified seed, fertilizer, and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

B. Apply slurry uniformly to all areas to be seeded. Rate of application as required to obtain specified seed sowing rate.

3.05 Sodding Lawns

A. Lay sod within 24 hours of stripping. Do not lay dormant sod or if ground is frozen.

B. Lay sod to form solid mass with tightly fitting joints. Butt ends and sides of sod strips; do not overlap. Stagger strips to offset joints in adjacent courses. Work from boards to avoid damage to subgrade or sod. Tamp or roll lightly to ensure contact with subgrade. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering adjacent grass.

C. Anchor sod on slopes with wood pegs as required to prevent slippage.

D. Water sod with fine spray immediately after planting. During first week, water daily or more frequently as necessary to maintain moist soil to depth of 4 inches.

3.06 Plug Sodding Lawns

A. Cut plugs 2 inches to 4 inches square, retaining maximum amount of soil on roots. Do not tear or rip plug from sod mass. Keep roots moist and plant plugs immediately after cutting.

B. Plant plugs in holes on furrows. On slopes (if any), contour furrows to near level to prevent washing in heavy rains. Space plugs 12 inches apart in both directions.

3.07 Reconditioning Lawns

A. Recondition existing lawn areas damaged by Contractor's operations including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required. Recondition other existing lawn areas where indicated.

B. Provide fertilizer, seed or sod, and soil amendments as specified for new lawns and as required to provide satisfactorily reconditioned lawn. Provide new planting soil as required to fill low spots and meet new finish grades.

C. Cultivate bare and compacted areas thoroughly to provide a good, deep planting bed.

D. Remove diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil drippings, stone, gravel, and other construction materials; replace with new topsoil.

E. Where substantial lawn remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps, cultivate soil, fertilize, and seed. Remove weeds before seeding. If weeds are extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist condition.

F. Water newly planted areas and keep moist until new grass is established.

3.08 Application of Nitrogen

A. Make two applications of nitrogen to all grassed areas using mechanical spreading equipment. Apply at a uniform rate of not less than 70 pounds per acre per application. Make both applications only when weather conditions will permit uniform and even distribution and when moisture conditions will not cause harm to grass.

B. Place first application of nitrogen when young grass reaches a height of at least one inch. Make the second application of nitrogen between 30 and 45 days after the first application.

3.09 Protection

Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period until lawn is established.

3.10 Maintenance

A. Begin maintenance of lawns immediately after each area is planted and continue for the periods required to establish acceptable lawns, but no less than the following:

1. Seeded lawns, at least 60 days, after date of substantial completion.

If seeded in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance during following spring until acceptable lawn is established.

2. Sodded lawns, at least 30 days after date of substantial completion.

3. Sod plug lawns, at least 30 days after date of substantial completion.

B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

C. Remulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.

D. Replant bare areas with same materials specified for lawns.

E. Watering: Provide and maintain temporary piping, hoses and lawn watering equipment to convey water from sources and to keep lawn areas uniformly moist as required for proper growth.

F. Lay out temporary lawn-watering system and arrange watering schedule to prevent puddling, water erosion, and displacement of seed or mulch (if any). Lay out temporary watering system to avoid necessity of walking over muddy or newly seeded areas.

G. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height. Remove no more than 40 percent of grass leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Time initial and subsequent mowings to maintain following grass height:

Mow grass from 1-1/2 inches to 2 inches high. Do not mow to less than 1-1/2 inches.

H. Apply second fertilizer application after first mowing and when grass is dry.

Use fertilizer that will provide at least 1.0 lb. of actual nitrogen per 1,000 sq. ft. of lawn area.

3.11 Required Coverage

A. Grassed areas will be considered acceptable when a viable stand of grass covers at least 98 percent of the total area with no bare spots

exceeding one square foot and the ground surface is fully stabilized against erosion.

3.12 Acceptance

A. When work is substantially completed, including maintenance, Construction Manager or Owner will, upon request, make an inspection to determine acceptability.

B. Lawn work may be inspected for acceptance in parts agreeable to Construction Manager or Owner , provided work offered for inspection is complete, including maintenance.

C. Replant rejected work and continue specified maintenance until re - inspected by Construction Project Manager or Owner and found to be acceptable.

D. Seeded lawns will be acceptable provided requirements, including maintenance and coverage, have been met and healthy, uniform close stand of specified grass is established free of weeds, bare spots, and surface irregularities.

E. Sodded lawns will be acceptable provided requirements, including maintenance and coverage, have been met and required number of plugs are established as well-rooted, viable patches of grass and areas between plugs are free of weeds and other undesirable vegetation.

F Plugged lawns will be acceptable, provided requirements, including maintenance and coverage, have been met and required number of plugs are established as well-rooted, viable patches of grass and areas between plugs are free of weeds and other undesirable vegetation.

3.13 Clean Up

A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto surface of roads, sidewalks, or other paved areas.

END OF SECTION

SECTION 02933

SEEDING

Part 1 General

1.01 Scope

A. The work covered by this Section consists of furnishing all labor, equipment and material required to place topsoil, seed, commercial fertilizer, agricultural limestone and mulch material, including seedbed preparation, harrowing, compacting and other placement operations on graded earthen areas as described herein and/or shown on the Drawings. In general, seeding operations shall be conducted on all newly graded earthen areas not covered by structures, pavement or sidewalks; all cleared or grubbed areas which are to remain as finish grade surfaces; and on all existing turf areas which are disturbed by construction operations and which are to remain as finish grade surfaces. Areas disturbed by borrow activities shall also be seeded according to these Specifications.

B. The work shall include temporary seeding operations to stabilize earthen surfaces during construction or inclement weather and to minimize stream siltation and erosion. Temporary seeding shall be performed at the times and locations as directed by the Engineer.

1.02 Quality Assurance

A. Prior to seeding operations, the Contractor shall furnish to the Construction Project Manager labels or certified laboratory reports from an accredited commercial seed laboratory or a state seed laboratory showing the analysis and germination of the seed to be furnished. Acceptance of the seed test reports shall not relieve the Contractor of any responsibility or liability for furnishing seed meeting the requirements of this Section.

B. Prior to topsoil operations, the Contractor shall obtain representative samples and furnish soil test certificates including textural, pH, and organic analysis from the State University Agricultural Extension Services or other certified testing laboratory.

Part 2 Products

2.01 Acceptable Manufacturers

All materials shall conform to the requirements and standards of this Section.

Wood-cellulose fiber mulch shall be manufactured by Weyerhauser Company or Conway Corporation.

2.02 Topsoil

A. Utilizing designated stockpiles or borrow areas on site, the Contractor shall place a minimum of 4-inches of topsoil over all graded earthen areas and over any other areas to be seeded. Sources of topsoil shall be approved by the Construction Project Manager, prior to disturbance. Importing topsoil from offsite sources shall be at the discretion of the Construction Project Manager and shall be justification for additional compensation to the Contractor. A change order properly authorized by the Owner shall be agreed upon prior to importing offsite topsoil. No additional compensation will be allowed for spreading of topsoil.

B. Topsoil shall be a friable loam containing a large amount of humus and shall be original surface soil of good, rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than 1/2-inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, sticks, chips or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements or vegetable debris undesirable or harmful to plant life.

C. Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, sandy loam or a combination thereof. The pH shall range from 5.5 to 7.0. Topsoil shall contain not less than five percent nor more than 20 percent, by weight, of organic matter as determined by loss on ignition of oven-dried samples to 65 degrees C.

2.03 Seed

A. Seed shall be delivered in new bags or bags that are sound and labeled in accordance with the U.S. Department of Agriculture Federal Seed Act.

B. All seed shall be from the last crop available at time of purchase and shall not be moldy, wet or otherwise damaged in transit or storage.

C. Seed shall bear the growers analysis testing to 98 percent for purity and 90 percent for germination. At the discretion of the Construction Project Manager, samples of seed may be taken for verification against the grower's analysis.

D. Species, rate of seeding, fertilization and other requirements are shown on Table 1.

2.04 Fertilizer and Liming Materials

A. Fertilizer and liming materials shall comply with applicable state, local and federal laws concerned with their production and use.

B. Commercial fertilizer shall be a ready mixed material equivalent to the grade or grades specified in Table 1. Container bags shall have the name and address of the manufacturer, the brand name, net weight and chemical composition.

C. Agricultural limestone shall be a pulverized dolamitic limestone having a calcium carbonate content of not less than 85 percent by weight. Agricultural limestone shall be crushed so that at least 85 percent of the material will pass a No. 10 mesh screen and 50 percent will pass a No. 40 mesh screen.

2.05 Mulch Material

A. All mulch materials shall be air dried and reasonably free of noxious weeds and weed seeds or other materials detrimental to plant growth.

B. Mulch shall be composed of wood cellulose fiber, straw or stalks, as specified herein. Mulch shall be suitable for spreading with standard mulch blowing equipment.

C. Straw mulch shall be partially decomposed stalks of wheat, rye, oats or other approved grain crops.

D. Stalks shall be the partially decomposed, shredded residue of corn, cane, sorghum or other approved standing field crops.

2.06 Mulch Binder

A. Mulch on slopes exceeding 3 to 1 ratio shall be held in place by the use of an approved mulch binder. The mulch binder shall be non-toxic to plant life and shall be acceptable to the Construction Project Manager.

B. Emulsified asphalt binder shall be Grade SS-1, ASTM D 977. Cutback asphalt binder shall be Grade RC 70 or RC 250.

2.07 Legumes

All leguminous seed shall be inoculated prior to seeding with a standard culture of nitrogen-fixing bacteria that is adapted to the particular seed involved.

2.08 Water

Water shall be clean, clear water free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.

Part 3 Execution

3.01 Securing and Placing Topsoil

A. Topsoil shall be secured from areas from which topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the Construction Project Manager.

B. The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage and other characteristics as to offer assurance that, when removed the product will be homogeneous in nature and will conform to the requirements of these Specifications.

C. All areas from which topsoil is to be secured, shall be cleaned of all sticks, boards, stones, cement, ashes, cinders, slag, concrete, bitumen or its residue and any other refuse which will hinder or prevent growth.

D. In securing topsoil from a designated pit, or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such material shall be removed from the topsoil or if required by the Construction Project Manager the pit shall be abandoned.

E. Before placing or depositing topsoil upon any areas, all improvement within the area shall be completed, unless otherwise approved by the Construction Project Manager.

F. The areas in which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.

3.02 Seedbed Preparation

A. Before fertilizing and seeding, the topsoil surfaces shall be trimmed and worked to true line from unsightly variation, bumps, ridges and depressions and all detrimental material, roots and stones larger than 3-inches in any dimension shall be removed from the soil.

B. Not earlier than 24 hours before the seed is to be sown, the soil surface to be seeded shall be thoroughly cultivated to a depth of not less than 4-inches with a weighted disc, tiller, pulvimixer or other equipment, until

the surface is smooth and in a condition acceptable to the Construction Project Manager.

C. If the prepared surface becomes eroded as a result of rain or for any other reason, or becomes crusted before the seed is sown, the surface shall again be placed in a condition suitable for seeding.

D. Ground preparation operations shall be performed only when the ground is in a tillable and workable condition, as determined by the Construction Project Manager.

3.03 Fertilization and Liming

A. Following seedbed preparation, fertilizer shall be applied to all areas to be seeded so as to achieve the application rates shown on Table 1.

B. Fertilizer shall be spread evenly over the seedbed and shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of 1-inch.

C. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. The seed shall not remain in water containing fertilizer for more than 30 minutes when a hydraulic seeder is used.

D. Agricultural limestone shall be thoroughly mixed into the soil according to the rates shown on Drawings. The specified rate of application of limestone may be reduced by the Construction Project Manager if pH tests indicate this to be desirable. It is the responsibility of the Contractor to obtain such tests and submit the results to the Engineer for adjustment in rates.

E. It is the responsibility of the Contractor to make one application of a maintenance fertilizer according to the recommendations listed in Table 1.

F. Lime spread by conventional equipment shall be “ground limestone.” Ground limestone is calcitic or dolomitic limestone ground so that 90 percent of the material will pass through a 10-mesh sieve, not less than 50 percent will pass through a 50-mesh sieve and not less than 25 percent will pass through a 100-mesh sieve.

G. Fast-acting lime spread by hydraulic seeding equipment should be “finely ground limestone” spanning from the 180 micron size to the 5 micron size. Finely ground limestone is calcitic or dolomitic limestone ground so that 95 percent of the material will pass through a 100-mesh sieve

3.04 Seeding

A. Seed of the specified group shall be sown as soon as preparation of the seedbed has been completed. No seed shall be sown during high winds,

nor until the surface is suitable for working and is in a proper condition. Seeding shall be performed during the dates shown in Table 1 unless otherwise approved by the Construction Project Manager. Seed mixtures may be sown together provided they are kept in a thoroughly mixed condition during the seeding operation.

B. Seed shall be uniformly sown by any approved mechanical method suitable for the slope and size of the areas to be seeded, preferably with a broadcast type seeder, windmill hand seeder or approved mechanical power drawn seed drills. Hydro-seeding and hydro-mulching may be used on steep embankments, provided full coverage is obtained. Care shall be taken to adjust the seeder for seedings at the proper rate before seeding operations are started and to maintain their adjustment during seeding. Seed in hoppers shall be agitated to prevent segregation of the various seeds in a seeding mixture.

C. Immediately after sowing, the seeds shall be covered and compacted to a depth of 1/8 to 3/8-inch by a cultipacker or suitable roller.

D. Leguminous seeds shall be inoculated prior to seeding with an approved and compatible nitrogen-fixing inoculant in accordance with the manufacturer's mixing instructions.

3.05 Mulching

A. All seeded areas shall be uniformly mulched in a continuous blanket immediately after seeding. The mulch shall be applied evenly so as to permit sunlight to penetrate and the air to circulate and at the same time shade the ground, reduce erosion and conserve soil moisture. Approximately 45 percent of the ground shall be visible through the mulch blanket.

B. One of the following mulches shall be spread evenly over the seeded areas at the following application rates:

1. Wood Cellulose Fiber: 1,400 pounds/acre.

2. Straw: 4,000 pounds/acre.

3. Stalks: 4,000 pounds/acre.

4. These rates may be adjusted at the discretion of the Engineer at no additional cost to the Owner, depending on the texture and condition of the mulch material and the characteristics of the seeded area.

C. Mulch on slopes greater than 3 to 1 ratio shall be held in place by the use of an approved mulch binder. Binder shall be thoroughly mixed and applied with the mulch. Emulsified asphalt or cutback asphalt shall be

applied at the approximate rate of five gallons per 1,000 square feet as required to hold the mulch in place.

D. The Contractor shall cover structures, poles, fences and appurtenances if the mulch binder is applied in such a way that it would come in contact with or discolor the structures.

E. Mulch and binder shall be applied by suitable blowing equipment at closely controlled application rates in a manner acceptable to the Construction Project Manager.

3.06 Watering

A. The Contractor shall be responsible for maintaining the proper moisture content of the soil to insure adequate plant growth until a satisfactory stand is obtained. If necessary, watering shall be performed to maintain an adequate water content in the soil.

B. Watering shall be accomplished by hoses, tank truck or sprinklers in such a way to prevent erosion, excessive runoff and over-watered spots.

3.07 Maintenance

A. Upon completion of seeding operations, the Contractor shall clear the area of all equipment, debris and excess material and the premises shall be left in a neat and orderly condition.

B. The Contractor shall maintain all seeded areas without additional payment until final acceptance of the work by the Owner, and any regrading, refertilizing, reliming, reseeding or remulching shall be done at Contractor's own expense. Seeding work shall be repeated on defective areas until a satisfactory uniform stand is accomplished. Damage resulting from erosion, gulleys, washouts or other causes shall be repaired by filling with topsoil, compacting and repeating the seeding work at Contractor's expense.

TABLE 1

SEEDING REQUIREMENTS

Sowing Season	Species	Rates per 1,000 Square Feet		
		Seed	Fertilizer	Lime
3/15 - 8/14	Common Bermuda (hulled) (Giant Bermuda Seed, including NK-37 is not acceptable) Annual Ryegrass	2lbs. 2 lbs.	35 lbs. 6-12-12	25 lbs.
	Total	4 lbs.		
8/15 - 3/14	Lespedeza (Lespedeza sericea) Tall Fescue (Festuca arundinacea)	2lbs. 2 lbs.	45 lbs. 6-12-12	25 lbs.
	Total	4 lbs.		

END OF SECTION

SECTION 02934

SODDING

Part 1 General

1.01 Scope

Sodding shall consist of establishing certain critical areas with sod as designated on the Drawings.

Part 2 Products

2.01 Sod

A. Sod shall consist of a live, dense, well-rooted growth of turf grass species as noted on the Drawings. The sod shall be free from Johnson grass, nut grass and other obnoxious grasses and shall be of suitable character for the purpose intended and for the soil in which it is to be planted. It shall be un-injured at the time of planting.

B. Sod shall be uniform in thickness, having not over 2-inches or less than 1-inch of soil.

C. Sod strips shall have a consistent width of 12 or 18-inches.

2.02 Fertilizer

A. Fertilizer (10-10-10) used in connection with sodding, shall contain 10 percent nitrogen, 10 percent phosphoric acid and 10 percent potash. The fertilizer shall be furnished in standard containers with the name, weight and guaranteed analysis of the contents clearly marked. The containers shall ensure proper protection in handling and transporting the fertilizer. All commercial fertilizer shall comply with local, state and federal fertilizer laws.

B. Ammonium nitrate shall be a standard commercial product, shall conform to the requirements for other commercial fertilizers as specified above, and shall have a minimum of 32-1/2 percent nitrogen.

2.03 Lime

Agricultural limestone shall be dolomitic and contain not less than 85 percent of calcium carbonate and magnesium carbonate combined, and shall be crushed so that at least 85 percent will pass the No. 10 mesh sieve and 50 percent will pass a No. 40 mesh screen.

2.04 Weather Limitations

Sod shall be planted only when the soil is moist and favorable to growth. No planting shall be done between October 1 and April 1 unless weather and soil conditions are considered favorable and permission is granted by the Construction Project Manager.

Part 3 Execution

3.01 Sodding

A. The area to be sodded shall be constructed to the lines and grades indicated on the Drawings or as directed by the Construction Project Manager, and the surface loosened to a depth of not less than 3-inches with a rake or other device. If necessary, it shall be sprinkled until saturated at least 1-inch in depth and kept moist until the sod is place thereon. Immediately before placing the sod, the fertilizer shall be uniformly applied at the rate of 12 pounds of Grade 10-10-10, or equivalent, per 1,000 square feet. Agricultural limestone shall be applied at the rate of 50 pounds per 1,000 square feet.

B. The entire area shall be thoroughly covered with sod. The sod shall be placed on the prepared surface with the edges in close contact and, as far as possible, with staggered joints.

C. The sod shall be maintained moist from time of removal until reset but shall be placed as soon as practicable after removal from place where growing. Immediately after placing it shall be rolled with a light- weight roller or hand tamped to the satisfaction of the Construction Project Manager.

D. Sod on slopes steeper than 3 to 1 shall be held in place by wooden pins about 1-inch square and 6-inches long, driven through the sod into the soil until they are flush with the top of the sod.

3.02 Watering and Maintenance

A. The sod shall be watered, or as directed by the Construction Project Manager for a period of two weeks after which ammonium nitrate shall be applied at the rate of three pounds per 1,000 square feet and the sod given a final watering.

B. The Contractor shall not allow any equipment or material to be placed on any planted area and shall erect suitable barricades and guards to prevent Contractor's equipment, labor or the public from traveling on or over any area planted with sod.

C. It shall be the obligation of the Contractor to secure a satisfactory growth of grass before final acceptance of the Project.

END OF SECTION

SECTION 02951

TREE REMOVAL AND PROTECTION

Part 1 General

1.01 Scope

A. The work specified in this Section includes furnishing all labor, equipment and material required to locate, identify, verify condition and remove or protect existing trees as shown on the Drawings and/or as directed by the Construction Project Manager or Owner.

B. The contractor shall install orange tree protection fencing (barrier) around each tree to be protected, as shown on the Drawings and as ordered by the Construction Project Manager or Owner.

C. No trees or vegetation shall be removed except as specifically exempted or approved by the Construction Project Manager or Owner.

1.02 Reference

"Trenching and Tunneling near Trees," by James R. Fazio. Published by the National Arbor Day Foundation.

"Tree Preservation Ordinance and Administrative Guide Lines," Fulton County (January 2000).

1.03 Qualifications

Contractor shall have on staff for the project at least one person with a minimum of 5 years' experience as nurseryman in planting and protecting trees.

1.04 Submittals

A. Contractor shall walk the site with City of Alpharetta's Arborist, to understand (in more detail than shown on the Drawings) the scope and requirements of tree protection for this project. Prepare a Tree Protection Work Plan describing how tree protection will be handled during installation of the water lines. The Work Plan shall include, but is not limited to:

1. Confirmation of identification of specimen trees (shown on the Drawings) and other trees to be protected.
2. Scope of general protection of trees within right-of-ways and along the water line trench alignment.
3. Determination of drip line limits of protected trees and approximate free bore lengths.

4. Scope of general protection of trees outside right-of-ways but in close proximity to work areas.

5. Extent of approved or required tree limb cutting and trimming to make space for work area.

6. Extent of approved or required tree root cutting, if necessary within trench area.

7. Confirmation of the type of protective fencing, other protective measures as required, and installation details.

Contractor shall submit five copies of the Tree Protection Work Plan to the Construction Project Manager or Owner for approval. Contractor shall not begin any field activity prior to approval of this Work Plan by the Construction Project Manager or Owner and City Arborist.

Part 2 Products

2.01 Products

A. Protective Fencing

1. Orange Safety Fencing: Minimum 4 feet in width and shall be made of high density polyethylene resin, extruded and stretched to provide a highly visible bright orange, non-fading fence. The fabric shall remain flexible from -60° F to 200° F and shall be inert to most chemicals and acids. The fabric pattern may vary from diamond to circular with a minimum unit weight of 0.4 lbs. and a maximum opening size of 2 inches. The fabric shall have minimum tensile yield strength (horizontal) of 2000 psi and ultimate tensile strength of 2680 psi.

2. The fencing material shall be supported by steel pipe tee posts or U posts, that are minimum 5 ½ feet in height and spaced no more than 8 feet on centers. The fabric shall be secured to post by bands or wire ties.

B. Warning Signs: A weather proof warning sign shall be prominently displayed on each tree protection fence at 20-foot intervals. The sign shall be minimum 8.5-inches X 11-inches and clearly state in half inch tall letters: “Warning – Tree Protection Zone”.

C. Silt Fence (Type C): Silt fence shall be installed 2-feet from the outside of the tree protection fence where required or directed by the Construction Project Manager or Owner and City Arborist.

D. Trunk Protection: When directed by the City Arborist, the tree trunk protection shall be provided using either 2x4-inch or 2x6-inch planking or plastic strapping.

E. Tree Dressing: Dressing of any damaged areas shall be accomplished using any approved asphaltic tree wound paint immediately after damage occurs.

Part 3 Execution

3.01 Execution

A. Protective Fencing: All trees and shrubs in the proximity of the construction site shall be carefully checked for damage prior to initiation of any construction activity. All individual trees, shrubs, and natural areas scheduled for preservation shall be protected during construction with temporary fencing as indicated on the Drawings or directed by the City Arborist. Protective fences shall be installed prior to the start of any site preparation work (clearing, grubbing, or grading), and shall be maintained in functioning condition throughout all phases of the construction project. Protective fence locations in close proximity to intersecting streets or drives shall adhere to the site distance requirements.

B. Protective fences shall be constructed around trees to be protected, at the locations (typically the outer limits of the Critical Root Zone) and with materials indicated on the Drawings to prevent the following:

1. Soil compaction in the root zone area resulting from vehicular traffic or storage of equipment or materials.

2. Root zone disturbances due to grade changes greater than 6-inch cut or fill or trenching not reviewed and authorized by the City Arborist or the Construction Manager or Owmer.

3. Damage to exposed roots, trunks or limbs by mechanical equipment.

4. Other activities detrimental to trees such as chemical storage, concrete truck cleaning, and fires.

C. Exceptions to the installation of protective fences at the tree drip lines <u>may be</u> permitted in the following cases:

1. Where there is to be an approved grade change, impermeable paving surface, tree well, or other such site development, the fence shall be erected approximately 2 to 4 feet beyond the areas of disturbance.

2. When permeable paving is to be installed within a tree drip line, the fence shall be erected at the outer limits of the permeable paving area prior to any site grading so that this enclosed area is graded separately to minimize root damage.

3. When trees are located close to a proposed building or other construction activity, the fence shall be erected to allow 6 to 10 feet work space between the fence and the structure and apply organic mulch to a depth of (4) to six (6) inches in the unprotected root zone area;

4. When there are street-side pedestrian walkways, fences shall be constructed in a manner that does not obstruct safe passage;

5. When there are severe space constraints due to tract size or other special requirements, the Contractor shall contact the Arborist or the Engineer to discuss alternatives.

6. When any of the exceptions listed above will result in a fence being located closer than five (5) feet to a tree trunk, the Contractor shall also protect the trunk with strapped-on planking to a height of 8 feet or to the limits of lower branching in addition to the reduced fencing required.

D. Repair of Damage: Tree roots scarred by equipment shall be cut cleanly and covered with topsoil. When tree roots are pruned, a comparable portion of selected branches shall be cut from the tree on the opposite side. Limb pruning shall be made at the branch collar. All limbs greater than 1-inch in diameter shall be precut in accordance with ANSI 300 pruning methods to prevent splitting. All cut limbs shall be treated with an approved tree dressing. Tools shall be disinfected with alcohol or 5 ppm chlorine solution between repairs to trees to prevent the transmission of diseases from one tree to another. All trees damaged during construction shall receive an application of fertilizer within the drip line at the rate of 4 pounds per caliper inch.

E. Cutting and Filling around Trees: When the depth of an excavation or embankment exceeds 6 inches of any tree with a diameter greater than 8 inches, a tree well shall be constructed to protect the tree.

F. Free Bore: Where a pipe is to be installed within critical root zone (CRZ) and inside drip line area, installation of the pipe by free bore method is required to protect trees. The length of tree bore shall extend a minimum of five feet beyond drip line on both sides or as recommended length in the table provided on the Drawings, whichever is greater. The depth of free bore shall be such that there is a minimum of 4 feet of cover on top of pipe. The location and procedures shall be approved by the Construction Project Manager or Owner and City Arborist.

G. Paving Around Trees: Where paving within the drip line of any tree greater than a 6 inch diameter is necessary, a permeable pavement and aeration system must be installed except for street construction.

H. Tree Removal: Trees which directly interfere with construction may only be removed if approval of the Construction Project Manager and City Arborist has been obtained. When a tree or shrub is scheduled for removal, it shall be cut to a depth of 12 inches below the surrounding ground line. After removal, soil shall be placed in the hole to a depth matching the existing grade. The tree shall be cut into sections that can be managed, removed from the site and disposed of. All work shall be conducted in such a manner as to protect all facilities, improvements and vegetation in the work area. All damage resulting from tree removal or pruning shall be repaired at the Contractor's own expense.

I. Final cleanup: All temporary tree and shrub preservation and protection measures shall be removed when the construction has been completed.

J. Roots larger than 2-inch diameter shall not be cut without written permission from the City Arborist.

END OF SECTION

SECTION 03200

REINFORCING STEEL

PART 1 -- GENERAL

1.01 THE REQUIREMENTS

A. Provide all concrete reinforcing including all cutting, bending, fastening and any special work necessary to hold the reinforcing steel in place and protect it from injury and corrosion in accordance with the requirements of this section.

B. Provide deformed reinforcing bars to be grouted into reinforced concrete masonry walls.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Formwork

B. Section 03250 - Concrete Accessories

C. Section 03300 - Cast-in-Place Concrete

D. Section 03400 - Precast Concrete

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Georgia State Minimum Standard Building Code

2. CRSI - Concrete Reinforcing Institute Manual of Standard Practice

3. ACI SP66 - ACI Detailing Manual

4. ACI 315 - Details and Detailing of Concrete Reinforcing

5. ACI 318 - Building Code Requirements for Structural Concrete

6. WRI - Manual of Standard Practice for Welded Wire Fabric

7. ASTM A 185 - Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcing

8. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcing

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Detailed placing and shop fabricating drawings, prepared in accordance with ACI 315 and ACI Detailing Manual - (SP66), shall be furnished for all concrete reinforcing. These drawings shall be made to such a scale as to clearly show joint locations, openings, and the arrangement, spacing and splicing of the bars.

2. Mill test certificates - 3 copies of each.

3. Description of the reinforcing steel manufacturer's marking pattern.

4. Requests to relocate any bars that cause interferences or that cause placing tolerances to be violated.

5. Proposed supports for each type of reinforcing.

6. Request to use splices not shown on the Drawings.

7. Request to use mechanical couplers along with manufacturer's literature on mechanical couplers with instructions for installation, and certified test reports on the couplers' capacity.

8. Request for placement of column dowels without the use of templates.

9. Request and procedure to field bend or straighten partially embedded reinforcing.

1.05 QUALITY ASSURANCE

A. If requested by the Engineer, the Contractor shall provide samples from each load of reinforcing steel delivered in a quantity adequate for testing. Costs of initial tests will be paid by the Owner. Costs of additional tests due to material failing initial tests shall be paid by the Contractor.

PART 2 -- PRODUCTS

2.01 REINFORCING STEEL

A. Bar reinforcing shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel reinforcing. All reinforcing steel shall be from domestic mills and shall have the manufacturer's mill marking rolled into the bar which shall indicate the producer, size, type and grade.

B. Welded wire fabric reinforcing shall conform to the requirements of ASTM A 185 and the details shown on the Drawings.

C. A certified copy of the mill test on each load of reinforcing steel delivered showing physical and chemical analysis shall be provided, prior to shipment. The Engineer reserves the right to require the Contractor to obtain separate test results from an independent testing laboratory in the event of any questionable steel. When such tests are necessary because of failure to comply with this Specification, such as improper identification, the cost of such tests shall be borne by the Contractor.

D. Field welding of reinforcing steel will not be allowed.

E. Use of coiled reinforcing steel will not be allowed.

2.02 ACCESSORIES

A. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers and other devices to position reinforcing during concrete placement. Slab bolsters shall have gray plastic-coated legs.

B. Concrete blocks (dobies), used to support and position bottom reinforcing steel, shall have the same or higher compressive strength as specified for the concrete in which it is located.

2.03 MECHANICAL COUPLERS

A. Mechanical couplers shall develop a tensile strength which exceeds 125 percent of the yield strength of the reinforcing bars being spliced at each splice. The reinforcing steel and coupler used shall be compatible for obtaining the required strength of the connection.

B. Where the type of coupler used is composed of more than one component, all components required for a complete splice shall be supplied.

C. Hot-forged sleeve type couplers shall not be used. Acceptable mechanical couplers are Richmond Dowel Bar Splicer System by Richmond Screw Anchor Company, Fort Worth, Texas. Mechanical couplers shall only be used where shown on the Drawings or where specifically approved by the Engineer.

2.04 DOWEL ADHESIVE SYSTEM

A. Where shown on the Drawings, reinforcing bars anchored into hardened concrete with a dowel adhesive system shall use a two-component adhesive mix which shall be injected with a static mixing nozzle following manufacturer's instructions. Thoroughly clean drill holes of all debris and drill dust with wire brush prior to installation of adhesive and reinforcing bar. The embedment depth of the bar shall be per manufacturer's recommendations, so as to provide a minimum allowable bond strength that is equal to 125 percent of the yield strength of the bar, unless noted otherwise on the Drawings. The adhesive system shall be "Epcon System A7, C6 or G5" as manufactured by ITW Ramset/Redhead, or "HIT HY-150 or RE-500 Injection Adhesive Anchor System" as manufactured by Hilti, Inc. or "SET/ET Epoxy-Tie" or "AT Acrylic-Tie" as manufactured by Simpson Strong-Tie Co., or equal. Engineer's approval is required for use of this system in locations other than those shown on the Drawings.

PART 3 -- EXECUTION

3.01 TEMPERATURE REINFORCING

A. Unless otherwise shown on the Drawings or in the absence of the concrete reinforcing being shown, the minimum cross sectional area of horizontal and vertical concrete reinforcing in walls shall be 0.0033 times the gross concrete area and the minimum cross sectional area of reinforcing perpendicular to the principal reinforcing in slabs shall be 0.0020 times the gross concrete area. Temperature reinforcing shall not be spaced further apart than five times the slab or wall thickness, nor more than 18 inches.

3.02 FABRICATION

A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

B. The Contractor shall fabricate reinforcing bars for structures in accordance with the bending diagrams, placing lists and placing Drawings.

C. No fabrication shall commence until approval of Shop Drawings has been obtained. All reinforcing bars shall be shop fabricated unless approved by the Engineer to be bent in the field. Reinforcing bars shall not be straightened or rebent in a manner that will injure the material. Heating of bars will not be permitted.

D. Welded wire fabric with longitudinal wire of W9.5 size or smaller shall be either furnished in flat sheets or in rolls with a core diameter of not less than 10 inches. Welded wire fabric with longitudinal wires larger than W9.5 size shall be furnished in flat sheets only.

3.03 DELIVERY, STORAGE AND HANDLING

A. All reinforcing shall be neatly bundled and tagged for placement when delivered to the job site. Bundles shall be properly identified for coordination with mill test reports.

B. Reinforcing steel shall be stored above ground on platforms or other supports and shall be protected from the weather at all times by suitable covering. It shall be stored in an orderly manner and plainly marked to facilitate identification.

C. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

D. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcing shall be reinspected and if necessary recleaned.

3.04 PLACING

A. Reinforcing steel shall be accurately positioned as shown on the Drawings and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the reinforcing bars without settlement. In no case shall concrete block supports be continuous.

B. The portions of all accessories in contact with the formwork shall be made of plastic or steel coated with a 1/8 inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. Reinforcing bars additional to those shown on the Drawings, which may be found necessary or desirable by the Contractor for the purpose of securing reinforcing in position, shall be provided by the Contractor at no additional cost to the Owner.

E. Reinforcing placing, spacing, and protection tolerances shall be within the limits specified in ACI 318 except where in conflict with the Building Code, unless otherwise specified.

F. Reinforcing bars may be moved within one bar diameter as necessary to avoid interference with other concrete reinforcing, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed placing tolerances, the resulting arrangement of bars shall be as acceptable to the Engineer.

G. Welded wire fabric shall be supported on slab bolsters spaced not less than 30 inches on centers, extending continuously across the entire width of the reinforcing mat and supporting the reinforcing mat in the plane shown on the Drawings.

H. Reinforcing shall not be straightened or rebent unless specifically shown on the drawings or authorized in writing by the Engineer. Bars with kinks or bends not shown on the Drawings shall not be used. Coiled reinforcement shall not be used.

3.05 SPLICING

A. Reinforcing bar splices shall only be used at locations shown on the Drawings. When it is necessary to splice reinforcing at points other than where shown, the splice shall be as acceptable to the Engineer.

B. The length of lap for reinforcing bars, unless otherwise shown on the Drawings shall be in accordance with ACI 318 for a class B splice.

C. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

D. Mechanical splices shall be used only where shown on the drawings or when approved by the Engineer.

E. Couplers which are located at a joint face shall be a type which can be set either flush or recessed from the face as shown on the Drawings. The couplers shall be sealed during concrete placement to completely eliminate concrete or cement paste from entering. After the concrete is placed, couplers intended for future connections shall be plugged and sealed to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

3.06 INSPECTION

A. The Contractor shall advise the Engineer of his intentions to place concrete and shall allow him adequate time to inspect all reinforcing steel before concrete is placed.

B. The Contractor shall advise the Engineer of his intentions to place grout in masonry walls and shall allow him adequate time to inspect all reinforcing steel before grout is placed.

- END OF SECTION -

SECTION 01 01 00

PROJECT LOCATION AND SITE ACCESS

PART 1 GENERAL

1.01 PROJECT LOCATION

A. The work covered under this contract will be performed at the following locations:

PHASE 1 AND 2:

1. **PHASE 2:** The reuse main will be pumped from the Johns Creek Environmental Campus (JCEC), located in Fulton County at 8100 Holcomb Bridge Road, Alpharetta, Georgia 30022.
2. Once the proposed pipeline leaves the fenced JCEC area, the reuse main is routed north (on the west side of Holcomb Bridge Road) to near the end of the JCEC property, where it then crosses over routed north (on the east side of Holcomb Bridge Road).
3. At the intersection of Barnwell and Holcomb Bridge Road, the reuse main is located on the east side of Barnwell all the way to Country Club of the South (CCS).
4. Just past the creek crossing there is a service stub out for the Rivermont golf course.
5. **PHASE 1:** The reuse main will enter CCS through the maintenance entrance.
6. The reuse main is routed along the west side of Old Southwick Pass, crossing Merriweather Woods, then turning left along the north side of Merriweather Woods, then turning right and following the east side of Cherbury Lane into the tennis / clubhouse entrance. Note – this is a single lane entrance that will need to be closed for several days during construction.
7. The reuse main is routed straight through the parking lot and exit onto Old Alabama Road right of way through an existing fence.
8. Reuse main route is east along the shoulder of Old Alabama Road to the connection to the reuse line stub out. Note – City of Atlanta has a 48” potable water transmission main in the shoulder.

PHASE 3:

9. The reuse main will be connected to an existing 20-inch reuse main near the intersection of the tributary and Chattahoochee River.
10. The reuse main will follow along the existing gravity sanitary sewer easement to Boles Road.
11. At Boles Road, the reuse main will turn east and north along the east bound side of Boles Road and connect to an existing 20-inch stub-out at the intersection of Boles Road and Bell Road.

1.02 SITE ACCESS

Access to the JCEC site shall be via the existing plant entrance drive. Contractor shall be aware that the entrance drive will be utilized by other plant / maintenance personnel during the duration of this contract.

The Contractor's personnel will be required to park personal vehicles in the approved or designated areas.

The construction site shall be secured requiring check in by all individuals entering the location. The site shall be secured at the end of the construction work everyday per Owner's instructions. Refer to Spec Section 01 35 53 for additional security requirements.

Contractor shall maintain access for local residents, emergency vehicles, etc. at all times.

1.03 ADJACENT PROPERTY OWNERS

Contractor shall be aware that existing adjacent properties mainly consist of residential homes.

1.04 COORDINATION WITH OTHER OWNER PROJECTS

If separate Owner construction contracts exist at the same time, the Contractor is responsible for coordinating work with the Owner.

1.05 LIMITS OF CONSTRUCTION

All work performed under this contract, including storage, staging, and parking areas, shall be restricted to the existing JCEC site and within the existing right of way where approved by the Owner to stage / store equipment and vehicles in a safe location not blocking site distance.

1.06 FLOODPLAIN AND FLOODWAY

A portion of the new reuse main crosses a tributary to the Chattahoochee River along Barnwell Road, as shown on the Drawings.

1.07 PROTECTION OF WORK, PROPERTY AND PERSONS

The Contractor shall be responsible for the care of all Work until its completion and final acceptance; and the Contractor shall, at its own expense, replace damaged or lost material and repair damaged parts of the Work, or the same may be done by the Owner, and the Contractor and its sureties shall be liable therefore. The Contractor shall make its own provisions for properly storing and protecting all material and equipment against theft, injury, or damage from any and all causes. Damaged material and equipment shall not be used in the Work. The Contractor shall take all risks from floods and casualties or for delays from such causes. The Contractor may, however, be allowed a reasonable extension of time on account of such delays, subject to the conditions herein before specified. The Contractor shall remove from the vicinity of the completed Work all plant, buildings, rubbish, unused material, concrete forms, sheeting or equipment belonging to the Contractor or used under its discretion during construction; and in the event of the Contractor's failure to do so, the same may be removed by the Owner at the expense of the Contractor, and the Contractor and its sureties shall be liable therefore.

The Contractor shall adopt all practical means to minimize interference to traffic and inconvenience, discomfort, or damage. The Contractor shall protect against damage, any piling, duct or structures crossing trenching or encountered in the Work and shall be responsible for any damage done to such structures, or damage therefrom. The Contractor shall support or replace any such structures without delay and without any additional compensation, to the entire satisfaction of the Owner. The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations, and under all circumstances the Contractor shall comply with the regulations of the Owner, and the laws and regulations of the State of Georgia, relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdiction, and the Contractor shall be solely responsible for any damages caused by failure to provide proper safety.

The Contractor will be held responsible for and be required to make restitution, at its own expense, for all damage to persons or property caused by the Contractor or subcontractor, or the agents, or employees of either during the progress of the Work and until its final acceptance.

PART2 NOT USED

PART3 NOT USED

END OF SECTION

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

B. The work covered under this contract consists generally of the construction of a new 24-inch reuse main from Johns Creek Environmental Campus (JCEC) to the stub-out along Old Alabama Road, and a new 20-inch reuse main from the tie-in near the intersection of a tributary and Chattahoochee River to the stub-out at the intersection of Boles Road and Bell Road.

1.02 DESCRIPTION OF OWNER'S PROJECT

A. The work for this project shall include, but not be limited to, furnishing all labor, material, incidentals, supervision and equipment to perform the reuse main installation and testing, provide erosion and sedimentation control, traffic control, and all associated work in accordance with the Contract Documents.

B. The overall project generally includes:
   1. Installation of approximately 24,000 linear feet of 24-inch DIP reuse main.
   2. Installation of approximately 5,300 linear feet of 20-inch DIP reuse main.

1.03 QUANTITIES AND SCOPE OF WORK

A. The Owner reserves the right to alter the quantities and scope of work to be performed at any time when and as found necessary. The Contractor shall perform the work as altered, increased or decreased. Payment for such increased or decreased quantities and scope shall be made in accordance with contract documents.

1.04 CONTRACTS

A. The Owner shall award the contract for this Work to a single prime contractor. The contractor shall be solely responsible for the timely completion of the work and successful startup of the facility.

1.05 CONSTRUCTION DOCUMENT LANGUAGE

A. “JCEC” is defined as the Johns Creek Environmental Campus.

B. Specifications are written mostly in imperative and streamlined form; this imperative language is directed to the Contractor. Additionally, the words "shall be" shall be included by inference where a colon (:) is used within sentences or phrases.

C. Whenever the term “Construction Manager” or “Engineer” is used in the documents, it shall be taken to mean “Owner’s designated representative” or “Fulton County Engineer”.

1.06 PROTECTION OF WORK, PROPERTY AND PERSONS

A. The Contractor shall be responsible for the care of all Work until its completion and final acceptance; and the Contractor shall, at its own expense, replace damaged or lost material and repair damaged parts of the Work, or the same may be done by the Owner, and the Contractor and its sureties shall be liable therefore.

B. The Contractor shall make its own provisions for properly storing and protecting all material and equipment against theft, injury, or damage from any and all causes. Damaged material and equipment shall not be used in the Work.

C. The Contractor shall take all risks from floods and casualties or for delays from such causes. The Contractor may, however, be allowed a reasonable extension of time on account of such delays, subject to the conditions herein before specified.

D. The Contractor shall remove from the vicinity of the completed Work all plant, buildings, rubbish, unused material, concrete forms, sheeting or equipment belonging to the Contractor or used under its discretion during construction; and in the event of the Contractor's failure to do so, the same may be removed by the Owner at the expense of the Contractor, and the Contractor and its sureties shall be liable therefore.

E. The Contractor shall adopt all practical means to minimize interference to traffic and inconvenience, discomfort, or damage. The Contractor shall maintain local access, school buses, emergency vehicles, etc.

F. The Contractor shall protect against damage, any piling, duct or structures crossing trenching or encountered in the Work and shall be responsible for any damage done to such structures or damage therefrom. The Contractor shall support or replace any such structures without delay and without any additional compensation, to the entire satisfaction of the Owner.

G. The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations, and under all circumstances the Contractor shall comply with the regulations of the Owner, and the laws and regulations of the State of Georgia, relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdiction, and the Contractor shall be solely responsible for any damages caused by failure to provide proper safety.

H. The Contractor will be held responsible for and be required to make restitution, at its own expense, for all damage to persons or property caused by the Contractor or subcontractor, or the agents, or employees of either during the progress of the Work and until its final acceptance.

1.07 NOISE CRITERIA

A. Unless otherwise specified, noise levels for all operating equipment shall not exceed the local noise ordinance and all work shall be performed within the working hours as required by authorized government, City, and the County.

B. Noise criteria shall be met without the use of special external barriers or enclosures.

PART 2 PRODUCTS

A. All materials used in the work including equipment shall be new and unused.

PART 3 NOT USED

END OF SECTION

SECTION 01 11 10

GEOTECHNICAL INFORMATION

PART 1 GENERAL

1.01 SCOPE

The following geotechnical report document is available for review in the appendix of these contract documents:

Report of Subsurface Exploration and Geotechnical Engineering Evaluation
Johns Creek Reuse Main

Prepared by:
Willmer Engineering
October 2016

Interpretations, evaluations, and conclusions as to the nature of the geotechnical materials, the difficulties of making and maintaining the required excavations, and the difficulties of doing other work affected by geotechnical conditions shall be the sole responsibility of the Contractor. At no additional cost to the Owner, the Contractor may conduct, with Owner's approval, other investigations and tests it deems appropriate.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 11 80

ENVIRONMENTAL CONDITIONS

PART 1 GENERAL

ENVIRONMENTAL CONDITIONS

This section describes the environmental conditions which have been observed at the site of the work and which may reasonably be anticipated throughout the life of the project.

CLIMATE CONDITIONS

The site of the work is at an elevation of approximately 860 feet to 1,100 feet above mean sea level.

Climate conditions are described as follows:

Description	Range of Conditions
Winter	Cool and damp
Summer	Hot and humid
Relative humidity, percent	
Indoors	20 to 90
Average outdoors	20 to 100
Air temperature, degrees F	
Outdoors	15 to 105
Indoors	30 to 105
Barometric pressure, inches, mercury	29.1 to 31.0

ADDITIONAL CONDITIONS

Additional conditions which may be applicable are specified in other sections.

PRODUCTS (NOT USED)

EXECUTION (NOT USED)

END OF SECTION

SECTION 01 12 16

WORK SEQUENCE

PART 1 GENERAL

CONTINUITY OF PLANT OPERATIONS

A pressure relief valve installation at the reuse main pump station is part of a separate contract and must be completed prior to the new reuse main being placed in service.

The existing Johns Creek Environmental Campus (JCEC) is currently and continuously receiving and treating raw wastewater. The functions of the JCEC shall not be interrupted except as specified herein. The Contractor shall coordinate the work to avoid any interference with normal operation of plant and pump station equipment and processes.

SUBMITTAL

In accordance with Section 01 33 00, the Contractor shall submit a construction sequencing plan and detailed outage plan and time schedule for operations which will make it necessary to install the new reuse main and associated work and connect to existing stub-outs. The schedule shall be coordinated with the construction schedule specified in the General Conditions of the Contract Documents and shall meet the restrictions and conditions specified in this section. The detailed plan shall describe the Contractor's method for avoiding disruptions to existing plant operations and existing reuse main service, the length of time required to complete said operation, the necessary plant, and equipment which the Contractor shall provide in order to maintain operation of associated plant systems and reuse main service.

The Contractor shall observe the following restrictions:

Systems or individual equipment items shall be isolated, dewatered, decommissioned, deenergized, or depressurized in accordance with the detailed outage plan and schedule.

The Engineer and Owner shall be notified in writing at least two weeks in advance of the planned operation.

CONSTUCTION SEQUENCING AND SCHEDULE CONSIDERATIONS

Coordinate with the owner when connecting the new reuse main to existing stub-outs.

The final work sequence acceptability shall be at the discretion of the Owner.

END OF SECTION

SECTION 01 14 19

USE OF SITE

PART 1 GENERAL

SUMMARY

The Owner's operating personnel will be responsible for operating the existing facilities throughout the execution of this contract. Equipment presently installed in the treatment plants must be available to plant personnel at all times for use, maintenance, and repair. If it is necessary in the course of operating the plant, for the Contractor to move his equipment, materials, or any material included in the work, he shall do so promptly and place that equipment or material in an area which does not interfere with the plant operation. The Contractor shall not adjust or operate serviceable or functioning equipment or systems except as specifically required by this contract.

The existing treatment plants will remain in operation throughout the execution of this contract. The Contractor shall schedule and conduct his work to minimize necessary shutdowns and interference with normal plant operations and maintenance.

The Contractor shall notify the Engineer, in accordance with Section 01 12 16, 1 week in advance of the time it is necessary to take out of service any existing tank, pipeline, channel, electrical circuit, equipment or structure. Any unnecessary additional cost to operations due to the contractor’s poor workmanship or planning (repeat shut-downs or testing for example) shall be the responsibility of the contractor.

The Contractor shall be responsible for providing whatever temporary piping, piping restraint, pumping, power, and control facilities as are required to maintain continuous plant operation and complete treatment except as otherwise specified. The integrity of existing plant utilities shall be maintained by the Contractor at all times.

The Contractor’s work force shall not use the Owner’s existing facilities, including telephones and power, or other facilities. The Contractor shall provide all such facilities for the use of his personnel as specified.

The contractor is responsible for security of their equipment and materials to be incorporated into the work.

Any disruption to the current operation of the plant caused by the contractor shall be the financial responsibility of the contractor.

The contractor shall be responsible for any repair or replacement if damage to existing equipment or structures not slated for removal is caused by the contractor.

NOT USED

NOT USED

END OF SECTION

SECTION 01 31 19

PROJECT MEETING

1.01 SUMMARY

A. Construction period meetings will be conducted at monthly intervals or at some other frequency as determined by the Owner and Engineer. These meetings shall be attended by the Owner's representative, Engineer, and the Contractor's Project Manager with appropriate staff, subcontractors, or suppliers. Meetings shall include a pre-construction meeting, construction progress meetings, and other meetings called by the Owner or Engineer in response to developments during the work.

B. Contractor and Subcontractor representatives attending meetings must be qualified and authorized to act on behalf of their firms.

1.02 PRECONSTRUCTION MEETING

A. Owner will schedule a meeting to be held prior to the Contractor mobilizing and beginning any Work. This meeting is to review Construction Documents, administration requirements and mobilization procedures.

B. Meeting Location: To be determined.

C. Participants shall include:
   1. Contractor's Project Manager, Superintendent, CQC Representative, Safety and Health Officer
   2. Owner
   3. Engineer
   4. Owner's Maintenance and Operation Staff, as appropriate
   5. Others, including major Subcontractors, as appropriate

D. Engineer will:
   1. Administer the meeting
   2. Record and distribute copies of minutes within seven days of meeting to all meeting participants

E. Agenda: Discussion will pertain to detailed information, such as:
   1. The Work – including, but not limited to:
      a. Scheduling and phasing requirements
      b. Contractor's use of premises
      c. Special conditions and coordination
      d. Security
   2. Communications – including, but not limited to:
      a. Change and persons authorized to direct changes
      b. Requests for Information (RFI), field decisions, and clarifications

c. Non-Conformance Reports
d. Hazard communication
e. Project meetings

3. Contractor's Site Specific Safety Plan
4. Administrative and procedural requirements including, but not limited to:
   a. Contract modification
   b. Progress payment
   c. Submittals - including Contractor's Construction Progress Schedule
   d. Electronic Communications
   e. Apprentice and Journey Level Worker Utilization Reporting, if required
5. Owner testing and inspection
6. Contractor Quality Control
7. Temporary Facilities and Controls including, but not limited to:
   a. Deliveries and storage
   b. Temporary utilities and enclosures
   c. Security procedures
   d. Noise and vibration control
   e. Cutting, patching, and field engineering
   f. Utility shutdowns
   g. Contractor parking
   h. Housekeeping and waste management
8. Closeout Procedures – including Project Record documents

F. Contractor shall conduct a like meeting, covering the same body of information, with each Subcontractor's project manager and foreman supervising the Work prior to the performance of any work on site by that Subcontractor.
   1. Provide Engineer copies of meeting minutes prepared by the Contractor with each Subcontractor, when requested by Engineer.

1.03 CONSTRUCTION PROGRESS MEETINGS

A. Frequency: Biweekly or at other intervals as appropriate throughout the duration of construction.

B. Meeting Location: Project Site, or as mutually agreed.

C. Participants shall include:
   1. Contractor's Project Manager, Superintendent, CQC Representative, and Safety and Health Officer as appropriate
   2. Owner
   3. Engineer
   4. Owner's Operation and Maintenance Staff from Plant, as appropriate
   5. Others, as appropriate

D. Contractor shall:
   1. Administer the meetings
   2. Provide schedules, logs and other construction activity data in support of the issues discussed and recorded in meeting minutes
   3. Record and distribute copies of minutes prior to the next meeting

E. Engineer will:
   1. Will review meeting minutes and ascertain that the Work is in accordance with the Construction Documents and the Construction Progress Schedule.

F. Agenda: Discussion will pertain to items, such as but not limited to:
   1. Review and approve minutes of previous meeting noting exceptions, if any
   2. Review Work progress since previous meeting
   3. Review plans for progress during subsequent work period
      a. Identify pending meetings
      b. Discuss safety activities and Job Hazards Analysis
   4. Discuss field observations, problems, and conflicts
      a. Identify problems impeding the Construction Progress Schedule
   5. Review Quality Control
      a. Non-conformance reports - discuss corrective Work actions
   6. Review Submittal Schedules and RFIs - present methods to expedite as required
   7. Review off-site fabrication and delivery schedules
   8. Review proposed changes in the Work and substitution requests for:
      a. Timely processing
      b. Effect on Construction Progress Schedule and on completion date
      c. Effect on any other contracts of the Project
   9. Identify and track action items for all parties. The intent is to maintain a running list of action items with specific designation for parties responsible and expected completion dates.

1.04 CQC WORK PLAN MEETINGS

A. Meet with Engineer to discuss Quality Control Procedures specified in Section 01 40 00. Meetings shall occur as determined by the Engineer.

B. Meeting Location: Project Site, or as mutually agreed.

C. Participants shall include:
   1. Contractor's Project Manager, Superintendent, CQC Representative, and Safety and Health Officer as appropriate
   2. Owner
   3. Engineer
   4. Owner’s Operation and Maintenance Staff from Plant, as appropriate
   5. Others, as appropriate.

D. Contractor shall:
   1. Administer the meetings
   2. Provide schedules, logs and other construction activity data in support of the issues discussed and recorded in meeting minutes
   3. Record and distribute copies of minutes prior to the next meeting.

E. Engineer will:
   1. Will review meeting minutes and ascertain that the Work is in accordance with the Construction Documents.

F. Agenda: Discussion will pertain to items, such as:
   1. Review and approve minutes of previous meeting noting exceptions, if any
   2. Review Work progress since previous meeting
   3. Discuss field observations, problems, and conflicts
   4. CQC administrative procedures
   5. Work sequence and duration
   6. Testing, inspections and approvals records
   7. Fabrication and installation procedures, on-site and off-site
   8. Field constructed mock-ups
   9. Review off-site fabrication and delivery schedules

1.05 PREINSTALLATION MEETINGS

A. When deemed necessary by the Owner and/or Engineer, preinstallation meetings shall be held prior to the Contractor or Subcontractors beginning work on each definable feature of the Work identified in the Construction Documents and as required by the Owner. Notify Owner at least 10 working days in advance of each preinstallation meeting. Meeting examples include, but not by way of limitation:
   1. Site Clearing and excavation
   2. Demolition and remediation
   3. Site utilities
   4. Landscaping and restoration
   5. Concrete
   6. Masonry
   7. Structural Steel
   8. Exterior cladding systems
   9. Water and moisture proofing
   10. Roofing
   11. Doors, frames, and hardware
   12. Finishes, as appropriate
   13. Equipment
   14. Mechanical and Electrical systems as appropriate
   15. Medium Voltage
   16. Communications

17. Specialty items
18. Others, as required.

B. Meeting location: Project Site, or as mutually agreed.

C. Participants shall include:
1. Contractor's Superintendent, CQC Representative, and Safety and Health Officer, as appropriate
2. Subcontractor’s project manager or foreman supervising the Work, as appropriate
3. Owner
4. Engineer
5. Owner’s Operation and Maintenance Staff from Plant, as appropriate
6. Others, as appropriate.

D. Agenda:
1. Review Preinstallation CQC Work Plan (see Section 01 40 00)
2. Review Contract requirements
3. Materials - available and ready for use
4. Submittals
5. Persons responsible for the Work
6. Tests - required tests, testing criteria, who samples, and how often
7. Work sequence, shutdowns, outages, and MOPs
8. Safety procedures and requirements
9. Substrate - criteria for substrate
10. Others items as appropriate.

E. Contractor shall:
1. Administer the meeting
2. Record and distribute copies of minutes within seven days of each meeting to all meeting participants.

1.06 COMMISSIONING MEETINGS

A. As deemed necessary by the Owner and/or Engineer, additional commissioning meetings may be conducted on an as needed basis during the facility start-up and commissioning phase of the Work.

B. Meeting Locations: To be determined.

C. Participants shall include:
1. Contractor's Startup Manager, and Superintendent as appropriate
2. Subcontractor(s) representative(s), as appropriate
3. Owner
4. Engineer

5. Owner's Maintenance and Operation Staff, as appropriate
6. Others, as appropriate.

D. The Contractor shall:
   1. Record and distribute copies of minutes prior to the next meeting.

E. The Engineer will:
   1. Administer the meeting
   2. Ascertain that the Project commissioning processes and information provided is in accordance with the Construction Documents.

F. Agenda: Discussion will pertain to items such as:
   1. Coordination of Work of applicable trades, e.g., balancing, electrical, controls, communications wiring connectivity
   2. Scheduling of systems shut down(s) and switch over(s)
   3. Start-up and functional performance tests acceptance criteria
   4. Code and ordinance inspections/approvals.

1.07 OTHER MEETINGS

A. Other meetings may be called by Owner or Engineer, as warranted by unforeseen developments during construction. All interested parties shall attend such called other meetings.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SCOPE

A. This section specifies the procedures for preparing and revising the critical path method construction schedule used for planning and managing construction activities. The schedule provides a basis for determining the progress status of the project relative to specific dates and completion time.

1.02 DESCRIPTION

A. The Contractor shall provide a graphic construction schedule prepared by the critical path method of analysis. The critical path schedule shall be prepared from estimates of the required duration and sequence for each item of work and function to be performed. A general guide for preparing such a schedule is contained in "The Use of CPM in Construction, A Manual for Contractors," published by the Associated General Contractors of America. Tabulation and analysis of the work schedule shall be performed by computer using a commercially available critical path software program. In addition to the capability to produce tabular reports, the computer software shall plot the construction schedule after the Contractor has produced it in a draft form as required by paragraph 1.03 Submittal Procedures.

B. The schedule shall depict all significant construction activities and all items of work listed in the breakdown of contract prices submitted by the Contractor in accordance with the General Conditions of the Contract Documents. The dependencies between activities shall be indicated so that it may be established what effect the progress of any one activity has on the schedule.

C. Time for completion and all specific dates as specified in the Contract Documents and sequencing requirements described in Section 01 12 16 shall be shown on the schedule. Activities making up the critical path shall be identified.

D. No activity on the schedule shall have duration longer than 21 days or assigned value greater than $100,000, except activities comprising only fabrication, and delivery may extend for more than 21 days. Activities which exceed these limits shall be divided into more detailed components. The schedule duration of each activity shall be based on the work being performed during the normal 40-hour workweek with allowances made for legal holidays and normal weather conditions.

1.03 SUBMITTAL PROCEDURES

A. Within 20 days after the date of Notice to Proceed, the Contractor shall complete a construction schedule conforming to paragraph 1.02 Description and representing in detail all planned procurement and on-site construction activities. The Contractor shall submit the schedule to the Engineer in accordance with Section 01 33 00.

B. Within 7 days after receipt of the submittal, the Engineer shall review the submitted schedule and return one copy of the marked-up original to the Contractor. If the 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 for corrections and resubmitted as specified in Section 01 33 00.

1.04 SCHEDULE REVISIONS

A. Revisions to the accepted critical path construction schedule may be made only with written approval of the Contractor and Owner. Changes in timing for activities which are not on the critical path may be modified with written agreement of the Contractor and Engineer. A change affecting the contract value of any activity, the timing of any activity on the critical path, the completion time and specific dates as specified in the Contract Documents, and work sequencing (Section 01 12 16) may be made only in accordance with applicable provisions of the General Conditions of the Contract Documents.

1.05 PROJECT STATUS UPDATE

A. Project status review and update shall be provided each month as specified in the General Conditions of the Contract Documents.

END OF SECTION

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.01 PRECONSTRUCTION PHOTOGRAPHS AND VIDEO

A. The Contractor shall provide preconstruction photographs and video prior to commencement of work on the site. The documentation shall be digital, and shall indicate the date, name of project, direction in which the images were taken and the location where the images were taken. A minimum of 50 photographs shall be taken prior to construction including a video of the entire route. Before construction may start, digital copies of the documentation shall be delivered on a CD or DVD to the Engineer. The Contractor shall document the entire area of proposed construction and site entries and access roads from multiple perspectives.

1.02 CONSTRUCTION PHOTOGRAPHS AND VIDEO

A. The Contractor shall provide digital construction images showing the progress of the work on a monthly basis. Photographs shall be taken to document completely the ongoing work, points of site entry and access roads. A minimum of 50 photographs shall be taken each month including a video of the route. Additional photographs shall be taken and be of such subjects as may be directed by the Engineer. All photographs shall indicate the date, job title and brief description of the image(s), including the location and direction the image was taken. Starting immediately after the date of the preconstruction documentation and continuing as long as the work is in progress, construction photographs shall be taken. A final set of aerial photographs shall be taken once all grassing has been established. Photos should be provided on a CD with each payment application. If software is used to organize, store, and describe the photos, a copy of the software and all relevant updates shall be supplied to both the Owner and Engineer by the Contractor, at no additional cost to Owner and Engineer.

1.03 COMPLETION DIGITAL PHOTOGRAPHS AND VIDEO

A. The Contractor shall provide one (1) set of completion photographs after Substantial Completion has been achieved. The photographs shall be digital, and shall indicate the date, name of project, direction in which the photograph was taken and the location where the photograph was taken. A minimum of 50 photographs shall be taken at project completion including a video of the entire pipeline route. Before Final Completion and acceptance of the project, digital copies of the photographs shall be delivered on a CD or DVD to the Engineer. The Contractor shall photograph all of the constructed work, the entire area of construction and all site entries and access roads from multiple perspectives.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Submittals covered by these requirements include manufacturers' information, shop drawings, test procedures, test results, samples, requests for substitutions, and miscellaneous work-related submittals. Submittals shall also include, but not be limited to, all mechanical, electrical and electronic equipment and systems, materials, reinforcing steel, fabricated items, and piping and conduit details. The Contractor shall furnish all drawings, specifications, descriptive data, certificates, samples, tests, methods, schedules, and manufacturer's installation and other instructions as specifically required in the contract documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the contract documents.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. General:

1. 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 that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment, which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another contractor or the Owner. The Contractor shall coordinate submittals among his subcontractors and suppliers.
2. The Contractor shall coordinate submittals with the work so that work will not be delayed. He shall coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete. This requires that submittals for review and comment shall be returned to the Contractor stamped "No Exceptions Taken" or "Make Corrections Noted."
3. The Contractor shall certify on each submittal document that he has reviewed the submittal, verified field conditions, and complied with the contract documents.
4. The Contractor may authorize in writing a material or equipment supplier to deal directly with the Engineer or with the Owner with regard to a submittal. These dealings shall be limited to contract interpretations to clarify and expedite the work.

1.03 CATEGORIES OF SUBMITTALS

A. General:

1. Submittals fall into two general categories; submittals for review and comment, and submittals which are primarily for information only. Submittals which are for information only are generally specified as Product Data in Part 2 of applicable specification sections.

B. Submittals for review and comment:

1. All submittals except where specified to be submitted as product data for information only shall be submitted by the Contractor to the Engineer for review and comment.

C. Submittals (product data) for information only:

1. Where specified, the Contractor shall furnish submittals (product data) to the Engineer for Information only. Submittal requirements for operation and maintenance manuals, which are included in this category, are specified in Section 01 78 23.

1.04 TRANSMITTAL PROCEDURE

A. General:

1. Unless otherwise specified, submittals regarding material and equipment shall be accompanied by Transmittal Form 01 33 00-A specified in Section 01 99 90. Submittals for operation and maintenance manuals, information and data shall be accompanied by Transmittal Form 01 78 23-A specified in Section 01 99 90. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required. Submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.
2. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: XX XX XX.XX.YY, where ‘X’ denotes the applicable specification section and ‘Y’ denotes the individual submittal number for that particular specification section, beginning with 01. The initial submittal shall be identified as “Revision” 000. Subsequent resubmittals shall be identified 001, 002, etc. Packages shall be identified as follows: XXXXXXXXAA; where ‘X’ denotes the applicable specification.

B. Deviation from contract:

1. 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:
   1. Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

D. Submittal schedule and log:
   1. Contractor shall prepare and maintain a submittal log/schedule that includes all specified submittals for the project. Copies of the submittal log shall be provided to the Owner and Engineer for review within 15 days of the notice to proceed. No progress payments will be made by the Owner until the submittal log/schedule is accepted and approved by the Engineer.
   2. The schedule shall clearly delineate submittals for review and comment and product data (submittals) for information only.
   3. Submittal schedule information shall be updated monthly with the Contractor's updated project schedule.
   4. The Contractor shall identify as an activity in the project schedule specified in Section 01 32 16, all major equipment submittals as well as those involving complex reviews and long lead deliveries.

1.05 REVIEW PROCEDURE

A. General:
   1. Submittals are specified for those features and characteristics of materials, equipment, and methods of operation which can be selected based on the Contractor's judgment of their conformance to the specified requirements. Other features and characteristics are specified in a manner which enables the Contractor to determine acceptable options without submittals. The review procedure is based on the Contractor's guarantee that all features and characteristics not requiring submittals conform as specified. Review shall not extend to means, methods, techniques, sequences or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the project manual) 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.
   2. When the contract documents require a submittal, the Contractor shall submit the specified information as follows:
      a. Three (3) hard copies of all submitted information plus one digital pdf copy of all information shall be transmitted with submittals for review and comment.
      b. Unless otherwise specified, 3 copies of all sample data shall be transmitted with submittals (Product Data) for information only.

B. Submittals for review and comment:
   1. Unless otherwise specified, within 30 calendar days after receipt of a submittal for review and comment, the Engineer shall review the submittal and return 1 copy of the marked-up copy. The marked-up copy /returned submittal will be retained by the Engineer. The returned submittal shall indicate one of the following actions:
      a. If the review indicates that the material, equipment or work method complies with the project manual, submittal copies will be marked "NO EXCEPTIONS

TAKEN." In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

b. If the review indicates limited corrections are required, copies will be marked "MAKE CORRECTIONS NOTED." The Contractor may begin implementing the work method or incorporating the material and 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.

c. If the review reveals that the submittal is insufficient or contains incorrect data, 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 EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

d. If the review indicates that the material, equipment, or work method does not comply with the project manual, copies of the submittal will be marked "REJECTED - SEE REMARKS." Submittals with deviations which have not been identified clearly may be rejected. Except at his own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

C. Submittals (product data) for information only:

1. Such information is not subject to submittal review procedures and shall be provided as part of the work under this contract and its acceptability determined under normal inspection procedures.

1.06 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

A. General:

1. Review of contract drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or 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, of the method of work, material, or equipment so reviewed. A mark of "NO EXCEPTIONS 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.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 35 29

HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES

PART 1 GENERAL

1.01 CONTRACTOR'S RESPONSIBILITY FOR SAFETY

A. The Contractor shall conduct its operations and perform all work safely and perform all work necessary to ensure the safety of its personnel and others and shall be solely and completely responsible for the conditions on the jobsite, including the safety of all persons and property, both public and private, during the Contract period. This protection shall be provided for all persons including but not limited to his employees, employees of other contractors or subcontractors, members of the general public, Owner's employees, Engineer's employees, and regulatory agencies' personnel that may be on or about the work. Protection of public and private property including but not limited to utilities, pipes, equipment, motor vehicles, and structures. These requirements shall apply continuously and not be limited to normal working hours.

PART 2 SAFETY AND HEALTH REGULATIONS

2.01 GENERAL

A. Safety provisions shall conform to the Federal and State Departments of Labor Occupational Safety and Health Act (OSHA), and all other applicable federal, state, county, and local laws, ordinances, codes, the requirements set forth herein, and any regulations that may be specified elsewhere in these Contract Documents. Where any of these are in conflict, the more stringent requirement shall be followed. The Contractor's failure to thoroughly familiarize himself with the aforementioned safety provisions shall not relieve him from compliance with the obligations or relieve him of the penalties set forth therein.

B. 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. and all other laws, codes and standards that apply. Copies of these regulations may be obtained from Labor Building, 14th and Constitution Avenue N.W., Washington, DC 20013.

PART 3 EXECUTION

3.01 SAFE ACCESS TO THE WORK

A. The Contractor shall at all times provide proper facilities for safe access to the work by the Owner, the Engineer, their authorized representatives and by all authorized government officials.

3.02 CONSTRUCTION SAFETY PROGRAM

A. Contractor shall develop a written job safety program specifically suited for this project. The Contractor shall appoint for the duration of this Contract a qualified

supervisory employee to develop and supervise the Contractor's job safety program that will effectively implement the required safety provisions.

B. Neither the Owner nor the Engineer shall be responsible for safety precautions and programs in connection with the construction work. However, the Contractor shall provide the Owner and Engineer with two copies of the Contractor's safety program within 15 working days after the Notice to Proceed.

3.03 EXCAVATION PLANS

A. In accordance with the governing state and federal requirements, the Contractor shall submit a detailed excavation plan to the Owner before excavation, showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches five feet or more in depth. The excavation plan shall be prepared, sealed and signed by a licensed engineer registered in the state of Georgia.

B. This submittal is for record purposes only and shall not be reviewed and approved by the Owner or Engineer. The plan is the complete responsibility of the Contractor and submitting it to the Owner and Engineer shall not relieve the Contractor for overall responsibility and liability for the work.

C. It shall be understood that the above stipulated requirements are considered to be the minimum to be provided. It shall be the Contractor's responsibility to provide the additional strength required to support the side of the excavation against loads which may exceed those employed to derive the criteria set forth in the Industrial Safety Orders. The Contractor shall be solely responsible for any and all liabilities which may arise from his failure to provide adequate shoring, bracing, or sheeting as necessary to support the excavation under any or all of the conditions of loading which may exist, or which may arise during the construction of the project.

3.04 SAFETY EQUIPMENT

A. The Contractor shall maintain at the jobsite safety equipment applicable to the work as prescribed by the governing safety authorities and all articles necessary for giving first aid to the injured and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons who may be injured on the jobsite.

B. The performance of all work and all construction, particularly with respect to ladders, platforms, structure opening, scaffolding, shoring, lagging, and machinery guards, shall be in accordance with the requirements of applicable governing safety authorities.

3.05 ACCIDENT REPORTS

A. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner. In addition, the Contractor must promptly report in writing to the Owner all accidents in connection with work, giving full details, names, and statements of witnesses.

B. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Owner, giving full details of the claim.

3.06 TRAFFIC SAFETY AND ACCESS TO PROPERTY

A. Comply with all rules and regulations of the City, State, and County authorities regarding closing or restricting the use of public street or highways. No public or private road shall be closed, except by express permission of the Owner. Conduct the work so as to assure the least possible obstructions within traveled roadways by installing approved signs, barricades, and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project, and the protection of the persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner.

3.07 FIRE PREVENTION AND PROTECTION

A. The contractor shall execute all work in a fire-safe manner and shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, local, and state fire prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standards for Safeguarding Building Construction Operations, (NFPA No. 241) shall be followed.

B. Sufficient number of fire extinguishers of the type and capacity required to protect the Work and ancillary facilities, shall be provided and maintained by the Contractor in readily accessible locations.

3.08 EMERGENCY PHONE NUMBERS

A. Emergency phone numbers (fire, medical, police) shall be posted at all telephone locations at the Site of the Work and their locations made known to all.

END OF SECTION

SECTION 01 35 43

ENVIRONMENTAL PROCEDURES

PART 1 GENERAL

1.01 SITE MAINTENANCE

A. The Contractor shall keep the work site clean and free from rubbish and debris. Materials and equipment shall be removed from the site when they are no longer necessary.

B. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance.

1.02 TEMPORARY DAMS

A. Except in time of emergency, earth dams are not acceptable at catch basin openings, local depressions, or elsewhere. Temporary dams of sand bags, asphaltic concrete, or other acceptable material will be permitted when necessary to protect the work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as they are no longer necessary.

1.03 AIR POLLUTION CONTROL

A. The Contractor shall not discharge smoke, dust, and other contaminants, into the atmosphere that violate the regulations of any legally constituted authority. He shall also abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water, in amounts that result in mud on public streets, is not acceptable as a substitute for sweeping or other methods. The Contractor shall provide dust control at no additional cost to the Owner.

1.04 NOISE CONTROL

A. Noise from Contractor's operations shall not exceed limits established by applicable laws or regulations and local noise ordinances.

1.05 SEDIMENTATION AND EROSION CONTROL

A. Contractor shall employ best management practices in accordance with Local, State and Federal guidelines and regulations for erosion and sedimentation control. Unless otherwise noted, Contractor shall obtain related permits or approvals and pay applicable fees.

1.06 STATE OR FEDERAL WATERS

A. State or Federal Waters, wetlands or other environmental features shall not be disturbed without proper approvals, permits or notifications, which are the responsibility of the Contractor.

1.07 HAZARDOUS MATERIALS STORAGE

A. The Contractor shall submit Material Safety Data Sheets (MSDSs) for all hazardous chemicals contained onsite to the Engineer. The Contractor shall also maintain a copy of all applicable MSDSs onsite at all times.

B. The Contractor shall notify the Owner and the Engineer upon receipt of any hazardous chemicals onsite.

C. All hazardous chemicals onsite must be placed in approved containment with an appropriate leak detection system. Flammable materials (i.e., paints, thinners, solvents, etc.) must be stored in approved fire storage cabinets.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section specifies administrative and procedural requirements for quality control services, field inspections and field testing of civil and structural constructs required for this project. Contractor is responsible for the quality assurance and quality control of their respective work.

1.02 DEFINITIONS

A. Quality Control System (QCS): The quality control, assurance, and inspection system established and carried out to ensure compliance with the Plans and Specifications.

B. QCS Supervisor: That person in responsible charge of the work occurring, as designated by the Contractor in the QCS Plan.

C. QCS Inspector: Responsible, certified personnel inspecting the various constructs at specified milestones and during the project overall and designated by the Engineer. The Special Inspector is part of the QCS Inspector team.

D. Factory Test: Tests made on various materials, products and component parts prior to shipment to the job site.

E. Field Tests: Tests and analyses made at or in the vicinity of the job site in connection with the actual construction.

F. Certified Inspection Report: Reports signed by approved inspectors attesting that the items inspected meet the specification requirements other than any exceptions included in the report

G. Certificate of Compliance: Certificate from the manufacturer of the material or equipment identifying said manufacturer, product and referenced standard, and shall be signed by a designated officer of the manufacturer.

H. Standard Compliance: Condition whereby specified materials or equipment must conform to the standards of organizations such as the American National Standard Institute (ANSI), American Society for Testing and Materials (ASTM), Underwriters Laboratories (UL) or similar organization.

I. Quality Assurance: The day-to-day, in-process supervisory observations of work and materials conducted by the Contractor to assure that the proper methods and materials are being used and installed by tradesmen.

J. Source Quality Control: The in-process testing and inspections conducted by the QCS Inspector(s) to verify that the materials, equipment, workmanship and shop

manufactured constructs are in compliance with the Contract Documents, applicable Codes and standards.

K. Field Quality Control: The testing and inspections conducted by the QCS Inspector(s) in the field during and at the completion of each construct to verify that the in-process and completed construction is in compliance with the Contract Documents, applicable Codes and standards.

1.03 REFERENCES

A. 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 documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). 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. 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
ASTM C102	Practice for Laboratories Engaged in the Testing of Building Sealants.
ASTM C802	Practice for Conducting an Inter-Laboratory Test Program to Determine the Precision of Test Methods for Construction.
ASTM C1093	Practice for Accreditation of Testing Agencies for Unit Masonry.
ASTM D3740	Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
ASTM D4561	Practice for Quality Control Systems for an Inspection and testing Agency for Bituminous Paving Materials.
ASTM E329	Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.
IBC	2003 International Building Code, locally amended

1.04 CONTRACTOR’S RESPONSIBILITIES

A. Monitor quality assurance over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Coordinate with, schedule specified inspections by, and provide normal and customary assistance to the QCS Inspectors.

C. Comply fully with manufacturers' instructions, including each step in sequence.

D. Should manufacturers' instructions conflict with Contract Documents, request clarification before proceeding from Engineer.

E. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

F. Perform work by persons qualified to produce workmanship of specified quality.

1.05 REGULATORY REQUIREMENTS

A. General:
   1. Comply with all Federal, State, and local Codes as referenced herein. Such regulations apply to activities including, but not limited to, sitework and zoning, building practices and quality, on and offsite disposal, safety, sanitation, nuisance, and environmental quality.

B. Special Inspection:
   1. Special Inspection shall be performed by the Special Inspector under contract with the Owner in conformance with the IBC. Special Inspection is in addition to, but not replacing, other inspections and quality control requirements herein. Where sampling and testing required herein conforms to Special Inspection standards, such sampling and testing need not be duplicated.

C. Structural Observation:
   1. Engineer shall make visual inspections of the work to assess general conformance with the Contract Documents at significant construction stages and at completion of the structural system. The QCS shall include a preliminary set of Structural Observations and what items are expected to be observed. Contractor shall request this preliminary set from Owner through Engineer and submit as part of their QCS submittal.
   2. The following structural milestones shall be considered significant construction stages:
      a. Structure fill and deep foundations including piling.
      b. Foundations prepared for concrete placement, including grade beams, pile caps, strip, matt and pad footings, and monolithic slabs on grade.
      c. Preparation of concrete, water-retaining walls prior to placement of concrete.
      d. Completion of bearing walls prior to cover-up with nonstructural elements, including concrete, masonry, cold formed steel, and lumber.
      e. Roof and floor framing, including framed and sheathed systems, slabs, and composite systems.

f. Completion of lateral force resisting system elements not included in the above categories including moment connections, bracing, diaphragms, or other.

g. Completion of structural system after all significant architectural, mechanical, plumbing, heating/ventilation equipment, electrical, and finish elements are installed.

1.06 FIELD SAMPLE PROCEDURES

A. When field samples are specified in a unit of work, construct each field sample to include work of all trades required to complete the field sample prior to starting related field work. Field samples may be incorporated into the project after acceptance by Engineer. Remove unacceptable field samples when directed by Engineer. Acceptable samples represent a quality level for the work.

1.07 CONTRACTOR DESIGNED STRUCTURAL SYSTEMS

A. Design Engineering:

1. Contractor shall employ and pay for engineering services from a Professional Engineer registered in the State of Georgia for structural design of Contractor designed structural systems including but not limited to temporary shoring and bracing, formwork support, interior structural wall and ceiling systems, and support systems for fire sprinkler, plumbing, mechanical, and electrical systems and equipment

B. Tests and Inspections of Contractor Designed Structural Systems:

1. Contractor shall pay for preliminary testing of concrete, grout, and mortar mix designs where required by Code or the submittal process prior to start of such work. Contractor shall pay for required shop and site inspection of Contractor designed structural systems where required by Code or these specifications, to the extent such testing and inspection exceeds that required for the structural system on the drawings and in these specifications.

1.08 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, product suppliers or manufacturers shall provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to provide instructions when necessary. Contractor shall submit qualifications of observer to Engineer 30 days in advance of required observations. QCS Inspector shall record observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

1.09 JOB SITE CONDITIONS

A. Schedule to ensure all preparatory work has been accomplished prior to proceeding with current work. Proceeding with the work constitutes acceptance of conditions. Allow adequate time for materials susceptible to temperature and humidity to "stabilize" prior to installation. Establish and maintain environmental conditions (i.e.,

temperature, humidity, lighting) as recommended by the various material manufacturers for the duration of the work.

1.10 SUBMITTALS

A. The following information shall be provided in accordance with Section 01 33 00:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (☐) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The ENGINEER shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
2. Written description of Contractor's proposed QCS plan in sufficient detail to illustrate understanding and approach. The QCS plan and submittal shall include a log showing anticipated inspections, Special Inspections, and source and field Quality Assurance procedures. Preliminary submittal of the QCS plan may be made prior to commencing field work. The preliminary submittal will illustrate the project's initial three (3) month's work, and be followed one month later by a final QCS plan submittal.
3. Contractor's proposed QCS Supervisor, qualifications, and if requested, references.
4. Preliminary structural observation set as described in paragraph 1.05 Structural Observation.
5. Complete structural system information describing Contractor designed structural systems, including sealed calculations, shop and erection drawings, product literature for the various components, ICBO Evaluation Reports for structural components, and a discussion of risk issues associated with the proposed system which could adversely impact overall project completion.
6. If requested by the Engineer during the work, manufacturer's field services and reports. If not so requested, treat same as Product Data.

PRODUCTS

1.11 SOURCE QUALITY CONTROL

A. Contractor Responsibilities:

1. Provide source quality control according to the reviewed and accepted QCS plan and paragraph 1.04 herein. Coordinate with Engineer to facilitate the work of the Testing Laboratory specified and Special Inspector. Provide ready access to sampling and inspection locations and incidental labor customary in such sampling and inspections. Timely prepare and submit submittals, and revise as

indicated by review comments. Comply with technical requirements in each specification Section that applies to the work.

B. Engineer Responsibilities:
   1. Review Contractor's tracking of QCS activities at monthly meetings. Facilitate completion of submittal review per Section 01 33 00. Assist Contractor to ensure that Special Inspection occurs where and when specified.

C. Acceptance Criteria:
   1. Acceptable characteristics and quality of a particular item or construct is defined in that item's or construct's specification Section.

1.12 PRODUCT DATA

A. The following product data shall be provided in accordance with Section 01 33 00.
   1. Manufacturers' field services and reports unless requested by Engineer to be submitted for review.
   2. Special Inspection reports, unless otherwise directed in each technical specification Section.

EXECUTION

1.13 FIELD QUALITY CONTROL

A. Field quality control responsibilities of the Contractor and Engineer are substantially the same as described in paragraph 2.01, with the exception that this work occurs primarily on the jobsite as the work progresses, and Special Inspection will occur more often than at the source.

B. Acceptable characteristics and quality of a particular item or construct is defined in that item's or construct's specification Section.

1.14 REGULATORY COMPLIANCE – SPECIAL INSPECTIONS

A. The following types of work require Special Inspection according to Chapter 17 of the IBC and each system's specification Section:
   1. Structure Fill.
   2. Deep foundations including piling.
   3. Structural concrete and reinforcing.
   4. Anchor bolts and post-installed anchor systems.
   5. Masonry systems, complete.
   6. Structural steel and aluminum including connections.
   7. Cold formed structural steel including connections.
   8. Steel deck and wood sheathing.
   9. Structural lumber including sawn and manufactured including connections.
   10. All components of the lateral force resisting system not included in the above.

B. Specifications describe Testing Laboratory sampling, testing and reporting, much of which is conforming to Special Inspection requirements, and need not be replicated.

C. Contractor designed structural systems are subject to the same Special Inspection requirements as all other work.

1.15 CORRECTION OF DEFECTIVE WORK

A. Remove and replace defective, rejected, and condemned work at Contractor's expense until such work meets the requirements of Contract Documents.

END OF SECTION

SECTION 01 45 23

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SCOPE

A. This Section includes testing which the Owner may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.

B. This work also includes all testing required by the Owner to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength and slump testing, soil compaction, etc.

C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer, e.g., testing of pipe.

D. The testing laboratory or laboratories will be selected by the Owner. The testing laboratory or laboratories will work for the Owner.

1.02 PAYMENT FOR TESTING SERVICES

A. The cost of testing services required by the Contract to be provided by the Contractor shall not be paid by the Owner through the CASH ALLOWANCE, i.e., concrete testing, soil compaction, and asphalt testing.

B. The cost of additional testing services not specifically required in the Specifications, and Contract or Bid Item, but requested by the Owner or Engineer, shall be paid for by the Owner through the CASH ALLOWANCE.

C. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid for by the Owner.

D. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor. Retesting shall be performed by the testing laboratory working for the Owner.

1.03 LABORATORY DUTIES

A. Cooperate with the Owner, Engineer and Contractor.

B. Provide qualified personnel promptly on notice.

C. Perform specified inspections, sampling and testing of materials.

D. Comply with specified standards, ASTM, other recognized authorities, and as specified.

E. Ascertain compliance with requirements of the Contract Documents.

F. Promptly notify the Engineer and Contractor of irregularity or deficiency of work which are observed during performance of services.

G. Promptly submit three copies (two copies to the Engineer and one copy to the Contractor) of report of inspections and tests in addition to those additional copies required by the Contractor with the following information included:
   1. Date issued
   2. Project title and number
   3. Testing laboratory name and address
   4. Name and signature of inspector
   5. Date of inspection or sampling
   6. Record of temperature and weather
   7. Date of test
   8. Identification of product and Specification section
   9. Location of Project
   10. Type of inspection or test
   11. Results of test
   12. Observations regarding compliance with the Contract Documents
   13. Perform additional services as required.

H. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the Work.

1.04 CONTRACTOR RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work and/or manufacturer's requirements.

B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.

C. Furnish copies of mill test reports.

D. Furnish required labor and facilities to:
   1. Provide access to Work to be tested;
   2. Obtain and handle samples at the site;
   3. Facilitate inspections and tests;
   4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.

E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.

G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

1.05 QUALITY ASSURANCE

A. Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.06 PRODUCT HANDLING

A. Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.

1.07 FURNISHING MATERIALS

A. The Contractor shall be responsible for furnishing all materials necessary for testing.

1.08 CODE COMPLIANCE TESTING

A. Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of, and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.09 CONTRACTOR'S CONVENIENCE TESTING

A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.10 SCHEDULES FOR TESTING

A. Establishing Schedule

1. The Contractor shall, by advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.

2. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back charged to the Contractor and shall not be borne by the Owner.

1.11 TAKING SPECIMENS

A. Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

1.12 TRANSPORTING SAMPLES

A. The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

END OF SECTION

SECTION 01 52 50

CONTRACTOR'S FACILITIES, UTILITIES, AND STAGING AREAS

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish, install, and maintain staging areas and temporary utilities required for construction and remove upon completion of the work.

PART 2 PRODUCTS

2.01 OFFICE AND STAGING AREAS

A. The Contractor shall not be required to maintain an office at the site of the work.

B. The Contractor shall establish a staging area for construction as required. Allowable staging areas shall be within site property, road right of way, temporary easements, or permanent easements where approved by the Owner. Any required grading within the staging areas shall be the responsibility of the Contractor and shall be approved by Owner and Engineer. The Contractor shall be solely responsible for damages to equipment or materials due to heavy rains or flooding.

2.02 POWER AND LIGHTING

A. The Contractor shall provide and pay for temporary power for construction used by the Contractor. The Contractor shall make arrangements with the electrical utility and with the Owner for power takeoff points from the existing service, voltage and phasing requirements, transformers and metering and shall pay the costs and fees arising therefrom. The Contractor shall provide the special connections required for his work.

B. The Contractor shall provide sufficient electrical lighting so that all work may be done in an efficient manner when there is not sufficient daylight. The Contractor shall remove all temporary lighting following installation and proper operation of permanent lighting.

2.03 TELEPHONE

A. The Contractor shall provide telephone service for all construction site offices; cell phones are an acceptable substitute.

2.04 WATER

A. The Contractor shall coordinate with the Owner in providing metered water suitable for flushing and testing the mains, and for any other construction purposes. The Contractor shall be responsible for providing an Owner

approved backflow and metering device. The Contractor is responsible for paying service charges for water used.

2.05 SANITARY FACILITIES

A. The Contractor shall provide toilet and wash-up facilities for his workforce at the site of the work. The facilities shall comply with all applicable laws, ordinances and regulations pertaining to the public health and sanitation of dwellings.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall maintain and operate systems to assure continuous service. The Contractor shall remove temporary materials and equipment when no longer required for the work.

END OF SECTION

SECTION 01 56 16

DUST CONTROL

PART GENERAL

1.01 Scope

A. Limit blowing dust caused by construction operations by applying water or employing other appropriate means or methods to maintain dust control, subject to the approval of the Owner. As a minimum, this may require the use of a water wagon twice a day to suppress dusty conditions.

1.02 PROTECTION OF ADJACENT PROPERTY

A. The Bidders shall visit the site and note the buildings, landscaping, roads, parking areas and other facilities near the Work site that may be damaged by their operations. The Contractor shall make adequate provision to fully protect the surrounding area and will be held fully responsible for all damages resulting from Contractor's operations.

B. Protect all existing facilities (indoors or out) from damage by dust, fumes, spray or spills (indoors or out). Protect motors, bearings, electrical gear, instrumentation and building or other surfaces from dirt, dust, welding fumes, paint spray, spills or droppings causing wear, corrosion, malfunction, failure or defacement by enclosure, sprinkling or other dust palliatives, masking and covering, exhausting or containment.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.01 DAMAGE

A. Equipment, products and materials shall be shipped, handled, stored, and installed in ways which will prevent damage to the items. Damaged items will not be permitted as part of the work except in cases of minor damage that have been satisfactorily repaired and are acceptable to the Engineer.

1.02 PIPE

A. Pipe and appurtenances shall be handled, stored, and installed as recommended by the manufacturer. Pipes with paint, tape coatings, linings or the like shall be stored to protect the coating or lining from physical damage or other deterioration. Pipes shipped with interior bracing shall have the bracing removed only when recommended by the pipe manufacturer.

PART 2 EQUIPMENT

2.01 PACKAGE AND MARKING

A. All equipment shall be protected against damage from moisture, dust, handling, or other cause during transport from manufacturer's premises to site. Each item or package shall be marked with the number unique to the specification reference covering the item.

B. Stiffeners shall be used where necessary to maintain shapes and to give rigidity. Parts of equipment shall be delivered in assembled or subassembled units where possible.

2.02 IDENTIFICATION

A. Each item of equipment and valve shall have permanently affixed to it a label or tag with its equipment or valve number designated in this contract. Marker shall be of stainless steel. Location of label will be easily visible.

2.03 SHIPPING

A. Bearing housings, vents and other types of openings shall be wrapped or otherwise sealed to prevent contamination by grit and dirt.

B. Damage shall be corrected to conform to the requirements of the contract before the assembly is incorporated into the work. The Contractor shall bear the costs arising out of dismantling, inspection, repair and reassembly.

2.04 FACTORY APPLIED COATINGS

A. Unless otherwise specified, each item of equipment shall be shipped to the site of the work with the manufacturer's shop applied epoxy prime coating as specified in Section 09 90 00. The prime coating shall be applied over clean dry surfaces in accordance with the coating manufacturer's recommendations. The prime coating will serve as a base for field-applied finish coats. Electrical equipment and materials shall be painted by manufacturer as specified in Section 09 90 00-3.03 Electrical and Instrumentation Equipment and Materials.

2.05 STORAGE

A. During the interval between the delivery of equipment to the site and installation, all equipment, unless otherwise specified, shall be stored in an enclosed space affording protection from weather, dust and mechanical damage and providing favorable temperature, humidity and ventilation conditions to ensure against equipment deterioration. Manufacturer's recommendations shall be adhered to in addition to these requirements.

B. Equipment and materials to be located outdoors may be stored outdoors if protected against moisture condensation. Equipment shall be stored at least 6 inches above ground. Temporary power shall be provided to energize space heaters or other heat sources for control of moisture condensation. Space heaters or other heat sources shall be energized without disturbing the sealed enclosure.

C. 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.

2.06 PROTECTION OF EQUIPMENT AFTER INSTALLATION

A. After installation, all equipment shall be protected from damage from, including but not limited to, dust, abrasive particles, debris and dirt generated by the placement, chipping, sandblasting, cutting, finishing and grinding of new or existing concrete, terrazzo and metal; and from the fumes, particulate matter, and splatter from welding, brazing and painting of new or existing piping and equipment. As a minimum, vacuum cleaning, blowers with filters, protective shieldings, and other dust suppression methods will be required at all times to adequately protect all equipment. During concreting, including finishing, all equipment that may be affected by cement dust must be completely covered. During painting operations, all grease fittings and similar openings shall be covered to prevent the entry of paint. Electrical switchgear, unit substation, and motor load centers shall not be installed until after all

concrete work and sandblasting in those areas have been completed and accepted and the ventilation systems installed.

PART 3 NOT USED

END OF SECTION

SECTION 01 71 33

PROTECTION AND MAINTENANCE OF PROPERTY AND WORK

PART 1 GENERAL

1.01 SUMMARY

This Section specifies protection and maintenance of underground and above ground utilities, structures, fences, parking strips, sidewalks, driveways, streets, and other improvements which may be affected by the work.

SUBMITTALS

Procedures: Section 01 33 00.

Action submittal items:

Listing and schedule of all potholing.

Listing of all utilities/facilities to be physically protected and relocated.

Informational submittal items for this section:

Shoring for all affected structures and utilities. Submit detail drawings of proposed methods to support, protect, and buttress utilities and structures where the depth of the excavation is greater than the horizontal distance from the structure or utility.

LOCATION OF EXISTING UNDERGROUND FACILITIES

The Drawings indicate the existence of underground facilities known to the Owner within the treatment plant site. Utilities are shown schematically on the plans and are not necessarily accurate in location as to plan or elevation. Determine the location of all utilities outside the treatment plant site that may be impacted during construction.

The Contractor shall familiarize himself with and comply with the provisions of O.C.G.A. Section 25-9-1 et. seq.

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.

Locate existing underground utilities. Review with the Owner the locations of existing utilities in relation to the new construction and evaluate areas of conflict.

Excavate and expose all major and minor existing utilities prior to new construction to determine utility elevations in relation to the new facilities.

Examine and repair all pipelines prior to pipelines being buried.

EXISTING UTILITIES AND FACILITIES

Protect, modify, and/or relocate all existing utilities required to complete the work.

The locations of existing major utilities, whether above ground or underground, are indicated on the Drawings. This information has been obtained from utility maps and field surveys. The Owner does not guarantee the accuracy or completeness of this information, and it is to be understood that other above ground or underground facilities not shown on the Drawings may be encountered during the course of the work.

Contractor shall be responsible for damages resulting from any failure to contact utility owners for location, routing, and marking of a specific utility and its subsequent effects.

The Drawings may show underground utilities which are to be relocated. Contractor shall be responsible for all these relocations prior to commencing work in the area.

Protect, modify, or relocate existing utilities and facilities required to accommodate Contractor's means and methods. Specific means and methods to be utilized by the Contractor are not known to the Owner. Therefore, the Owner will not be liable for utility protection, modification, and relocation not shown on the Drawings that are required by the Contractor due to its means and methods. It is the Contractor's responsibility to determine the Work required by the Construction Documents and make provision for protection, modification, and relocation required. Coordinate all protection, modification, and relocation work through the affected utility. Complete Work to the utility owner's requirements and standards.

Underground Utilities:

For the purpose of this Section an underground utility will be defined as a transmission, collection, or distribution line where it would be customary to expect that drawings would exist for the line and the utility owner would be aware of the line.

An existing underground utility is considered to be in conflict if it crosses or projects into the specified excavation at an elevation between the top and bottom of the new facility or when parallel to the new facility, and projects into the specified excavation.

Contractor shall be responsible for all protection, affects, and damages on utilities not in conflict with the new construction, whether or not the utilities are shown on the Drawings.

When not shown on the Drawings and in conflict with the new construction, meet and agree with the Owner on how to proceed.

When not shown on the Drawings and no conflict with the new facility exists, no additional payment will be considered.

When in a substantially different location and not in conflict with the new construction, no additional payment will be considered.

When in a substantially different location and in conflict with the new construction, reimbursement for additional work per the Supplemental General Conditions.

Abandoned pipelines shown on the Drawings shall be removed and plugged per the local agency requirements when encountered.

Locate existing underground utilities with the field staking. Review with the Owner the locations of existing utilities in relation to the new construction and evaluate areas of conflict

Storm and Sanitary Sewers:

Existing live sewers shall remain in service. Adequate provision shall be made for disposal of existing sewage flow. Immediately repair construction damage to the existing sewer system and manholes to a condition equal to or better than that existing prior to the damage. Repair all damage which results from the disturbance of the existing sewer.

Remove water accumulating during construction from the new sewers and prevent it from entering existing lines. Flush existing pipes which were affected by the construction to the point of the next upstream connection and repair any pipelines or manholes damaged by gravel, rocks, or other debris that has entered the existing system during construction. The physical connection to an existing manhole or sewer line shall not be made until so authorized by the Owner.

Aboveground Electrical, Cable, and Communication Facilities:

Attention is called to all overhead items including, but not limited to, power and telephone lines, temporary traffic signals, traffic signal mast arms, overhead sign bridges, sign support span wires, signs, and street lights.

Observe the location of these overhead facilities and plan and conduct work operations, accordingly.

Take precautions to protect and avoid damage to all overhead facilities.

Relocate facilities as required to meet the means and methods to be utilized.

Observe and investigate the presence of facilities that may be affected by the work. Consult with and rely on the information given by utility owners and operators to determine the extent of any hazards and measures required. Determine the extent of any hazard created by facilities in all areas and follow approved safety procedures during the work.

Support poles at risk of being undermined by the work.

Follow the requirements of Georgia Power for all energized primary conductors. For 50 kV lines and less, at no time shall personnel or equipment approach closer than 10 feet to any energized primary conductors. For greater than 50 kV, meet the requirements of Georgia Power.

Georgia Power and the City of Savannah have agreed that a limited number of outages of the primary high voltage feeds to the plant substation from the east will be performed by Georgia Power at no cost to the Owner. These are intended to be used for mobilization and demobilization of

construction equipment associated with the project. Outages will last no longer than 48 hours, and Contractor shall notify Georgia Power a minimum of 7 days in advance of the required outage and shall coordinate with the utility's forces to de-energize and re-energize the primary feeds. A maximum of six (6) outages will be performed at no cost. Additional outages required for Contractor's operations shall be provided by Contractor at no additional cost to the Owner.

Underground Electrical, Cable, and Communication Facilities:

Determine the protection necessary to proceed safely to protect these underground facilities.

Gas:

As required by the appropriate utility owner, protect, maintain, support in place, or relocate all gas mains crossing the pipeline trenches.

Provide a minimum of 12 inches of clearance, measured from edge to edge, between gas mains or gas service lines and new facilities. If relocating either utility is not practical, a protective wrap shall be provided for the entire distance where less than 12 inches of vertical clearance and less than 6 inches of horizontal clearance are provided. Wrapping material shall consist of either a split polyvinyl chloride (PVC) pipe or PVC wrapping of at least 0.04 inch in thickness, and shall be applied to either one of the pipes.

All abandoned gas mains encountered in the trench area shall be removed.

All temporary gas service slack lines shall be protected and maintained during pipeline installation.

Notify the Owner and the utility at least two days (minimum of 48 hours) in advance of any excavation in the vicinity of any gas piping. The utility may require one of its inspectors to be onsite anytime work is conduct near gas lines.

Water:

As required by the appropriate utility, protect, maintain, support in place, or relocate all water pipelines affected by the work.

Maintain water service along the alignment of work at all times.

Thrust blocks are not shown on the Drawings and shall be assumed to be present at all water line deflections of 12.5 degrees or greater.

Notify the Owner in writing immediately of any damage. Begin repairs immediately, and work continuously until water service is restored.

Roadways:

Take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, adjoining property, and structures, and avoid damage.

Traffic signage, paint striping, and channelization shall be protected and replaced if damaged.

Maintain the existing illumination pattern for signs and roads at all times.

Install temporary roadway lighting as necessary.

Access for emergency equipment shall be maintained at all times.

SHORING AND BRACING

Shore up, brace, under-pin, and protect as necessary, the foundations and other parts of existing structures adjoining the site of the work that may be affected by the work. Contractor is responsible for any damages because of settlements or the loss of lateral or subjacent support of adjoining property and from all loss and damages to adjoining and adjacent structures and their premises.

Fully comply with the requirements of the authority having jurisdiction (AHJ) and the State of Georgia, as applicable.

EMERGENCIES

Whenever work endangers the safety of life or property, including adjoining property or property in the immediate proximity of the work, take all reasonable and prudent actions to prevent threatened loss or injury.

NOT USED

EXECUTION

GENERAL

Contact the Owner and the affected utilities prior to an excavation per the Supplemental General Conditions.

Pothole to locate and expose all utility locations to be affected by the work prior to new construction in the area of the utility. Adjust work when location of utility is different than shown on the Drawings and materially impacts construction. If the utility requires relocation not shown on the Drawings and the Contractor incurs additional cost, then the Owner will consider additional costs. Relocation of minor utilities such as irrigation lines less than 4 inches, water service lines, building drainage pipes will be considered incidental and not considered for additional costs.

If damage to a utility occurs, repair damage to the requirements of the utility owner prior to backfilling said utility.

END OF SECTION

SECTION 01 74 23

CLEANING AND WASTE MANAGEMENT

PART 1 GENERAL

1.01 SCOPE

A. This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

1.02 QUALITY ASSURANCE

A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.

B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.03 HAZARDOUS MATERIAL AND WASTE

A. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in approved landfills as applicable.

B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.

C. Burning or burying rubbish and waste materials on the site shall not be allowed.

D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.

1.04 DISPOSAL OF WASTE

A. The definitions contained in Georgia Environmental Protection Division Rules 391-3-4-.01 shall be applicable to this Project. The term waste shall include excess and surplus materials, and shall include liquid and solid wastes.

B. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

C. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on-site.

D. Remove and transport waste in a manner that will prevent spillage on adjacent surfaces and areas.

E. Burning: Do not burn waste materials on site.

F. Waste removed from the Project site shall be disposed of in sites permitted by the Georgia Environmental Protection Division for the acceptance of type of waste being disposed. The acceptable types of permitted disposal facilities are as follows:
   1. Inert Waste Landfills
   2. Municipal Solid Waste Landfills
   3. Municipal Solid Waste Landfills permitted to receive only construction and demolition wastes.

G. Exceptions to Paragraph F are as follows:

   Hazardous waste shall be disposed of in accordance with Georgia Environmental Protection Division Rules 391-3-11.

   Asbestos-containing waste shall also be handled and disposed in accordance with Georgia Environmental Protection Division Rules 391-3-14.

   Excess earth material and excess excavated rock material may be placed on sites for which the Contractor provides to the Owner a signed affidavit from the property owner that the placement of such material is acceptable to the property owner. The Contractor and property owner shall be responsible for all permitting of such disposal.

H. No waste shall be placed at a transfer station facility.

I. The Contractor shall maintain records related to all waste removed from the Project site so as to allow the Owner or the Engineer to readily determine the following:
   1. Date waste removed from Project site.
   2. Name of hauler (company and driver) transporting such waste.
   3. General description of waste transported.
   4. “Truck tickets” indicating the waste disposal site and amount of waste disposed therein.

J. For all wastes hauled to any landfill, the handler of such wastes must be licensed under Permit-by-Rule in accordance with Georgia Environmental Protection Division rules 391-3-4-06.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use only the cleaning materials, methods and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

A. General
   1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this Work.
   2. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
   3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site
   1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
   2. Restack materials stored on site weekly.
   3. At all times maintain the site in a neat and orderly condition which meets the approval of the Engineer.

C. Structures
   1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
   2. Weekly, and more often if necessary, sweep all interior spaces clean. “Clean”, for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by using a handheld broom.
   3. As required preparatory to installation of successive materials, clean the structures or pertinent portions as recommended by the manufacturer of the successive material.
   4. Following the installation of finish floor materials, clean the finish floor daily. “Clean”, for the purpose of this paragraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Engineer, may be injurious to the finish floor material.
   5. Schedule cleaning operation so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

3.02 FINAL CLEANING

A. Definitions: Unless otherwise specifically specified, “clean” for the purpose of this Article shall be interpreted as the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.

B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 3.01 above.

C. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.

D. Structures

1. Remove all traces of soil, waste material, splashed material, and other foreign matter to provide a uniform degree of exterior cleanliness. Visually inspect all exterior surfaces and remove all traces of soil, waste material, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.
2. Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges and other foreign matter. Remove all paint droppings, spots, stains and dirt from finished surfaces.
3. Clean all glass inside and outside.
4. Polish all surfaces requiring the routine application of buffed polish. Provide and apply polish as recommended by the manufacturer of the material being polished.

E. Post Construction Cleanup: All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, shall be removed as directed by the Engineer.

F. Restoration of Landscape Damage: Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. Restoration shall be performed to the satisfaction of the Engineer.

G. Timing: Schedule final cleaning as approved by the Engineer to enable the Owner to accept the Project.

3.03 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Engineer in accordance with the Supplementary Conditions of the Contract Documents.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. This section specifies the following sequence and procedures for Project closeout:
   1. Final Inspection (portions of the Work)
   2. Substantial Completion (portions of the Work per the Supplemental General Conditions)
   3. Final Completion (all Work per the Supplemental General Conditions)
   4. Final Acceptance (all Work per the Supplemental General Conditions)

1.02 FINAL INSPECTION

A. Request for Final Inspection: complete the following actions prior to the Owner's Final Inspection.
   1. Submit a written notice that the Project is ready for Final Inspection. Include a written plan and schedule outlining all actions necessary to achieve Substantial Completion.
   2. Preliminary Cleaning per Specification.

B. Final Inspection: Upon receipt of the Request for Final Inspection, the Owner will commence Final Inspection and, as necessary, provide a Corrective Work Items List. If a list of Corrective Work Items List is issued, make the required corrections and/or identify items that Contractor feels are not required by the Construction Documents; resolve these items with the Owner.

C. Reinspection: After completing the Owner's Corrective Work Items List and providing a Final Inspection Report noting completion of each item, request a re-inspection. Items whose completion is delayed due to circumstances acceptable to the Owner will be exceptions. Owner will confirm completion of the Corrective Work Items List. If Owner is required to perform more than one re-inspection, costs for additional inspections may be borne by the Contractor, at Owner's sole discretion.

1.03 SUBSTANTIAL COMPLETION

A. Prior to Substantial Completion: Substantial Completion is achieved when the portion of Work, other than incidental Corrective Work Items or Punch List items, is complete. Tasks to complete include, but are not limited to, the following:
   1. Work is complete and correct to the satisfaction of the Owner.
   2. Removal of temporary facilities and controls not required in other areas.
   3. Final cleaning complete per Specification.
   4. Completion of all testing, training, and commissioning.
   5. Certificate(s) of Occupancy submitted, as required.

B. Substantial Completion: Upon satisfactory completion of all specified requirements, the Owner will issue a letter of Substantial Completion. The letter will identify the date of Substantial Completion and list any incomplete Work.

1.04 FINAL COMPLETION

A. Prior to Final Completion: Final Completion is achieved when all Work is fully complete in accordance with the Construction Documents. Tasks to complete include, but are not limited to, the following:
   1. All Work is complete and correct to the satisfaction of the Owner.
   2. All temporary facilities and controls removed.
   3. All final cleaning complete per Cleaning Specification.
   4. Final Operation and Maintenance Manuals provision per Section 01 78 23.
   5. Warranties and Bond Manual submission per Section 01 78 36.
   6. Submittal of the Project Record Documents per Section 01 78 39.
   7. Spare parts delivery and acceptance.
   8. Landscaping complete.
   9. All final permits submitted, including Certificates of Occupancy.
   10. All Change Orders are approved and signed by both parties.
   11. Draft Final Application for Payment submitted.

B. Final Completion: Upon satisfactorily completion of all Construction Document requirements, the Owner will approve and process the Final Application for Payment and establish the date of Final Completion.

1.05 FINAL ACCEPTANCE

A. Final Application for Payment approved and payment made to Contractor.

B. The Owner will establish the date of Final Acceptance and issue the Letter of Final Acceptance after the Contractor completes all Construction Document requirements.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SCOPE

A. Operation and maintenance (O&M) instructions shall be provided in accordance with this section and as required in the technical sections of this project manual. O&M information shall be provided for each maintainable piece of equipment, equipment assembly or subassembly, and material provided or modified under this contract.

B. O&M instructions must be submitted and accepted before on-site training may start.

1.02 TYPES OF INFORMATION REQUIRED

A. General:

1. O&M information shall contain the names, addresses, and telephone numbers of the manufacturer, the nearest representative of the manufacturer, and the nearest supplier of the manufacturer's equipment and parts. In addition, one or more of the following items of information shall be provided as applicable.

B. Operating Instructions:

1. Specific instructions, procedures, and illustrations shall be provided for the following phases of operations:
   a. Safety Precautions: List personnel hazards for equipment and list safety precautions for all operating conditions.
   b. Operator Prestart: Provide requirements to set up and prepare each system for use.
   c. Start-Up, Shutdown, and Postshutdown Procedures: Provide a control sequence for each of these operations.
   d. Normal Operations: Provide control diagrams with data to explain operation and control of systems and specific equipment.
   e. Emergency Operations: Provide emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency shutdown instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.
   f. Operator Service Requirements: Provide instructions for services to be performed by the operator such as lubrication, adjustments, and inspection.
   g. Environmental Conditions: Provide a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which equipment should not be allowed to run.

C. Preventive Maintenance:
   1. The following information shall be provided for preventive and scheduled maintenance to minimize corrective maintenance and repair:
      a. Lubrication Data: Provide lubrication data, other than instructions for lubrication in accordance with paragraph 1.02 Operator Service Requirements.
         1) A table showing recommended lubricants for specific temperature ranges and applications;
         2) Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities; and
         3) A lubrication schedule showing service interval frequency.
      b. Preventive Maintenance Plan And Schedule: Provide manufacturer's schedule for routine preventive maintenance, inspections, tests, and adjustments required to ensure proper and economical operation and to minimize corrective maintenance and repair. Provide manufacturer's projection of preventive maintenance man-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft.

D. Corrective Maintenance:
   1. Manufacturer's recommendations shall be provided on procedures and instructions for correcting problems and making repairs.
      a. Troubleshooting Guides And Diagnostic Techniques: Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.
      b. Wiring Diagrams And Control Diagrams: Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job-specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type identically to actual installation numbering.
      c. Maintenance And Repair Procedures: Provide instructions and list tools required to restore product or equipment to proper condition or operating standards.
      d. Removal And Replacement Instructions: Provide step-by-step procedures and list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings, and adjustments required. Instructions shall include a combination of test and illustrations.
      e. Spare Parts And Supply Lists: Provide lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonably delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead time to obtain.
      f. Corrective Maintenance Man-hours: Provide manufacturer's projection of corrective maintenance man-hours including craft requirements by type of

craft. Corrective maintenance that requires participation of the equipment manufacturer shall be identified and tabulated separately.

E. Appendices:

1. The following information shall be provided; include information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment.

   a. Parts Identification: Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies.

   b. Warranty Information: List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force.

   c. Personnel Training Requirements: Provide information available from the manufacturers to use in training designated personnel to operate and maintain the equipment and systems properly.

   d. Testing Equipment And Special Tool Information: Provide information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

1.03 TRANSMITTAL PROCEDURE

A. Unless otherwise specified, O&M manuals, information, and data shall be transmitted in accordance with Section 01 33 00 accompanied by Transmittal Form 01 78 23-A and Equipment Record Forms 01 78 23-B and/or 01 78 23-C, as appropriate, all as specified in Section 01 99 90. The transmittal form shall be used as a checklist to ensure the manual is complete. Only complete sets of O&M instructions will be reviewed for acceptance.

B. One (1) electronic and six (6) hard copies of the specified O&M information in final format, with all prior comments addressed to the satisfaction of the Engineer, shall be provided following preliminary review and pre-final review of the O&M information.

1. Electronic copies of O&M manuals also shall be provided per Section 01 33 00. For electronic copies, files shall be proved on CD or DVD in an indexed PDF file format.

2. For ease of identification, each manufacturer's brochure and manual shall be appropriately labeled with the equipment name and equipment number as it appears in the project manual.

3. The information shall be organized in the binders in numerical order by the equipment numbers assigned in the project manual.

4. The binders shall be provided with a table of contents and tab sheets to permit easy location of desired information.
5. Binders shall be heavy-duty, d-ring.

C. If manufacturers' standard brochures and manuals are used to describe O&M procedures, such brochures and manuals shall be modified to reflect only the model or series of equipment used on this project. Extraneous material shall be crossed out neatly or otherwise annotated or eliminated.

1.04 PAYMENT

A. Acceptable O&M information for the project must be delivered to the Engineer prior to the project being 65 percent complete. Progress payments for work in excess of 65 percent completion will not be made until the specified acceptable O&M information has been delivered to the Engineer.

1.05 FIELD CHANGES

A. Following the acceptable installation and operation of an equipment item, the item's instructions and procedures shall be modified and supplemented by the Contractor to reflect any field changes or information requiring field data.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 78 36

WARRANTIES

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties required by the Construction Documents, including manufacturer's Standard Product Warranties and Special Warranties.

B. Refer to the Supplemental General Conditions for terms of the Contractor's Warranty of Construction.

C. If there is any discrepancy in the Construction Documents regarding the warranty period or its date of commencement, the passage granting the Owner the longest warranty period ending on the latest date shall govern.

D. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors that are required to countersign Special Warranties with the Contractor.

1.02 DEFINITIONS

A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Construction Documents, either to extend time limits provided by Standard Product Warranties or to provide greater rights to the Owner. Refer to individual sections of the Specifications for Special Warranty requirements.

1.03 WARRANTY REQUIREMENTS

A. All warranties begin at the date of Substantial Completion for the entire project, or, for Work associated with an interim milestone, on the date of Substantial Completion for that milestone.

B. When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to access the failed, warranted Work.

C. When Work covered by a warranty has failed and been corrected, replaced, retested, and recommissioned, reinstate the warranty by written endorsement. The reinstated warranty shall equal the original warranty with an equitable depreciation adjustment.

D. Upon determination that Work covered by a warranty has failed, correct or replace the Work to an acceptable condition complying with requirements of Construction

Documents. The Contractor is responsible for the cost of correcting, replacing, retesting, and recommissioning defective Work regardless of whether the Owner has benefited from use of the Work.

E. Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

F. The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Construction Documents.

G. The Owner reserves the right to refuse to accept Work for the Project where a Special Warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

H. Owner acceptance of warranties does not relieve the Contractor of the warranty requirements specified in the Supplemental General Conditions.

I. Ensure all Standard Product Warranties and Special Warranties are transferrable to Owner.

1.04 SUBMITTALS

A. Procedures: Section 01 33 00.

B. Warranties and Bonds Manual: Assemble executed licenses, certificates, warranties, bonds, and any required service and maintenance contracts from the respective manufacturers, suppliers, and Subcontractors. Provide two (2) preliminary review copies, identified “Preliminary.” Provide four (4) final signed copies of the Warranties and Bonds Manual following review and acceptance of the preliminary manual by the Owner.
   1. Out of the four final signed copies, one (1) shall be an original.
   2. Provide one (1) CD with scanned Adobe Acrobat (.pdf) files, including an index with hyperlinks to the individual sections.

C. Include complete information for each of the following:
   1. Neatly typed Table of Contents, in a complete and orderly sequence.
   2. Product or work item, including applicable specification section number(s) per the Construction Documents
   3. Firm, with name of principal, address, telephone number, email address, and web site address
   4. Scope of warranty
   5. Start date of warranty or service and maintenance contract
   6. Duration of warranty or service and maintenance contract
   7. Proper procedure in case of failure
   8. Instances which might affect validity of warranty or bond

9. Contractor, name or responsible principal, address, and telephone number.
10. For Special Warranties, prepare a written document containing all pertinent information and ready for execution by the required parties.

D. Copies shall be bound in slant-D, 3 ring view binders with an insert accepting clear vinyl overlay on the front cover and spine.
   1. Provide cover slip sheet typed with "WARRANTIES AND BONDS", Project name, Project number, Contractor, and blank field for the date. Label volumes consecutively.
   2. Each copy shall have a typewritten index and tabbed dividers between equipment categories or specification sections.
   3. The contents of the manual shall be printed on white 8-1/2” x 11” acid free, recycled copy paper and shall not exceed 75% capacity of the binder.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SCOPE

A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording and submitting of project Record Documents as herein specified.

B. Record documents refer to those documents maintained and annotated by the Contractor during construction and are defined as:
   1. A neatly and legibly marked set of contract drawings showing the final location of piping, equipment, structures, electrical conduits, outlet boxes and cables
   2. Specifications annotated with addenda and change order items, by section
   3. Change order documents
   4. Submittals and product data
   5. Field test data
   6. Additional documents such as schedules, lists, drawings, and electrical and instrumentation diagrams included in the specifications
   7. Contractor layout and installation drawings

C. The Contractor shall maintain on the Project site throughout the Contract Time an up- to-date set of Record Drawings.

1.02 GENERAL REQUIREMENTS

A. Unless otherwise specified, record drawings shall be full size and maintained in a clean, dry, and legible condition.

B. Record documents shall not be used for construction purposes and shall be available for review by the Owner during normal working hours.

C. At the completion of the work, prior to final payment, all record drawings and any CAD files shall be submitted to the Owner.

D. The record documents shall be maintained continuously.

E. Prior to each request for partial progress payment, Owner will review record drawings with Contractor.

F. Progress payment requests shall not be processed unless record drawings are current.

1.03 QUALITY ASSURANCE

A. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain Record Documents.

B. Accuracy of Records:
   1. Unless noted otherwise, Record Drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.
   2. Unless noted otherwise, Record Drawings shall provide elevations to the nearest 0.01 foot for all pertinent items constructed by the Contractor.
   3. Coordinate changes within Record Documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   4. Purpose of Project Record Documents is to document factual information regarding aspects of Work, both concealed and visible, to enable future modification of Work to proceed without lengthy and expensive site measurement, investigation, and examination.

C. Make entries within 24 hours after receipt of information that a change in Work has occurred.

D. Prior to submitting each request for progress payment, request Owner's review and approval of current status of Record Documents. Failure to properly maintain, update, and submit Record Documents may result in a deferral by Owner to recommend the whole or any part of the Contractor's Application for Payment, either partial or final.

1.04 CONTRACTOR MARK-UPS AND DATA ENTRY REQUIREMENTS

A. Marking of the drawings shall be kept current and shall be done at the time the material and equipment are installed.

B. Annotations to the record drawings shall be made with an erasable colored pencil conforming to the following color code:
   1. Additions – Red
   2. Deletions – Green
   3. Comments – Blue
   4. Dimensions – Graphite

C. Legibly mark drawings to record actual construction, including:
   1. Changes of dimension and detail.
   2. Changes made by Requests for Information (RFI), field order, work change directives, clarification memorandums or by change order.
   3. Details not on original Drawings.

D. Legibly mark to record actual depths, horizontal and vertical location of underground facilities, piping, taps, fitting, valves, underground structures, equipment, raceways, cables, and appurtenances referenced to permanent surface improvements. The horizontal locations shall be referenced to at least two easily identifiable, permanent landmarks (e.g., power poles, valve markers, etc.) or benchmarks.

E. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.

F. Provide elevation of piping through vaults / structures, invert elevation of all pipes entering manholes, junction boxes, valves, clean outs, etc. Provide center of manholes, and corners of facilities or structures with northing, easting and bottom / top elevations.

G. The Contractor shall provide offset staking for the centerline of the water main every 50 feet along the pipe (including all fittings and bends) – as installation of the pipeline progresses. The staking shall identify the distance to the centerline of the pipe and the depth of cover to the top of pipe. At the completion of construction, the Contractor shall provide coordinates for the centerline of the pipe, include depth of bury, based on staked offsets.

H. The Contractor shall obtain a set of signed / sealed as-built drawings from the Georgia registered surveyor and submit to the Owner. Survey shall accurately reflect installed location, depth, pipe size and other pertinent details.

I. Record Drawings shall be prepared using a survey that ties the site and improvements horizontally and vertically to the following state plane coordinate system or as amended by the Owner.

Horizontal Control: North American Datum 83 (NAD83) (HARN) 1994
Vertical Control: North American Vertical Datum of 1988 (NAVD88).
Grid Zone: Georgia West 1002 (US Survey feet)

END OF SECTION

SECTION 01 99 90

REFERENCE FORMS

PART 1 FORMS

1.01 DESCRIPTION

A. The forms listed below and included in this section are referenced from other sections of the project manual:

Form No.	Title
01 33 00-A	Submittal Transmittal Form
01 78 23-A	Operation and Maintenance Transmittal Form
01 78 23-B	Equipment Record Form
01 78 23-C	Equipment Record Form
09 90 00-A	Coating System Inspection Checklist
43 05 11-A	Manufacturer's Installation Certification Form

01 33 00-A. SUBMITTAL TRANSMITTAL FORM

Submittal Transmittal

Submittal Description: Submittal No:[1] Spec Section:

	Routing	Sent	Received
Owner:	Contractor/CM		
Project:	CM/Engineer		
	Engineer/CM		
Contractor:	CM/Contractor		

We are sending you:
☐ Attached
☐ Under separate cover via _____
☐ Submittals for review and comment
☐ Product data for information only

Remarks: _____

Item	Copies	Date	Section No.	Description	Review action[a]	Reviewer initials	Review comments attached

[a]*Note: NET = No exceptions taken; MCN = Make corrections noted; A&R = Amend and resubmit; R = Rejected*
Attach additional sheets if necessary.

Contractor

Certify either a or b:

☐ We have verified that the material or equipment contained in this submittal meets all the requirements, including coordination with all related work, specified (no exceptions).

☐ We have verified that the material or equipment contained in this submittal meets all the requirements specified except for the attached deviations.

No.	Deviation

[1]See *Section 01 33 00-1.04. A, Transmittal Procedure.*

Certified by: _____

Contractor's Signature: _____

01 78 23-A. OPERATION AND MAINTENANCE TRANSMITTAL FORM

Date:	Submittal No:[2]
To:	Contract No:
	Spec. Section:
	Submittal Description:
Attention:	From:

Checklist	Contractor		Construction Manager	
	Satisfactory	N/A	Accept	Deficient
1. Table of contents				
Equipment record forms				
Manufacturer information				
Vendor information				
Safety precautions				
Operator prestart				
Start-up, shutdown, and post shutdown procedures				
Normal operations				
Emergency operations				
Operator service requirements				
Environmental conditions				
Lubrication data				
Preventive maintenance plan and schedule				
Troubleshooting guides and diagnostic techniques				
Wiring diagrams and control diagrams				
Maintenance and repair procedures				
Removal and replacement instructions				
Spare parts and supply list				
Corrective maintenance man-hours				
Parts identification				
Warranty information				
Personnel training requirements				
Testing equipment and special tool information				

[2] See Section 01 33 00-1.04.A, Transmittal Procedure.

Remarks:
Contractor's Signature :

01 78 23-B. EQUIPMENT RECORD FORM

Equip Descrip		Equip Loc	
Equip No.	Shop Dwg No.	Date Inst	Cost
Mfgr		Mfgr Contact	
Mfgr Address			Phone
Vendor		Vendor Contact	
Vendor Address			Phone

Maintenance Requirements	D	W	M	Q	S	A	Hours

Lubricants: Recommended:

Alternative:

Misc. Notes:

Recommended Spare Parts					Electrical Nameplate Data			
Part No	Quan	Part Name	Cost		Equip			
					Make			
					Serial No.		Id No.	
					Model No.		Frame No.	
					Hp	V	Amp	Hz
					Ph	Rpm	Sf	Duty
					Code	Insl. Cl	Des	Type
					Nema Des	C Amb	Temp Rise	Rating
					Misc.			
					Mechanical Nameplate Data			
					Equip			
					Make			
					Serial No.		Id No.	
					Model No.		Frame No.	
					Hp	Rpm	Cap	Size
					Tdh	Imp Sz	Belt No.	Cfm
					Psi	Assy No.	Case No.	

					Misc

01 78 23-C. EQUIPMENT RECORD FORM

Equip Descrip		Equip Loc	
Equip No.	Shop Dwg No.	Date Inst	Cost
Mfgr		Mfgr Contact	
Mfgr Address			Phone
Vendor		Vendor Contact	
Vendor Address			Phone

Maintenance Requirements	D	W	M	Q	S	A	Hours

09 90 00-A COATING SYSTEM INSPECTION CHECKLIST

Project Name: **Johns Creek Reuse Main**

Owner:	**Fulton County, GA**	Coating System Manufacturer (CSM)	
General Contractor (GC)		Coating System Applicator (CSA)	
Area or Structure		Location within Structure	
Coating System (e.g., E-1)		Coating Type (e.g., Epoxy, etc.)	

Coating System Inspection Checklist

Step	Description		Name	Signature	Date
1	Completion of cleaning and substrate decontamination prior to abrasive blast cleaning.	GC QC			
		CSM QC			
		CSA QC			
2	Installation of protective enclosure of structure or area and protection of adjacent surfaces or structures that are not to be coated.	GC QC			
		CSM QC			
		CSA QC			
3	Completion of ambient condition control in structure or building area and acceptance of ventilation methods in structure or Area.	GC QC			
		CSM QC			
		CSA QC			
4	Completion of Surface Preparation for Substrates to Be Coated.	GC QC			
		CSM QC			
		CSA QC			
5	Completion of Primer Application.	GC QC			
		CSM QC			
		CSA QC			
6	Completion of Concrete Repairs If Required and Related Surface	GC QC			
		CSM QC			

Coating System Inspection Checklist

Step	Description		Name	Signature	Date
	Preparation Rework Prior to Coating System Application.	CSA QC			
7	Completion of Concrete Filler/ Surface Application to Concrete.	GC QC			
		CSM QC			
		CSA QC			
8	Completion of First Finish Coat Application and of Detail Treatment at Transitions or Terminations.	GC QC			
		CSM QC			
		CSA QC			
9	Completion of Second Finish Coat Application and of Detail Treatment at Transitions and Terminations.	GC QC			
		CSM QC			
		CSA QC			
10	Completion of Full and Proper Cure of Coating System.	GC QC			
		CSM QC			
		CSA QC			
11	Completion of Testing of Cured Coating System including Adhesion, Holiday (Continuity) Testing and Dry Film Thickness.	GC QC			
		CSM QC			
		CSA QC			
12	Completion of Localized Repairs to Coating System Following Testing.	GC QC			
		CSM QC			
		CSA QC			
13	Final Acceptance of Coating System Installation Including Final Clean-Up Complying with Specification Requirements and the CSM's Quality Requirements.	GC QC			
		CSM QC			
		CSA QC			

43 05 11-A. MANUFACTURER'S INSTALLATION CERTIFICATION FORM

Contract No:	Specification section:
Equipment name:	
Contractor:	
Manufacturer of equipment item:	
The undersigned manufacturer of the equipment item described above hereby certifies that he has checked the installation of the equipment and that the equipment, as specified in the project manual, has been provided in accordance with the manufacturer's recommendations, and that the trial operation of the equipment item has been satisfactory.	
Comments:	

Manufacturer		Contractor
Signature of Authorized Representative		Signature of Authorized Representative
Date		Date

SECTION 02 41 13.33

PAVING REMOVAL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes
   1. Equipment
   2. Trench paving removal
   3. Milling Operations

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. County Department of Transportation Standard Specifications.

1.03 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, tools and materials necessary to remove asphalt and/or concrete paving as required for the installation of proposed water mains or sewer mains and related appurtenances under the Contract and as directed by Owner.

1.04 SUBMITTALS

A. The Contractor shall submit for approval to Owner, County DOT and Georgia DOT when work is within a state road right-of-way, all working drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. The Contractor shall submit photographs or videotape, sufficiently detailed, of existing conditions of project site. These shall be used to evaluate project areas that might be misconstrued as damage, caused by debris, or construction material removal.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Milling Equipment:
   1. Use power-driven, self-propelled milling equipment that is the size and shape that allows traffic to pass safely through areas adjacent to the work. Also use equipment that is:
      a. Designed to mill and remove specified depth of existing asphalt and/or concrete paving

b. Equipped with grade slope controls operating from a string line or ski and based on mechanical or sonic operation
c. Capable of removing pavement to an accuracy of 1/8 in. (3 mm)
d. Furnished with lighting system for night work, as necessary
e. Provided with conveyors capable of side, rear, or front loading to transfer the milled material from the roadway to a truck

B. Dust Control
1. Provide power brooms, vacuum sweepers, power blowers, or other means to remove loose debris or dust. Do not allow dust control to restrict visibility of passing traffic or to disrupt adjacent property owners.

PART 3 EXECUTION

3.01 TRENCH PAVING REMOVAL

A. Where trench excavation within a paved surface is required, the Contractor shall saw cut in a straight line, vertical joints for the entire depth of pavement. The saw cut joints shall extend for the entire length of trench on both sides of the trench. Ragged edges shall be trimmed so as to provide a substantially straight line juncture between the old and new surfaces.

B. The saw cut joints shall be a minimum of 12 inches outside of the maximum width of excavated trench.

C. Pavement shall be removed in and hauled off site and disposed of in a proper legal manner. Contractor shall be careful not to disturb or damage any pavement that is to remain.

3.02 MILLING OPERATION

A. Follow the Plans to mill the designated areas and depths, as required. Ensure the following requirements are met:
1. Schedule the construction operation. Use milling methods that will produce a uniform finished surface and maintain a constant cross slope between extremities in each lane.
2. Provide positive drainage to prevent water accumulation on the milled pavement, as shown on the Plans or directed by the Engineer.
3. Bevel back the longitudinal vertical edges greater than 2 in (50 mm) that are produced by the removal process and left exposed to traffic. Bevel them back at least 3 in for each 2 in (75 mm for each 50 mm) of material removed. Use an attached mold board or other approved method.
4. When removing material at ramp areas and ends of milled sections, taper the transverse edges 10 ft (3 m) to avoid creating a traffic hazard and to produce a smooth surface.
5. Protect with a temporary asphaltic concrete tie-in (paper joint) vertical edges at other areas such as bridge approach slabs, drainage structures, and utility appurtenances greater than ½-inch that are left open to trans versing vehicles.

Place the temporary tie-in at taper rate of at least 6 to 1 horizontal to vertical distance.

6. Remove dust, residue, and loose milled material from the milled surface. Do not allow traffic on the milled surface and do not place asphaltic concrete on the milled surface until removal is complete.

B. The reclaimed asphaltic and/or concrete pavement becomes the Contractor's property unless otherwise specified.

END OF SECTION

SECTION 02 42 11

REMOVAL OF CONSTRUCTION MATERIALS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Workmanship

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.03 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary to remove all unwanted construction material and debris, as directed by Owner

1.04 SUBMITTALS

A. The Contractor shall submit for approval to Owner and County DOT, all working drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. The Contractor shall supply identification and license of company hauling/transporting material from the site.

C. The Contractor shall submit photographs and/or videotape, sufficiently detailed, of existing conditions of project site. These shall be used to evaluate project areas that might be misconstrued as damage, caused by debris, or construction material removal.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 WORKMANSHIP

A. The Contractor shall follow all federal, state, and local regulations related to removal, hauling, and disposal of trash and debris.

B. The Contractor shall comply with any ordinances / regulations for hauling and disposal of all solid waste removed from the site for the duration of the Work.

C. The Contractor shall load, haul away, and dispose of debris, trash, structures, automobiles, etc., that may be pre-existing on the Worksite, to a legally permitted location.

D. The Contractor shall load, haul away, and dispose of construction material that is generated in execution of the Work, to a legally permitted location; including, but not limited to any debris, trash, structures, piping, etc.

E. The Contractor shall remove and dispose of all unused construction materials prior to Final Acceptance of the Work by Owner and the Engineer.

F. No additional payment shall be made for excavation or disposal of excavated material required for placement or removal of backfill placed above the foundation of the pavement; or for preparation of subgrade. The cost thereof shall be considered included in the pavement unit prices bid.

END OF SECTION

SECTION 03 11 00

CONCRETE FORMING

PART 1 GENERAL

1.01 DESCRIPTION

A. Formwork requirements for concrete construction.

1.02 QUALITY ASSURANCE

A. References:

1. The references listed below are part of this section. Where a referenced document cites other standards, such standards are included as references under this section as if referenced directly. In the event of conflict, the requirements of this section shall prevail.

Reference	Title
ACI 117	Tolerances for Concrete Construction and Materials
ACI 301	Specifications for Structural Concrete
ACI 318	Building Code Requirements for Structural Concrete
ACI 350	Code Requirements for Environmental Engineering Concrete Structures
ACI 350.5	Specifications for Environmental Concrete Structures
National Institute of Standards - PS1	Construction and Industrial Plywood

B. Design – General:

1. Provide design of formwork, shoring and reshoring systems by the Contractor's Professional Engineer currently registered in the State of the project.
2. Design, engineering, and construction of formwork, shoring, and reshoring systems is the responsibility of the Contractor.
3. Develop a procedure and schedule for removal of shores (and installation of reshores).
4. Structural record calculations, signed and sealed by the Contractor's Engineer, are required to prove that all portions of the structure, in combination with the remaining forming and shoring systems, have sufficient strength to safely support their own weight plus the loads placed thereon.
5. When developing procedures, schedules, and structural calculations; consider the structural system that exists, effects of imposed loads, and the strength of concrete at each stage of construction.

C. Design Criteria:
   1. Design formwork in accordance with ACI 301 and ACI 318 for building structures and ACI 350 and 350.5 for environmental structures to provide concrete finishes as specified in Section 03 30 00.
   2. Design systems for full height of wet concrete pressure.
   3. Design formwork to limit maximum deflection of form facing materials, as reflected in concrete surfaces exposed to view, to 1/240 of span.

1.03 SUBMITTALS

A. Action Submittals:
   1. Procedures: Section 01 33 00.
   2. Manufacturer's product data with installation instructions:
      a. Form materials.
      b. Form ties (with waterstops).
      c. Form release compound.
      d. Void forms.

B. Informational Submittals:
   1. Procedures: Section 01 33 00.
   2. Letter of certification:
      a. Stating that formwork has been designed in accordance with this specification and referenced documents, sealed and stamped by the Contractor's registered design Engineer.

PART 2 PRODUCTS

2.01 FORMS

A. Wood Forms:
   1. Provide new and unused exterior grade plywood panels manufactured in accordance with American Plywood Association (APA) and bearing the trademark of that group.
      a. Forms for concrete surfaces exposed to view: use APA High Density Overlay (HDO) Plyform Class I Exterior 48" X 96" X 3/4".
      b. Forms for other concrete surfaces: use APA Douglas Fir B-B Plyform Class I Exterior 48" X 96" X 3/4-inch.
   2. When approved, plywood may be reused.

B. Metal Forms:
   1. Do not use aluminum. Provide forms free of rust and straight without dents to provide members of uniform thickness.

2.02 FORM TIES

A. Commercially fabricated for use in form construction. Fabricated so that ends or end fasteners can be removed without causing spalling at surfaces of the concrete. Cone

on ends shall be 3/4 inch to 1 inch diameter. Provide embedded portion of tie not less than 1 1/2 inch from face of concrete after cone ends have been removed. Provide ties with integral waterstops at water-retaining and below grade structures.

B. Tapered through-bolts may be used when approved. Use 1-inch minimum diameter at the smallest end. Fill tapered tie holes after cleaning to produce watertight construction. Use a mechanical waterstop plug near the center of the wall and fill each side with non-shrink cement grout. Mechanical waterstop plug shall be Greenstreak Group, Inc. “X-Plug”; or equal.

2.03 FORM RELEASE COMPOUND

A. Coat form surfaces in contact with concrete using a non-staining, non-residual, water based, bond-breaking form coating.

PART 3 EXECUTION

3.01 PREPARATION

A. Cover surface of forms with form release compound prior to form installation in accordance with manufacturer’s recommendations.

B. Do not permit excess form coating material to stand in puddles on forms or hardened concrete surfaces against which fresh concrete is to be placed.

C. Clean surfaces of forms, reinforcing steel and other embedded items of accumulated mortar, grout, or other foreign materials from previous concreting or construction activities before concrete is placed.

3.02 FORMWORK CONSTRUCTION

A. Form vertical surfaces of cast-in-place concrete including sides of footings.

B. Construct and place forms so that the resulting concrete will be of the shape, lines, dimensions, and appearance indicated on the Drawings. Brace or tie forms together to maintain position and shape under the load of freshly-placed concrete.

C. Tighten forms to prevent leakage.

D. Provide temporary openings(windows) at base of column and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed.

E. Provide temporary openings to limit height of free fall of concrete and to limit the lateral movement of concrete during placement. Openings are required in wall placements greater than 20 feet in height, spaced no more than 8 feet on center measured horizontally and vertically.

F. Place a 3/4-inch chamfer strip at exposed to view corners of formed surfaces.

G. At construction joints, overlap hardened concrete surface by at least 1 inch. Brace forms against hardened concrete to prevent movement, offsets, or loss of mortar at construction joint and to maintain a true surface. Where possible, locate juncture of built-in-place forms at architectural lines, control joints, or at other inconspicuous lines.

H. Where circular sections are formed using flat faced materials, use flat form lengths not exceeding 2 feet wide and the resulting deflection angles at the joints is not greater than 3-1/2 degrees.

I. Construct wood forms for openings to facilitate loosening. Anchor forms so that movement of any part of the formwork system is prevented during concrete placement.

J. At platforms constructed to move equipment over in-place reinforcement, provide beams, struts, and/or legs, supported directly on formwork or other structural members without resting on reinforcing steel.

K. Provide a positive means of adjustment (wedges or jacks) at shores and struts to take up settlement during concrete placement. Brace forms against lateral deflection. Fasten in-place wedges and shims used for final adjustment of forms prior to concrete placement.

L. Place tapered through-bolt form ties with the larger end on the side of the structure in contact with liquid.

3.03 TOLERANCES

A. Install formwork with tolerances in accordance with ACI 117 and the following (the more stringent requirement controls):
   1. Install formwork in accordance with manufacturer's written instructions.
   2. Vertical surface tolerance from plumb; walls, columns, piers, and risers:
      ± 1/2 inch for entire height
      ± 1/4 inch in any 10 feet of height
   3. Vertical surface tolerance from plumb; exposed wall corners, end columns, control-joint grooves, and other exposed to view vertical lines:
      ± 1/2 inch for entire height
      ± 1/4 inch in any 20 feet of height
   4. Horizontal variation from level or from grade; top of slabs, slab soffits, ceilings, and beam soffits, measured before removal of supporting shores:
      ± 3/4 inch for entire length
      ± 3/8 inch for any bay or 20 foot length
      ± 1/4 inch in any 10 feet of length
   5. Horizontal variation from level or from grade; exposed lintels, sills, parapets, horizontal grooves, and other exposed-to-view horizontal lines:
      ± 1/2 inch for entire length
      ± 1/4 inch in any 20 feet of length.

6. Plan position variation; columns, walls, and partitions:
   ± 3/4 inch for entire length
   ± 3/8 inch for any bay or 20 foot length
7. Plan location and size; sleeves, floor openings, walls, wall openings, beams, and columns:
   ± 1/2 inch
8. Cross sectional dimensions; columns and beams and thickness of slabs and walls:
   ± 3/8 inch
9. Plan dimensions; footings and foundations:
   minus 1/2 inch
   + 2 inches
10. Misplacement or eccentricity; footings and foundations:
    2 percent of footing width in direction of misplacement
    not more than 2 inches
11. Thickness; footings and foundations:
    minus 5 percent
    no limit on the maximum increase except that which may interfere with other construction.
12. Step variance in flight of stairs:
    Rise ± 1/16 inch
    Tread from level ± 1/8 inch

B. Use control points and benchmarks for reference purposes to check tolerances. Establish and maintain reference points in an undisturbed condition until final completion and acceptance of the work.

C. Regardless of tolerances listed, no portion of a structure shall extend beyond the legal boundary of work site.

D. Camber formwork to compensate for anticipated deflections in formwork under wet load of concrete. Adjust camber to maintain above specified tolerances in hardened concrete after forms and shoring are removed.

3.04 REMOVAL OF FORMS

A. Do not impose construction loads or remove shoring from any part of the structure until that portion of the structure in combination with remaining forming and shoring systems has sufficient strength to safely support its weight and loads placed thereon.

B. If forms are loosened and not removed, proceed same day with wet curing operations to soak surfaces of concrete where forms are loosened. When wet curing is not practical or not planned, loosen, remove, and start approved curing procedures on the same day.

C. When required for concrete curing in hot weather, required for repair of surface defects, or when required for finishing at an early age; remove forms as soon as concrete has hardened sufficiently to resist damage from removal operations or lack of support.

D. Remove top forms on sloping surfaces as soon as concrete has attained sufficient stiffness to prevent sagging. Make repairs or finishing treatment on such sloping surfaces immediately after form removal.

E. Remove wood forms for wall openings as soon as this can be accomplished without damage to concrete.

F. Remove formwork from columns, walls, sides of beams, and other parts not supporting weight of concrete as soon as concrete has hardened sufficiently to resist damage from removal.

G. When shores and supports are so arranged such that non-load-carrying form facing material can be removed without loosening or disturbing other shores and supports, facing material may be removed when concrete has sufficiently hardened to resist damage from removal.

H. In all cases, proceed with curing same day as form removal.

I. Where no reshoring is planned, forms and shoring used to support weight of concrete shall be left in place until concrete has attained its specified 28-day compressive strength.

3.05 RESHORING

A. Do not impose construction loads or remove shoring from any part of the structure until that portion of the structure, in combination with remaining forming and shoring systems, has sufficient strength to safely support its weight and loads placed thereon.

B. While reshoring is underway, no superimposed dead or live loads are permitted on the new construction.

C. During reshoring, do not subject concrete in structural members to combined dead and construction loads in excess of loads that the structural members can adequately support.

D. Place reshores as soon as practicable after stripping operations are complete, but in no case later than the end of working day on which stripping occurs.

E. Place reshores to carry their required loads without overstressing.

F. Where a reshoring procedure is planned, supporting formwork may be removed when concrete has reached the concrete strength specified by the formwork engineer’s structural calculations and verified by field cured test cylinders or other approved method.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 GENERAL

1.01 DESCRIPTION

A. Section includes: Reinforcing steel for use in reinforced concrete.

1.02 REFERENCES

A. The references listed below are a part of this section. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ACI 117	Specification for Tolerances for Concrete Construction and Materials
ACI 315	Details and Detailing of Concrete Reinforcement
ACI 318	Building Code Requirements For Structural Concrete
ACI SP-66	ACI Detailing Manual
ASTM A615	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A706	Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A1064	Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
AWS D1.4	Structural Welding Code - Reinforcing Steel
CRSI-PRB	Placing Reinforcing Bars
CRSI-MSP	Manual of Standard Practice
FEDSPEC QQ-W-461H	Wire, Steel, Carbon (Round, Bare, and Coated)

1.03 SUBMITTALS

A. Action Submittals
1. Procedures: Section 01 33 00.
2. A copy of this specification section with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
3. Check-marks (✓) shall denote full compliance with a paragraph as a whole. Deviations shall be underlined and denoted by a number in the margin to the

right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Include a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

4. Mill certificates for all reinforcing.
5. Manufacturer and type of proprietary reinforcing steel splices. Submit a current ICC Report and manufacturer's literature that contains instructions and recommendations for each type of coupler used.
6. Qualifications of welding operators, welding processes and procedures.
7. Reinforcing steel shop drawings showing reinforcing steel bar quantities, sizes, spacing, dimensions, configurations, locations, mark numbers, lap splice lengths and locations, concrete cover and reinforcing steel supports. Reinforcing steel shop drawings shall be of sufficient detail to permit installation of reinforcing steel without reference to the contract drawings. Shop drawings shall not be prepared by reproducing the plans and details indicated on the contract drawings but shall consist of completely redrawn plans and details as necessary to indicate complete fabrication and installation of reinforcing steel, including large scale drawings at joints detailing bar placement in congested areas. Placement drawings shall be in accordance with ACI 315. Reinforcing details shall be in accordance with ACI SP-66.

1.04 DELIVERY, STORAGE AND HANDLING

A. Ship reinforcing steel to the jobsite with attached plastic or metal tags having permanent mark numbers which match the shop drawing mark numbers. All reinforcing shall be supported and stored above ground. Use only plastic tags secured to the reinforcing steel bars with nylon or plastic tags for epoxy coated reinforcing steel bars.

PART 2 PRODUCTS

2.01 BAR REINFORCEMENT

A. Reinforcing steel bars shall be deformed billet steel in conformance with ASTM A615, Grade 60. Bars to be welded shall be deformed billet steel conforming to ASTM A706.

2.02 WIRE FABRIC

A. Wire fabric shall be welded steel mesh conforming to ASTM A1064.

2.03 SMOOTH DOWEL BARS

A. Smooth dowel bars shall conform to ASTM A615, Grade 60, with a metal end cap at the greased or sliding end to allow longitudinal movement.

2.04 REINFORCING STEEL MECHANICAL SPLICES

A. Reinforcing steel mechanical splices shall be a positive connecting threaded type mechanical splice system manufactured by Erico, Inc., Dayton Superior, Williams Form Engineering Company, or approved equal.

B. Mechanical splices shall develop in tension or compression a strength of not less than 125 percent of the ASTM specified minimum yield strength of the reinforcement and shall meet all other ACI 318 requirements.

2.05 TIE WIRE

A. The wire shall be minimum 16 gage annealed steel conforming to FEDSPEC QQ-W-461H.

2.06 BAR SUPPORTS

A. Provide manufactured concrete block supports with or without embedded tie wires (wire dobies) for footing and slabs on grade. Do not use brick, broken concrete masonry units, spalls, rocks, construction debris, or similar material for supporting reinforcing steel.

B. Provide manufactured concrete block supports with embedded tie wires (wire dobies) for all formed surfaces where surface will be exposed to weather, water, wastewater, or soil.

C. Provide CRSI Class 1 plastic protected or Class 2 stainless steel protected in accordance with CRSI-MSP and placed in accordance with CRSI-PRB for all other work.

2.07 FABRICATION

A. Fabricate reinforcing steel bars in accordance with ACI 315 and the following tolerances:
   1. Sheared lengths: +/-1 inch.
   2. Overall dimensions of stirrups, ties, and spirals: +/-1/2 inch.
   3. All other bends: +0 inch, -1/2 inch
   4. Minimum diameter of bends of reinforcing steel bars: Per ACI 318.

PART 3 EXECUTION

3.01 PLACEMENT TOLERANCE

A. Reinforcing steel placement tolerance shall conform to the requirements of ACI 117, ACI 318, and the following:
   1. Reinforcing steel bar clear distance to formed surfaces shall be within +/-1/4 inch of specified clearance and minimum spacing between bars shall be a maximum of 1/4 inch less than specified.

2. Reinforcing steel top bars in slabs and beams shall be placed +/-3/8 inch of specified depth in members 8 inches deep or less and +/-1/2 inch of specified depth in members greater than 8 inches deep.
3. Reinforcing steel spacing shall be placed within +/- one bar diameter or +/- 1 inch, whichever is greater.
4. The minimum clear distance between reinforcing steel bars shall be equal to the greater of 1 inch or the reinforcing steel bar diameter for beams, walls and slabs, and the greater of 1 1/2 inches or 1.5 times the reinforcing steel bar diameter for columns.
5. Beam and slab reinforcing steel bars shall be threaded through column vertical reinforcing steel bars without displacing the column reinforcing steel bars and still maintain clear distances for beam and slab reinforcing steel bars.

3.02 CONCRETE COVER

A. Unless specified otherwise on the Drawings, reinforcing steel bar cover shall conform to the following:
   1. Reinforcing steel bar cover shall be 3 inches for concrete cast against earth.
   2. Reinforcing steel bar cover shall be 2 inches for reinforcing steel bars in all other areas.

3.03 SPLICING

A. Reinforcing steel splicing shall conform to the following:
   1. Use splice lengths as shown on the drawings.
   2. Unless noted otherwise on the Drawings, splices in circumferential reinforcement in circular walls shall be staggered. Adjacent hoop reinforcement splices shall be staggered horizontally by not less than one lap length (center of lap below to center of lap above) or 3 feet, whichever is greater, and shall not coincide in vertical arrays more frequently than every third bar.
   3. Splicing of reinforcing elements noted as “tension tie” members on the Drawings shall be avoided whenever possible. If splices cannot be avoided, the splices shall be made with full mechanical capable of developing at least 125 percent of the specified yield strength of the bar. Splices in adjacent bars shall be staggered at least 30 inches.
   4. For welded wire fabric the splice lap length measured between the outermost cross wires of each fabric sheet shall not be less than one spacing of cross wires plus 2 inches, or less than 1.5 times the development length or less than 6 inches.
   5. Splices of reinforcement steel bars not specifically indicated or specified shall be subject to the approval of the Owner’s Representative. Mechanical proprietary splice connections may be used when approved by the Owner’s Representative or as indicated on the drawings.
   6. Welding of reinforcing steel bars is not allowed unless approved by the Owner’s Representative.

3.04 CLEANING

A. Reinforcing steel bars at time of concrete placement shall be free of mud, oil, loose rust, or other materials that may affect or reduce bond. Reinforcing steel bars with rust, mill scale or a combination of both may be accepted without cleaning or brushing provided dimensions and weights including heights of deformation on a cleaned sample are not less than required by applicable ASTM standards.

3.05 PLACEMENT

A. Reinforcing steel bar placement shall conform to the following:
   1. Reinforcing steel bars shall be supported and fastened together to prevent displacement by construction loads or concrete placement. Provide bar supports as previously prescribed.
   2. Where parallel horizontal reinforcement in beams is indicated to be placed in two or more layers, reinforcing steel bars in the upper layers shall be placed directly over the reinforcing steel bars in the bottom layer with the clear distance between each layer to be 2 inches unless otherwise noted on the Drawings. Place spacer reinforcing steel bars at a maximum of 3’-0” on center to maintain the minimum clear spacing between layers.
   3. Extend reinforcement to within 2 inches of formed edges and 3 inches of the concrete perimeter when concrete is placed against earth.
   4. Reinforcing steel bars shall not be bent after embedding in hardened concrete unless approved by the Owner’s Representative.
   5. Tack welding or bending reinforcing steel bars by means of heat is prohibited.
   6. Where required by the contract documents, reinforcing steel bars shall be embedded into the hardened concrete utilizing an adhesive anchoring system specifically manufactured for that application. Installation shall be per the manufacturer’s written instructions.
   7. Bars with kinks or with bends not shown shall not be used.
   8. Heating or welding bars shall be performed in accordance with AWS D1.4 and shall only be permitted where specified or approved by the Owner’s Representative. Bars shall not be welded at the bend.

3.06 FIELD QUALITY CONTROL

A. Field quality control shall include the following:
   1. Notify the Owner’s Representative whenever the specified clearances between the reinforcing steel bars cannot be met. The concrete shall not be placed until the Contractor submits a solution to the congestion problem and it has been approved by the Owner’s Representative.
   2. The reinforcing steel bars may be moved as necessary to avoid other reinforcing steel bars, conduits or other embedded items provided the tolerance does not exceed that specified in this section. The Engineer’s approval of the modified reinforcing steel arrangement is required where the specified tolerance is exceeded. No cutting of the reinforcing steel bars shall be done without written approval of the Owner’s Representative.

3. An independent laboratory shall be employed to review and approve Contractor welding procedures and qualify welders in accordance with AWS D1.4. The laboratory shall visually inspect each weld for visible defects and conduct non-destructive field testing (radiographic or magnetic particle) on not less than one sample for each 10 welds. If a defective weld is found, the previous 5 welds by the same welder shall also be tested.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
1.5	Quality Assurance
1.6	Delivery, Storage, and Handling
2.1	General
2.2	Concrete Materials
2.3	Forms
2.4	Reinforcement
2.5	Concrete Mix Design
3.1	Measuring Materials
3.2	Mixing and Transporting
3.3	Concrete Appearance
3.4	Placing and Compacting
3.5	Curing and Protection
3.6	Removal of Forms
3.7	Inspection and Field Testing
3.8	Concrete Finishing
3.9	Failure to Meet Requirements
3.10	Patching and Repairs
3.11	Concrete Schedule

1.02 REFERENCES

B. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

C. American Society for Testing and Materials (ASTM)

1. C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. C33 - Standard Specification for Concrete Aggregates
3. C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
4. C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
5. C94 - Standard Specification for Ready-Mixed Concrete
6. C143 - Standard Test Method for Slump of Hydraulic Cement Concrete
7. C150 - Standard Specification for Portland Cement
8. C171 - Standard Specification for Sheet Materials for Curing Concrete

9. C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
10. C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
11. C260 - Standard Specification for Air-Entraining Admixtures for Concrete
12. C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
13. C494 - Standard Specification for Chemical Admixtures for Concrete
14. C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
15. C1017 - Standard Specification for Chemical Admixtures for use in Producing Flowing Concrete

D. American Concrete Institute (ACI)
1. ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete
2. ACI 305R - Hot Weather Concreting
3. ACI 306.1 - Standard Specification for Cold Weather Concreting
4. ACI 318 - Building Code Requirements for Structural Concrete
5. ACI 350R - Environmental Engineering Concrete Structures

E. Where reference is made to one of the above Standards, the revision in effect at the time of bid opening shall apply.

1.03 WORK INCLUDED

F. The Contractor shall, under this item, furnish all materials, tools, labor, and equipment to place all cast-in-place concrete, including all reinforcing steel and formwork, in the structures shown on the Contract Drawings, and such other concrete as may be found necessary to fully complete the Work indicated under this Contract, or as directed by Owner.

1.04 SUBMITTALS

G. Submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working drawings and schedules of materials and methods proposed to be followed in the execution of the Work under this item.
1. Mix Design
a. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cementitious materials ratio, concrete slump, type and manufacturer of cement. Provide either 1) or 2) below for each mix proposed.
1) Standard deviation data for each proposed concrete mix based on statistical records.
2) The curve of water-cementitious materials ratio versus concrete cylinder strength for each formulation of concrete proposed based on laboratory tests. Provide the cylinder strength for the average of the 28-day cylinder strength test results for each mix. Provide results of 7- and 14-day tests.

2. Product Data
   a. Sources of cement, Pozzolan and aggregates.
   b. Material Safety Data Sheets (MSDS) for all concrete components and admixtures.
   c. Air-entraining admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM Standards.
   d. Water-reducing admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.
   e. High-range water-reducing admixture (plasticizer). Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations of use.
   f. Sheet curing material. Product data including catalogue cut, technical data and conformity to ASTM standard.
   g. Liquid curing compound. Product data including catalogue cut, technical data, storage requirements, product life, application rate and conformity to ASTM Standards. Identify proposed locations of use.
3. Samples
   a. Fine and coarse aggregates if requested by the Engineer.
4. Certificates
   a. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.
   b. Certify admixtures are suitable for use in contact with potable water after 30 days of concrete curing.
   c. Certify curing compound is suitable for use in contact with potable water after 30 days (non-toxic and free of taste or odor).
5. Test and Evaluation Reports
   a. Fine aggregates – sieve analysis, physical properties, and deleterious substance.
   b. Coarse aggregates – sieve analysis, physical properties, and deleterious substances.
   c. Cements – chemical analysis and physical properties for each type.
   d. Pozzolans – chemical analysis and physical properties.
   e. Proposed concrete mixes – compressive strength, slump and air content.
   f. Shrinkage Test Results – In accordance with ASTM C157 as modified hereinafter.
6. Field Quality Control Submittals
   a. Field test reports.
   b. Concrete Delivery/Batch Tickets:
      1) For each batch of concrete before unloading at Site.
      2) In accordance with ASTM C94/C94M, Section 14 including requirements 14.2.1 through 14.2.10.

3) Indicate the amount of mixing water withheld, and maximum amount that may be permitted to be added at Project Site.

7. Special Procedure Submittals
   a. Detailed plan for cold weather curing and protection of concrete placed and cured in weather below 40 degrees F.
   b. Detailed plan for hot weather placements including curing and protection for concrete placed in ambient temperatures over 80 degrees F.
   c. If Contractor chooses to use self-consolidating concrete: Detailed plan of modified procedures for handling, placing, and finishing.

1.05 QUALITY ASSURANCE

H. Comply with ACI 318, the recommendations of ACI 350R and other stated requirements, codes and standards. The most stringent requirement of the codes, standards and this Section apply when conflicts exist.

I. Use only one source of cement and aggregates on any one structure. Provide concrete of uniform color and appearance.

J. A minimum of 14 days in advance of placing concrete, discuss with the Engineer the sources of individual materials and batched concrete proposed for use. Discuss placement methods, waterstops and curing. Propose methods of hot and cold weather concreting as required. Discuss the properties and techniques of batching and placing plasticized concrete prior to the placement of any concrete containing a high-range water-reducing admixture (plasticizer). Include the plasticizer manufacturer in the discussions.

K. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. Make all changes ordered at the Contractor's expense.

L. If, during the progress of the work, the materials from the sources originally accepted change in characteristics, provide all materials, labor, and equipment, at the Contractor’s expense, necessary to perform new acceptance tests as were originally required using the new materials prior to their incorporation in the work. If the tests are specified to be conducted by others, the costs of these tests shall be borne solely by the Contractor.

M. Qualifications
   1. Batch Plant: NRMCA Program for Certification of Ready-Mixed Concrete Production Facilities or an approved equivalent program.
   2. Mix Designer: Person responsible for developing concrete mixture proportions certified as NRMCA Concrete Technologist Level 2 or DOT certified mix designer in the jurisdiction of the Work. Requirements may be waived if the individual is Contractor’s Licensed Design Engineer.
   3. Installers: Unless otherwise permitted, at least one person on the finishing crew must be certified as an ACI Flatwork Finisher, or equivalent.

N. Preconstruction Testing
   1. Have the following materials tested to verify conformity with this Specification Section and the stated ASTM Standards.
      a. Fine aggregates for conformity with ASTM C33 – sieve analysis, physical properties, and deleterious substances.
      b. Coarse aggregates for conformity with ASTM C33 – sieve analysis, physical properties, and deleterious substances.
      c. Cements for conformity with ASTM C150 – chemical analysis and physical properties.
      d. Pozzolans for conformity with ASTM C618 – chemical analysis and physical properties.
      e. Proposed concrete mix designs – compressive strength, slump and air content.

O. Field Samples
   1. Field testing and inspection services will be provided by Owner. Owner will pay the cost of such work, except as specifically stated otherwise. Owner will test the following items to verify conformity with this Specification Section.
      a. Concrete placements – compressive strength (cylinders), compressive strength (cores), slump, and air content.
      b. Other materials or products that may come under question.
   2. Confirm all materials incorporated in the work to accepted samples.

1.06 DELIVERY, STORAGE, AND HANDLING

P. Storage and Handling Requirements
   1. Cement: Store in weathertight buildings, bins or silos to provide protection from dampness and contamination and to minimize warehouse set.
   2. Aggregate: Arrange and use stockpiles to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Build stockpiles in successive horizontal layers not exceeding 3-ft in thickness. Complete each layer before the next is started. Do not use frozen or partially frozen aggregate.
   3. Sand: Arrange and use stockpiles to avoid contamination. Allow sand to drain to a uniform moisture content before using. Do not use frozen or partially frozen aggregates.
   4. Admixtures: Store in closed containers to avoid contamination, evaporation or damage. Provide suitable agitating equipment to assure uniform dispersion of ingredients in admixture solutions which tend to separate. Protect liquid admixtures from freezing and other temperature changes which could adversely affect their characteristics.
   5. Pozzolan: Store in weathertight buildings, bins or silos to provide protection from dampness and contamination.
   6. Sheet Curing Materials: Store in weathertight buildings or off the ground and under cover.
   7. Liquid Curing Compounds: Store in closed containers.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired. Such reference is not intended to indicate a restrictive preference on the part of Owner for that particular manufacturer or product, or to prohibit the use of equivalent products or equally qualified manufacturers.

B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance and manufacturer's service.

2.02 CONCRETE MATERIALS

A. Cementitious Materials
   1. Portland Cement
      a. In accordance with requirements of ASTM C150.
      b. Brand: Subject to approval of Engineer. Use one brand throughout the Work.
      c. Alkalies: Maximum 0.60 percent.
      d. Nonhydraulic above grade structures: Type I or Type II.
      e. Hydraulic and below grade structures and sewers: Type II
   2. Supplementary Cementitious Materials
      a. Fly Ash (Pozzolan): Class F or Class N fly ash in accordance with ASTM C618, except as modified herein:
         1) Produced from process that does not use hazardous or potentially hazardous materials.
         2) ASTM C618, Table 1, Loss on Ignition: Maximum 3 percent.
         3) ASTM C618, Table 2, Water Requirement: Maximum 100 percent of control.
         4) ASTM C618, Table 3, Effectiveness in Controlling Alkali-Silica Reaction: Maximum 100 percent expansion of test mixture as a percentage of low-alkali cement control at 14 days.
         5) ASTM C618, Table 3, Expansion of Test Mixture: Evaluate results using either Procedure A or Procedure B as follows:
            a) Procedure A after 6-month sulfate exposure, maximum 0.10 percent.
            b) Procedure B, expansion of test mixture as a percentage of sulfate resistance cement control, after at least 6-month exposure, maximum 100 percent.
         6) Where fly ash is specified to be used with Type I cement, have fly ash meet one of the following requirements:
            a) CaO: Maximum 15 percent.
            b) Test cementitious materials as follows:
               (1) In accordance with ASTM C1012.

(2) Furnish test data confirming fly ash in combination with cement used meets strength requirements, is compatible with air-entraining agents and other additives, provides increased sulfate resistance equivalent to or better than Type II cement.

(3) Conduct tests using proposed fly ash and cement samples together with control samples using Type II cement without fly ash.

b. Slag Cement: In accordance with ASTM C989, Grades 100 or 120.

3. Tricalcium Aluminate

a. Content of Cementitious Materials: Maximum 8 percent.

B. Aggregates: Furnish from one source.

1. Natural Aggregates

a. Free from deleterious coatings and substances and conforming to requirements of ASTM C33, except as modified herein.

b. Free from materials and aggregate types causing popouts, discoloration, staining, or other defects on surface of concrete.

2. Nonpotentially Reactive: In accordance with ASTM C33, Appendix XI, Paragraph X1.1.

3. Aggregate Soundness: Test for fine and coarse aggregates in accordance with ASTM C33 and ASTM C88 using sodium sulfate solution.

4. Fine Aggregates

a. Clean, sharp, and natural sand.

b. ASTM C33.

c. Material Passing 200 Sieve: 4 percent maximum.

d. Limit deleterious substances in accordance with ASTM C33, Table 1 with material finer than 20 sieve limited to 3 percent, coal and lignite limited to 0.5 percent.

5. Coarse Aggregates

a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).

b. Materials Passing 200 Sieve: 0.5 percent maximum.

c. Limit deleterious substances in accordance with ASTM C33, Table 3 for exposed concrete.

C. Admixtures: Unless otherwise permitted, furnish from one manufacturer.

1. Characteristics

a. Compatible with other constituents in mix.

b. Free of chlorides and alkalis (except for those attributable to water).

c. Do not use admixtures known to be toxic after concrete has cured for 30 days.

d. Furnish type of admixtures as recommended by manufacturer for anticipated temperature ranges.

e. Proportion and mix in accordance with manufacturer's recommendations.

2. Air-Entraining Admixture: ASTM C260
3. Water-Reducing Admixture: ASTM C494/C494M, Type A or Type D.
4. Retarding Admixture: ASTM C494/C494M, Type B.
5. High Range Water Reducing Admixture (Superplasticizer): ASTM C494/C494M, Type F or G. Use only when approved by Engineer.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II. Use only when approved by Engineer.
   a. Use of viscosity modifier if intent is to achieve self-consolidating concrete.
7. Do not use calcium chloride as an admixture.

D. Water and Ice: Use potable water for mixing water for concrete and water used to make ice, unless alternative sources of water are permitted.
   1. Water from alternative sources: Comply with requirements of ASTM C1602/C1602M and contain less than:
      a. 1,000 ppm of chlorides.
      b. 3,000 ppm sulfate as SO_4.
      c. 600 ppm alkalis as (Na_2O + 0.658 K_2O).
      d. 50,000 ppm total solids by mass.

2.03 FORMS

A. The Contractor shall furnish all labor and materials for all forms required for the construction of the Work.

B. Either metal or wood forms may be used.

C. All forms shall be true to the required shape, clean, of sufficient strength, and well braced so that they shall maintain their proper position during the placing and vibrating of the concrete.

2.04 REINFORCEMENT

A. All steel reinforcement bars, wire, and dowel bars shall be in accordance with GDOT Standard Specifications for Construction of Road and Bridges, latest edition, Section 853.

B. Steel reinforcement shall be designed, detailed, fabricated and placed in conformance with all applicable requirements of ACI 318, and the CRSI Manual of Standard Practice.

C. No concrete shall be placed until all steel reinforcement to be covered has been inspected in place and approved by Owner or the Engineer.

2.05 CONCRETE MIX DESIGN

A. Use an independent testing laboratory acceptable to the Engineer for development of mix designs and testing.

B. Select proportions of ingredients to meet the design strength and materials limits specified in Table 1 and to produce concrete having proper workability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

C. Base the design mix on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if such data is not available, be developed by a testing laboratory, acceptable to the Engineer, engaged by and at the expense of the Contractor. Acceptance of mixes based on standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318.

D. The water content of the concrete mix, determined by laboratory testing, shall be based on a curve showing the relation between water cementitious ratio and 7- and 28-day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the specified design strengths as modified below, without extrapolation. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the specified design strengths. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratio and net minimum cementitious content as specified in Table 1.

E. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the specified design strength requirements in conformity with the above paragraphs.

F. Entrained air, as measured by ASTM C231, as shown in Table 1.
   1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal.

G. Slump of the concrete as measured by ASTM C143, as shown in Table 1. If a high-range water-reducer (plasticizer) is used, measure the slump before plasticizer is added. Plasticized concrete shall have a slump ranging from 7 to 10 inches.

H. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

TABLE 1
CONCRETE MIX REQUIREMENTS

Class	Design Strength (1)	Cement (2)	Fine Aggregate (2)	Coarse Aggregate (3)	Cementitious Content (4)
B	2,500	C150 Type II	C33	57	440 min.
A	3,000	C150 Type II	C33	57	480 min.
AA	4,000	C150 Type II	C33	57	560 min.
AAA	5,000	C150 Type II	C33	56	600 min.

Class	W/C Ratio (5)	Fly Ash	AE Range (6)	WR (7)	HRWR (8)	Slump Range, Inches
B	0.62 max	--	3.5 to 5	Yes	*	1-4
A	0.54 max	--	3.5 to 5	Yes	*	1-3
AA	0.44 max	25% max	3.5 to 5	Yes	*	3-5
AAA	0.40 max	--	3.5 to 5	Yes	*	3-5

NOTES:

2. Minimum compressive strength in psi at 28 days
3. ASTM designation
4. Size Number in ASTM C33
5. Cementitious content in lb/cu yd
6. W/C is Water-Cementitious ratio by weight
7. AE is percent air-entrainment
8. WR is water-reducer admixture
9. HRWR is high-range water-reducer admixture
10. *HRWR used at contractor's option

PART 3 EXECUTION

3.01 MEASURING MATERIALS

A. Compose concrete of Portland cement, fine aggregate, coarse aggregate, water and admixtures as specified. Use a batch plant acceptable to the Engineer for concrete production. Batch all constituents, including admixtures, at the plant except a high-range water-reducer may also be added in the field.

B. Measure materials for batching concrete by weighing in conformity with and within the tolerances given in ASTM C94 except as otherwise specified. Have scales certified by the local Sealer of Weights and Measures within 1 year of use.

C. Measure the amount of free water in fine aggregates within 0.3 percent with a moisture meter. Compensate for varying moisture contents of fine aggregates. Record the number of gallons of water as-batched on printed batching tickets.

D. Dispense admixtures either manually using calibrated containers or measuring tanks, or by means of an automatic dispenser approved by the manufacturer of the specific admixture.
   1. Charge air-entraining and chemical admixtures into the mixer as a solution using an automatic dispenser or similar metering device.
   2. Inject multiple admixtures separately during the batching sequence.

3.02 MIXING AND TRANSPORTING

A. Provide ready-mixed concrete produced by equipment acceptable to the Engineer. No hand-mixing will be permitted. Clean each transit mix truck drum and reverse

drum rotation before the truck proceeds under the batching plant. Equip each transit-mix truck with a continuous, nonreversible, revolution counter showing the number of revolutions at mixing speeds.

B. Transport ready-mix concrete to the site in watertight agitator or mixer trucks loaded not in excess of their rated capacities as stated on the name plate.

C. Keep the water tank valve on each transit truck locked at all times. Any addition of water must be directed by the Engineer. Incorporate added water by additional mixing of at least 35 revolutions. Meter all added water with the amount of water added shown on each delivery ticket.

D. All central plant and rolling stock equipment and methods shall comply with ACI 318 and ASTM C94.

E. Select equipment of size and design to ensure continuous flow of concrete at the delivery end. Use metal or metal-lined non-aluminum discharge chutes with slopes not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20-ft long and chutes not meeting slope requirements may be used if concrete is discharged into a hopper before distribution.

F. Retempering (mixing with or without additional cement, aggregate, or water) of concrete or mortar which has reached initial set will not be permitted.

G. Handle concrete from mixer to placement as quickly as practicable while providing concrete of required quality in the placement area. Dispatch trucks from the batching plant so they arrive at the work site just before the concrete is required, thus avoiding excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

H. Furnish a delivery ticket for ready mixed concrete to the Engineer as each truck arrives. Provide a printed record of the weight of cement and each aggregate as batched individually on each ticket. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of the truck mixer.

I. Temperature and Mixing Time Control
   1. In cold weather, do not allow the as-mixed temperature and concrete temperature at the time of placement in the forms to drop below 40 degrees F.
   2. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees F.
   3. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees F. If necessary, substitute well-crushed ice for all or part of the mixing water.

4. Do not exceed the values shown in Table 2 for the maximum time interval between the addition of mixing water and/or cement to the batch and the placing of concrete in the forms.

TABLE 2
MAXIMUM TIME TO DISCHARGE OF CONCRETE

Air or Concrete Temperature (whichever is greater)	Maximum Time
80 to 90 Degrees F (27 to 30 Degrees C)	45 Minutes
70 to 79 Degrees F (21 to 26 Degrees C)	60 Minutes
40 to 69 Degrees F (5 to 20 degrees C)	90 Minutes

a. If an approved high-range water-reducer (plasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes.

3.03 CONCRETE APPEARANCE

A. Remix concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste. If this does not correct the condition, reject the concrete. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, obtain changes in the concrete mix only by adjusting one or more of the following:
   1. The gradation of aggregate.
   2. The proportion of fine and coarse aggregate.
   3. The percentage of entrained air, within the allowable limits.

B. Provide concrete for the work that results in a homogeneous structure which, when hardened, will have the required strength, durability and appearance. Provide mixtures and workmanship such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete, when viewed in good lighting from 10-ft away, shall be pleasing in appearance, and at 20-ft shall show no visible defects.

3.04 PLACING AND COMPACTING

A. Placing
   1. Verify that all formwork completely encloses concrete to be placed and is securely braced prior to concrete placement. Remove ice, excess water, dirt and other foreign materials from forms. Confirm that reinforcement and other embedded items are securely in place. Have a competent workman at the location of the placement who can assure that reinforcing steel and embedded items remain in designated locations while concrete is being placed. Sprinkle semi-porous subgrades or forms to eliminate suction of water from the mix. Seal extremely porous subgrades in an approved manner.
   2. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing. Place concrete continuously at a rate which ensures the concrete is being integrated with fresh plastic concrete. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials or on concrete which has hardened sufficiently to cause formation of seams or

planes of weakness within the section. If the section cannot be placed continuously, place construction joints as specified or as approved.

3. Pumping of concrete will be permitted. Use a mix design and aggregate sizes suitable for pumping and submit for approval.
4. Remove temporary spreaders from forms when the spreader is no longer useful. Temporary spreaders may remain embedded in concrete only when made of galvanized metal or concrete and if prior approval has been obtained.
5. Do not place concrete for supported elements until concrete previously placed in the supporting element (columns, slabs and/or walls) has reached adequate strength.
6. Where surface mortar is to form the base of a finish, especially surfaces designated to be painted, work coarse aggregate back from forms with a suitable tool to bring the full surface of the mortar against the form. Prevent the formation of excessive surface voids.
7. Slabs
   a. After suitable bulkheads, screeds and jointing materials have been positioned, place the concrete continuously between construction joints beginning at a bulkhead, edge form, or corner. Place each batch into the edge of the previously placed concrete to avoid stone pockets and segregation.
   b. Avoid delays in casting. If there is a delay in casting, thoroughly spade and consolidate at the edge of that previously placed and the concrete placed after the delay to avoid cold joints. Then bring concrete to correct level and strike off with a straightedge. Use bullfloats or darbies to smooth the surface, leaving it free of humps or hollows.
   c. Where slabs are to be placed integrally with the walls below them, place the walls and compact as specified. Allow 1 hour to pass between placement of the wall and the overlying slab to permit consolidation of the wall concrete. Keep the top surface of the wall moist so as to prevent cold joints.
8. Formed Concrete
   a. Place concrete in forms using tremie tubes and taking care to prevent segregation. Bottom of tremie tubes shall preferably be in contact with the concrete already placed. Do not permit concrete to drop freely more than 4-ft. Place concrete for walls in 12 to 24-inch lifts, keeping the surface horizontal. If plasticized concrete is used, the maximum lift thickness may be increased to 7-ft and the maximum free fall of concrete not exceeding 15-ft.
9. Perform underwater concreting in conformity with the recommendations of ACI 304R. The tremie system shall be used to place underwater concrete. Use tremie pipes in the range of 8 to 12 inches in diameter and space at not more than 16-ft on centers nor more than 8-ft from an end form. Where concrete is being placed around a pipe, provide at least one tremie pipe on each side of each pipe. Where the tremie system is not practical, direct pumped concrete for underwater placement may be used subject to approval of the system including details by the Engineer.

B. Compacting
   1. Consolidate concrete by vibration, puddling, spading, rodding or forking so that concrete is thoroughly worked around reinforcement, embedded items and

openings and into corners of forms. Continuously perform puddling, spading, etc., along with vibration of the placement to eliminate air or stone pockets which may cause honeycombing, pitting or planes of weakness.

2. Place and compact all concrete with mechanical vibrators. Obtain approval of the number, type and size of the units from the Engineer in advance of placing operations. Do not order concrete until sufficient approved vibrators (including standby units in working order) are on the job.
3. A minimum frequency of 7,000 rpm is required for mechanical vibrators. Insert vibrators and withdraw at points from 18 to 30 inches apart. At each insertion, vibrate sufficiently to consolidate concrete, generally from 5 to 15 seconds. Do not overvibrate so as to segregate. Keep a spare vibrator on the site during concrete placing operations.
4. Concrete Slabs: Consolidate concrete for slabs less than 8 inches thick with vibrating screeds; slabs 8 to 12-in thick with internal vibrators and (optionally) with vibrating screeds. Always place vibrators into concrete vertically and do not lay horizontally or over.
5. Walls and Columns: Use internal vibrators (rather than form vibrators) unless otherwise approved by the Engineer. In general, for each vibrator needed to melt down the batch at the point of discharge, one or more additional vibrators must be used to densify, homogenize and perfect the surface. Insert the vibrators vertically at regular intervals, through the fresh concrete and slightly into the previous lift, if any.
6. Amount of Vibration: Vibrators are to be used to consolidate properly placed concrete. Do not use vibrators to move or transport concrete in the forms. Continue vibration until:
   a. Frequency returns to normal.
   b. Surface appears liquefied, flattened and glistening.
   c. Trapped air ceases to rise.
   d. Coarse aggregate has blended into surface, but has not disappeared.

3.05 CURING AND PROTECTION

A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

B. Curing Methods
   1. Curing Methods for Concrete Surfaces: Cure concrete to retain moisture and maintain specified temperature at the surface for a minimum of 7 days after placement. Use the following curing methods.
      a. Water Curing: Keep entire concrete surface wet by ponding, continuous sprinkling or covered with saturated burlap. Begin wet cure as soon as concrete attains an initial set and maintain wet cure 24 hours a day.
      b. Sheet Material Curing: Cover entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting or entrapping air under the sheet. Place and secure sheet as soon as initial concrete set occurs.
      c. Liquid Membrane Curing: Apply over the entire concrete surface except for surfaces to receive additional concrete. Curing compound shall NOT be

placed on any concrete surface where additional concrete is to be placed, where concrete sealers or surface coatings are to be used, or where the concrete finish requires an integral floor product. Apply curing compound as soon as the free water on the surface has disappeared and no water sheen is visible, but not after the concrete is dry or when the curing compound can be absorbed into the concrete. Comply with the manufacturer's application recommendations.

2. Specified applications of curing methods.
   a. Slabs for Water Containment Structures: Water curing only.
   b. Slabs on Grade and Footings (not used to contain water): Water curing, sheet material curing or liquid membrane curing.
   c. Structural Slabs (other than water containment): Water curing or liquid membrane curing.
   d. Horizontal Surfaces which will Receive Additional Concrete, Coatings, Grout or Other Material that Requires Bond to the substrate: Water curing.
   e. Formed Surfaces: None if nonabsorbent forms are left in place 7 days. Water cure if absorbent forms are used. Sheet cured or liquid membrane cured if forms are removed prior to 7 days. Water cure exposed horizontal surfaces of formed walls or columns for 7 days or until next placement of concrete is made.
   f. Concrete Joints: Water cured or sheet material cured.

C. Protect finished surfaces and slabs from the direct rays of the sun to prevent checking and crazing.

D. Cold Weather Concreting:
   1. "Cold weather" is defined as a period when for more than 3 successive days, the average daily outdoor temperature drops below 40 degrees F. Calculate the average daily temperature as the average of the highest and the lowest temperature during the period from midnight to midnight.
   2. Conform cold weather concreting to ACI 306.1 and the additional requirements specified herein. Record temperatures at the concrete placement at 12-hour intervals (minimum).
   3. Discuss a cold weather work plan with the Engineer. Discuss the methods and procedures proposed for use during cold weather including the production, transportation, placement, protection, curing and temperature monitoring of the concrete. Also discuss the procedures to be implemented upon abrupt changes in weather conditions or equipment failures. Do not begin cold weather concreting until the work plan is acceptable to the Engineer. Approval of the work Plan by the Engineer shall not relieve the Contractor of their sole responsibility for the quality of the concrete work produced.
   4. During periods of cold weather, protect concrete to provide continuous warm, moist curing (with supplementary heat when required) for a total of at least 350 degree-days of curing.
      a. Degree-days are defined as the total number of 24 hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g., 5 days at an average 70 degrees F = 350 degree-days).

b. To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50 degrees F as 0 degrees F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.

5. Salt, manure or other chemicals shall not be used for protection.
6. Do not terminate the protection period for concrete being water cured during cold weather until at least 24 hours after water curing has been terminated.

E. Hot Weather Concreting

1. "Hot weather" is defined as any combination of high air temperatures, low relative humidity and wind velocity which produces a rate of evaporation estimated in accordance with ACI 305R, approaching or exceeding 0.2 lb/sqft/hr.
2. Concrete placed during hot weather, shall be batched, delivered, placed, cured and protected in compliance with the recommendations of ACI 305R and the additional requirements specified herein.
   a. Do not exceed 90 degrees F for the temperature of concrete being placed. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set or cold joints.
   b. Take all necessary precautions to promptly deliver, to promptly place the concrete upon its arrival at the job and to provide vibration immediately after placement.
   c. The Engineer may direct the Contractor to immediately cover plastic concrete with sheet material.
3. Provide the Engineer with a work plan describing the methods and procedures proposed to use for concrete placement and curing during hot weather periods. Do not begin hot weather concreting until the work plan is acceptable to the Engineer. Approval of the work plan by the Engineer shall not relieve the Contractor of their sole responsibility for the quality of the concrete work produced.

3.06 REMOVAL OF FORMS

A. Except as otherwise specifically authorized by the Engineer, do not remove forms before the concrete has attained a strength of at least 30 percent of its specified design strength, nor before reaching the following number of day-degrees of curing (whichever is the longer):

TABLE 3
MINIMUM TIME TO FORM REMOVAL

Forms for	Degree Day
Beams and slabs	500
Walls / Vertical survaces	100

(See definition of degree-days in Paragraph 3.5.D above).

B. Do not remove shores until the concrete has attained at least 70 percent of its specified design strength and has achieved sufficient strength to support safely its own weight and construction live loads.

3.07 INSPECTION AND FIELD TESTING

A. The batching, mixing, transporting, placing and curing of concrete are subject to the inspection of the Engineer at all times. Advise the Engineer of readiness to proceed at least 24 hours prior to each concrete placement. The Engineer or Owner will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel and the alignment, cleanliness and tightness of formwork. Do not place concrete without the inspection and acceptance of the Engineer or Owner.

B. Sets of field control cylinder specimens will be taken by the Engineer or Owner Materials Testing Representative during the progress of the work, in compliance with ASTM C31. Take a minimum of one set of concrete test cylinders per day, one set for each 150 cubic yards of concrete, or one set for each 5,000 sq ft of surface area for slabs or walls of each class of concrete placed each day.
   1. A "set" of test cylinders consists of five cylinders: one to be tested at 7 days and two to be tested and their strengths averaged at 28 days. The other two may be used for special tests at 3 days or to verify strength after 56 days if 28-day test results are low.
   2. When the average 28-day compressive strength of the cylinders in any set falls below the specified design strength or below proportional minimum 7-day strengths (where proper relation between seven and 28-day strengths have been established by tests), change proportions, water content, or temperature conditions to achieve the required strengths.

C. Cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through the operations, and furnish material and labor required for the purpose of taking concrete cylinder samples. Provide an appropriate number of curing boxes acceptable to the Engineer.

D. Slump tests will be made in the field immediately prior to placing the concrete. Make such tests in accordance with ASTM C143. Reject concrete if the slump is greater than the specified range.

E. Air Content: Test for air content shall be made on a fresh concrete samples. Air content for concrete made of ordinary aggregates having low absorption shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173. If lightweight aggregates or aggregates with high absorptions are used, the latter test method shall be used.

F. The Engineer may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of

concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection or determining the continuation of concrete work.

G. Cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding and such incidental equipment as may be required. Perform coring and collect core samples at the locations indicated by the Engineer and repair all core holes. The testing of the cores will be at the expense of Owner. Owner will pay for collection and repair of cores if the test results meet the required specifications.

3.08 CONCRETE FINISHING

A. Walls
   1. Type W-1 (Ordinary Wall Finish)
      a. Patch tie holes.
      b. Surface tolerance Class C as specified in ACI 117.
      c. Knock off projections larger than ½-inch.
      d. Patch defective areas.
   2. Type W-2 (Smooth Wall Finish)
      a. Patch tie holes.
      b. Surface tolerance Class B as specified in ACI 117.
      c. Grind off projections larger than ¼-inch.
      d. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.
   3. Type W-3 (Smooth Rubbed Wall Finish)
      a. Surface tolerance Class A as specified in ACI 117.
      b. Remove projections larger than 1/8-inch.
      c. Only water curing will be permitted on walls being rubbed.
      d. Perform rubbing while green concrete can be physically worked and smoothed without adding other materials, if structurally possible, the day following placement. Finish no later than 3 days after placement has been completed.
      e. Remove forms at such a rate that finishing, form tie filling, removal of projections, and patching can be completed on same day forms are removed while curing wall.
      f. After pointings have set sufficiently to permit working on surface, thoroughly saturate entire surface with water for period of 3 hours and rub until uniform surface is obtained.
      g. Rub either by hand with carborundum stone of medium-coarse grade or abrasive of equal quality, or mechanically operated carborundum stone.
      h. Obtain Engineer approval of mechanically operated carborundum stones before concrete finishing.
      i. Do not use cement grout, other than cement paste drawn from the concrete itself by rubbing process.

j. Finishing past formed by rubbing by either brushing or floating as follows:
   1) Brushing:
      a) Carefully strike with clean brush.
      b) Brush in long direction of surface being finished.
   2) Floating:
      a) Spread uniformly over surface and allow to reset.
      b) Finish by floating with canvas, carpet face, or cork float, or rub down with dry burlap.
k. Continue water curing of wall during finishing operation in areas not being rubbed.
l. Move water curing onto rubbed areas as soon as water will not erode rubbed surface.

B. Slabs
   1. General
      a. Finish slab concrete per the requirements of ACI 302.1R.
      b. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
      c. Do not use “jitterbugs” or other special tools designed for purpose of forcing coarse aggregate away from surface and allowing layer or mortar, which will be weak and cause cracks or delamination, to accumulate.
      d. Do not dust surface with dry materials.
      e. Use evaporation retardant.
      f. Round off edges of slabs with steel edging tool, except where cove finish is shown. Use a steel edging tool with a ¼-inch radius for slabs subject to wheeled traffic.
   2. Type S-1 (Steel Troweled Finish)
      a. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
      b. While concrete is still green, but sufficiently hardened to bear a person’s weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
      c. Use sufficient pressure on wood floats to bring moisture to surface.
      d. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
      e. Burnish surface with an additional troweling. Final troweling shall produce ringing sound from trowel.
      f. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
      g. Power Finishing:
         1) Approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
         2) Do not use power machine when concrete has not attained necessary set to allow finishing without introducing high and low spots in slab.
         3) Do first steel troweling for slab S-1 finish by hand.

3. Type S-2 (Wood Float Finish)
    a. Finish slab to receive fill and mortar setting bed by screeding with straight-edges to bring surface to required finish plane.
    b. Wood float finish to compact and seal surface.
    c. Remove laitance and leave surface clean.
    d. Coordinate with other finish procedures.
4. Type S-3 (Underside Elevated Slab Finish)
    a. When forming is removed, grind off projections on underside of slab and patch defective areas.
5. Type S-4 (Broomed Finish)
    a. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing fine-hair broom lightly across surface.
    b. Broom in same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab.
6. Type S-5 (Sidewalk Finish)
    a. Slope sidewalk down ¼-inch per foot away from structures, unless otherwise shown.
    b. Strike off surface by means of strike board and float with wood or cork float to true plane, then flat steel trowel before brooming.
    c. Broom surface at right angles to direction of traffic or as shown.
    d. Lay out sidewalk surface in blocks, as shown or as directed by Engineer, with grooving tool.

C. Beams and Columns
1. General: Inject cracks with crack repair epoxy. Patch and repair defective areas.
2. Type B-1: Match wall Type W-1.
3. Type B-2: Match wall Type W-2.
4. Type B-3:
    a. Repair rock pockets.
    b. Fill air voids.
    c. Match wall Type W-3.
5. Type C-1: Match wall Type W-1.
6. Type C-2: match wall Type W-2.
7. Type C-3:
    a. Repair rock pockets.
    b. Fill air voids.
    c. Match wall Type W-3.

3.09 FAILURE TO MEET REQUIREMENTS

A. Should the strengths shown by the test specimens made and tested in compliance with the previous provisions fall below the values given in Table 1, the Engineer has the right to require changes in proportions outlined to apply to the remainder of the work. Furthermore, the Engineer has the right to require additional curing on those

portions of the structure represented by the test specimens which failed. The cost of such additional curing shall be at the Contractor's expense. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the Engineer has the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at the expense of the Contractor. In such cases of failure to meet strength requirements confer with the Engineer to determine what adjustment, if any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of ASTM C94. The "purchaser" referred to in ASTM C94 is the Contractor in this Section.

B. When the tests on control specimens of concrete fall below the specified strength, the Engineer will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In the case of cores not indicating adequate strength, the Engineer, in addition to other recourses, may require, at the Contractor's expense, load tests on any of the slabs, beams, piles, caps, and columns in which such concrete was used. Tests need not be made until concrete has aged 60 days.

C. Should the strength of test cylinders fall below 60 percent of the required minimum 28-day strength, the concrete shall be rejected and shall be removed and replaced.

D. Any concrete found to be defective from any cause whatsoever, at any time prior to Final Acceptance of the Work, shall be removed and replaced, or repaired at the expense of the Contractor.

3.10 PATCHING AND REPAIRS

A. It is the intent of this Section to require quality work, including adequate forming, proper mixture and placement of concrete and curing, so completed surfaces will require no patching.

B. Repair defective concrete and honeycombed areas using methods complying with industry standards which meet the approval of the Engineer.

C. As soon as the forms have been stripped and the concrete surfaces exposed, remove fins and other projections; fill recesses left by the removal of form ties; and repair surface defects which do not impair structural strength. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to approval of the Engineer.

D. Immediately after removal of forms remove plugs and break off metal ties. Promptly fill holes upon stripping as follows: Moisten the hole with water, followed by a 1/16-in brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spiderweb. Trowel smooth with heavy pressure. Avoid burnishing.

E. When patching exposed surfaces use the same source of cement and sand as used in the parent concrete. Adjust color if necessary by addition of proper amounts of white cement. Rub lightly with a fine Carborundum stone at an age of 1 to 5 days if necessary to bring the surface down with the parent concrete. Exercise care to avoid damaging or staining the virgin skin of the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.

3.11 CONCRETE SCHEDULE

A. The following (Table 4) are the general applications for the various concrete classes and design strengths:

TABLE 4
CONCRETE SCHEDULE

Class	Design Strength (psi)	Description
A	3,000	Thrust blocking, slabs, curbs, and pavements
AA	4,000	Walls, beam systems, columns, and all other structural concrete
AAA	5,000	Pre-stressed concrete

END OF SECTION

SECTION 03 60 00

GROUTING

PART 1 GENERAL

1.01 DESCRIPTION

A. Section includes: Grout for column base plates, other structural supports, equipment bases, surface repair and uses other than masonry. Grout for masonry is specified in Section 04 20 00.

1.02 RELATED SECTIONS

A. This section contains specific references to the following related sections. Additional related sections may apply that are not specifically listed below.
   1. Section 04 20 00 Unit Masonry
   2. Section 43 05 13 Rigid Equipment Mounts

1.03 REFERENCES

A. The references listed below are a part of this section. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ASTM C230	Flow Table for Use in Tests of Hydraulic Cement
ASTM C307	Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings
ASTM C531	Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM C579	Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes
ASTM C882	Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
ASTM C942	Standard Test Method for Compressive Strength of Grouts for Preplaced-Aggregate Concrete in the Laboratory
ASTM C1107	Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
ASTM C1181	Standard Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts
ASTM E329	Agencies Engaged in Construction Inspection, Testing, or Special Inspection

Reference	Title
COE CRD-C611	Flow of Grout for Preplaced Aggregate Concrete
COE CRD-C621	Non-shrink Grout
IBC	International Building Code

1.04 SUBMITTALS

A. Action Submittals

1. Procedure: Section 01 33 00.
2. A copy of this specification section with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
3. Check-marks (✓) shall denote full compliance with a paragraph as a whole. Deviations shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Include a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
4. Complete product literature and installation instructions for the following: Cementitious non-shrink grout, epoxy grout, adhesive for dowel and anchor setting, and concrete repair mortar products to be used on the project.
5. Current ICC Evaluation Service reports for adhesives used for dowel and anchor setting.
6. Installer certification in accordance with ACI/CRSI Adhesive Anchor Installer Certification Program for installers of horizontal or upwardly inclined adhesive anchors.

1.05 QUALITY ASSURANCE

A. Quality Control by Owner

1. The Owner will provide the services of a qualified Special Inspector in accordance with specifications.
2. Adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be continuously inspected during installation by a Special Inspector.
   a. The Special Inspector shall furnish a report to the Engineer, Owner's Representative and Building Official that the work covered by the report has been performed and that the materials used and the installation procedures used conform with the approved Project Manual and the Manufacturer's Printed Installation Instructions (MPII).

B. Quality Control by Contractor
   1. Provide the services of an independent testing laboratory which complies with the requirements of ASTM E329 if a product other than those listed below is proposed and test data is not available from the supplier to demonstrate equivalence to the specified grout. The testing laboratory shall sample and test the proposed grout materials. Costs of testing laboratory services shall be borne by the Contractor.

C. Certifications
   1. Installer certification shall be in accordance with ACI/CRSI Adhesive Anchor Installer Certification Program for installers of horizontal or upwardly inclined adhesive anchors.

PART 2 PRODUCTS

2.01 CEMENTITIOUS NON-SHRINK GROUT

A. Cementitious non-shrink non-metallic aggregate grout shall be:
   1. BASF, Masterflow 928
   2. Euclid Chemical Company, Hi-Flow Grout
   3. Five Star Products, Inc., Five Star Grout
   4. Sika Corporation, SikaGrout 212
   5. Approved Equal

2.02 EPOXY GROUT FOR EQUIPMENT MOUNTING

A. Epoxy grout for equipment mounting shall be a non-cementitious, resin based, multi-component formulation. Epoxy grout shall be flowable, with shrinkage minimized to achieve minimum 98% effective bearing area. Epoxy grout shall be:
   1. BASF, Masterflow 648
   2. Euclid Chemical Company, E3-G
   3. Sika Corporation, Sikadur 42
   4. Approved Equal.

2.03 ADHESIVE FOR DOWEL AND ANCHOR SETTING

A. Adhesive for setting dowels and anchoring connection/base plate bolts shall be an injectable two-component epoxy adhesive. Adhesive shall be approved for the intended use per the product ICC Report. Adhesive shall be:
   1. Hilti, HIT-RE 500-SD
   2. Simpson Strong Tie, SET XP Anchoring Adhesive
   3. Approved Equal (equivalent product must have ICC approval for use in cracked concrete in areas with high seismic risk).

2.04 CONCRETE REPAIR MORTAR

A. Horizontal Applications: Repair mortars shall be:
   1. BASF, MasterEmaco S 466CI
   2. Sika Corporation, SikaTop 111 Plus
   3. Approved Equal

B. Vertical and Overhead Applications: Repair mortars shall be:
   1. BASF, MasterEmaco 1500HCR Vertical Overhead
   2. Sika Corporation, SikaTop 123 Plus
   3. Approved Equal

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine and accept existing conditions before beginning work.

3.02 CEMENTITIOUS NONSHRINK GROUT

A. Non-shrink, cementitious, nonmetallic aggregate grout shall be used for column base plates, structural bearing plates, and all locations where the general term “non-shrink grout” is indicated on the Drawings. Use of this grout to support the bearing surfaces of machinery shall be as specified in Section 43 05 13 or as detailed on the Drawings for specific locations or pieces of equipment. If guidance is not provided in locations noted above, use of non-shrink grout for equipment mounting shall be limited to equipment less than 25 horsepower or 750 pounds. Grout shall be placed and cured in accordance with the manufacturer's instructions.

B. Non-shrink cementitious grout shall not be used as a surface patch or topping. Non-shrink cementitious grout must be used in confined applications only.

3.03 EPOXY GROUT FOR EQUIPMENT MOUNTING

A. Prepare concrete surfaces of equipment pads as indicated in details on the Drawings and as required by the epoxy grout manufacturer. Epoxy grout for equipment mounting shall be placed and cured in accordance with the requirements of Section 43 05 13, details on the Drawings, and in conformance with manufacturer’s recommendations.

3.04 CONCRETE REPAIR MORTAR

A. Concrete repair materials and procedures shall be submitted for review to the Owner’s Representative and shall be accepted prior to commencement of the repair work.

B. Follow all manufacturers’ instructions, including those for minimum and maximum application thickness, surface preparation and curing. Add aggregate as required per manufacturer's recommendations. Any deviations from the manufacturer's

instructions shall be submitted for review to the Owner's Representative and shall be accepted prior to commencement of the work.

END OF SECTION

SECTION 05 05 13.13

ZINC COATINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section specifies both hot-dip zinc coating and mechanical zinc coating. Electroplated corrosion protection is not an acceptable substitute for mechanical zinc coating.

1.02 REFERENCES

A. 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 documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). 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. 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
ASTM A123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A143	Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
ASTM A153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A384	Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
ASTM A385	Providing High-Quality Zinc Coatings (Hot-Dip)
ASTM A780	Repair of Damaged Hot-Dip Galvanized Coatings
ASTM B695	Coatings of Zinc Mechanically Deposited on Iron and Steel
MILSPEC DOD-P-21035	Paint, High Zinc Dust Content, Galvanizing Repair

1.03 SUBMITTALS

A. The following information shall be provided in accordance with Section 01 33 00:
   1. Zinc dust-zinc oxide coating manufacturer's product data showing conformance to the specified product.
   2. Manufacturer's recommendation for application of zinc dust-zinc oxide coating.
   3. Coating applicator's Certificate of Compliance that the hot-dip galvanized coating meets or exceeds the specified requirements of ASTM A123 or A153, as applicable.

PART 2 PRODUCTS

2.01 MATERIALS

A. Zinc Coating:
   1. Hop-dip zinc coating material shall be as specified in ASTM A123 and A153, as applicable. Mechanical zinc coating shall be as specified in ASTM B695.

B. Zinc Dust-Zinc Oxide Coating:
   1. Zinc dust-zinc oxide coating shall conform to MILSPEC DOD-P-21035. Coating shall be as manufactured by Z.R.C. Chemical Products Co., Galvicon Co., or equal.

2.02 FABRICATION REQUIREMENTS

A. Fabrication practices for products to be galvanized shall be in accordance with applicable portions of ASTM A143, A384 and A385.

PART 3 EXECUTION

3.01 APPLICATION

A. Steel members, fabrications and assemblies shall be galvanized after fabrication in accordance with ASTM A123.

B. Structural steel connection bolts, screws, nuts, washers shall be hot-dip galvanized per ASTM A153.

3.02 COATING REQUIREMENTS

A. Hot-dip coating weight shall conform to paragraph 5.1 of ASTM A123 or Table 1 of ASTM A153, as appropriate.

B. Mechanically applied coating thickness shall be Class 50 as specified in ASTM B695.

3.03 REPAIR OF DEFECTIVE GALVANIZED COATING

A. Where zinc coating has been damaged after installation, substrate surface shall be first cleaned and then repaired with zinc dust-zinc oxide coating in accordance with

ASTM A780. Application shall be as recommended by the zinc dust-zinc oxide coating manufacturer. Coating shall consist of multiple coats to dry film thickness of 8 mils.

B. Items not physically damaged, but which have insufficient or deteriorating zinc coatings, and items damaged in shipment or prior to installation, shall be removed from the project site for repair by the hot-dip zinc coating method.

END OF SECTION

SECTION 05 05 20

ANCHOR BOLTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Bolts and all-thread rods used to attach structural elements and equipment to concrete and concrete masonry. Included are cast-in-place and post-installed anchors (adhesive systems and wedge type expansion anchors), nuts and washers.

B. Cast-in-place and post-installed anchors shall be Type 316 stainless steel unless noted otherwise.

2.02 RELATED SECTIONS

C. This section contains specific references to the following related sections. Additional related sections may apply that are not specifically listed below.
   1. Section 01 73 24 Design Requirements for Nonstructural Components and Nonbuilding Structures
   2. Section 03 60 00 Grouting
   3. Section 43 05 13 Rigid Equipment Mounts
   4. Section 43 05 18 Vibration Isolation Systems

1.02 REFERENCES

A. The references listed below are a part of this section. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ACI 318	Building Code Requirements for Structural Concrete
ASTM A193	Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A194	Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
ASTM A320	Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service
ASTM A563	Carbon and Alloy Steel Nuts
ASTM F593	Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F594	Stainless Steel Nuts
ASTM F844	Washers, Steel, Plain (Flat), Unhardened for General Use

Reference	Title
ASTM F1554	Anchor Bolts, Steel, 36, 55, 105-ksi Yield Strength
IBC	International Building Code with local amendments

1.03 SUBMITTALS

A. Action Submittals

1. Procedures: Section 01 33 00.
2. A copy of this specification section with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
3. Check-marks (✓) shall denote full compliance with a paragraph as a whole. Deviations shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Include a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
4. Anchor bolt placement plans.
5. Anchor bolt, nut, and washer material information, including material certifications.
6. Record copy of design calculations and details showing the required diameter, length, embedment, edge distance, confinement, anchor reinforcement, anchor bolt sleeves, connection redesign, and other conditions, stamped and signed by a Professional Engineer currently registered in the state of Georgia. Calculations shall comply with the provisions of ACI 318 Appendix D.
7. Product Data:
   a. ICC Evaluation Service Reports for post-installed adhesive type anchors and expansion (wedge type) anchors when allowed. Products shall be ICC approved for use in cracked concrete in high seismic areas (Seismic Design Category D, E and F).
   b. Product data indicating load capacity charts/calculations.
   c. Chemical resistance.
   d. Temperature limitations.
   e. Manufacturers written installation instructions.
8. Installer certification for horizontal or upwardly inclined adhesive anchors in accordance with ACI/CRSI Adhesive Anchor Installer Certification Program.

1.04 QUALITY ASSURANCE

A. Quality Assurance By Owner

1. Special inspection of anchor bolts shall be performed by the Special Inspector under contract with the Owner and in accordance with IBC Chapter 17.

2. A five percent sample of installed post-installed anchors shall be proof-loaded by an independent laboratory contracted by the Contractor. The quantity of samples and locations shall be coordinated with the Owner's Representative.
3. Adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be continuously inspected during installation by a Special Inspector.
4. The Special Inspector shall furnish a report to the Engineer, Owner's Representative, and Building Official that the work covered by the report has been performed and that the materials used and the installation procedures used conform with the approved Project Manual and the Manufacturer's Printed Installation Instructions (MPII).

B. Certifications
1. Installer certification shall be in accordance with ACI/CRSI Adhesive Anchor Installer Certification Program for installers of horizontal or upwardly inclined adhesive anchors.

PART 2 PRODUCTS

2.01 GENERAL

A. Anchor bolt holes in equipment support frames shall not exceed the bolt diameters by more than 1/4 inch. Minimum anchor bolt diameter shall be 1/2 inch. Anchor bolts for equipment mounting and vibration isolation systems shall be provided as specified in Sections 43 05 13 and 43 05 18, respectively.

B. Tapered washers shall be provided where mating surface is not square with the nut.

C. Anchor bolts shall be cast-in-place anchors unless post-installed anchors are specified or shown on the Drawings. Substitution of post-installed anchors will not be permitted unless specifically requested by the Contractor and approved by the Engineer.

2.02 PERFORMANCE/DESIGN CRITERIA

A. Anchor bolts for equipment shall be designed by the equipment manufacturer to include equipment operational loads combined with seismic and wind forces when applicable. Design criteria provided in Section 01 73 24.

2.03 MATERIALS

A. Anchor bolt materials shall be as specified in the following table:

Material	Specification
Stainless Steel Anchor Bolts	ASTM A193 or A320, Type 316
Stainless Steel Threaded Rods	ASTM F593, Type 316
Stainless Steel Nuts and Washers	ASTM A194 Heavy Hex Nuts and Washers, Type 316 ASTM F594 Heavy Hex Nuts at Adhesive

Material	Specification
	Anchors, Type 316
Carbon Steel Anchor Bolts	ASTM F1554, Grade 36, Hot Dip Galvanized
High-Strength Carbon Steel Anchor Bolts	ASTM F1554, Grade 55, Weldable per Supplementary Requirement S1, Hot Dip Galvanized
Carbon Steel Nuts and Washers	ASTM A563 and F844, Heavy Hex, Hot-Dip Galvanized
Concrete Adhesive Anchors	Hilti “HIT-RE 500-SD”, Simpson “SET-XP”, or approved equal, with Type 316 Stainless Steel threaded rods
Masonry Adhesive Anchors	Hilti "HIT-HY 70", Simpson “SET”, or approved equal, with Type 316 Stainless Steel threaded rods
Masonry Expansion (wedge) Anchors*	Hilti "KWIK BOLT 3", or approved equal, Type 316 Stainless Steel
Concrete Expansion (wedge) Anchors *	Hilti “KWIK BOLT TZ”, or approved equal, Type 316 Stainless Steel

**Post installed anchors shall always be an adhesive type anchor system except where noted otherwise or when Contractor makes a request for a specific application and Engineer approves.*

2.04 STAINLESS STEEL FASTENER LUBRICANT (ANTI-SEIZING)

A. Anti-seizing Lubricant for Stainless Steel Threaded Connections:
   1. Suitable for potable water supply.
   2. Formulated to resist washout.
   3. Acceptable manufacturers are Bostik, Saf-T-Eze, or equal.

2.05 ANCHOR BOLT SLEEVES

A. Provide anchor bolt sleeves as shown on design drawings and as required by equipment manufacturer’s design.
   1. Provide high density polyethylene plastic sleeves of single unit construction with deformed sidewalls such that the concrete and grout lock in place.
   2. The top of the sleeve shall be self-threading to provide adjustment of the threaded anchor bolt projection.
   3. Acceptable manufacturers are Contec, Wilson, or equal.

PART 3 EXECUTION

3.01 GENERAL

A. Anchor bolts shall be cast-in-place anchors unless post-installed anchors are specified or shown on the Drawings.

B. Grouting of anchor bolts using plastic sleeves with non-shrink or epoxy grout, where specified, shall be in accordance with Section 03 60 00.

C. The threaded end of anchor bolts and all-thread rods shall be long enough to project through the entire depth of the nut and if too long, shall be cut off at ½-inch beyond top of nut and ground smooth.

3.02 CAST-IN-PLACE ANCHOR BOLTS

A. Anchor bolts to be embedded in concrete shall be placed accurately and held in correct position using templates while the concrete is placed.

B. After anchor bolts have been embedded, their threads shall be protected by grease and the nuts run on.

3.03 ADHESIVE ANCHOR BOLTS

A. Note that adhesive anchors shall not be substituted for cast-in-place anchor bolts unless the adhesive anchors have been specified or shown on the Drawings, or approval has been obtained from the Engineer that substitution of adhesive anchors is acceptable for the specific use and location. Use of adhesive anchors shall be subject to the following conditions:
   1. Limit to locations where intermittent or continuous exposure to the following is extremely unlikely:
      a. Acid concentrations higher than 10 percent
      b. Chlorine gas
      c. Machine or diesel oils
   2. Limit to applications where exposure to the following is extremely unlikely:
      a. Fire
      b. Concrete or rod temperature above 120 degrees F
   3. Overhead applications (such as pipe supports) shall not be allowed unless approved by the Engineer and installation is by an Installer specially certified for overhead applications.
   4. Approval from Engineer for specific application and from supplier of equipment to be anchored, if applicable.
   5. Anchor diameter and material shall be per Contract Documents or equipment manufacturer’s specifications. Anchor shall be threaded or deformed the full length of embedment and shall be free of rust, scale, grease, and oils.
   6. Embedment depth shall be as specified or as required by the equipment manufacturer.
   7. Follow the anchor system manufacturer’s installation instructions.
   8. Holes shall have rough surfaces created by using a hammer drill with carbide bit. Core drilled holes are not allowed.
   9. Holes shall be blown clean with oil-free compressed air and be free of dust or standing water prior to installation. Follow additional requirements of the adhesive manufacturer.

10. Concrete and air temperature shall be compatible with curing requirements of adhesives per adhesive manufacturer's instructions. Anchors shall not be placed in concrete when the temperature is below 25 degrees F.
11. Anchors shall be left undisturbed and unloaded for full adhesive curing period, which is based on temperature of the concrete.

3.04 EXPANSION ANCHORS

A. Expansion (wedge type) anchors shall not be substituted for cast-in-place anchor bolts or adhesive anchors unless approved by the Engineer for a specific application. Use of expansion anchors shall be subject to conditions 4 through 9 as specified above for adhesive anchors. Expansion anchors shall not be used in a submerged condition or in mounting of equipment subject to vibration or cyclic motion.

3.05 REINFORCING STEEL CONFLICTS WITH POST-INSTALLED ANCHOR INSTALLATION

A. When reinforcing steel is encountered in the drill path, slant drill to clear obstruction and provide beveled washer to match angle of anchor. Drill shall not be slanted more than 10 degrees.

B. Where slanting the drill does not resolve the conflict, notify the Owner's Representative and resolve the conflict to the satisfaction of the Owner's Representative in consultation with the Engineer.

C. Abandoned post-installed anchor holes shall be cleaned and filled with non-shrink grout and struck off flush with adjacent surface.

D. The costs of determining and executing the resolution shall be borne by the Contractor. The determination and execution of the resolution shall not result in additional cost to the Owner.

E. Reinforcing steel in masonry shall not be damaged.

F. In order to avoid or resolve a conflict, locate embedded reinforcing steel using non-destructive methods and/or redesign the attachment.
   1. Redesign shall be done by the Contractor's Professional Engineer currently registered in the state of Georgia.
   2. Calculations and details for redesign shall be submitted.

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes access doors and frames.

B. Unless indicated otherwise, provide Type I access doors over spaces intended to be dry such as pipe galleries and pump rooms; use Type II access doors over spaces intended to be wet such as wet wells and liquid holding basins; and use Type III access doors where doors are subject to vehicular traffic.

1.02 REFERENCES

A. 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 documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ASTM A666	Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
ASTM B308	Aluminum-Alloy 6061-T6 Standard Structural Profiles
ASTM C578	Rigid, Cellular Polystyrene Thermal Insulation

1.03 SUBMITTALS

A. Action Submittals:
   1. Procedures: Section 01 33 00.
   2. A copy of this specification section with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
   3. Check-marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated and, therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

4. Shop Drawings including profiles, accessories, location, adjacent construction interface and dimensions.

B. Informational Submittals:
1. Procedures: Section 01 33 00
2. Manufacturer's product data.
3. Warranty.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Procedures: Section 01 66 00

1.05 SPECIAL WARRANTY

A. Special Warranty: Manufacturer shall warrant Access Doors and Frames against defects in materials and workmanship for 5 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Candidate manufacturers are listed below. The manufacturer's standard product may require modification to conform to specified requirements:
1. Bilco
2. Halliday
3. Approved Equal

2.02 GENERAL

A. Door leaf(s) shall be minimum 1/4 inch thick aluminum diamond pattern plate stiffened with aluminum members as required. Door frame shall be on all four sides of the openings, of aluminum construction, with anchor tabs around the perimeter. Finish of door leaf(s) and frame shall be mill. All aluminum plate and structural shapes shall conform to ASTM B308, Type 6061-T6.

B. Hardware shall be ASTM A666 Type 316 stainless steel.

C. Door leaf hinges shall be forged stainless steel with stainless steel pins. Door leaf hinges shall be through bolted to the door leaf with tamperproof stainless steel lock bolts and to the frame with stainless steel bolts and locknuts.

D. Door leaf latches shall be stainless steel slam lock with fixed interior handle and removable exterior turn/lift handle. Latch release shall be protected by a flush, gasketed, removable screw plug.

E. Aluminum in direct contact with concrete shall receive a protective coating on all surfaces that will be in contact with concrete.

F. Double leaf access doors shall have a stainless steel chain on both sides of the door opening for personnel protection.

G. Door leaf(s) shall have compression spring lifting operators enclosed in telescopic tubes and automatic hold-open arm with release handle to automatically lock the door leaf(s) in the open (90 degree) position.

H. Door leaf(s) over spaces intended for human occupancy shall be insulated with 2 inches preformed, cellular polystyrene thermal insulation, Type X or Type IV, conforming to ASTM C578. Insulation shall be fully enclosed within door leaf with minimum 1/8 inch aluminum plate.

I. All access doors shall have a safety grate directly under the door leaf(s). Safety grate shall be located directly under the door leaf(s), of aluminum or fiberglass construction and shall be lockable independent of the door leaf. Safety grate shall hinged to match the access door leaf(s); one piece for single access doors and two-piece for double access doors. The spacing of the grid shall be no greater than five inches square. The safety grate shall be able to withstand a live load of 150 pounds per square foot.

J. Where specifically indicated on the drawings, provide a recessed padlock hasp lock with a flush hinged lid and fully welded receptacle designed to receive a standard padlock.

K. Where specifically indicated on the drawings, provide an EPDM gasket system that will provide an air infiltration rate of less than 1 cubic foot per minute per linear foot of cover perimeter.

2.03 ACCESS DOOR AND FRAME

A. Door leaf(s) shall withstand a live load of 300 pounds per square foot. Door frame shall be a channel profile to capture water. A 1 1/2-inch drainage coupling shall be provided in at least one corner of the frame.

B. Door leaf(s) shall withstand an AASHTO H-20 wheel load with a maximum deflection of $1/150^{th}$ of the span.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in strict accordance with manufacturer's instructions and approved submittals. Access doors and frames shall be level, plumb and square. Adjust as necessary for proper operation. Repair damaged finishes to like new appearance.

B. Frames with drainage coupling shall be piped with PVC pipe to location as indicated on the drawings or prescribed by the Owner's Representative.

3.02 CLEANING

A. Clean exposed surfaces using methods acceptable to the manufacturer.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

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SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section specifies coating systems, surface preparations, and application requirements for coating systems.

B. Definitions:
   1. Specific coating terminology used in this Section is in accordance with definitions contained in ASTM D16, ASTM D3960, and the following definitions.
      a. Definitions:
         1) Abrasive: Material used for blast cleaning, such as sand, grit or shot.
         2) Abrasive Blast Cleaning: Cleaning/surface preparation by abrasive propelled at high speed.
         3) Anchor Pattern: Profile or texture of prepared surface(s).
         4) ANSI: American National Standards Institute.
         5) Bug Holes: Small cavities, usually not exceeding 15 mm in diameter, resulting from entrapment of air bubbles in the surface of formed concrete during placement and compaction.
         6) Coating/Paint/Lining Thickness: The total thickness of primer, intermediate and/or finish coats.
         7) Coating System Applicator (CSA): A generic reference to the specialty subcontractor or subcontractors retained by the Contractor to install the coating systems specified in this Section.
         8) Coating System Manufacturer (CSM): Refers to the acceptable coating system manufacturer, abbreviated as the CSM.
         9) Coating System Manufacturer's Technical Representative(s) (CTR): Refers to the technical representative(s) of the acceptable Coating System Manufacturer and is abbreviated as CTR.
         10) Dew point: Temperature of a given air/water vapor mixture at which condensation starts.
         11) Dry Film Thickness (DFT): Depth of cured film, usually expressed in mils (0.001 inch). Use this definition as opposed to existing definition.
         12) Drying Time: Time interval between application and curing of material.
         13) Dry to Recoat: Time interval between application of material and ability to receive next coat.
         14) Dry to Touch: Time interval between application of material and ability to touch lightly without damage.
         15) Feather Edging: Reducing the thickness of the edge of paint.

16) Feathering: Operation of tapering off the edge of a point with a comparatively dry brush.
17) Field Coat: The application or the completion of application of the coating system after installation of the surface at the site of the work.
18) Hold Point: A defined point, specified in this Section, at which work shall be halted for inspection.
19) Holiday: a discontinuity, skip, or void in coating or coating system film that exposes the substrate.
20) Honeycomb: Segregated condition of hardened concrete due to non-consolidation.
21) ICRI: International Concrete Repair Institute.
22) Incompatibility: Inability of a coating to perform well over another coating because of bleeding, poor bonding, or lifting of old coating; inability of a coating to perform well on a substrate.
23) Laitance: A layer of weak, non-durable concrete containing cement fines that is brought to the surface through bleed water because of concrete finishing and/or over-finishing.
24) Mil: 0.001 inch.
25) NACE: National Association of Corrosion Engineers.
26) Overspray: Dry spray, particularly such paint that failed to strike the intended surface.
27) Pinhole: A small diameter discontinuity in a coating or coating system film that is typically created by outgassing of air from a void in a concrete substrate resulting in exposure of the substrate or a void between coats.
28) Pot Life: Time interval after mixing of components during which the coating can be satisfactorily applied.
29) Resurfacer/Resurfacing Material: A layer of cementitious and/or resin-base material used to fill or otherwise restore surface continuity to worn or damaged concrete surfaces.
30) Shelf Life: Maximum storage time for which a material may be stored without losing its usefulness.
31) Shop Coat: One or more coats applied in a shop or plant prior to shipment to the site of the work, where the field or finishing coat is applied.
32) Spreading Rate: Area covered by a unit volume of paint at a specific thickness.
33) SSPC: The Society for Protective Coatings.
34) Stripe Coat: A separate coat of paint applied to all weld seems, pits, nuts/bolts/washers and edges by brush. This coat shall not be applied until any previous coat(s) have cured and, once applied, shall be allowed to cure prior to the application of the subsequent coat(s).
35) Surface Saturated Dry (SSD): Refers to concrete surface condition where the surface is saturated (damp) without the presence of standing water.
36) Tie Coat: An intermediate coat used to bond different types of paint coats. Coatings used to improve the adhesion of a succeeding coat.

37) Touch-Up Painting: The application of paint on areas of painted surfaces to repair marks, scratches, and areas where the coating has deteriorated to restore the coating film to an unbroken condition.
38) TPC: Technical Practice Committee.
39) Volatile Organic Compound (VOC) Content: The portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in grams per liter (g/l) or pounds per gallon (lb/gal).
40) Immersion: Refers to a service condition in which the substrate is below the waterline or submerged in water or wastewater at least intermittently if not constantly.
41) Weld Splatter: Beads of metal scattered near seam during welding.
42) Wet Film Thickness (WFT): The primer or coating film's thickness immediately following application. Wet film thickness is measured in mils or thousandths of an inch (0.001 inch) and is abbreviated WFT.

1.02 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 documents are included as references under this section as if referenced directly. In the event of 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 Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). 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. 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/ASC 29.4 Exhaust Systems	Abrasive Blasting Operations – Ventilation and Safe Practice
ANSI/NSF 61	Drinking Water System Components Health Effects
ANSI B74.18	Grading of Certain Abrasive Grain on Coated Abrasive Material
ASTM D16	Standard Terminology for Paint, Related Coatings, Materials, and Applications
ASTM D2200 (SSPC-VIS1)	Pictorial Surface Preparation Standards for Painting Steel Surfaces
ASTM D3960	Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

Reference	Title
ASTM D4262	Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces
ASTM D4263	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D4414	Standard Practice for Measurement of Wet Film Thickness by Notch Gages
ASTM D4417	Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM D4541	Standard Test Methods for Pull-Off Strength of Coatings On Metal Substrates Using Portable Adhesion Testers
ASTM D4787	Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates
ASTM D5162	Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
ASTM D7234	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Adhesion Testers.
ASTM E337	Standard Test Method for Measuring Humidity With a Psychrometer
ASTM F1869	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
FS 595b	Federal Standard Colors
ICRI 03732	Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays
NACE Publication 6D-163	A Manual for Painter Safety
NACE Publication 6F-163	Surface Preparation of Steel or Concrete Tank/Interiors
NACE Publication 6G-164 A	Surface Preparation Abrasives for Industrial Maintenance Painting
NACE Standards	January 1988 Edition of the National Association of Corrosion Engineers, TPC.
NACE Standard RP0188	Standard Recommended Practice – Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
NACE Standard RP0288	Standard Recommended Practice, Inspection of Linings on Steel and Concrete
NACE Standard RP0892	Standard Recommended Practice, Linings Over Concrete in Immersion Service
NACE Publication TPC2	Coatings and Linings for Immersion Service
NAPF 500-03	Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings
NAPF 500-03-04	Abrasive Blast Cleaning for Ductile Iron Pipe
NAPF 500-03-05	Abrasive Blast Cleaning for Cast Ductile Iron Fittings

Reference	Title
OSHA 1910.144	Safety Color Code for Marking Physical Hazards
OSHA 1915.35	Standards – 29CFR - Painting
SSPC	Paint Application Specification No. 1.
SSPC-AB 1	Mineral and Slag Abrasives
SSPC-PA 1	Shop, Field, and Maintenance Painting of Steel
SSPC-PA 2	Measurement of Dry Coating Thickness with Magnetic Gages
SSPC-PA 9	Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages
SSPC-PA Guide 1	Guide for Illumination of Industrial Painting Project
SSPC-PA Guide 3	A Guide to Safety in Paint Application
SSPC-PA Guide 6	Guide for Containing Debris Generated During Paint Removal Operations
SSPC-PA Guide 11	Guide for Coating Concrete
SSPC SP1	Solvent Cleaning
SSPC SP2	Hand Tool Cleaning
SSPC SP3	Power Tool Cleaning
SSPC SP5	White Metal Blast Cleaning
SSPC SP6	Commercial Blast Cleaning
SSPC SP7	Brush-Off Blast Cleaning
SSPC SP10	Near-White Blast Cleaning
SSPC SP11	Power Tool Cleaning to Bare Metal
SSPC SP12	Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra-High Pressure Water Jetting Prior to Recoating
SSPC SP13	Surface Preparation of Concrete
SSPC-TR2	Wet Abrasive Blast Cleaning
SSPC-TU-3	Overcoating
SSPC-TU-4	Field Methods for Retrieval and Analysis of Soluble Salts on Substrates.
SSPC V2	Systems and Specifications: Steel Structures Painting Manual, Volume 2
SSPC-VIS 1	Visual Standard for Abrasive Blast Cleaned Steel
SSPC-VIS 3	Visual Standard for Power and Hand – Tool Cleaned Steel
SSPC-VIS 4	Visual Standards (Waterjetting)
SSPC-VIS 5	Visual Standards (Wet Abrasive Blast Cleaning)
WPCF Manual of Practice No. 17	Paints and Protective Coatings for Wastewater Treatment Facilities. Guide and Paint Application Specifications.

B. Standardization:
   1. Materials and supplies provided shall be the standard products of CSMs. Materials in each coating system shall be the products of a single CSM.
   2. The standard products of CSMs other than those specified may be acceptable when it is demonstrated to the Engineer that they are equal in composition, durability, usefulness, and convenience for the purpose intended. Requests for consideration of CSMs other than those specified in this Section will be considered, provided the following minimum conditions are met. Such requests are not a substitution for submittals after the alternative CSMs have been considered and accepted.
      a. The proposed coating system shall use an equal or greater number of separate coats to achieve the required total dry film thickness.
      b. The proposed coating system shall use coatings of the same generic type as that specified including curing agent type.
      c. Requests for consideration of products from CSMs other than those specified in this Section shall include information listed in paragraph 1.04, demonstrating that the proposed CSM's product is equal to the specified coating system.
      d. The Contractor and the proposed alternative CSM shall provide a list of references for the proposed product where the coating of the same generic type has been applied. The reference list shall include the project name, city, state, owner, phone number of owner; coating system reference and number from this Section 09 90 00; type of facility in which it was used, generic type, and year coating was applied.

C. Quality Control Requirements:
   1. The Contractor is responsible for the workmanship and quality of the coating system installation. Inspections by the Engineer or the CTR will not relieve or limit the Contractor's responsibilities.
   2. The Contractor's methods shall conform to requirements of this specification and the standards referenced in this Section. Changes in the coating system installation requirements will be allowed only with the written acceptance of the Engineer before work commences.
   3. Only personnel who are trained by the CTR specifically for this contract or who are approved by the CSM specifically for this contract shall be allowed to perform the coating system installation specified in this Section.
   4. Contaminated, outdated, diluted materials, and/or materials from previously opened containers shall not be used.
   5. For repairs, the Contractor shall provide the same products, or products recommended by the CSM, as used for the original coating.
   6. The Contractor shall identify the points of access for inspection by the Owner or the Engineer. The Contractor shall provide ventilation, ingress and egress, and other means necessary for the Engineer's personnel to access safely the work areas.
   7. The Contractor shall conduct the work so that the coating system is installed as specified and shall inspect the work continually to ensure that the coating system

is installed as specified. Coating system work that does not conform to the specifications or is otherwise not acceptable shall be corrected as specified.

8. The Contractor shall complete the Coating System Inspection Checklist, Form 09 90 00-A, included in Section 01 99 90, for coating system installations. Follow the sequential steps required for proper coating system installation as specified and as listed in the Coating System Inspection Checklist. For each portion of the work, install the coating system and complete sign-offs as specified prior to proceeding with the next step. After completing each step as indicated on the Coating System Inspection Checklist, the Contractor shall sign the checklist indicating that the work has been installed and inspected as specified.
9. The Contractor shall provide written daily reports that present, in summary form, test data, work progress, surfaces covered, ambient conditions, quality control inspection test findings, and other information pertinent to the coating system installation.

D. Inspection at Hold Points:

1. The Contractor shall conduct inspections at Hold Points during the coating system installation and record the results from those inspections on Form 09 90 00-A. The Contractor shall coordinate such Hold Points with the Engineer such that the Engineer may observe Contractor's inspections on a scheduled basis. The Contractor shall provide the Engineer a minimum of two (2) hours of notice prior to conducting Hold Point Inspections. The Hold Points shall be as follows:
   a. Environment and Site Conditions. Prior to commencing an activity associated with coating system installation, the Contractor shall measure, record, and confirm acceptability of ambient air temperature and humidity as well as other conditions such as proper protective measures for surfaces not to be coated and safety requirements for personnel. The acceptability of the weather and/or environmental conditions within the structure shall be determined by the requirements specified by the CSM of the coating system being used.
   b. Conditions Prior to Surface Preparation. Prior to commencing surface preparation, the Contractor shall observe, record, and confirm that oil, grease, and/or soluble salts have been eliminated from the surface.
   c. Monitoring of Surface Preparation. Spot checking of degree of cleanliness, surface profile, and surface pH testing, where applicable. In addition, the compressed air used for surface preparation or blow down cleaning shall be checked to confirm it is free from oil and moisture.
   d. Post Surface Preparation – Upon completion of the surface preparation, the Contractor shall measure and inspect for proper degree of cleanliness and surface profile as specified in this Section 09 90 00 and in the CSM's written instructions.
   e. Monitoring of Coatings Application – The Contractor shall inspect, measure, and record the wet film thickness and general film quality (visual inspection) for lack of runs, sags, pinholes, holidays, etc. as the application work proceeds.
   f. Post Application Inspection – The Contractor shall identify defects in application work including pinholes, holidays, excessive runs or sags,

inadequate or excessive film thickness and other problems as may be observed.

g. Post Cure Evaluation – The Contractor shall measure and inspect the overall dry film thickness. The Contractor shall conduct a DFT survey, as well as perform adhesion testing, holiday detection, or cure testing as required based on the type of project and the specific requirements in this Section 09 90 00 and/or in the CSM's written instructions.

h. Follow-up to Corrective Actions and Final Inspection. The Contractor shall measure and reinspect corrective coating work performed to repair defects identified at prior Hold Points. This activity also includes final visual inspection along with follow-up tests such as holiday detection, adhesion tests, and DFT surveys.

1.03 DELIVERY AND STORAGE

A. General:

1. Materials shall be delivered to the job site in their original, unopened containers. Each container shall be properly labeled. Materials shall be handled and stored to prevent damage to or loss of label.
2. Labels on material containers shall show the following information:
   a. Name or title of product.
   b. CSM's batch number.
   c. CSM's name.
   d. Generic type of material.
   e. Application and mixing instructions.
   f. Hazardous material identification label.
   g. Shelf life expiration date.
3. Materials shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold in accordance with the CSM's recommendations. Flammable materials shall be stored in accordance with state and local requirements.
4. Containers shall be clearly marked indicating personnel safety hazards associated with the use of or exposure to the materials.
5. Material Safety Data Sheets (MSDS) for each material shall be provided to the Engineer.
6. The Contractor shall store and dispose of hazardous waste according to federal, state and local requirements. This requirement specifically addresses waste solvents and coatings.

1.04 SUBMITTALS

A. General:

1. Provide in accordance with Section 01 33 00:
   a. A copy of this specification section, with addendum updates included, and referenced and applicable sections, with addendum updates included, with each paragraph check-marked (☐) to indicate specification compliance or

marked to indicate requested deviations from specification requirements or those parts which are to be provided by the Contractor or others. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined shall signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for requested deviations to the specification requirements shall be cause for rejection of the entire submittal and no further submittal material will be reviewed.

b. CSM's current printed recommendations and product data sheets for coating systems including:
   1) Volatile organic compound (VOC) data.
   2) Surface preparation recommendations.
   3) Primer type, where required.
   4) Maximum dry and wet-mil thickness per coat.
   5) Minimum and maximum curing time between coats, including atmospheric conditions for each.
   6) Curing time before submergence in liquid.
   7) Thinner to be used with each coating.
   8) Ventilation requirements.
   9) Minimum atmospheric conditions during which the paint shall be applied.
   10) Allowable application methods.
   11) Maximum allowable moisture content.
   12) Maximum shelf life.
c. Affidavits signed and sealed by an officer of the CSM's corporation, attesting to full compliance of each coating system component with current and promulgated federal, state, and local air pollution control regulations and requirements.
d. Material Safety Data Sheets (MSDS) for materials to be delivered to the job site, including coating system materials, solvents, and abrasive blast media.
e. List of cleaning and thinner solutions allowed by the CSMs.
f. Storage requirements including temperature, humidity, and ventilation for Coating System Materials as recommended by the CSMs.
g. CSM's detailed, written instructions for coating system treatment and graphic details for coating system terminations in the structures to be coated including pipe penetrations, metal embedments, gate frames, and other terminations to be determined from the contract drawings. This information shall also include detail treatment for coating system at joints in concrete.
h. The Contractor and CSA shall provide a minimum of five project references each including contact name, address, and telephone number where similar coating work has been performed by their companies in the past five years.

1.05 RESPONSIBILITIES OF THE CTR

A. General:

1. The Contractor shall retain or obtain the services of the CTR to be on site to perform the Contractor and/or CSA application training and to routinely inspect and verify in writing that the application personnel have successfully performed surface preparation, filler/surface application, coating system application, and Quality Control Inspection in accordance with this Section 09 90 00 and to warrantable level of quality. This must include checking the required degree of cleanliness, surface pH for concrete substrates, surface profile of substrates, proper mixing of coating materials, application (including checking the wet and dry film thickness of the coating systems), proper cure of the coating systems, and proper treatment of coating systems at terminations, transitions, and joints and cracks in substrates. Refer to paragraph 1.05 Coating System Installation Training for further details on these CTR requirements. This inspection is in addition to the inspection performed by the Contractor in accordance with this Section 09 90 00.

B. Coating System Installation Training:

1. Provide a minimum of 8 hours of classroom and off site training for application and supervisory personnel (both the Contractor's and CSA's). Provide training to a minimum of two supervisory personnel from the CSA and one supervisor from the Contractor. Alternatively, the CTR shall provide a written letter from the CSM stating that the application personnel (listed by name) who shall perform coating work are approved by the CSM without further or additional training.
2. One CTR can provide training for up to fourteen application personnel and three supervisory personnel at one time. The training shall include the following as a minimum:
   a. A detailed explanation of mixing, application, curing, and termination details.
   b. Hands-on demonstration of how to mix and apply the coating systems.
   c. A detailed explanation of the ambient condition requirements (temperature and humidity) and surface preparation requirements for application of the coating system as well as a detailed explanation of re-coat times, cure times, and related ambient condition requirements.
   d. When training is performed, the CTR shall provide a written letter stating that training was satisfactorily completed by the personnel listed by name in the letter.

C. Coating System Inspection:

1. While on site to routinely inspect and verify, the CTR shall perform the following activities to confirm acceptability and conformance with the specifications:
   a. Inspect ambient conditions during various coating system installation at hold points for conformance with the specified requirements.
   b. Inspect the surface preparation of the substrates where the coating system will terminate or will be applied for conformance to the specified application criteria.
   c. Inspect preparation and application of coating detail treatment (for example, terminations at joints, metal embedments in concrete, etc.).

d. Inspect application of the filler/surface materials for concrete and masonry substrates.
e. Inspect application of the primers and finish coats including wet and dry film thickness of the coatings.
f. Inspect coating systems for cure.
g. Review adhesion testing of the cured coating systems for conformance to specified criteria.
h. Review coating system continuity testing for conformance to specified criteria.
i. Inspect and record representative localized repairs made to discontinuities identified via continuity testing.
j. Conduct a final review of completed coating system installation for conformance to the specifications.
k. Prepare and submit a site visit report following each site visit that documents the acceptability of the coating work in accordance with the CSM's Recommendations.

D. Final Report:
1. Upon completion of coating work for the project, the CTR shall prepare a final report. That report shall summarize daily test data, observations, drawings, and photographs in a report to be submitted in accordance with paragraph 2.02. Include substrate conditions, ambient conditions, and application procedures, observed during the CTR's site visits. Include a statement that the completed work was performed in accordance with the requirements of this Section 09 90 00 and the CSM's recommendations.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:
1. Notwithstanding the listing of product names in this Section 09 90 00, the Contractor shall provide affidavits, signed and sealed by an officer of the CSM's corporation, attesting to full compliance of each coating system component with current and promulgated federal, state, and local air pollution control regulations and requirements. No coatings shall be applied to a surface until the specified affidavits have been submitted and have been reviewed and accepted. Failure to comply with this requirement shall be cause for rejection and removal of such materials from the site.
2. The following list specifies the material requirements for coating systems. Coating systems are categorized by generic name followed by an identifying abbreviation. If an abbreviation has a suffix number, it is for identifying subgroups within the coating system. Coating Systems E-5 and E-6 shall be NSF 61 certified.

Material Requirements for Coating Systems: All of U.S. Except California

Coating System	CSM	First Coat(s)	Finish Coat(s)
Epoxy Coatings			
E-1	PPG PMC	Amerlock 2/400 Series	Amerlock 2/400 Series
	Carboline	Carboguard 890	Carboguard 890
	International Paint/ICI *	Devran 224 HS	Devran 224
	Sherwin Williams	Macropoxy 646	Macropoxy 646
	Tnemec	Series V69	Series V69
E-1-G	PPG PMC	Amerlock 2/400 Series	Amerlock 2/400 Series
	Carboline	Carboguard 894	Carboguard 894
	International Paint/ICI *	Devran 223/224HS	Devran 224HS
	Sherwin Williams	Macropoxy 646 Epoxy B67-600	Macropoxy 646 Epoxy B67-600
	Tnemec	Series V27 or V69	Series V69
E-2	PPG PMC	Amerlock 2/400 Series	Amerlock 2/400 Series
	Carboline	Carboguard 890	Carboguard 890
	International Paint/ICI	Bar-Rust 236	Bar-Rust 236
	Sherwin Williams	Sea Guard 6000 Epoxy N11-400	Sea Guard 6000 Epoxy N11-400
	Tnemec	Series V27 or V69	Series V69
E-3	PPG PMC	Amerlock 2/400 Series	Amerlock 2/400 Series
	Carboline	Carboguard 890	Carboguard 890
	International Paint/ICI	Bar-Rust 236	Bar-Rust 236
	Sherwin Williams	Sea Guard 6000 Epoxy N11-400	Sea Guard 6000 Epoxy N11-400
	Tnemec	Series V69	Series V69
E-4	PPG PMC	Amerlock 2/400 Series	Amerlock 2/400 Series
	Carboline	Carboguard 890	Carboguard 890
	International Paint/ICI	Bar-Rust 236	Bar-Rust 236
	Sherwin Williams	Macropoxy 646	Macropoxy 646
	Tnemec	Series V69	Series V69
E-5	PPG PMC	Amercoat 395FD	Amercoat 395FD
	Carboline	Carboguard 691	Carboguard 691
	International	Bar-Rust 233H	Bar-Rust 233H

Material Requirements for Coating Systems: All of U.S. Except California

Coating System	CSM	First Coat(s)	Finish Coat(s)
	Paint/ICI		
	Sherwin Williams	Macropoxy 646	Macropoxy 646
	Tnemec	Series V69	Series V69
E6	PPG PMC	Amercoat 395FD	Amercoat 395FD
	Carboline	Carboguard 691	Carboguard 691
	International Paint/ICI	Tru-Glaze 4408 - WB	Tru-Glaze 4408 - WB
	Sherwin Williams	Macropoxy 646	Macropoxy 646
	Tnemec	Series V69	Series V69
E7	PPG PMC	Amercoat 385	Amercoat 385
	Carboline	Sanitile 120	Carboguard 890
	International Paint/ICI	Bar-Rust 236	Bar-Rust 236
	Sherwin Williams	Macropoxy 646	Macropoxy 646
	Tnemec	Series V69	Series V69
E8	PPG PMC	Amercoat 385	Amercoat 385
	Carboline	Carboguard 1340	Carboguard 1340
	International Paint/ICI	Prep and Prime (Gripper)	Tru-Glaze 4408 - WB
	Sherwin Williams	Macropoxy 646	Macropoxy 646
	Tnemec	Series 201	Series 201
E-9	PPG PMC	Amercoat 395 FD	Amercoat 395 FD
	Carboline	Carboguard 890	Carboguard 890
	International Paint/ICI	Bar-Rust 231	Bar-Rust 231
	Sherwin Williams	Sea Guard 6000 Epoxy N11-400	Sea Guard 6000 Epoxy N11-400
	Tnemec	Series 104	Series 104
E-9-C	PPG PMC	Amercoat 395 FD	Amercoat 395 FD
	Carboline	Carboguard 890	Carboguard 890
	International Paint/ICI	Bar-Rust 231	Bar-Rust 231
	Sherwin Williams	Sea Guard 6000 Epoxy N11-400	Sea Guard 6000 Epoxy N11-400
	Tnemec	Series 104	Series 104

Material Requirements for Coating Systems: All of U.S. Except California

Coating System	CSM	First Coat(s)			Finish Coat(s)	
E-10	PPG PMC	Amerlock 2/400 Series			Amerlock 2/400 Series	
	Carboline	Carboguard 890			Carboguard 890	
	International Paint/ICI	Bar-Rust 236			Bar-Rust 236	
	Sherwin Williams	Macropoxy 646			Macropoxy 646	
	Tnemec	Series V69			Series V69	
Specialty Epoxy Linings						
EA-1	Carboline	Plasite 4500S			Plasite 4500S	
	Sauereisen	Sewergard 210S			Sewergard 210S	
	Tnemec	Series 435			Series 435	
Coating System	CSM	Base Coat	Filler/Surfacer		Glaze Coat	
EA-2	Carboline Carboguard	Plasite 4500S	Carboguard 510		Plasite 4500S	
	Sauereisen	Sewergard 210S	Series 209 HB		Sewergard 210S	
	Tnemec	Series 435	Series 218		Series 435	
EA-3	Carboline	N/A	Carboguard 510		Plasite 5371	
	Sauereisen	N/A	Series 209 HB		Sewergard 210T	
	Tnemec	N/A	Series 218		Series 434	
Coating System	CSM	Primer	Base Coat		Glaze Coat	
EA-4	Carboline	N/A	Plasite 5371		Plasite 4500S	
	Sauereisen	N/A	Sewergard 210T		Sewergard 210G	
	Tnemec	N/A	Series 434		Series 435	
Coating System	CSM	Primer	Filler/ Surfacer	Base Coat w/Scrim Cloth	Saturation Coat w/Silica Sand	Finish Coats
EA-5	Tnemec	Series 201	Series 218	Series 239	Series 239	Series 282
	Carboline	Semstone 110/110EP	Carboguard 510	Semstone 145	Semstone 145	Semstone 145
Elastomeric Coatings						
EC-1	Carboline	Carboguard 671			Polibrid 705 (2 coats)	
	Sherwin Williams	Corobond 100			Envirolastic 170 (2 coats)	
	Tnemec	Series 1			Series 406 (2 coats)	

Material Requirements for Coating Systems: All of U.S. Except California

Coating System	CSM	First Coat(s)		Finish Coat(s)
EC-2	Carboline	Carboguard 671		Polibrid 705 (2 coats)
	Sherwin Williams	Corobond 100		Envirolastic 520PW (2 coats)
	Tnemec	Series V69		Series 264
Epoxy Flooring Systems				
Coating System	CSM	Primer	Intermediate Coat	Finish Coat
EF-1	Stonhard	Stonhard Standard Primer	Stonshield Undercoat and Broadcoat	Stoneshield Sealer
	Tnemec	Series 238	Series 238 with Broadcoat	Series 284 Clear
EF-2	Stonhard	Stonhard Standard Primer	Stonclad GS	Stonkote GS-4
	Tnemec	Series 238	Series 238	Series 280
Epoxy Polyurethane				
		Primer Coat(s)	Intermediate Coat(s)	
EU-1	PPG PMC	Amercoat	Amercoat 385	Amercoat 450H
	Carboline	Carbozinc 859	Carboguard 890	Carbothane 134 VOC
	International Paint/ICI	Cathacoat 313	Devran 233 or 224HS	Devthane 379
	Sherwin Williams	Zinc Clad IV	Macropoxy 646	Hi Solids Polyurethane
	Tnemec	Series 90-97	Series V69	Series 1075
EU-1-FRP	PPG PMC	Amerlock 2/400 Series		Amershield VOC
	Carboline	Carbocrylic 120		Carbothane 134 VOC
	International Paint/ICI	Devran 223/224		Devthane 378H
	Sherwin Williams	Macropoxy 646		High Solids Polyurethane
	Tnemec	Series V27		Series 1075
Grease				
G	Texaco	N/A		Rust Inhibitive Grease
	Chevron	N/A		E.P. Roller Grease
High Heat				
HH-1	High Temperature	Hi Temp 1027		1000 VS (any color)

Material Requirements for Coating Systems: All of U.S. Except California

Coating System	CSM	First Coat(s)	Finish Coat(s)
	Coatings, Inc.		
HH-2	High Temperature Coatings, Inc.	Hi Temp 1027	1000 VS (black or aluminum)
Latex Acrylic			
L-1	PPG PMC	Amercoat 148	Amercoat 220
	Carboline	Carbocrylic 120	Carbocrylic 3359
	International Paint/ICI	UH Gripper 3210	Dulux Pro 1406
	Sherwin Williams	Loxon Acrylic Primer	Sher Cryl HPA
	Tnemec	Series 1028 or 1029	Series 1028 or 1029
L-2	PPG PMC	Amercoat 220	Amercoat 220
	Carboline	Carbocrylic 120	Carbocrylic 3359
	International Paint/ICI	Prep and Prime Gripper	Ultrahide 250-1406
	Sherwin Williams	Sher Cryl HPA	Sher Cryl HPA
	Tnemec	Series 1028 or 1029	Series 1028 or 1029
L-3	PPG PMC	Amercoat 148	Amercoat 220
	Carboline	Carbocrylic 3359 DTM	Carbocrylic 3359 DTM
	International Paint/ICI	Devflex 4020 PF	Dulux Pro 1406
	Sherwin Williams	Procryl Primer	Sher Cryl HPA
	Tnemec	Series 1028 or 1029	Series 1028 or 1029
L-4	PPG PMC	Amercoat 148	Amercoat 220
	Carboline	Sanitile 120	Sanitile 155
	International Paint/ICI	Prepared Prime Gripper	Ultrahide 250-1406
	Sherwin Williams	Prep Rite ProBlock	Sher Cryl HPA
	Tnemec	Series 1028 or 1029	Series 1028 or 1029
Miscellaneous			
M-1	Carboline	Carbowrap Priming Paste	Tape A, B, or C (temp. dependent)
	Denso	Denso Paste	Densyl Tape
	Trenton	Waxtape Primer	#1 Wax Tape
M-2	Carboline	Carbomastic 15	Carbomastic 15

Material Requirements for Coating Systems: All of U.S. Except California

Coating System	CSM	First Coat(s)	Finish Coat(s)
	International Paint/ICI	Bar-Rust 231 (231K 9100)	Bar-Rust 231 (231K 9100)
	Sherwin Williams	Epoxy Mastic Aluminum II	Epoxy Mastic Aluminum II
	Tnemec	Series 135 (1243)	Series 135 (1243)
Penetrating Stain			
	CSM	Primer	Finish
S-1	Carboline	Carbocrete Sealer WB	Carbocrete Sealer WB
	International Paint/ICI	Groundworks	Groundworks
	Sherwin Williams	H&C Acrylic Concrete Stain	H&C Acrylic Concrete Stain
	Tnemec	Series 617	Series 617
S-2	Tnemec	N/A	Series 636 Dur A Pell 20
	Curecrete Chemical Company	N/A	Ashford Formula
S-3	Tnemec	N/A	Series V626 Dur A Pell GS
S-4	Tnemec Professional Products of Kansas	N/A N/A	Series V626 Dur A Pell GS PWS-15 Super

**See CSM's Product Data Sheets for acceptable thinners for VOC compliance or do not thin.*

2.02 PRODUCT DATA

A. General:

1. Prior to application of coatings, submit letter(s) from the CTR(s) identifying the application personnel who have satisfactorily completed training as specified in paragraph 1.05 or a letter from the CSM stating that personnel who shall perform the work are approved by the CSM without need for further or additional training.
2. Submit reports specified in paragraph 1.02 Quality Control Requirements and 1.05 Coating System Inspection when the work is underway.
3. Submit the Coating System Inspection Checklists, using Form 09 90 00-A, included in Section 01 99 90, for the coating work.
4. CTR final report in accordance with paragraph 1.05 Final Report.

2.03 SPARE SUPPLIES

A. The Contractor shall provide one unbroken gallon container of each color and type of paint and each type of solvent and thinner required by the specification. These spare paint supplies shall be stored as required in paragraph 1.03 until delivery is requested by the Engineer.

PART 3 EXECUTION

3.01 COATINGS

A. General:
   1. Coating products shall not be used until the Engineer has accepted the affidavits specified in paragraphs 1.04 and 2.01, the Engineer has inspected the materials, and the CTR has trained the Contractor and CSA in the surface preparation, mixing and application of each coating system.
   2. Erect and maintain protective enclosures as stipulated per SSPC-Guide 6 Guide for Containing Debris Generated During Paint Removal Operations.

B. Shop and Field Coats:
   1. Shop Applied Prime Coat: Except as otherwise specified, prime coats may be shop-applied or field-applied. Shop-applied primer shall be compatible with the specified coating system and shall be applied at the minimum dry film thickness recommended by the CSM. Data sheets identifying the shop primer used shall be provided to the on-site coating application personnel. Adhesion tests shall be performed on the shop primer as specified in paragraph 3.01 Adhesion Confirmation. Damaged, deteriorated and poorly applied shop coatings that do not meet the requirements of this Section 09 90 00 shall be removed and the surfaces recoated. If the shop primer coat meets the requirements of this Section 09 90 00, the field coating may consist of touching up the shop prime coat and then applying the finish coats to achieve the specified film thickness and continuity.
   2. Field Coats: Field coats shall consist of one or more prime coats and one or more finish coats to build up the coating to the specified dry film thickness. Unless otherwise specified, finish coats shall not be applied until other work in the area is complete and until previous coats have been inspected.
   3. Adhesion Confirmation: The Contractor shall perform an adhesion test after proper cure in accordance with ASTM D3359 to demonstrate that (1) the shop applied prime coat adheres to the substrate, and (2) the specified field coatings adhere to the shop coat. Test results showing an adhesion rating of 5A on immersed surfaces and 4A or better on other surfaces shall be considered acceptable for coatings 5 mils or more in thickness (Method A). Test results showing an adhesion rating of 5B on immersed surfaces and 4B or better on other surfaces shall be considered acceptable for coating thicknesses less than 5 mils.

C. Application Location Requirements:
   1. Equipment, Nonimmersed: Items of equipment, or parts of equipment that are not immersed in service, shall be shop primed and then finish coated in the field after

installation with the specified or acceptable color. If the shop primer requires topcoating within a specified period, the equipment shall be finish coated in the shop and then touch-up painted after installation. If equipment removal and reinstallation is required for the project, touch-up coating work shall be performed in the field following installation.

2. Equipment, Immersed: Items of equipment, or parts and surfaces of equipment that are immersed when in service, with the exception of pumps and valves, shall have surface preparation and coating work performed in the field. Coating systems applied to immersed equipment shall be pinhole free.

3.02 PREPARATION

A. General:

1. Surface preparations for each type of surface shall be in accordance with the specific requirements of each coating specification sheet (COATSPEC) and the following. In the event of a conflict, the COATSPEC sheets shall take precedence.
2. Surfaces to be coated shall be clean and dry. Before applying coating or surface treatments, oil, grease, dirt, rust, loose mill scale, old weathered coatings, and other foreign substances shall be removed. Oil and grease shall be removed before mechanical cleaning is started. Where mechanical cleaning is accomplished by blast cleaning, the abrasive used shall be washed, graded and free from contaminants that might interfere with the adhesion of the coatings. The air used for blast cleaning shall be sufficiently free of oil and moisture so as not to cause detrimental contamination of the surfaces to be coated.
3. Where deemed necessary by the Owner’s representative, a NACE International certified coatings inspector, provided by the Owner, will inspect and approve surfaces to be coated before application of a coating. Surface defects identified by the inspector shall be corrected by the Contractor at no additional cost to the Owner.
4. Cleaning and painting shall be scheduled so that dust and spray from the cleaning process shall not fall on wet, newly coated surfaces. Hardware, hardware accessories, nameplates, data tags, machined surfaces, sprinkler heads, electrical fixtures, and similar uncoated items which are in contact with coated surfaces shall be removed or masked prior to surface preparation and painting operations. Following completion of coating, removed items shall be reinstalled. Equipment adjacent to walls shall be disconnected and moved to permit cleaning and painting of equipment and walls and, following painting, shall be replaced and reconnected.

B. Blast Cleaning:

1. When abrasive blast cleaning is required to achieve the specified surface preparation the following requirements for blast cleaning materials and equipment shall be met:
   a. Used or spent blast abrasive shall not be reused on this project.
   b. The compressed air used for blast cleaning shall be filtered and shall contain no condensed water and no oil. Moisture traps shall be cleaned at least once every four hours or more frequently as required to prevent moisture from entering the supply air to the abrasive blasting equipment.

c. Oil separators shall be installed just downstream of compressor discharge valves and at the discharge of the blast pot discharges. These shall be checked on the same frequency as the moisture traps as defined above.

d. Regulators, gauges, filters, and separators shall be in use on compressor air lines to blasting nozzles times during this work.

e. An air dryer or desiccant filter drying unit shall be installed which dries the compressed air prior to blast pot connections. This dryer shall be used and maintained for the duration of surface preparation work.

f. The abrasive blast nozzles used shall be of the venturi or other high velocity type supplied with a minimum of 100 psig air pressure and sufficient volume to obtain the blast cleaning production rates and cleanliness/specified.

g. The Contractor shall provide ventilation for airborne particulate evacuation (meeting pertinent safety standards) to optimize visibility for both blast cleaning and inspection of the substrate during surface preparation work.

h. If, between final surface preparation work and coating system application, contamination of prepared and cleaned metallic substrates occurs, or if the prepared substrates' appearance darkens or changes color, recleaning by water blasting, reblasting and abrasive blast cleaning shall be required until the specified degree of cleanliness is reclaimed.

i. The Contractor is responsible for dust control and for protection of mechanical, electrical, and other equipment adjacent to and surrounding the work area.

C. Solvent Cleaning:

1. Any solvent wash, solvent wipe, or cleaner used, including but not limited to those used for surface preparation in accordance with SSPC SP-1 Solvent Cleaning and shall be of the emulsifying type which emits no more than 340 g/l VOCs for AIM regions, 250 g/l for CARB regions and 100 g/l for SCAQMD regions, contains no phosphates, is biodegradable, removes no zinc, and is compatible with the specified primer.

2. Clean white cloths and clean fluids shall be used in solvent cleaning.

D. Metallic Surfaces:

1. Metallic surfaces shall be prepared in accordance with applicable portions of surface preparation specifications of the Society for Protective Coatings (SSPC) specified for each coating system. See Coat Spec for each coating system in this Section 09 90 00. The profile depth of the surface to be coated shall be in accordance with the COATSPEC requirements in this Section measured by Method C of ASTM D4417. Blast particle size shall be selected by the Contractor to produce the specified surface profile. The solvent in solvent cleaning operations shall be as recommended by the CSM.

2. Preparation of metallic surfaces shall be based upon comparison with SSPC-VIS1-89 (ASTM D2200), and as described in the Coat Spec for each coating system. If dry abrasive blast cleaning is selected and to facilitate inspection, the Contractor shall, on the first day of cleaning operations, abrasive blast metal panels to the standards specified. Plates shall measure a minimum of 8-1/2 inches by 11 inches. Panels meeting the requirements of the specifications shall be initialed by the Contractor and the Engineer and coated with a clear non-

yellowing finish. One of these panels shall be prepared for each type of abrasive blasting and shall be used as the comparison standard throughout the project.

3. Blast cleaning requirements for steel, ductile iron and stainless steel substrates are as follows:
   a. Steel piping shall be prepared in accordance with SSPC SP-6 (Commercial Blast Cleaning) and primed before installation. Ductile iron piping surfaces including fittings shall be prepared in accordance with NAPF 500-03, NAPF 500-03-04, and NAPF 500-03-05.
   b. Stainless steel surfaces shall be abrasive blast cleaned to leave a clean uniform appearance with a minimum surface profile of 1.5 to 2.5 mils that is uniform.
   c. Remove traces of grit, dust, dirt, rust scale, friable material, loose corrosion products or embedded abrasive from substrate by vacuum cleaning prior to coating application.
   d. Care must be taken to prevent contamination of the surface after blasting from worker's fingerprints, deleterious substances on workers' clothing, or from atmospheric conditions.
   e. Ambient environmental conditions in the enclosure must be constantly monitored and maintained to ensure the degree of cleanliness is held and no "rust back" occurs prior to coating material application.

E. Concrete Surfaces:
   1. Inspection of concrete surfaces prior to surface preparation and surface preparation of concrete surfaces shall be performed in accordance with SSPC-SP13 (also called NACE 6).
   2. Prepare substrate cracks, areas requiring resurfacing and perform detail treatment including but not limited to, terminating edges, per CSM recommendations. This shall precede surface preparation for degree of cleanliness and profile.
   3. The surface profile for prepared concrete surfaces to be coated shall be evaluated by comparing the profile of the prepared concrete with the profile of graded abrasive paper, as described in ANSI B74.18 or by comparing the profile with the ICRI 03732 (surface profile replicas). Surface profile requirements shall be in accordance with the Coat Spec requirements and the CSM's recommendations.
   4. Surface cleanliness of prepared concrete substrates shall be inspected after cleaning, preparation, and/or drying, but prior to making repairs or applying a coat in the coating system. If concrete surfaces are repaired, they shall be reinspected for surface cleanliness prior to application of the coating system.
   5. Surface preparation of concrete substrates shall be accomplished using methods such as dry abrasive blast cleaning, high, or ultra high-pressure water blast cleaning in accordance with SSPC-SP-13. The selected cleaning method shall produce the requirements set forth below.
      a. A clean substrate that is free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances shall be achieved. Blast cleaning and other means necessary shall be used to open up air voids or bugholes to expose their complete

perimeter. Leaving shelled over, hidden air voids beneath the exposed concrete surface is not acceptable. Concrete substrate must be dry prior to the application of filler/surface or coating system materials.

b. Acceptable surface preparation must produce a concrete surface with a minimum pH of 8.0 to be confirmed by surface pH testing. If after surface preparation, the surface pH remains below 8.0, perform additional water blasting, cleaning, or abrasive blast cleaning until additional pH testing indicates an acceptable pH level.

c. Following inspection by the Contractor of the concrete surface preparation, thoroughly vacuum clean concrete surfaces to be coated to remove loose dirt, and spent abrasive (if dry blast cleaning is used) leaving a dust free, sound concrete substrate. Debris produced by blast cleaning shall be removed from the structures to be coated and disposed of legally off site by the Contractor.

6. Should abrasive blast cleaning or high or ultrahigh pressure water blasting not remove degraded concrete, chipping or other abrading tools shall be used to remove the deteriorated concrete until a sound, clean substrate is achieved which is free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances. Concrete substrates must be dry prior to the application of filler/surfacers or coating system materials.

7. Surface cleanliness of prepared concrete substrates shall be inspected after cleaning, preparation, and/or drying, but prior to application of coating materials. If concrete surfaces are repaired, they shall be reinspected for surface cleanliness and required surface profile prior to application of the coating system.

8. Moisture content of concrete to be coated shall be tested in accordance with ASTM D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method and ASTM F 1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride. The ASTM D4263 plastic sheet test shall be conducted at least once for every 500 sq. ft. of surface area to be coated. The presence of any moisture on plastic sheet following test period constitutes a non-acceptable test. For concrete surfaces to be coated which are on the negative or back side of concrete walls or structures exposed to soils (back filled) or immersed and waterproofed in accordance with Section 07 10 00, perform calcium chloride tests in accordance with ASTM F-1869 once for each 500 sq. ft. of surface area to be coated. Comply with CSM's written recommendations regarding acceptance/non-acceptance of moisture vapor emissions.

F. Masonry Surfaces:

1. Prepare masonry surfaces such as Concrete Masonry Units (CMU) to remove chalk, loose dirt, dried mortar splatter, dust, peeling, or loose existing coatings, or otherwise deleterious substances to leave a clean, sound substrate.

2. Be certain masonry surfaces are dry prior to coating application. If pressure washing or low-pressure water blast cleaning is used for preparation, allow the masonry to dry for at least 5 days under dry weather conditions or when the minimum ambient temperature is 70 degrees F prior to coating application work.

G. Fiberglass Reinforced Plastic (FRP) Surfaces:
   1. Prepare FRP surfaces by sanding to establish uniform surface roughness and to remove gloss from the resin in the FRP. Next, vacuum clean to remove loose FRP dust, dirt, and other materials. Next, solvent clean using clean white rags and allow solvent to evaporate completely before application of coating materials.

H. Existing Facilities:
   1. Existing equipment and metalwork shall be coated in accordance with the appropriate coating system specified for new work in paragraph 3.05 COATSPEC.
   2. Modified work shall require the full coating system. Other work shall require cleaning and surface preparation as recommended by the CSM followed by two finish coats of the appropriate system.
   3. Contractor shall demonstrate that the existing coating is compatible with field coating by performing the adhesion test specified in paragraph 3.01 COATINGS. Where unacceptable test results are obtained, the Contractor shall follow manufacturer's written instructions as to the necessity of a tie coat to provide a satisfactory bond between the existing coating and the specified field coating.
   4. Abrasive blasting shall be used to clean wall surfaces of existing process channels and tanks to be coated. Surfaces to be coated, or recoated, shall be repaired, cleaned, and finished to the standards as specified herein and in Section 03 30 00 for new concrete. Major repair work for wall surfaces of (specify surfaces) shall be as specified in Section 03 30 00.

3.03 APPLICATION

A. Workmanship:
   1. Coated surfaces shall be free from runs, drips, ridges, waves, laps, and brush marks. Coats shall be applied to produce an even film of uniform thickness completely coating corners and crevices.
   2. The Contractor's equipment shall be designed for application of the materials specified. Compressors shall have suitable traps and filters to remove water and oils from the air. A paper blotter test shall be performed by the Contractor when requested by the Engineer to determine if the air is sufficiently free of oil and moisture so as not to produce deteriorating effects on the coating system. The amount of oil and moisture in spray air shall be less than the amount recommended by the CSM. Spray equipment shall be equipped with mechanical agitators, pressure gages, and pressure regulators, and spray nozzles of the proper sizes.
   3. Each coat of coating material shall be applied evenly and sharply cut to line. Care shall be exercised to avoid overspraying or spattering paint on surfaces not to be coated. Glass, hardware, floors, roofs, and other adjacent areas and installations shall be protected by taping, drop cloths, or other suitable measures.
   4. Coating applications method shall be conventional or airless spray, brush or roller, or trowel as recommended by CSM.
   5. Allow each coat to cure or dry thoroughly, according to CSM's printed instructions, prior to recoating.
   6. Vary color for each successive coat for coating systems when possible.

7. When coating complex steel shapes, prior to overall coating system application, stripe coat welds, edges of structural steel shapes, metal cut-outs, pits in steel surfaces, or rough surfaces with the primer coat. This involves applying a separate coat using brushes or rollers to ensure proper coverage. Stripe coat via spray application is not permitted.

B. Coating Properties, Mixing and Thinning:

1. Coatings, when applied, shall provide a satisfactory film and smooth even surface. Glossy undercoats shall be lightly sanded to provide a surface suitable for the proper application and adhesion of subsequent coats. Coating materials shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings consisting of two or more components shall be mixed in accordance with the CSM's instructions. Where necessary to suit the conditions of the surface, temperature, weather and method of application, the coating may be thinned as recommended by the CSM immediately prior to use. The volatile organic content (VOC) of the coating as applied shall comply with prevailing air pollution control regulations. Unless otherwise specified, coatings shall not be reduced more than necessary to obtain the proper application characteristics. Thinner shall be as recommended by the CSM.

C. Atmospheric Conditions:

1. Coatings shall be applied only to surfaces that are dry, and only under conditions of evaporation rather than condensation. Coatings systems shall not be applied during rainy, misty weather, or to surfaces upon which there is frost or moisture condensation. During damp weather, when the temperature of the surface to be coated is within 10 degrees F of the dew point, forced dehumidification equipment may be used to maintain a temperature of minimum 40 degrees F and 10 degrees F above the dew point for the surfaces to be coated, the coated surface, and the atmosphere in contact with the surface. These conditions shall be maintained for a period of at least 8 hours or as recommended by the CSM. Where conditions causing condensation are severe, dehumidification equipment, fans, and/or heaters shall be used inside enclosed areas to maintain the required atmospheric and surface temperature requirements for proper coating application and cure.

D. Concrete Substrate Temperatures and Detail Treatment:

1. When the surface temperatures of the concrete substrates to be coated are rising or when these substrates are in direct sunlight, outgassing of air from the concrete may result in bubbling, pinhole formations, and/or blistering in the coating system. The application of the filler/surface and the coating system will only be allowed during periods of falling temperature. This will require that application of the filler/surface and coating system shall only occur during the cooler evening hours. Contractor shall include any cost for working outside of normal hours in the bid.
2. Should bubbles, pinholes, or discontinuities form in the applied coating system material, they shall be repaired as recommended by the CSM. Should pinholes develop in the filler/surfacer material or in the first coat of the coating material, the pinholes shall be repaired in accordance with the CSM's recommendations prior to application of the next coat of material. Whenever pinholes occur, the air

void behind or beneath the pinhole shall be opened up completely and then completely filled with the specified filler/surfacer material. Next, the coated area around the pinhole repair shall be abraded and the coating reapplied over that area.

3. Perform application detail work per CSM's current written recommendations and/or drawings.

E. Protection of Coated Surfaces:

1. Items that have been coated shall not be handled, worked on, or otherwise disturbed, until the coating is completely dry and hard. After delivery at the site, and upon permanent erection or installation, shop-coated metalwork shall be recoated or retouched with specified coating when it is necessary to maintain the integrity of the film.

F. Method of Coating Application:

1. Where two or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors. Color additives shall not contain lead, or lead compounds, which may be destroyed or affected by hydrogen sulfide or other corrosive gas, and/or chromium.
2. Mechanical equipment, on which the equipment manufacturer's coating is acceptable, shall be touch-up primed and coated with two coats of the specified coating system to match the color scheduled. Electrical and instrumentation equipment specified in Divisions 26 and 40 shall be coated as specified in paragraph 3.03 Electrical and Instrumentation Equipment and Materials.
3. Coatings shall not be applied to a surface until it has been prepared as specified. The primer or first coat shall be applied by brush to ferrous surfaces that are not blast-cleaned. Coats for blast-cleaned ferrous surfaces and subsequent coats for nonblast-cleaned ferrous surfaces may be either brush or spray applied. After the prime coat is dry, pinholes and holidays shall be marked, repaired in accordance with CSM's recommendations and retested before succeeding coats are applied. Unless otherwise specified, coats for concrete and masonry shall be brushed, rolled, or troweled.

G. Film Thickness and Continuity:

1. WFT of the first coat of the coating system and subsequent coats shall be verified by the Contractor, following application of each coat.
2. The surface area covered per gallon of coating for various types of surfaces shall not exceed those recommended by the CSM. The first coat, referred to as the prime coat, on metal surfaces refers to the first full paint coat and not to solvent wash, grease emulsifiers or other pretreatment applications. Coatings shall be applied to the thickness specified, and in accordance with these specifications. Unless otherwise specified, the average total thickness (dry) of a completed protective coating system on exposed metal surfaces shall be not less than 1.25 mils per coat. The minimum thickness at any point shall not deviate more than 25 percent from the required average. Unless otherwise specified, no less than two coats shall be applied.
3. In testing for continuity of coating about welds, projections (such as bolts and nuts), and crevices, the Engineer shall determine the minimum conductivity for

smooth areas of like coating where the dry-mil thickness has been accepted. This conductivity shall be the minimum required for these rough or irregular areas. Pinholes and holidays shall be recoated to the required coverage.

4. The ability to obtain specified film thickness is generally compromised when brush or roller application methods are used and, therefore, more coats may need to be applied to achieve the specified dry film thickness.
5. For concrete substrates, the Contractor shall apply a complete skim coat of the specified filler/surfacer material over the entire substrate prior to application of the coating system. This material shall be applied such that all open air voids and bugholes in the concrete substrate are completely filled prior to coating application.

H. Special Requirements:

1. Before erection, the Contractor shall apply all but the final finish coat to interior surfaces of roof plates, roof rafters and supports, pipe hangers, piping in contact with hangers, and contact surfaces that are inaccessible after assembly. The final coat shall be applied after erection. Structural friction connections and high tensile bolts and nuts shall be coated after erection. Areas damaged during erection shall be hand-cleaned or power-tool cleaned and recoated with primer coat prior to the application of subsequent coats. Touch-up of surfaces shall be performed after installation. Surfaces to be coated shall be clean and dry at the time of application. Except for those to be filled with grout, the underside of equipment bases and supports that have not been galvanized shall be coated with at least two coats of primer specified for system E-2 prior to setting the equipment in place. Provide coating system terminations at leading edges and transitions to other substrates in accordance with the CSM’s recommendations or detail drawings.

I. Electrical and Instrumentation Equipment and Materials:

1. Electrical and instrumentation equipment and materials shall be coated by the equipment manufacturer as specified below.
   a. Finish: Electrical equipment shall be treated with zinc phosphate, bonderized or otherwise given a rust-preventive treatment. Equipment shall be primed, coated with enamel, and baked. Minimum dry film thickness shall be 3 mils.
      1) Unless otherwise specified, instrumentation panels shall be coated with system E-1 for indoor mounting and system EU-1 for outdoor mounting.
      2) Before final acceptance, the Contractor shall touch up scratches on equipment with identical color coating. Finish shall be smooth, free of runs, and match existing finish. Prior to touching up scratches, Contractor shall fill them with an appropriate filler material approved by the CSM.
   b. Color: Exterior color of electrical equipment shall be FS 26463 (ANSI/NSF 61) light gray. Interior shall be painted FS 27880 white. Nonmetallic electrical enclosures and equipment shall be the equipment manufacturer's standard grey color.
      1) Exterior color of instrumentation panels and cabinets mounted indoors shall be FS 26463 light gray; unless otherwise specified, exterior color for cabinets mounted outdoors shall be FS 27722, white. Cabinet interiors shall be FS 27880, white.

J. Soluble Salt Contamination of Metallic Substrates:

1. Contractor shall test in accordance with SSPC-TU-4 metallic substrates to be coated that have been exposed to seawater or coastal air or to industrial fallout of particulate or other sources of soluble chlorides (such as wastewater exposure). If testing indicates detrimental levels of soluble salts, those in excess of 25 ppm, the Contractor shall clean and prepare these surfaces to remove the soluble salts.

3.04 CLEANUP

A. General:

1. Upon completion of coating, the Contractor shall remove surplus materials, protective coverings, and accumulated rubbish, and thoroughly clean surfaces and repair overspray or other coating-related damage.

3.05 COATING SYSTEM SPECIFICATION SHEETS (COATSPEC)

A. General:

1. Coating systems for different types of surfaces and general service conditions for which these systems are normally applied are specified on the following COATSPEC sheets. Surfaces shall be coated in accordance with the COATSPEC to the system thickness specified. Coating systems shall be as specified in paragraph 3.06. In case of conflict between the schedule and the COATSPECS, the requirements of the schedule shall prevail.
2. Coating Specification Sheets included in Table A are included this paragraph 3.05.

Table A Coating Specification Sheets

Coating System ID	Coating Material	Surface	Service Condition
E-1	Epoxy	Metal	Interior; exterior, covered, not exposed to direct sunlight, non-corrosive exposure.
E-2	Epoxy	Metal	Immersed, nonpotable; non-immersed, moderately corrosive environment, color required.
E-4	Epoxy	Concrete, masonry, plaster, gypsum board	Interior
E-7	Epoxy	Plastic	Interior; exterior covered, not exposed to direct sunlight.
EA-1	Blended Amine Cured Epoxy	Metal	Immersed, nonpotable; non-immersed, corrosive environment, color not required especially for headspace environments that are corrosive due to biogenic sulfide corrosion.

Table A Coating Specification Sheets

Coating System ID	Coating Material	Surface	Service Condition
G	Grease	Metal	Ferrous Metal: Ferrous metal surfaces shall be prepared in accordance with SSPC SP-1 (Solvent Cleaning.)
L-1	Latex	Concrete, masonry, plaster, gypsum board	Interior and Exterior including existing exterior coated concrete.
L-2	Latex	PVC and CPVC pipe	Exterior, direct sunlight exposure.
M-1	Petrolatum based mastic or wax based wrapping tapes	Metal	Below grade (buried) or where little to no surface preparation can be performed on piping or structural steel.
M-2	Epoxy mastic or equal	Ferrous Metal	Interior, corrosive environment, confined enclosures, where minimal surface preparation is possible.
EU-1	Zinc-epoxy-polyurethane system	Ferrous Metal	Exterior, exposed to direct sunlight, moderately corrosive non-immersed.
S-1	Penetrating acrylic stain, color required	Concrete	Non-immersed, exposure to moisture and sunlight.
S-2	Silane/Siloxane or Blended Sealer	Concrete Floors	Wet, non-immersed, non-corrosive. Interior or exterior for waterproofing.

Coating System Specification Sheets (COATSPEC)	
A. Coating System Identification: E-1	
1. Coating Material:	Epoxy
2. Surface:	Metal
3. Service Condition:	Interior; exterior, covered, not exposed to direct sunlight, non-corrosive exposure.
4. Surface Preparation:	
a. General:	Shop primed surfaces which are to be incorporated in the work shall be prepared in the field by cleaning surfaces in accordance with SSPC SP-2 (Hand Tool Cleaning). Damaged shop coated areas shall be cleaned in accordance with SSPC SP-5 (White Metal Blast Cleaning) to achieve a uniform surface profile of 2.0 to 2.5 mils and spot primed with the primer specified. Shop epoxy primed surfaces shall require light abrasive and vacuum cleaning blasting prior to receiving finish coats.
b. Ferrous Metal:	Bare ferrous metal surfaces shall be prepared in accordance with SSPC SP-6 (Commercial Blast Cleaning) to achieve a uniform, surface profile of 2.0 to 2.5 mils.
	Ferrous metal with rust bleeding shall be cleaned in accordance with SSPC SP-1 (Solvent Cleaning). Areas of rust penetration shall be spot blasted to SSPC SP-10 (Near White Blast) (to achieve the 2.0- to 2.5-mil surface profile) and spot primed with the specified primer. For ductile iron surfaces, refer to the requirements in paragraph 3.02 Metallic Surfaces.
c. Nonferrous and Galvanized Metal:	Nonferrous and galvanized metal shall be prepared in accordance with SSPC SP-7 (Brush-off Blast Cleaning) to achieve uniform, minimum surface profile 1.0 to 1.5 mils.
5. Application:	Field
a. General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
b. Ferrous Metal:	Prime coats shall be an epoxy primer compatible with the specified finish coats and applied in accordance with the written instructions of the CSM.
c. Nonferrous and Galvanized Metal:	Nonferrous and galvanized metal shall be cleaned prior to the application of the prime coat in accordance with SSPC SP-1 (Solvent Cleaning).
6. System Thickness:	10 mils dry film.
7. Coatings:	
a. Primer:	One coat at CSM's recommended dry film thickness.
b. Finish:	One or more coats at CSM's recommended dry film thickness per coat to achieve the specified system thickness.

Coating System Specification Sheets (COATSPEC)	
B. Coating System Identification: E-1-G	
1. Coating Material:	Epoxy
2. Surface:	Galvanized Steel
3. Service Condition:	Interior; exterior, covered, non-corrosive exposure. Do not use in immersion service.
4. Surface Preparation:	
a. General:	Damaged galvanized steel areas with exposed ferrous metal and/or rusted shall be cleaned in accordance with SSPC SP-5 (White Metal Blast Cleaning) or Power Tool Cleaned to Bare Metal in accordance with SSPC-SP-11 to achieve a uniform 1.0- to 1.5-milprofile and spot primed with the primer specified.
b. Galvanized Metal:	Nonferrous and galvanized metal shall be prepared in accordance with SSPC SP-7 (Brush-off Blast Cleaning) impart a 1- to 2-milprofile to the galvanized steel surfaces. Where this cannot be performed, prepare by abrading in accordance with SSPC-SP-3, Power Tool Cleaning to impart a 1.0- to 1.5-mil profile uniformly to the galvanized steel surfaces.
5. Application:	Field
a. General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
b. Galvanized Metal:	Nonferrous and galvanized metal shall be cleaned prior to the application of the prime coat in accordance with SSPC SP-1 (Solvent Cleaning).
6. System Thickness:	5 to 8 mils dry film.
7. Coatings:	
a. Primer:	One coat at CSM's recommended dry film thickness.
b. Finish:	One or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.
	If the coated galvanized steel is to be exposed to ultraviolet light, apply one polyurethane top coat from coating system EU-1 over the second coat of the two epoxy coats specified.
C. Coating System Identification: E-2	
1. Coating Material:	Epoxy
2. Surface:	Metal
3. Service Condition:	Immersed, nonpotable; non-immersed, moderately corrosive environment, color required.
4. Surface Preparation:	
a. Ferrous Metal:	Ferrous metal surfaces shall be prepared in accordance with SSPC SP-5 (White Metal Blast Cleaning) to achieve a uniform surface profile of 2.0 to 2.5 mils.

Coating System Specification Sheets (COATSPEC)	
	Damaged shop coating shall be cleaned in accordance with SSPC SP-5 (White Metal Blast Cleaning) and vacuum cleaning and spot primed with the primer specified. Shop epoxy primed surfaces shall require light abrasive blasting or abrading prior to receiving finish coats if the maximum recoat time for the primer has been exceeded. This cleaning must produce a uniform 1.0- to 1.5-mil profile in the intact shop primer. For ductile iron surfaces, refer to the requirements in paragraph 3.02 Metallic Surfaces.
b. Nonferrous and Galvanized Metal:	Nonferrous and galvanized metal shall be prepared in accordance with SSPC SP-7 (Brush-off Blast Cleaning) to achieve a uniform surface profile of 1.0 to 1.5 mils. Galvanized steel with this E-2 coating system shall not be used in immersion service in wastewater.
5. Application:	Field
a. General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
b. Ferrous Metal:	Prime coat shall be an epoxy primer compatible with the specified finish coats.
c. Nonferrous and Galvanized Metal:	Nonferrous and galvanized metal, non-immersed, shall be coated prior to the application of the prime coat with a grease emulsifying agent in accordance with the CSM's written instructions. Nonferrous metal to be immersed shall not be painted. Galvanized metal shall not be immersed even if it is painted.
6. System Thickness:	16 mils dry film.
7. Coatings:	
a. Primer:	One coat at CSM's recommended dry film thickness.
b. Finish:	Two or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.
D. Coating System Identification: E-3 (NOT USED)	
E. Coating System Identification: E-4 (NOT USED)	
F. Coating System Identification: E-5 (NSF 61 certified) (NOT USED)	
G. Coating System Identification: E-6 (NSF 61 certified) (NOT USED)	
H. Coating System Identification: E-7	
1. Coating Material:	Epoxy
2. Surface:	Plastic
3. Service Condition:	Interior; exterior covered, not exposed to direct sunlight.
4. Surface Preparation:	Plastic shall be prepared in accordance with SSPC SP-1 (Solvent Cleaning) and light sanding to produce a uniform surface roughness(uniform surface profile of 1.0 to 1.5 mils) on the plastic.

Coating System Specification Sheets (COATSPEC)	
5. Application:	Field
6. System Thickness:	5 mils dry film.
7. Coatings:	One or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.
I. Coating System Identification: E-8 (NOT USED)	
J. Coating System Identification: E-9 (NOT USED)	
K. Coating System Identification: E-9-C (NOT USED)	
L. Coating System Identification: E-10 (NOT USED)	
M. Coating System Identification: EF-1 (NOT USED)	
N. Coating System Identification: EF-2 (NOT USED)	
O. Coating System Identification: EA-1	
1. Coating Material:	Blended Amine Cured Epoxy
2. Surface:	Metal
3. Service Condition:	Immersed, nonpotable; non-immersed, corrosive environment, color not required especially for headspace environments that are corrosive due to biogenic sulfide corrosion.
4. Surface Preparation:	
a. Ferrous Metal:	Ferrous metal surfaces shall be prepared in accordance with SSPC SP-5 (White Metal Blast Cleaning) to achieve a uniform surface profile of 3.0 to 3.5 mils. Blast Cleaning shall produce a minimum surface profile of 3.0 mils.
	Shop primed surfaces which are to be incorporated in the work shall be prepared in the field by cleaning surfaces in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal). Damaged shop coated areas shall be cleaned in accordance with SSPC SP-5 (White Metal Blast Cleaning) and spot primed with the primer specified. Shop epoxy primed surfaces shall require light abrasive blasting and blow down cleaning prior to receiving finish coats. Cast or ductile iron surfaces to be coated shall be abrasive blast cleaned to a clean, gray uniform metal appearance free of variations in color and loose materials. Ductile iron surfaces shall be prepared in accordance with paragraph 3.02 Metallic Surfaces.
b. Nonferrous and Galvanized Metal:	Nonferrous and galvanized metal shall be prepared in accordance with SSPC SP-7 (Brush-off Blast Cleaning) to achieve a uniform surface profile of 2.0 to 2.5 mils. Galvanized metal should generally not be used in these environments.
5. Application:	Field
a. General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.

Coating System Specification Sheets (COATSPEC)	
	Drying time between coats shall be as specified by the CSM for the site conditions. If the maximum recoat time is exceeded, surface preparation shall require solvent washing, light abrasive blasting, or other procedures per CSM's instructions.
b. Ferrous Metal:	If shop priming is required or field priming is necessary, the prime coat shall be an epoxy primer compatible with the specified coating system. Generally, the EA-1 coating system is self-priming and does not require a primer unless there is a special reason to prime the steel to hold the blast cleaning from rusting back.
6. System Thickness:	30 to 40 mils dry film.
7. Coatings:	
a. Primer:	One coat at CSM's recommended dry film thickness only if required by special circumstances.
b. Finish:	One or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.
c. Testing:	Holiday detection shall be performed over 100% of the coated surface area to identify any holidays or pinholes that must be repaired.
d. Pinhole and Holiday Repair Procedure:	Pinholes and holidays identified by Holiday Detection shall be repaired as follows:
	• Using a pencil grinder, remove a ½-inch diameter area of the coating system material back to the ferrous metal substrate. The metal must be shiny
	• Aggressively sand or abrade the intact coating system surface 2 inches around the complete periphery of the ½-inch diameter removal area to produce a uniform 6 to 8 mils profile
	• Vacuum clean the prepared area to remove all dust and dirt to achieve a clean, sound surface. Tape the peripheral area to prevent coating application onto unprepared surfaces
	• Brush apply one coat of the finish coating material. Following proper recoat cure time, apply additional coats of the finish coating system to achieve 60 mils DFT at the coating removal area and feather the coating onto the roughened coated surfaces to form a neat repair outline
P. Coating System Identification: EA-2 (NOT USED)	
Q. Coating System Identification: EA-3 (NOT USED)	
R. Coating System Identification: EA-4 (NOT USED)	
S. Coating System Identification: EA-5 (NOT USED)	
T. Coating System Identification: EC-1 (NOT USED)	
U. Coating System Identification: EC-2 (NSF-61) (NOT USED)	
V. Coating System Identification: EU-1	
1. Coating Material:	Zinc-Epoxy-Polyurethane System

Coating System Specification Sheets (COATSPEC)	
2. Surface:	Ferrous Metal
3. Service Condition:	Exterior, exposed to direct sunlight, moderately corrosive, non-immersed.
4. Surface Preparation:	
a. General:	Shop primed surfaces which are to be incorporated in the work shall be prepared in the field by cleaning surfaces in accordance with SSPC SP-2 (Hand Tool Cleaning). Damaged shop coated areas shall be cleaned in accordance with SSPC SP-3 (Power Tool Cleaning) and recoated with the primer specified.
b. Ferrous Metal:	Bare ferrous metal surfaces shall be prepared in accordance with SSPC SP-6 (Commercial Blast Cleaning) 2.5 – 3.0. Ductile iron surfaces to be coated shall be abrasive blast cleaned in accordance with paragraph 3.02 Metallic Surfaces.
	Ferrous metal with rust bleeding shall be cleaned in accordance with SSPC-SP-11 (Power Tool Cleaning to Bare Metal). Areas of rust penetration shall be spot blasted to SSPC SP-10 (Near White Blast) and spot primed with the specified primer.
c. Galvanized Metal:	Damaged galvanized steel areas with exposed ferrous metal and/or rusted shall be cleaned in accordance with SSPC SP-5 (White Metal Blast Cleaning) or Power Tool Cleaned to Bare Metal in accordance with SSPC-SP-11 to achieve a uniform 1.0- to 1.5-mil profile and spot primed with the primer specified.
	Nonferrous and galvanized metal shall be prepared in accordance with SSPC SP-7 (Brush-off Blast Cleaning) to impart a 1.0- to 2.0-mil profile to the galvanized steel surfaces. Where this cannot be performed, prepare by abrading in accordance with SSPC-SP-3, Power Tool Cleaning to impart a 1.0- to 1.5-mil profile uniformly to the galvanized steel surfaces.
	For EU-1 over galvanized steel, delete the zinc rich primer.
5. Application:	Field
a. General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
b. Ferrous Metal:	Prime coats shall be a zinc rich epoxy or polyurethane primer compatible for use with urethane finish coats and applied in accordance with written instructions of the CSM or in the case of CARB or SCAQMD applications, prime with specified primer that is not zinc rich. In these cases, only a two-coat system is applied.
6. System Thickness:	3 to 4 mils of zinc rich primer, one intermediate or primer epoxy coat at 5 to 6 mils and one finish coat of polyurethane at 2 to 3 mils DFT.
7. Coatings:	

Coating System Specification Sheets (COATSPEC)	
a. Primer:	One coat at CSM's recommended dry film thickness.
b. Intermediate:	One coat at CSM's recommended dry film thickness.
c. Finish:	One coat at CSM's recommended dry film thickness per coat to meet the specified system thickness.
W. Coating System Identification: EU-1-FRP (NOT USED)	
X. Coating System Identification: G	
1. Coating Material:	Grease
2. Surface:	Metal
3. Surface Preparation:	
a. Ferrous Metal:	Ferrous metal surfaces shall be prepared in accordance with SSPC SP-1 (Solvent Cleaning).
4. Application:	Field
	Coating shall be applied with stiff brush, hand swab, or airless spray gun.
5. System Thickness:	50 square feet per gallon
6. Coating:	One coat of grease coating.
Y. Coating System Identification: HH-1 (NOT USED)	
Z. Coating System Identification: HH-2 (NOT USED)	
AA. Coating System Identification: L-1	
1. Coating Material:	Latex
2. Surfaces:	Concrete, masonry, plaster, gypsum board.
3. Service Condition:	Interior and exterior including existing exterior coated concrete.
4. Surface Preparation:	
a. Concrete:	Concrete surfaces shall be allowed to age for at least 28 days and allowed to dry to the moisture content recommended by the CSM. Moisture content may be tested by the Engineer with a Delmhorst Instrument Company moisture detector, or equal. Loose concrete and laitance shall be removed from surfaces, and voids and cracks shall be repaired as specified in Section 03 30 00.
b. Existing Coated Concrete:	Remove all loose coating down to a sound substrate or intact, well-adhered existing coating by scraping or other means. Then, abrade all surfaces to achieve a 0.5- to 1.5-mil uniform profile and vacuum clean to remove all loose dirt, paint chips, and dirt.

Coating System Specification Sheets (COATSPEC)	
c. Masonry:	Masonry surfaces shall be allowed to age for at least 28 days. Holes or other joint defects shall be filled with mortar and repointed. Loose or splattered mortar shall be removed by scraping and chipping. Masonry surfaces shall be cleaned with clear water by washing and scrubbing to remove foreign and deleterious substances. Muriatic acid shall not be used. After cleaning, masonry surfaces shall be filled with block filler compatible with the specified primer.
d. Plaster:	Plaster surfaces shall be dry, clean, and free from grit, loose plaster, and surface irregularities. Cracks and holes shall be repaired with acceptable patching materials, keyed to existing surfaces, and sandpapered smooth. Surfaces shall be cleaned with clear water by washing and scrubbing to remove foreign and deleterious substances. After cleaning, surfaces shall be sealed with a compatible sealer.
e. Gypsum Wallboard:	Tape joints and spackled nail heads shall be sanded smooth and dusted. Seal with PVA sealer for interior uses only.
5. Application:	Field
a. General:	Sealer or filler shall dry a minimum of 48 hours prior to primer application.
	Drying time between coats shall be as recommended by CSM.
6. System Thickness:	4 mils dry film.
7. Coatings:	
a. Primer:	One coat at CSM's recommended dry film thickness.
b. Finish:	Two or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.
BB. Coating System Identification: L-2	
1. Coating Material:	Latex
2. Surface:	PVC and CPVC pipe.
3. Service Condition:	Exterior, direct sunlight exposure.
4. Surface Preparation:	Plastic pipe shall be cleaned with solvent compatible with the specified primer and sanded to roughen surfaces to achieve a uniform surface profile of 1.0 to 1.5 mils. Vacuum clean after sanding to remove all loose dust, plastic particles, and dirt.
5. Application:	Field
6. System Thickness:	3 mils dry film.
7. Coatings:	
a. Primer:	One coat at CSM's recommended dry film thickness.
b. Finish:	One or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.

Coating System Specification Sheets (COATSPEC)	
CC. Coating System Identification: L-3 (NOT USED)	
DD. Coating System Identification: L-4 (NOT USED)	
EE. Coating System Identification: M-1	
1. Coating Material:	Petrolatum based mastic or wax based wrapping tapes.
2. Surfaces:	Metal
3. Service Condition:	Below grade (buried) or where little to no surface preparation can be performed on piping or structural steel.
4. Surface Preparation:	Remove loose scale, rust, dirt, excessive moisture, or frost from the surface in accordance with SSPC SP-2 (Hand Tool Cleaning).
5. Application:	All surfaces shall be hand rubbed or brushed with a priming paste recommended by the CSM. Sharp projections such as threads, irregular contours, or badly pitted areas shall receive a liberal amount of priming paste to ensure maximum protection of metal throughout.
	On irregular shaped surfaces, i.e., nuts, bolts, flanges, valves, etc., the Contractor shall use either of the following systems recommended by the CSM.
	A. Apply recommended mastic by hand in sufficient quantity to build an even contour over entire surface. The Contractor shall pay particular attention to ensure that folds and air pockets within the mastic layer are thoroughly pressed out prior to subsequent application of tape.
	OR:
	B. An extra layer of tape shall be cut and carefully molded around sharp projections, nuts, bolts, etc., before final application of tape, in order to meet specified system thickness.
	Tape shall be spirally wrapped with a 55 percent overlap and sufficient tension and pressure to provide continuous adhesion without stretching the tape. Edges of tape must be continuously smoothed and sealed by hand during wrapping. On vertical application, contractor shall begin at bottom and proceed upward creating a weatherboard overlap.
6. System Thickness:	Smooth contours shall have a minimum thickness of 50 mils while nuts, bolts, and sharp projections shall be 100 mils.
7. Tape:	Number and types of tape wraps shall be in accordance with the CSM's written instructions.
FF. Coating System Identification: M-2	
1. Coating Material:	Epoxy mastic or equal
2. Surface:	Ferrous Metal
3. Service Condition:	Interior, corrosive environment, confined enclosures, where minimal surface preparation is possible.

Coating System Specification Sheets (COATSPEC)	
4. Surface Preparation:	
a. Ferrous Metal:	All uncoated ferrous metal surfaces shall be prepared in accordance with SSPC SP-3 (Power Tool Cleaning), or SSPC-SP-11 (Power to Cleaning to Bare Metal) prior to assembly. Surface preparation to achieve a uniform surface profile of 2.0 to 2.5 mils. Shop primed ferrous metal surfaces and fabricated assemblies shall be clean and dry prior to the application of field coats. Following assembly, the Contractor shall smooth welds and prominences using power tools prior to the application of the field applied coatings.
5. Application:	Field
a. General:	Prior to the application of field applied coatings, welds, back-to-back angles, sharp or rough edges and weld splatter shall be brushed with the specified prime coat and allowed to cure overnight.
6. System Thickness:	15 mils dry film.
7. Coatings:	
a. Prime:	One coat of the CSM's recommended dry film thickness.
b. Finish:	One or more coats of CSM's recommended dry film thickness per coat to the specified system thickness.
GG. Coating System Identification: S-1	
1. Coating Material:	Penetrating acrylic stain, color required.
2. Surface:	Concrete
3. Service Condition:	Non-immersed, exposure to moisture and sunlight.
4. Surface Preparation:	Brush-off blast or industry standard acid etch or other preparation as approved by the CSM.
5. Application:	
a. General:	Drying time between coats shall be as specified by the CSM for the site conditions.
b. Coatings:	Minimum of two coats overall (coat as many times as required to achieve desired color).
6. System Thickness:	200 square feet per gallon maximum or as recommended by the CSM.
7. Color Selection:	As approved by the Engineer consistent with neighborhood selection. The Contractor to price materials based on custom color.
HH. Coating System Identification: S-2	
1. Coating Material:	Penetrating Water Repellent (Clear and Non-Film Building)
2. Surface:	Concrete Floors
3. Service Condition:	Exterior and Interior.

Coating System Specification Sheets (COATSPEC)	
4. Surface Preparation:	Clean surfaces of all traces of dirt, dust, efflorescence, mold, salt, grease, oil, asphalt, laitance, curing compounds, paint, coatings, and other foreign materials by brush-off blast, water blasting, and/or chemical cleaners or other preparation as approved by the CSM.
a. Concrete	Concrete surfaces shall be allowed to age for at least 28 days and allowed to dry to the moisture content recommended by the CSM. Moisture content may be tested by the Engineer with a Delmhorst Instrument Company moisture detector, or equal. Loose concrete and laitance shall be removed from surfaces, and voids and cracks shall be repaired as specified in Section 03 30 00.
5. Application:	
a. General:	Drying time before placing into service shall be as recommended by the CSM for site conditions.
6. System Coverage:	Follow CSM's recommendations.
7. Color Selection:	Clear.
II. Coating System Identification: S-3 (NOT USED)	
JJ. Coating System Identification: S-4 (NOT USED)	

3.06 COATING SYSTEMS SCHEDULE (FINISH SCHEDULE)

A. General:

1. Specific coating systems, colors, and finishes for rooms, galleries, piping, equipment, and other items that are coated or have other architectural finishes are specified in the following coating system schedule. Unless otherwise specified in the coating system schedule, the word "interior" shall mean the inside of a building or structure, and the word "exterior" shall mean outside exposure to weather elements.

Coating Systems Schedule (Finish Schedule)

Location/Surface	Coating System Identification	Standard Color
A. General: All Surfaces not Specified by Area or Structure		
1. Structural Steel, Metal Decking, and Galvanized Acoustical Decking	Uncoated or E-2	
2. Equipment and Metal Appurtenances		
a. Equipment, non immersed, unless otherwise specified		
1) Indoors	E-1	FS 25051 Blue
2) Outdoors	EU-1	FS 20040 Brown
b. Equipment, immersed, unless otherwise specified	E-2	Beige
c. High temperature equipment operable at		
1) 200 to 750 degrees F	HH-1	FS 26306 Grey
2) above 750 degrees F to 1200 degrees F	HH-2	Aluminum or Black
d. Existing equipment		
1) Not damaged nor modified by work in this contract	Uncoated	--
2) Damaged, exposed, or modified by work in this contract		
a) Indoors	E-1 (see paragraph 3.02)	Match existing color
b) Outdoors	EU-1 without primer (see paragraph 3.02)	Match existing color
e. Diffusers and grilles on coated surfaces, unless otherwise specified		
1) Indoors	E-1	Match background color
2) Outdoors	EU-1	Match background color
f. Diffusers and grilles on uncoated surfaces, unless otherwise specified		
1) Indoors	E-1	FS 25051 Blue
2) Outdoors	EU-1	FS 20040

Coating Systems Schedule (Finish Schedule)

Location/Surface	Coating System Identification	Standard Color
		Brown
g. Existing diffusers and grilles		
1) Not damaged not modified by work in this contract	Uncoated	--
2) Damaged, exposed, or modified by work in this contract		
a) Indoors	E-1 (see paragraph 3.02 Masonry Surfaces)	Match existing color
b) Outdoors	EU-1 without primer (see paragraph 3.02 Masonry Surfaces)	Match existing color
h. Electrical switchgear panels, unit substations, motor control centers, power transformers, distribution centers, and relay panels; indoors and outdoors	See paragraph 3.03 Electrical and Instrumentation Equipment and Materials	ANSI 61 Grey (outside) FS 27880 White (inside)
i. Instrumentation panels, graphic indicating panels, indicating and transmitting field panels, unless otherwise specified		
1) Indoors	See paragraph 3.03 Electrical and Instrumentation Equipment and Materials	FS 26306 Grey (outside) FS 27880 White (inside)
2) Outdoors	See paragraph 3.03 Electrical and Instrumentation Equipment and Materials	FS 27722 White (outside) FS 27880 White (inside)
j. Existing electrical and instrumentation panels		
1) Not damaged by work in this contract	Uncoated	--
2) Damaged or exposed to outside surfaces by work in this contract		
a) Indoors	E-1 (see paragraph 3.02 Masonry Surfaces)	FS 26306 Grey
b) Outdoors	EU-1 without primer (see paragraph 3.02 Masonry Surfaces)	FS 26306 Grey (Electrical) FS 27722

Coating Systems Schedule (Finish Schedule)

Location/Surface	Coating System Identification	Standard Color
		White (Instrumentation)
3. Conduit, Piping and Ductwork		
a. Ferrous, non-ferrous and galvanized piping, and appurtenant hangers and supports, non-immersed, unless otherwise specified.		
1) Indoors – noncorrosive	E-1	FS 25051 Blue
2) Outdoors – noncorrosive	EU-1	FS 20040 Brown
3) Indoors – in corrosive environment	EA-1	To be determined
4) Buried piping	M-1 or M-2	Not required
b. Ferrous piping, appurtenant and supports, immersed	E-2	To be determined
c. Conduit, outlet and junction boxes, lighting transformers, lighting, communication and small power panels, control stations, piping, lagged ductwork, appurtenant hangers, clamps, and supports on coated surfaces, unless otherwise specified.		
1) Indoors	E-1	Match background color
2) Outdoors	EU-1	Match background color
d. Conduit, outlets and junction boxes, lighting transformers, lighting, communication and small power panels, control stations, piping, lagged ductwork, appurtenant hangers, clamps and supports on uncoated surfaces, unless otherwise specified		
1) Indoors	E-1	FS 25051 Blue
2) Outdoors	EU-1	FS 20040 Brown

Coating Systems Schedule (Finish Schedule)

Location/Surface	Coating System Identification	Standard Color
e. Existing conduit, outlet and junction boxes, lighting transformers, lighting communication and small power panels, control stations, piping, lagged ductwork, appurtenant hangers, clamps, and supports		
1) Not damaged nor modified by work in this contract	Uncoated	--
2) Damaged, exposed, or modified by work in this contract		
a) Indoors	E-1 (see paragraph 3.02 Masonry Surfaces)	Match existing color
b) Outdoors	EU-1 without primer (see paragraph 3.02 Masonry Surfaces)	Match existing color
f. Racked conduits and cable trays	Uncoated	--
g. Insulated pipe jacketing	Uncoated	--
h. Plastic, fiberglass and flexible conduit and piping		
1) Unless otherwise specified	Uncoated	--
2) PVC and CPVC Piping	L-2	FS 25051 Blue
a) Exposed to direct sunlight	L-2	FS 25051 Blue
b) Not exposed to direct sunlight	E-7	FS 25051 Blue
i. High temperature piping operable at		
1) 200 to 750 degrees F	HH-1	FS 26306 Grey
2) Above 750 degrees F to 1,200 degrees F	HH-2	Aluminum or Black
j. Exposed ductwork, unless otherwise specified	Uncoated	--
4. Concrete, Grout, Masonry and Plaster		
a. Immersed tank and channel walls and bottoms unless otherwise specified	Uncoated	--
b. Outside concrete walls below grade common with dry area or room	In accordance with Section 07 10 00	--
c. Walls and ceilings		
1) Precast concrete or colored masonry	Uncoated	--
2) Outdoors, unless otherwise specified	Uncoated	--

Coating Systems Schedule (Finish Schedule)

Location/Surface	Coating System Identification	Standard Color
3) Indoors, unless otherwise specified	E-4	FS 23617 Beige
d. Concrete equipment bases unless otherwise specified	E-4	Match equipment color
e. Floors unless otherwise specified	S-2	
f. Existing coated surfaces.	L-1	Match existing color
5. Door and Door Frames		
a. Doors unless otherwise specified		
1) Ferrous metal		
a) Indoors	E-1	FS 20040 Brown
b) Outdoors	EU-1	FS 25051 Blue
2) Aluminum	Uncoated	--
3) Other	Plastic laminate	Formica 947 Brown
4) Existing		
a) Not damaged by work in this contract	Uncoated	--
b) Damaged, exposed, or modified by work in this contract		
(1) Indoors	E-1 (see paragraph 3.02 Masonry Surfaces)	Match existing color
(2) Outdoors	EU-1 (see paragraph 3.02 Masonry Surfaces)	Match existing color
b. Door frames unless otherwise specified		
1) Adjacent wall coated		
a) Indoors	E-1	Match wall color
b) Outdoors	EU-1	Match wall color
2) Adjacent wall uncoated		
a) Indoors	E-1	FS 20040 Brown
b) Outdoors	EU-1	FS 25051 Blue

Coating Systems Schedule (Finish Schedule)

Location/Surface	Coating System Identification	Standard Color
3) Aluminum	Uncoated	--
4) Existing		
a) Not damaged by work in this contract	Uncoated	--
b) Damaged, exposed, or modified by work in this contract		
(1) Indoors	E-1 (see paragraph 3.02 Masonry Surfaces)	Match existing color
(2) Outdoors	EU-1 without primer (see paragraph 3.02 Masonry Surfaces)	Match existing color
6. Handrails, Gratings, Floor Plates, Manhole Covers, and Hatches		
a. Unless otherwise specified	Uncoated	
b. Existing		
1) Not damaged by work in this contract	Uncoated	--
2) Damaged, exposed, or modified by work in this contract		
a) Indoors	E-1 (see paragraph 3.02 Masonry Surfaces)	Match existing color
b) Outdoors	EU-1 without primer (see paragraph 3.02 Masonry Surfaces)	Match existing color
7. Metal Stairs, Ladders, Platforms, and Supports Except Tread and Grating		
a. Indoors	E-1	FS 25051 Blue
b. Outdoors	EU-1	FS 20040 Brown
c. Existing		
1) Not damaged nor modified by work in this contract	Uncoated	--
2) Damaged, exposed, or modified by work in this contract		
a) Indoors	E-1 (see paragraph 3.02 Masonry Surfaces)	Match existing color
b) Outdoors	EU-1 without primer (see paragraph 3.02 Masonry	Match existing color

Coating Systems Schedule (Finish Schedule)

Location/Surface	Coating System Identification	Standard Color
	Surfaces)	
8. Aluminum Flashing, Light Standards, Supports, and Louvers		
a. Indoors and outdoors, unless otherwise specified	Uncoated	--
9. Precast Concrete Metalwork		
a. Fasteners, anchors, supports, etc.	EU-1	Match wall
10. Other		
a. Fire hydrants	EU-1	FS 21302 Red
b. Flap gates	EA-1	Beige
c. Aluminum slide gates	Uncoated	--
d. Sluice gates		
1) Gate	--	--
2) Stem, except potable	G	--
3) Operator		
a) Indoors	E-2	FS 25051 Blue
b) Outdoors	EU-1	FS 20040 Brown
e. Tanks (not used)		
f. Pipe, ductwork, equipment and appurtenances made from fiberglass, plastic, rubber, including flexible hose, conduit, and plastic coated tubing, in areas not exposed to view (indoors) (metal hangers and supports are coated with E-1)	Uncoated	--
g. Buried, sleeve-type and flanged pipe, couplings, valves, mechanical and electrical penetrations	M-1 or M-2	Manufacturer's color

Note: Owner will select color from coating manufacturer's list of EPA approved colors for potable water.

3.07 INSPECTION AND TESTING BY OWNER

A. General:

1. Inspection by the Owner or others does not limit the Contractor's or CSA's responsibilities for quality workmanship or quality control as specified or as

required by the CSM's instructions. Inspection by the Owner is in addition to any inspection required to be performed by the Contractor.

2. The Owner may perform, or contract with an inspection agency to perform, quality control inspection and testing of the coating work covered by this Section 09 90 00. These inspections may include the following:
   a. Inspect materials upon receipt to ensure that are supplied by the CSM.
   b. Inspect to verify that specified storage conditions for the coating system materials, solvents and abrasives are provided.
   c. Inspect and record findings for the degree of cleanliness of substrates.
   d. Inspect and record the pH of concrete and metal substrates.
   e. Inspect and record substrate profile (anchor pattern)
   f. Measure and record ambient air and substrate temperature.
   g. Measure and record relative humidity.
   h. Check for the presence of substrate moisture in the concrete.
   i. Inspect to verify that correct mixing of coating system materials is performed in accordance with CSM's instructions.
   j. Inspect, confirm, and record that the "pot life" of coating system materials is not exceeded during installation. Inspect to verify that recoat limitations for coating materials are not exceeded.
   k. Perform adhesion testing.
   l. Measure and record the thickness of the coating system.
   m. Inspect to verify proper curing of the coating system in accordance with the CSM's instructions.
   n. Perform holiday or continuity testing for coatings that will be immersed or coatings that will be exposed to aggressively corrosive conditions.

3.08 FINAL INSPECTION

A. General:
   1. Contractor shall conduct a final inspection to determine whether coating system work meets the requirements of the specifications.
   2. The Engineer will subsequently conduct a final inspection with the Contractor to determine the work is in conformance with requirements of the contract documents.
   3. Any rework required shall be marked. Such areas shall be recleaned and repaired as specified at no additional cost to the Owner.

END OF SECTION

SECTION 31 10 00

SITE PREPARATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities
7. Temporary erosion and sedimentation control measures.

B. Related Sections:
1. Division 01
2. Division 02
3. Division 31

1.03 DEFINITIONS

A. Subsoil:
1. All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil:
1. Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil:
1. Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
2. Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

D. Plant-Protection Zone:
   1. Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

E. Tree-Protection Zone:
   1. Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

F. Vegetation:
   1. Trees, shrubs, groundcovers, grass, and other plants.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.05 SUBMITTALS

A. Existing Conditions:
   1. Documentation of existing trees and plantings, adjoining construction, and site improvements that establish preconstruction conditions that might be misconstrued as damage caused by site clearing.
      a. Use sufficiently detailed photographs or videotape.
      b. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

B. Record Drawings:
   1. Identifying and accurately showing locations of capped utilities and other structural, electrical, and mechanical conditions.

1.06 QUALITY ASSURANCE

A. Preinstallation Conference:
   1. Conduct conference at Project site.

1.07 PROJECT CONDITIONS

A. Traffic:
   1. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
      a. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
      b. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements On Adjoining Property: (NOT USED)

C. Salvable Improvements:
   1. Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

D. Utility Locator Service:
   1. Utilize a utility locator service for area where Project is located before site clearing.
   2. Do not commence site clearing operations until temporary erosion and sedimentation control and plant-protection measures are in place.
   3. The following practices are prohibited within protection zones:
      a. Storage of construction materials, debris, or excavated material.
      b. Parking vehicles or equipment.
      c. Foot traffic.
      d. Erection of sheds or structures.
      e. Impoundment of water.
      f. Excavation or other digging unless otherwise indicated.
      g. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
   4. Do not direct vehicle or equipment exhaust towards protection zones.
   5. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

E. Soil Stripping, Handling, And Stockpiling:
   1. Perform only when the topsoil is dry or slightly moist.

PART 2 PRODUCTS

2.01 MATERIALS

A. Satisfactory Soil Material:
   1. Requirements for satisfactory soil material are specified in Section 31 23 00 – Excavation and Fill.
      a. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

B. Antirust Coating:
   1. Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #79, Alkyd Anticorrosive Metal Primer or SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.

PART 3 EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Revise first paragraph below to suit regional standards or office practices; delete if specified in Division 01 Section "Temporary Tree and Plant Protection." Insert requirement for flagging trees to be relocated if required.

C. Locate and clearly identify trees, shrubs, and other vegetation to remain.

D. Protect existing site improvements to remain from damage during construction.
Restore damaged improvements to their original condition, as acceptable to Owner.

1.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion and sedimentation control Drawings and requirements of authorities having jurisdiction.

B. Retain first paragraph below if tree- or plant-protection zones are required.

C. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

D. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

E. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 TREE AND PLANT PROTECTION.

A. General:
1. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by the Engineer.

3.04 EXISTING UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.
Arrange with utility companies to shut off indicated utilities.
Owner will arrange to shut off indicated utilities when requested by Contractor.

C. Locate, identify, and disconnect utilities indicated to be abandoned in place.

D. Interrupting Existing Utilities:

1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   a. Notify Owner and Engineer not less than two days in advance of proposed utility interruptions.
   c. Do not proceed with utility interruptions without Owner or Engineer's written permission.

Excavate for and remove underground utilities indicated to be removed.

Removal of underground utilities as included on the drawings.

3.05 CLEARING AND GRUBBING

A. The sites of all excavation and grading shall be first cleared of all paving, trees, stumps, roots, brush, organic matter, crops, paving, structures, fences, sidewalks, rubbish, debris, etc., which shall be removed or disposed of in a satisfactory manner in a legally permitted location.

B. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated. When it is necessary to cut tree roots on the surface of the ground, the ends shall be cut off smooth, without splitting or shattering and scars greater than one inch in diameter shall be sealed with an approved asphalt sealant tree paint. The trunks of the trees shall be carefully protected from damage, and if unavoidable damage occurs, the injured portions shall be neatly trimmed and covered with an application of an approved asphalt sealant tree paint. Excavating machinery, cranes, etc., shall be handled with care to prevent damage to trees, particularly to overhanging branches, and branches shall not be cut off except by permission of Owner.

Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.

Use only hand methods for grubbing within protection zones.

Chip removed tree branches and stockpile in approved areas or dispose of offsite, as directed by Owner.

Grub and remove stumps and roots to a depth not less than two feet (2') below grade. Fill depressions caused by clearing and grubbing operations with proper backfill soil material, unless further excavation or earthwork is indicated by the Drawings or directed by Owner. Place fill material in horizontal layers or lifts, not exceeding a loose depth of eight (8) inches, and compact each layer to 85% of maximum dry density – Standard Proctor (ASTM D698).

Grub, stockpile, and/or place in embankments surface rocks and boulders from the soil in accordance with the Specifications.

Grub the entire construction area with heavy tractors with root rakes. Generally, conduct raking along the contour rather than up and down slopes so as to inhibit soil erosion.

Grubbing shall consist of completely removing roots, stumps, trash, and other debris from all graded areas so that topsoil is free of roots and debris. Topsoil is to be left sufficiently clean so that further picking and raking will not be required.

Burying of residual materials will not be allowed.

All Contractors should be aware that the Georgia Environmental Protection Division has issued a burning ban for thirteen (13) Metro Atlanta Counties. The ban went into effect in 1996 and shall continue each year from May 1 through September 30. This ban should be considered when bidding projects that require clearing and debris removal. It is the Contractor's responsibility to remove all construction debris from the jobsite. Any costs incurred as a result of the burning ban are the sole responsibility of the Contractor.

3.06 TIMBER

Salvage all timber within cleared area having a marketable value.

The timber within the cleared area shall become the property of the Contractor and the Contractor shall be responsible for selling the timber.

3.07 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

Dispose of the cleared and grubbed materials by burning or chipping. Burning shall be permitted during approved burning seasons only. During non-burning season periods, use chipping for debris disposal. Remove chipped material from the site or disposed of in areas approved by Owner.

If burning is allowed, do not allow a fire to be unattended. The Contractor is responsible for damage occasioned by such fires. Do not bury burned and nonflammable materials.

Disposal of materials in streams will not be permitted. Do not pile materials in stream channels or along the banks where it might be washed away by flood.

Remove all fence material within the areas to be cleared from the job site. Fence materials become the property of the Contractor.

3.08 DISCING

After grubbing is complete, discing of the entire area is required. Perform discing in two directions at approximate right angles. Generally, perform the second discing along the contour.

The construction area is to be left free-draining with a finished agricultural appearance.

3.09 TOPSOIL STRIPPING

Remove sod and grass before stripping topsoil.

Strip topsoil to a depth of 6 inches (150 mm) in a manner to prevent intermingling with underlying subsoil or other waste materials.

Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; trash, debris, weeds, roots, and other waste materials.

Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

Limit height of topsoil stockpiles to 72 inches (1800 mm).

Do not stockpile topsoil within protection zones.

Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.10 SITE IMPROVEMENTS

Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION

SECTION 31 23 00

TRENCH EXCAVATION AND FILL

PART 1 GENERAL

1.01 SCOPE

A. The work under this Section consists of furnishing all labor, equipment and materials and performing all operations in connection with the trench excavation and backfill required to install the water lines as shown on the Drawings and as specified.

B. Excavation shall include the removal of any trees, stumps, brush, debris or other obstacles which remain after the clearing and grubbing operations, which may obstruct the work, and the excavation and removal of all earth, rock or other materials to the extent necessary to install the water line and appurtenances in conformance with the lines and grades shown on the Drawings and as specified.

C. Backfill shall include the refilling and compaction of the fill in the trenches and excavations up to the surrounding ground surface or road grade at crossing.

D. The trench is divided into five specific areas:
   1. Foundation: The area beneath the bedding, sometimes also referenced to as trench stabilization.
   2. Bedding: The area above the trench bottom (or foundation) and below the bottom of the barrel of the pipe.
   3. Haunching: The area above the bottom of the barrel of the pipe up to a specified height above the bottom of the barrel of the pipe.
   4. Initial Backfill: The area above the haunching material and below a plane 18 inches above the top of the barrel of the pipe.
   5. Final Backfill: The area above plane 18-inches above the top of the barrel of the pipe.

E. The choice of method, means, techniques and equipment rests with the Contractor. The Contractor shall select the method and equipment for trench excavation and backfill depending upon the type of material to be excavated and backfilled, the depth of excavation, the amount of space available for operation of equipment, storage of excavated material, proximity of man-made improvements to be protected, available easement or right-of-way and prevailing practice in the area.

1.02 QUALITY ASSURANCE

A. Density: All references to “maximum dry density” shall mean the maximum dry density defined by the “Maximum Density-Optimum Moisture Test”, ASTM D 698, except that for non-cohesive materials “maximum dry density” shall mean the maximum index density as determined by the “Maximum Index Density of Soils Using a Vibratory Table”, ASTM D 4253. Determination of

the density of foundation, bedding, haunching, or backfill materials in place shall meet with the requirements of ASTM D 1556, “Density of Soil In Place by the Sand Cone Method”, ASTM D 2937, “Density of Soil In Place by the Drive-Cylinder Method” or ASTM D 2922, “Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)”.

B. Sources and Evaluation Testing: Testing of materials to certify conformance with the Specifications shall be performed by an independent testing laboratory in accordance with Specifications. All imported fill materials shall meet the requirements of on-site fill materials.

1.03 SAFETY

A. Perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P “Excavation, Trenching & Shoring” as described in OSHA publication 2226.

PART 2 PRODUCTS

2.01 TRENCH FOUNDATION MATERIALS

B. Crushed stone shall be utilized for trench foundation (trench stabilization) and shall meet the requirements of the Georgia Department of Transportation Specification 800.2.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

2.02 BEDDING AND HAUNCHING MATERIALS

A. Unless specified otherwise, bedding and haunching materials shall be earth materials as specified below.

B. Crushed stone utilized for bedding and haunching shall meet the requirements of the Georgia Department of Transportation Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

C. Filter Fabric – Non-Woven Type

1. Filter fabric associated with bedding shall be a UV stabilized, spun bonded, continuous filament, needle punched, and polypropylene, nonwoven geotextile.
2. The fabric shall have an equivalent open size (EOS or AOS) of 120 - 70. The fabric shall also conform to the minimum property values listed in the following table:

Fabric Property	Unit	Test Procedure	Average Value	
			Typical	Minimum
Weight	oz/yd^2	ASTM D 3776	8.3	
Thickness	mils	ASTM D 1777	105	
Grab Strength	lbs.	ASTM D 4632	240	210
Grab Elongation	%	ASTM D 4632	>50	50
Tear Strength	lbs.	ASTM D 4533	100	85
Mullen Burst	psi	ASTM D 3786	350	320
Puncture Resistance	lbs.	ASTM D 4833	115	100
Permittivity	sec^-1	ASTM D 4491	1.7	
Water Permeability	cm/sec	ASTM D 4491	0.4	
Water Flow Rate	gpm/ft^2	ASTM D 4491	120	
UV Resistance (500 hrs)	%	ASTM D 4355	>85	
pH			2 - 13	

3. If ordered by the Owner, the filter fabric manufacturer shall furnish the services of a competent factory representative to supervise and/or inspect the installation of pipe. This service will be furnished for a minimum of 10 days during initial pipe installation.
4. Filter fabric shall be Mirafi 500X, Amoco 2002 or Exxon GTF-200.

2.03 INITIAL BACKFILL

A. Initial backfill material shall be crushed stone or earth materials as specified for bedding and haunching materials.

B. Earth materials utilized for initial backfill shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2-inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, initial backfill materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as initial backfill material, provide select material conforming to the requirements of this Section at no additional cost to the Owner.

2.04 FINAL BACKFILL

A. Final backfill material shall be general excavated earth materials, shall not contain rock larger than 2-inches at its greatest diameter, cinders, stumps, limbs, man-made wastes and other unsuitable materials. If materials excavated from the trench are not suitable for use as final backfill material, provide select material conforming to the requirements of this Section.

2.05 SELECT BACKFILL

A. Select backfill shall be materials which meet the requirements as specified for bedding, haunching or initial backfill materials, including compaction requirements.

2.06 CONCRETE

A. Concrete for bedding, haunching, initial backfill or encasement shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches unless shown or specified otherwise. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

2.07 FLOWABLE FILL

A. Low strength flowable fill concrete shall meet the requirements of Section 600 of the Georgia Department of Transportation specifications.

2.08 GRANULAR MATERIAL

B. Granular material, where required for trench backfill, shall be sand, river sand, crushed stone or aggregate, pond screenings, crusher run, recycled concrete, or other angular material. Granular material shall meet gradation requirements for Size No. 57 or finer.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION

C. Topsoil and grass shall be stripped a minimum of 6-inches over the trench excavation site and stockpiled separately for replacement over the finished grading areas.

D. Trenches shall be excavated to the lines and grades shown on the Drawings with the centerlines of the trenches on the centerlines of the pipes and to the dimensions which provide the proper support and protection of the pipe and other structures and accessories.

E. Trench Width for Pipelines

1. The sides of all trenches shall be vertical to a minimum of one foot above the top of the pipe. The maximum trench width shall be as shown in the allowable trench width table provided in the Drawings. The minimum trench width shall be that which allows the proper consolidation of the haunching and initial backfill material.
2. Excavate the top portion of the trench to any width within the construction easement or right-of-way which will not cause unnecessary damage to adjoining structures, roadways, pavement, utilities, trees or private property. Where necessary to accomplish this, provide sheeting and shoring.
3. Where rock is encountered in trenches, excavate to remove boulders and stones to provide a minimum of 12-inches clearance between the rock and any part of the pipe barrel.
4. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the next higher Class or Type of bedding and haunching as shown on the Drawings for the full trench width as actually cut. The excessive trench width may be due to unstable trench walls, inadequate or improperly placed bracing and sheeting which caused sloughing, accidental over-excavation, intentional over-excavation necessitated by the size of the Contractor's tamping and compaction

equipment, intentional over-excavation due to the size of the Contractor's excavation equipment, or other reasons beyond the control of the Engineer or Owner.

F. Depth
   1. The trenches shall be excavated to the required depth which allow for the placement of the pipe and bedding to the dimensions shown on the drawings.
   2. Where rock is encountered in trenches for pipelines, excavate to the minimum depth which will provide clearance below the pipe barrel of 8-inches for pipe 21-inches in diameter and smaller and 12-inches for larger pipe and valves.

G. Excavated Materials
   1. Excavated materials shall be placed adjacent to the work to be used for backfilling as required. Top soil shall be carefully separated and lastly placed in its original location.
   2. Excavated material shall be placed sufficiently back from the edge of the excavation to prevent caving of the trench wall, to permit safe access along the trench and not cause any drainage problems. Excavated material shall be placed so as not to damage existing landscape features or man-made improvements.

3.02 SHEETING, BRACING AND SHORING

A. Sheeting, bracing and shoring shall be installed in the following instances:
   1. Where sloping of the trench walls does not adequately protect persons within the trench from slides or cave-ins.
   2. In caving ground.
   3. In wet, saturated, flowing or otherwise unstable materials. The sides of all trenches and excavations shall be adequately sheeted, braced and shored.
   4. Where necessary to prevent damage to adjoining buildings, structures, roadways, pavement, utilities, trees or private properties which are required to remain.
   5. Where necessary to maintain the top of the trench within the available construction easement or right-of-way.

B. In all cases, excavation protection shall strictly conform to the requirements of the Occupational Safety and Health Act of 1970, as amended.

C. Timber: Timber for shoring, sheeting, or bracing shall be sound and free of large or loose knots and in good, serviceable condition. Size and spacing shall be in accordance with OSHA regulations.

D. Steel Sheeting and Sheet Piling: Steel sheet piling shall be the continuous interlock type. The weight, depth and section modulus of the sheet piling shall be sufficient to restrain the loads of earth pressure and surcharge from existing foundations and live loads. Procedure for installation and bracing shall be so scheduled and coordinated with the removal of the earth that the ground under existing structures shall be protected against lateral movement at all times. The Contractor shall provide closure and sealing between sheet piling and existing facilities.

E. Trench Shield: A trench shield or box may be used to support the trench walls. The use of a trench shield does not necessarily preclude the additional use of bracing and sheeting. When trench shields are used, care must be taken to avoid disturbing the alignment and grade of the pipe or disrupting the haunching of the pipe as the shield is moved. When the bottom of the trench shield extends below the top of the pipe, the trench shield will be raised in 6-inch increments with specified backfilling occurring simultaneously. At no time shall the trench shield be “dragged” with the bottom of the shield extending below the top of the pipe or utility.

F. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the pipe and adjacent property. Leave sheeting in place when in the opinion of the Engineer it cannot be safely removed or is within three feet of an existing structure, utility, or pipeline. Cut off any sheeting left in place at least two feet below the surface.

G. Sheet piling within three feet of an existing structure or pipeline shall remain in place, unless otherwise directed by the Engineer.

3.03 ROCK EXCAVATION

A. Definition of Rock: Any material which cannot be excavated with conventional excavating equipment, and is removed by drilling and blasting, and occupies an original volume of at least one-half cubic yard.

B. Blasting: Provide licensed, experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all buildings and structures from the effects of the blast. Repair any resulting damage. If the Contractor repeatedly uses excessive blasting charges or blasts in an unsafe or improper manner, the Engineer

shall direct the Contractor to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.

C. Removal of Rock: Dispose of rock off site that is surplus or not suitable for use as rip rap or backfill.

D. The Contractor shall notify the Owner prior to any blasting. Additionally, the Contractor shall notify the Owner and local fire department before any charge is set.

E. Blasting Requirements
   1. Blasting for removing rock for excavation shall be properly permitted.
   2. Contractor shall use all possible precautions against accidents or damages due to use or storage of explosives, and Contractor assumes all responsibility/liability associated with blasting activities.
   3. ONLY **LICENSED** EMPLOYEES OR SUBCONTRACTORS WILL BE ALLOWED TO CONDUCT BLASTING ACTIVITIES – PROOF OF SUCH PROPER LICENSING **MUST** BE PROVIDED TO OWNER **PRIOR TO** ENGAGING IN ANY BLASTING ACTIVITIES.
   4. Furnish all labor, equipment and materials required to drill, blast, loosen, excavate, and dispose material to complete the work shown on the Drawings and specified herein.
   5. The work includes, but is not be limited to:
      a. Blast round design.
      b. Planning and execution of appropriate site-specific safety measures to be employed during all blasting operations, and the safe handling and storage of high explosives and blasting agents.
      c. Drilling blast holes, loading blast holes with explosives, and wiring and safe detonation of blast rounds.
      d. Removal from the site of all excess excavated soil, debris, and rock as indicated in the contract Documents, or as directed, and disposal of excess materials at a permitted disposal site.
      e. Dewatering and maintenance of groundwater and surface water in all excavations.
      f. Performance of all surveys necessary to establish and verify the lines and grades and to determine the amount of material removed.
      g. Implementation of monitoring program to monitor condition of existing structures and utilities in vicinity of proposed blasting operations to insure existing features remain undamaged by blasting procedures.
   6. Make all excavations in conformance with the lines, grades, and cross sections on the Drawings or established by the Engineer. Where blasting is required, blasting should ensure removal of six inches (6”) of rock below proposed grade line. All overblast shall be removed and the resulting overexcavation backfilled and compacted with #57 gradation stone coarse aggregate.

7. Conduct all blasting operations, including transporting and storing of explosives in compliance with the Georgia State Fire Commissioner's Rules and Regulations for Explosives and Blasting Agents, latest edition and all applicable local codes.

F. Blasting Submittals

1. Submit the following in accordance with the procedures and requirements set forth in Section 01 33 00 Submittal Procedures, at least thirty (30) working days prior to beginning any blasting operations:
   a. Names, addresses, telephone numbers, and qualifications of the blasting subcontractor(s) and explosives supplier(s) that will be used, including the designated Blaster-In-Charge.
   b. Copies of Training Certificates for the designated Blaster-In-Charge, blasting foreman and any other key personnel that will be responsible for the work, showing that they have received specialized training in the proper handling of explosives.
   c. A Blasting Plan, indicating the methods, materials and equipment to be used. The Blasting Plan should indicate the types of explosives to be used, drilling patterns, and a general layout and schedule for executing the work in accordance with state regulations.
   d. A ground vibration and air blast monitoring plan, indicating structures that will be monitored, monitoring equipment that will be used, and personnel that will perform the monitoring.
2. At least 24 hours before each blast round, submit a detailed blast round design plan to the Engineer's or Owner's on-site representative. The blasting plan submitted is for quality control and record keeping purposes. Review by the Engineer does not relieve the Contractor of his responsibilities as provided herein. Include the following in the blast round design submittals:
   a. Location (state, grid coordinates) and limits of the shot.
   b. Number, diameter, and depth of blast holes to be detonated in the round, and a plan showing the drill hole pattern, spacing and distance to the free face.
   c. Depth of overburden.
   d. Total weight of explosives in the round and the types of explosives to be used.
   e. Loading diagram showing the location of explosives, primers, and initiators; and location, depth, and type of stemming to be used in each hole.
   f. Initiation sequence, including delay timer and delay system, total weight of explosive to be detonated on each delay, and a list of the timing of the delays.
   g. Manufacturer's data sheet for all explosives, primers, and initiators to be used.
   h. Planned seismic monitoring positions, distances from the blast round, and seismograph types to be used to monitor vibrations and air blast overpressures.

i. Type and amount of blasting mats and/or depth of soil cover to be used over the top surface of the shot.

j. Any other information required by applicable state and federal regulations.

3. Within 24 hours after each blast round, submit a blasting report to the Engineer. Include the following in the blasting report:

a. Date and time of shot.

b. Foreman's name.

c. Number and depth of holes detonated.

d. Weather conditions at the time of detonation.

e. Type of explosives and detonators used.

f. Peak particle velocity of ground motion and primary frequency for all ground vibration monitoring stations.

g. Peak air blast overpressure measured.

h. Distance from the blast round to each monitoring station for vibrations and air blast.

i. Amount of explosive used in each hole, and maximum weight of explosive detonated on any single delay in the blast round.

G. Pre-Blast Survey

1. Contractor shall have an approved vibration consultant conduct the pre-blast survey on the residences and facilities adjacent to the proposed rock blasting in accordance with the submitted survey and monitoring plan. The survey shall include, but not be limited to the following:

a. A site plan or drawing of the structure to be examined showing the structure in relationship to the proposed rock blasting area and a full description of the structure including type of materials and construction.

b. Examination of the structure (interior and exterior surfaces) by experienced and qualified personnel, noting any visible structural and aesthetic flaws in or on the structure. Note existing cracks and flaws, with significant cracks measured, and all cracks and flaws photographed.

c. Upon completion of the examination, ask the structure's owner to review the report, note any corrections or omissions, and sign a statement that to the best of his knowledge, the examination report reflects the conditions of the structure prior to any rock blasting. If the structure's owner refuses to sign said report, it should be noted in the report by the examiner.

d. Nothing contained herein shall relieve the Contractor of responsibility for claims arising from his construction operations. Failure to inspect any structure, whether or not required by these Contract Documents, or inadequacy of the inspections shall not relieve the Contractor of his responsibility. The Contractor shall indemnify the County from such claim.

e. In the event that any property owner denies access for the survey of structures and facilities, notify such property owner, by certified mail, stating that this is final notification. Submit to the Engineer, copies of all correspondence between the Contractor and the property owner(s). The Engineer, upon review of the submitted correspondence may waive requirements set forth above. However, the Contractor is fully responsible for claims and damage arising from his construction operations regardless of property location.

f. Submit two (2) sets of copies of the examination reports to the Engineer for their records.

H. Use of Explosives

1. When the use of explosives is necessary for the prosecution of the work, exercise the utmost care not to endanger life or property. Be responsible for any and all damage or injury to persons or property resulting from the use of explosives.
2. Store all explosives in a secure manner, in compliance with all laws, and clearly mark all such storage places "DANGEROUS EXPLOSIVES".
3. Notify any public utility company having facilities in close proximity to the site of the work of the intention to use explosives. Provide this notice sufficiently in advance to enable the utility companies to take whatever steps they may consider necessary to protect their property from injury. Also give the Engineer, all occupants of adjacent property, and all other Contractors working in or near the Project, notice of the intention to use explosives.
4. Only non-electric type initiators maybe used.

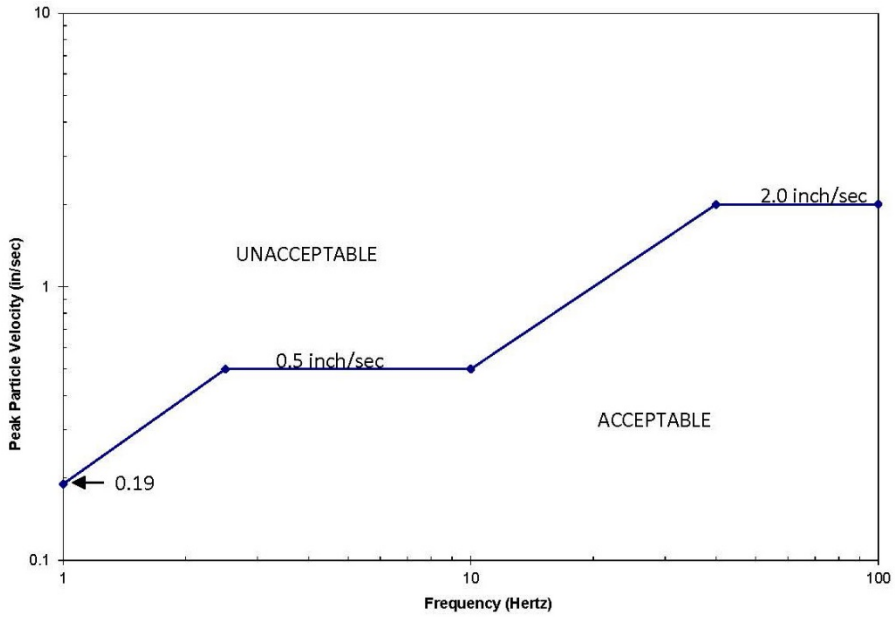
I. Blasting Operations

1. Provide explosives of such quantity and power and use in such locations as will neither open seams nor otherwise disturb the material outside the prescribed limits of excavation. As the excavation approaches its final limits, reduce the depth of holes for blasting and the amount of explosives used for each hole so that the underlying or adjacent rock will not be disturbed or shattered.
2. Do not perform blasting within 100 feet of newly placed concrete that has cured less than 7 days. Do not perform blasting within 50 feet of any existing structure or any new structure in progress.

J. Blast Monitoring

1. Exercise the utmost care not to damage property on-site and off-site. Notify each adjoining property owner within 5,000 feet of the site of the anticipated ground vibrations and noise which will occur due to the blasting operations. Provide this notice 30 days in advance to enable the adjacent property owners to take whatever precautions they may consider necessary. Limit operations to minimize any disturbance to the adjacent property owners. Notify motorists on adjacent roadways in accordance with state regulations. Take responsibility for any damage to any structure or utility line, pipes, etc., on-site and off-site as a result of his operations.

2. For each blast round, monitor and record noise and air blast overpressures at the site perimeter nearest the blast location and at the on-site or off-site structure located nearest to the round. Peak air blast overpressure shall not exceed 0.018 psi, measured at the site perimeter.
3. Sufficiently cover the site of every blast round with blasting mats or other devices to prevent any flying debris. The Contractor will be fully responsible for any damage caused by flying debris, both to on-site and off-site properties.
4. Whenever blasting is to be performed within 2,500 feet of any structure, measure the peak particle velocities of ground vibration resulting from each blast at the structure. Monitor vibrations utilizing a seismograph capable of providing a record of particle velocity and frequency along three mutually perpendicular axes utilizing internal calibration. Measured peak particle velocity of ground motion at the monitored structure shall not exceed the values shown in the following graph:



K. Blasting Notification
   1. Give twenty-four (24) hour notice to Engineer and adjacent residences and/or businesses prior to each blast.

L. Complaints
   1. Submit notice of blasting complaints to Owner in writing within twenty-four (24) hours of receipt thereof. Identify the origin of complaint in the notice and provide a brief description of alleged damages or other circumstances upon which the complaint is predicated. Assign a number to each complaint consecutively in the order of receipt. Assign each complaint a separate number and show in each letter complaint all previous complaint numbers registered by the same complainant. In addition, make a summary report each month to Owner. Indicate date, time and name of person investigating the complaint and amount of damages (or an estimate thereof), if any, in the summary report.

M. Post Blast Survey

1. Contractor shall have the same vibration consultant who performed the pre-blast survey conduct the post-blast survey. The consultant shall examine all structures from which a complaint has originated after the blast. The survey shall include, but not be limited to the following:
   a. A full description of the alleged damage caused by the blast. Where appropriate, provide a sketch to more fully describe the location and type of damage. Measure cracks and compare to any original measurements which may have been taken in the Pre-Blast Survey.
   b. Take colored photographs of any alleged damage.
   c. Submit two (2) copies of the Post Blast Survey report to the Engineer. The report shall include the consultant's assessment of the alleged damage and an opinion as to its likely cause.

3.04 DEWATERING EXCAVATIONS

A. Dewater excavation continuously to maintain a water level two feet below the bottom of the trench.

B. Control drainage in the vicinity of excavation so the ground surface is properly pitched to prevent water running into the excavation.

C. There shall be sufficient pumping equipment, in good working order, available at all times, to remove any water that accumulates in excavations. Where the utility crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Provision shall be made for the satisfactory disposal of surface water to prevent damage to public or private property.

D. In all cases, accumulated water in the trench shall be removed before placing bedding or haunching, laying pipe, placing concrete or backfilling.

E. Where dewatering is performed by pumping the water from a sump, crushed stone shall be used as the medium for conducting the water to the sump. Sump depth shall be at least two feet below the bottom of the trench. Pumping equipment shall be of sufficient quantity and/or capacity to maintain the water level in the sump two feet below the bottom of the trench. Pumps shall be a type such that intermittent flows can be discharged. A standby pump shall be required in the event the operating pump or pumps clog or otherwise stop operation.

F. Dewater by use of a well point system when pumping from sumps does not lower the water level two feet below the trench bottom. Where soil conditions dictate, the Contractor shall construct well points cased in sand wicks. The casing, 6 to 10-inches in diameter, shall be jetted into the ground, followed by the installation of the well point, filling casing with sand and withdrawing the casing.

3.05 TRENCH FOUNDATION AND STABILIZATION

A. The bottom of the trench shall provide a foundation to support the pipe and its specified bedding. The trench bottom shall be graded to support the pipe and bedding uniformly throughout its length and width.

B. If, after dewatering as specified above, the trench bottom is spongy, or if the trench bottom does not provide firm, stable footing and the material at the bottom of the trench will still not adequately support the pipe, the trench will be determined to be unsuitable and the Engineer shall then order trench stabilization by directing the Contractor to overexcavate trench bottom and fill with crushed stone.

C. Should the undisturbed material encountered at the trench bottom constitute, in the opinion of the Engineer, an unstable foundation for the pipe, the Contractor shall be required to remove such unstable material and fill the

trench to the proper subgrade with crushed stone as directed by the Engineer.

D. Where the replacement of unsuitable material with crushed stone does not provide an adequate trench foundation, the trench bottom shall be excavated to a depth of at least two feet below the specified trench bottom. Place filter fabric in the bottom of the trench and support the fabric along the trench walls until the trench stabilization, bedding, haunching and pipe have been placed at the proper grade. The ends of the filter fabric shall be overlapped by one foot above the pipe.

E. Where trench stabilization is provided, the trench stabilization material shall be compacted to at least 95 percent of the maximum dry density, unless shown or specified otherwise.

3.06 BEDDING AND HAUNCHING

A. Prior to placement of bedding material, the trench bottom shall be free of any water, loose rocks, boulders or large dirt clods.

B. Bedding material shall be placed to provide uniform support along the bottom of the pipe and to place and maintain the pipe at the proper elevation. The initial layer of bedding placed to receive the pipe shall be brought to the grade and dimensions indicated on the Drawings. All bedding shall extend the full width of the trench bottom. The pipe shall be placed and brought to grade by tamping the bedding material or by removal of the excess amount of the bedding material under the pipe. Adjustment to grade line shall be made by scraping away or filling with bedding material. Wedging or blocking up of pipe shall not be permitted. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted. Each pipe section shall have a uniform bearing on the bedding for the length of the pipe, except immediately at the joint.

C. At each joint, excavate bell holes of ample depth and width to permit the joint to be assembled properly and to relieve the pipe bell of any load.

D. After the pipe section is properly placed, add the haunching material to the specified depth. The haunching material shall be shovel sliced, tamped, vigorously chinked or otherwise consolidated to provide uniform support for the pipe barrel and to fill completely the voids under the pipe, including the bell hole. Prior to placement of the haunching material, the bedding shall be clean and free of any water, loose rocks, boulders or dirt clods.

E. Gravity Waters and Accessories: Lay PVC pipe with minimum Class “B” bedding. Lay all other pipe with Class “C” bedding, unless shown or specified otherwise.

1. Class "A": Excavate the bottom of the trench flat at a minimum depth as shown on the Drawings, below the bottom of the pipe barrel. Lay pipe to line and grade on concrete block. Place concrete to the full width of the

trench and to a height of one-fourth of the outside diameter of the pipe above the invert.

2. Class "B": Excavate the bottom of the trench flat at a minimum depth as shown on the Drawings, below the bottom of the pipe barrel. Place and compact bedding material to the proper grade. Haunching material shall then be carefully placed by hand and compacted to provide full support under and up to the centerline of the pipe.

3. Class "C": Excavate the bottom of the trench flat at a minimum depth as shown on the Drawings, below the bottom of the pipe barrel. Place and compact bedding material to the proper grade. Haunching material shall then be carefully placed by hand and compacted to provide full support under and up to a height of one-fourth the outside diameter of the pipe above the bottom of the pipe barrel.

4. Type 5: Excavate the bottom of the trench flat at a minimum depth as shown on the Drawings, below the bottom of the pipe barrel. Place and compact bedding material to the proper grade before installing pipe. After the pipe has been brought to the proper grade, haunching material shall be carefully placed by hand and compacted to the top of the pipe.

F. Manholes: Excavate to a minimum of 12-inches below the planned elevation of the base of the manhole. Place and compact crushed stone bedding material to the required grade before constructing the manhole.

G. Excessive Width and Depth
   1. If the trench is excavated to excess width, provide the next higher type or class of pipe bedding. Type 5 Bedding may be used in lieu of Class “A” bedding, where Class “A” bedding is necessitated by excessive trench width
   2. If the trench is excavated to excessive depth, provide crushed stone to place the bedding at the proper elevation or grade.

H. Compaction: Bedding and haunching materials under pipe and accessories shall be compacted to a minimum of 90 percent of the maximum dry density, unless shown or specified otherwise.

3.07 INITIAL BACKFILL

A. Initial backfill shall be placed to anchor the pipe, protect the pipe from damage by subsequent backfill and ensure the uniform distribution of the loads over the top of the pipe.

B. Place initial backfill material carefully around the pipe in uniform layers to a depth of at least 12-inches above the pipe barrel or duct bank. Layer depths shall be a maximum of 6-inches for pipe 18-inches in diameter and smaller and a maximum of 12-inches for pipe larger than 18-inches in diameter.

C. Backfill on both sides of the pipe simultaneously to prevent side pressures.

D. Compact each layer thoroughly with suitable hand tools or tamping equipment.

E. Initial backfill shall be compacted to a minimum 90 percent of the maximum dry density, unless shown or specified otherwise.

F. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.

3.08 CONCRETE ENCASEMENT FOR PIPELINES

G. Where concrete encasement is shown on the Drawings for pipelines, excavate the trench to provide a minimum of 12-inches clearance from the barrel of the pipe. Lay the pipe to line and grade on solid concrete blocks or solid bricks. In lieu of bedding, haunching and initial backfill, place concrete to the full width of the trench and to a height of not less than 12-inches above the pipe bell. Do not backfill the trench for a period of at least 24 hours after concrete is placed.

3.09 FINAL BACKFILL

A. Backfill carefully to restore the ground surface to its original condition.

B. The top 6-inches shall be topsoil obtained as specified in “Trench Excavation” of this Section.

C. Excavated material which is unsuitable for backfilling, and excess material, shall be disposed of, at no additional cost to the Owner, in a manner approved by the Engineer. Surplus soil may be neatly distributed and spread over the site, if approved by the Engineer. If such spreading is allowed, the site shall be left in a clean and sightly condition and shall not affect pre-construction drainage patterns. Surplus rock from the trenching operations shall be removed from the site.

D. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.

E. After initial backfill material has been placed and compacted, backfill with final backfill material. Place backfill material in uniform layers, compacting each layer thoroughly as follows:
   1. In 6-inch layers, if using light power tamping equipment, such as a "jumping jack".
   2. In 12-inch layers, if using heavy tamping equipment, such as hammer with tamping feet.
   3. In 24-inch layers, if using a hydra-hammer.

F. Settlement: If trench settles, re-fill and grade the surface to conform to the adjacent surfaces.

G. Final backfill shall be compacted to a minimum 95 percent of the maximum dry density, unless specified otherwise.

3.10 ADDITIONAL MATERIAL

A. Where final grades above the pre-construction grades are required to maintain minimum cover, additional fill material will be as shown on the Drawings. The final grade, however, shall not change the drainage patter of the area. Utilize excess material excavated from the trench, if the material is suitable. If excess excavated materials are not suitable, or if the quantity available is not sufficient, provide additional suitable fill material at no cost to the owner.

3.11 BACKFILL UNDER ROADS

A. Compact backfill underlying pavement and sidewalks, and backfill under dirt and gravel roads to a minimum 95 percent of the maximum dry density. The top 12-inches shall be compacted to a minimum of 98 percent of the maximum dry density. If shown in the Drawings, the top 18-inches shall be flowable fill concrete meeting the requirements of this specification.

3.12 BACKFILL WITHIN GEORGIA DOT RIGHT-OF-WAY

A. Backfill within the Georgia DOT right-of-way shall meet the requirements stipulated in the "Utility Accommodation Policy and Standards", published by the Georgia Department of Transportation.

3.13 FLOWABLE FILL

A. Where flowable fill is required, excavate the trench to provide a minimum of 6-inches clearance on either side of the pipe barrel. Lay the pipe to line and grade on solid concrete blocks or bricks. In lieu of bedding, haunching and

initial backfill, place flowable fill to the full width and depth of the trench. Flowable fill shall be protected from freezing for a period of 36 hours after placement. Minimum temperature of flowable fill at point of delivery shall be 50 degrees F. The Contractor shall provide steel plates over flowable fill in road locations.

3.14 COMPACTED GRANULAR MATERIAL

A. Where compacted granular material is required as initial and final backfill material, it shall be placed after bedding and haunching material specified elsewhere has been placed. Compacted granular material shall be compacted to a minimum 95 percent of the maximum dry density.

3.15 TESTING AND INSPECTION

A. The soils testing laboratory is responsible for the following:
   1. Compaction tests in accordance with Article 1.02 of this Section.
   2. Field density tests for each two feet of lift, one test for each 500 feet of pipe installed or more frequently if ordered by the Engineer.
   3. Inspecting and testing stripped site, subgrades and proposed fill materials.

B. The Contractor's duties relative to testing include:
   1. Notifying laboratory of conditions requiring testing.
   2. Coordinating with laboratory for field testing.
   3. Paying costs for additional testing performed beyond the scope of that required and for re-testing where initial tests reveal non-conformance with specified requirements.
   4. Providing excavation as necessary for laboratory personnel to conduct tests.

C. Inspection
   1. Earthwork operations, acceptability of excavated materials for bedding or backfill, and placing and compaction of bedding and backfill is subject to inspection by the Engineer.
   2. Foundations and shallow spread footing foundations are required to be inspected by a geotechnical engineer, who shall verify suitable bearing and construction.

D. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.01 SUMMARY

A. Scope: This Section specifies the design, installation, operation, and maintenance of the systems necessary to dewater structure and trench excavations.

1. During excavation the Contractor may encounter perched water. The Contractor shall control groundwater seepage and surface run-off so as to prevent entry or collection of water in excavations.
2. The Contractor shall divert stormwater flow around the work area for the duration required to perform excavation, stockpiling, and backfill activities. Erosion control and water pollution control requirements are shown on Contract Drawings.
3. All sediment laden groundwater produced from excavations and surface run-off entering excavations shall be collected and conveyed to an approved onsite location and dissipated (i.e., no offsite discharge is allowed).

B. Definitions: Terminology used in this Section conforms to the following definitions:

1. Control Of Water: General term referring to the management of groundwater and surface water inflow into excavations.
2. Control Of Water System: General term referring the Dewatering Systems.
3. Dewatering: General term referring to the process of removing accumulated water, including precipitation, water separated from excavated soils and seepage from the open excavation or from excavated soils.
4. Dewatering System: System to collect and remove said accumulated water from the open excavation or from excavated soils.
5. Watertight: Level of tightness required for installed barriers to minimize the groundwater seepage and inflow of water into excavations to accommodate design criteria.
6. Groundwater Seepage: Groundwater entering an excavation as inflow or seepage from exposed soils in the excavation and installed watertight systems.
7. Perched Water: A layer of saturated soil that results when an underlying impermeable layer, restricts the downward movement of water. This water table is usually above the regional water table.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. This Section incorporates by reference the latest revisions of the following documents. They are part of this Section insofar as specified and modified herein. In the event of 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 on the effective date of the Agreement. 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.

1.03 SUBMITTALS

A. Procedures: Section 01 33 00.

B. Informational submittal items for this section:

1. A copy of this Section, addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from Section requirements.
2. Dewatering Plan: Dewatering Plan, prepared, sealed, and signed by a professional engineer registered in the State of Georgia, outlining the method and installation of the dewatering system, including details. The Plan shall include the following:
   a. Indicate number and type of equipment and pipelines and other means of conveyance, including capacities.
   b. Dewatering pit and sump locations and water discharge locations.
   c. Dewatering well locations and water discharge locations.
   d. Groundwater monitoring systems where necessary.
   e. Filter systems and locations as necessary, and such other information to verify acceptable control and performance.
   f. The Plan shall include the following excavation dewatering elements:
      1) Details of methods to maintain the excavations in a dewatered and hydrostatically relieved condition.
      2) Systems for control of groundwater inflow into excavations using watertight barriers, grouted soil masses, or other means.
      3) Method for the measurement of inflow into excavations.
   g. The Plan shall include the following surface water flow elements:
      1) Method for prevention and removal of surface water flow entering the excavation.
3. Contact Information and Reporting:
   a. The Contractor shall submit contact information for a designated emergency contact. The contact shall be a responsible individual available at all times.
   b. The Contractor shall resubmit components of the drawings and design data if the systems or any part thereof is significantly modified during installation or operation.
   c. Before dewatering commences, the Contractor shall obtain the acceptance of the Owner for the method, installation, and details of the dewatering system proposed for use.

C. Review by the Owner of the submitted Dewatering Plan shall not in any way relieve the Contractor from responsibility for errors therein or from the entire responsibility for a complete and adequate dewatering system. The Contractor shall bear sole responsibility for proper design, installation, operation, maintenance, and any failure of any component of the groundwater control system for the duration of this Contract.

1.04 PERFORMANCE REQUIREMENTS

A. Discharges of groundwater and surface water collected from excavations shall meet the discharge requirements of the State of Georgia, including discharges to infiltration facilities.

B. Comply with State of Georgia standards for the drilling, installation, construction, and abandonment of all dewatering wells, well points, monitoring wells.

PART 2 NOT USED

PART 3 EXECUTION

3.01 GENERAL

A. Furnish, install, operate, maintain, and remove all necessary equipment to keep excavations free from water during construction as needed to perform the excavations and to divert water around work areas. The withdrawal, removal, or disposal of the water shall not cause injury to public or private property or nuisance to the public.

B. Sufficient pumping and power equipment in good working condition shall be available at all times for all emergencies, including power outage, and competent workmen shall be available at all times for the operation of the dewatering and bypass system.

C. Systems shall not be shut down between shifts, on holidays, or weekends, or during work stoppages.

D. The Contractor has the option to install groundwater monitoring wells prior to excavating in order to verify adequacy of Contractor-designed dewatering system. However, if the system as designed is incapable of maintaining a dewatered excavation, the Contractor shall modify the system as required at no additional cost to the Owner. Any wells used for monitoring or dewatering shall be developed, drilled, and abandoned meeting the requirements of federal, state, and local codes.

3.02 DEWATERING SYSTEM OPERATION

A. The dewatering system shall be installed and operated so that the groundwater level outside the excavation or fill areas is not drawn down to the extent that would damage or endanger adjacent slopes, structure, underground installation, sidewalk, pavement, other improvement, or property.

B. Configuration and sizing of the dewatering system shall take into account run-off from areas adjacent to the Work where existing drainage patterns are interrupted.

C. During any backfill, filling, and compaction activities, control surface run-off so as to prevent entry or collection of water in excavations and fills. The static water level within excavations shall be drawn down a minimum of 1 foot below the bottom of the excavation so as to maintain the undisturbed state of the foundation soils and allow acceptable placement of any backfill to the required density.

D. Discharge of water from the dewatering of the excavations shall be as shown on Contract Drawings. The Contractor may consider use of the stormwater pipeline to the existing on-site presettling pond and infiltration basin as a component of the dewatering system with the following provisions:
   1. The Contractor is responsible for verifying hydraulic requirements and capacity for coordination with the dewatering system.
   2. Identification and provision of any temporary facilities needed to connect to the pipeline are the Contractor's responsibility.
   3. Pipelines shall be cleaned and inspected, and the existing presettling pond shall be restored after dewatering system use.

E. Immediate steps shall be taken including but not limited to the modification of excavation and ground support procedures and ground permeability modifications, to reduce the inflow of water entering an excavation, where the volume or inflow rate is at risk of causing the following:
   1. Drawdown of the groundwater level to an unacceptable level for the area outside the excavation.
   2. Damage or has the potential of causing loss or damage to adjacent property or structures.
   3. Adversely affects the performance of the work.

F. Excavations shall be kept free of water to the extent required to perform the Work during excavation. Excavations shall be kept free of water for backfill, slope construction, and compaction.

G. Control surface runoff so as to prevent entry or collection of water in excavations or in other isolated areas of the site.

H. Discharge Points:
   1. All water discharged shall be as shown on Contract Drawings.
   2. Dewater and dispose of the water so as not to cause injury to public, private, or other property, or to cause a nuisance or a hazard to the public.

3.03 ELECTRICAL SUPPLY FOR DEWATERING SYSTEM

A. Supply two separate electrical services or sources to be used for dewatering, stormwater bypass, and construction stormwater collection and conveyance that are separate from each other and all other Contractor electrical requirements.

3.04 DEWATERING SYSTEM PROTECTION

A. Take all reasonable precautions necessary to ensure continuous operation of the system.

B. Mark and signpost all pump and pipeline locations.

C. Standby pumps are to be fueled and on-line, isolated from the primary system by a valve at all times.

D. Test daily all standby pumps and generators to ensure their immediate availability.

E. Wherever vacuum headers or discharge lines are to be crossed for access and egress, use physical bridging devices such as a ramp to protect and separate the system from vehicular traffic.
   1. Bridges shall be capable of supporting the heaviest equipment on site and shall provide at least 1 foot of clearance between the dewatering system element and the underside of the barrier.
   2. Clearly identify with brightly colored or flagged 8-foot-high poles on each side of the access point for all vehicular access points to be used across the dewatering system.
   3. All pipelines with vehicular crossing bridges, such as ramps, shall be equipped with valves on both sides of the ramp.

3.05 DAMAGES

A. Repair any damage to work in place that may result from inadequate or improper dewatering system installation, maintenance, and operation of the system, and any mechanical or electrical failure of the system. Work in place shall include but is not limited to:
   1. Structures, pipelines, and utilities.
   2. Other contractors' equipment.
   3. The excavation, including damage to the bottom due to heave and removal of material and pumping out of the excavated area.

B. Immediately support any footings, slopes, foundations, basement or walls, concrete driveways, pipelines, utilities, or other structures that become unstable and vulnerable to settlement due to removal or disturbance of groundwater. Support shall include but not be limited to shoring, sheeting, bracing, grouting, underpinning, driving piles, excavation, backfilling, placing new structural concrete beneath or adjacent to the unstable structure, or other means necessary to rectify the particular problem involved.

C. Contractor is responsible for all loss or damage arising from removal or disturbance of groundwater including, but not limited to, subsidence damage or the loss of structural support that may occur in the prosecution of the Work.

3.06 SOIL AND GROUNDWATER DATA

A. Soil and groundwater data: Section 01 11 10.

B. Use of available information in no way relieves the Contractor from its responsibility for the operation of a properly functioning dewatering system.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 NOT USED

PART 2 PRODUCTS

2.01 CHEMICALS FOR DUST CONTROL

A. Calcium Chloride, Anionic Asphalt Emulsion, Latex Emulsion or Resin-in-Water Emulsion may be used for dust control.

2.02 SILT FENCE FABRIC

A. Silt fence fabric shall be a woven fabric certified to meet FHWA's Task Force 25 minimum roll average per ASTM-D-4354. The geotextile fabric shall be a woven sheet of plastic yarn, of a long chain 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 the filaments resistant to deterioration due to ultra-violet and/or heat exposure. The fabric should be finished so that the filaments will retain their relative position with respect to each other. The fabric shall be free of defects, rips, holes, or flaws.

B. The fabric shall meet the following requirements:

Woven Fabrics	
Grab Strength	90 lb
Mullen Burst Strength	250 lb
UV Resistance	90%
Permittivity	15 gal/min/sf

C. Product shall be equivalent to EXXON GTF-180 Fabric or AMOCO Woven Construction Fabric No. 1380.

D. Silt fencing shall not be placed in waterways or areas of concentrated flow. Type “C” wire-reinforced silt fence shall be used where fill slopes exceed 3:1.

2.03 GABIONS

A. Gabions shall be constructed of heavy galvanized steel wire mesh with a zinc coating of triple hexagon weave. The mesh wire diameter for the galvanized gabions shall be 2.2 mm (0.0866") + 2 1/2%; the mesh edge wire shall be not less than 2.7 mm – 2 1/2%. The lacing wire for binding the netting units together shall be 2.2 mm (0.0866") + 2 1/2%.

B. Geotextiles are recommended to be used behind all gabion structures and shall be specified in accordance with AASHTO M288-96 Section 7.5, “Permanent Erosion Control Requirements.”

2.04 HAY BALES

A. Hay bales rectangular in shape shall be bound with wire or nylon to securely contain the material. Pine straw bales may be used in lieu of hay bales. Bales shall be placed in a single row, lengthwise, on the contour and embedded in the soil to a depth of four (4) inches. Bales must be securely anchored in place by stake or bars driven through the bales.

2.05 PLASTIC FILTER FABRIC

A. Plastic filter fabric shall be a pervious sheet of plastic yarn, of a long chain synthetic polymer composed of 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 cloth should be finished so that the filaments will retain their relative position with respect to each other. The cloth shall be free of defects, rips, holes, or flaws. During shipment and storage, the filter fabric shall be wrapped in a protective material. The fabric shall meet the following requirements.

Woven Fabrics

Tensile Strength (any direction)	200 lb
Bursting Strength	400 psi
Elongation Before Breaking	15%
Permittivity	4 gal/min/sf

B. Product shall be equivalent to EXXON GTF-400E or AMOCO Woven Construction Fabric No. 2002.

C. Seams - Fabric may be sewn together with thread of a material having the same chemical requirements as the material forming the fabric or shall be bonded by cementing or by heat. The strength of the seams shall be equal to that of the unaged fabric. Fabrics to be used under riprap are allowed to be bonded or sewn together forming sections not less than 6 feet wide.

2.06 SHEET PILING

A. Sheet piling shall be treated timber (0.5 CCA), steel (minimum 3/8-inch thick), or other material accepted on a case by case basis by the Engineer for the site at which the piling is used.

2.07 STONE

A. Stone shall be hard quarry, granite or field stone and shall be of such quality that the stone will not disintegrate on exposure to water or weather. The stone size, type and weight shall be as shown in conjunction with the structure with which it is associated. The stone shall be accepted by the Engineer prior to delivery.

2.08 TREATED TIMBERS

A. Treated timbers (0.5 CCA) shall be a nominal 4" by 4" and of varying length to accommodate the size of the proposed structure.

2.09 RIPRAP

A. Riprap shall be hard quarry or field stone, and shall be of such quality that they will not disintegrate on exposure to water and weather. The stone shall range in weight from a minimum of 25 pounds to a maximum of 150 pounds. At least 50 percent of the stone pieces shall weigh more than 60 pounds. The stone pieces shall have a minimum plane dimension of 12 inches. The stone analysis, source and other pertinent data shall be submitted for review by the Engineer prior to delivery. The filter fabric for permanent riprap shall be Mirafi 140N or equivalent. Riprap shall not be placed on slopes steeper than 1.5 horizontal to 1.0 vertical.

PART 3 EXECUTION

3.01 GENERAL

A. Every effort shall reasonably be employed by the Contractor to control erosion with the use of, but not limited to, terraces, grassing, and silt fencing during the project. All erosion and sedimentation control measures or facilities, whether temporary or permanent, shall be continuously maintained by the Contractor so as to be effective, or as ordered by the Owner.

3.02 BUFFER ZONE

A. Buffer zone is an undisturbed zone or "green belt" surrounding the site, bordering streams or environmentally sensitive areas. Contractors shall not trespass on or in these areas unless he has prior acceptance by the Owner. Trespass in these areas will not be permitted unless there is no alternative method to accomplish the task. Cost shall not come into consideration in the evaluation of this type of request.

3.03 CONSTRUCTION EXIT

A. Construction exits shall be located at the exits of the project to remove mud from the tires of all vehicles leaving the site. The construction exit shall consist of a minimum of six (6) inch thick pad of washed stone meeting Section AASHTO M288-96, Section 7.4, Stabilization Requirements. The aggregate size shall be in accordance with National Stone Association R-2 (1 ½"-3 ½" diameter in size and of the necessary length to accomplish the task for which it is intended. The pad may require periodic top dressing with 2" of similar stone. Geotextiles are required and a Separation/ Stabilization fabric to keep the aggregate stone from becoming contaminated with subgrade soils. The geotextile shall be based on AASHTO M288-96 Specifications. The entrance area must be excavated to a depth of 3 inches and be cleaned of all vegetation and roots. Geotextile underliner must be placed the full length and width of the entrance.

3.04 DISTURBED AREA STABILIZATION

A. Vegetative cover will be placed on completed areas. This vegetative plan will be carried out on road cut and fill slopes, shoulders, and other critical areas created by construction. Plant grass seed as soon as construction in an area is completed. Planting will be made to control erosion, to reduce damage from sediment and runoff to downstream areas and to improve the safety and beauty of the development area.

B. Due to grading and construction, the areas to be treated are mainly subsoil and substrate. Fertility is low and the physical characteristics of the exposed material are unfavorable to all but the most hardy plants.

C. Conventional Seeding Equipment - Grade, shape and smooth where needed to provide for safe equipment operation at seeding time and for maintenance purposes. The lime and fertilizer in dry form will be spread uniformly over the area immediately before seedbed preparation. A seedbed will be prepared by scarifying to a depth of 1 to 4 inches as determined on site. The seedbed must be well pulverized, smoothed and firmed. Seeding will be by either a cultipacker-seeder, drill, rotary seeder, mechanical seeder, hand seeder or hydro-seeding. Seed will be distributed uniformly over a freshly prepared seedbed and covered lightly. Within 24 hours after seeding, with exception to hydro-seeding, straw or hay mulch will be spread uniformly over the area, leaving about 25 percent of the ground surface exposed. Mulch will be spread with blower-type mulch equipment or by hand and anchored immediately after it is spread. A disk harrow with the disk set straight or a special packer disk may be used to press the mulch into the soil.

D. The per acre application rates are as follows using conventional seeding equipment on slopes less than 3:1:

Soil Treatment	Application
Agricultural limestone	4,000 #/acre
Fertilizer, 10-10-10 (with micro-nutrients)	1,500 #/acre
Mulch, straw or hay	4,000 #/acre

Seed Species	Application Rates/Acre	Planting Dates
Hulled common bermuda grass	10 #	3/1 – 9/30
Rye grass	50 #	10/1 – 2/28
Temporary cover	4,000 #	N/A

Top-dressing: Apply when plants are 2 to 4 inches tall.

Fertilizer (Ammonium Nitrate 33.5%) at 300 #/acre.

If the project extends in to the second year, fertilizer shall be applied at the rate of 800 #/acre.

3.05 DUST CONTROL ON DISTURBED AREAS

A. Dust raised from vehicular traffic will be controlled by wetting down the access road with water or by the use of a deliquescent chemical, such as calcium chloride, if the relative humidity is over 30%. Chemicals shall be applied in accordance with the manufacturer's recommendations. Calcium chloride, anionic asphalt emulsion, latex emulsion or resin-in-water emulsion may be used for dust control.

3.06 DOWNDRAIN STRUCTURE

A. Downdrain structures shall be constructed where shown on the drawings and elsewhere as necessary to carry runoff down slopes to prevent the formation of rills or gullies. Downdrain structures shall be a paved chute, steel or plastic pipe, or sectional pipe at the discretion of the contractor. Outlets of downdrains shall outfall into stabilized areas only. Soil around the inlet shall be compacted to prevent the pipe from being washed out by seepage. Rock riprap or other suitable materials shall be placed at the outlet for stabilization.

3.07 GABIONS

A. Gabions shall be of the size shown on the drawing and as dimensioned in the details on the plans. The gabions shall be laced together along the perimeter of all surfaces and filled with 4" to 8" diameter stone in 3 lifts, with two connecting wires placed between each lift. Care shall be taken to protect the vertical panels from being bent during filling.

3.08 SEDIMENT BARRIER

A. Sediment barrier shall be constructed of hay bales (pine bales) anchored and embedded into the soil to prevent washout or water washing under the barrier. A minimum of two (2) re-bars, steel pickets or 2" x 2" stakes shall be used per bale and shall be long enough to extend through the bale and be driven into the ground a minimum of 1-1/2 feet. Where two (2) rows are called for, the bales shall be staggered. Bales shall be embedded in the soil to a depth of 4 inches.

B. Bales shall be placed in a single row, lengthwise, on the contour and embedded in the soil to a depth of four (4) inches. Bales must be securely anchored in place by stakes or bars driven through the bales.

3.09 SILT FENCE

A. Silt fence shall be placed at the approximate location shown on the plans and installed in accordance with the Georgia Erosion and Sediment Control Manual recommendations. Type “C” wire-reinforced silt fence shall be used where fill slopes exceeds 3:1. Silt fence shall not be placed in waterways or areas of concentrated flow.

3.10 STONE PLACEMENT

A. The minimum thickness or depth of the stone layer shall be shown on the drawings or the detail with which the device is associated. When used with a plastic filter

fabric, the stone placing shall begin in a trench at the bottom of the slope with the filter fabric wrapped in stone. The entire mass of stone shall be placed so as to be in conformance with the lines, grades, and thickness shown on the drawings.

3.11 RIPRAP

A. Riprap shall be placed in accordance with the notes on the drawings. Any rip rap that shall be permanent shall have an underlayment of filter fabric.

3.12 STORM DRAIN OUTLET PROTECTION

A. Storm drain outlets shall be paved or have a rock or other energy dispersion device associated with it, as called for on the drawings. The length shall be a minimum of six (6) times the pipe diameter and placed on a 1% grade unless otherwise specified on the drawings.

B. To prevent undermining of the riprap apron a separation geotextile shall be used beneath the entire length of apron. The geotextile shall be specified in accordance with AASHTO M288-96, Section 7.5, “Permanent Erosion Control Requirements”.

3.13 INLET SEDIMENT TRAP

A. The Contractor shall erect silt fence or hay bales at and around inlets under construction. Existing inlets in paved areas shall be protected by the use of concrete blocks wrapped with filter fabric as per detail. Sufficient quantities of selected devices shall be utilized to completely protect the entire length of the inlet. Contractor may alternately construct a temporary baffle in the inlet on the effluent pipe per detail providing that accumulated sediment be removed after each erosion event.

3.14 SITE RESTORATION

A. The site shall be restored in a manner suitable to accommodate the erosion control device or system of devices for the use which they are intended.

3.15 TOPSOIL

A. If topsoil is stripped and stored on site to be used after construction, the stockpile side slopes shall be 2:1 or flatter. Stockpiled topsoil shall not obstruct natural drainage. Topsoil replacement shall be spread at minimum of 4" thickness.

3.16 SITE SAFETY

A. The Contractor shall incorporate and utilize all necessary fencing and other safety barriers as necessary, or directed by Owner, to prevent trespassing into potentially dangerous areas of the erosion control area.

END OF SECTION

SECTION 31 41 00

SHEETING, SHORING AND BRACING

PART1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes temporary excavation support and protection systems.

B. Related Sections:
   1. Sections 01 32 33 “Photographic Documentation” and 01 14 19 - “Use of Site” for recording preexisting conditions and excavation support and protection system progress.
   2. Section 31 23 19 - "Dewatering" for dewatering system for excavations.

1.03 PERFORMANCE REQUIREMENTS

A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
   1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
   2. Prevent surface water from entering excavations by grading, dikes, or other means.
   3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
   4. Monitor vibrations, settlements, and movements.

1.04 SUBMITTALS

A. Shop Drawings:
   1. For excavation support and protection system.

B. Delegated-Design Submittal:
   1. For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   2. Coordinate first paragraph below with qualification requirements in Section 01 40 00 - “Quality Requirements” for qualified professional engineer.

C. Other Informational Submittals:
   1. Photographs or Videotape: Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems. Submit before Work begins.
   2. Record Drawings: Identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.

      Note locations and capping depth of wells and well points.

1.05 QUALITY ASSURANCE

A. Preinstallation Conference:
   1. Conduct conference at Project site.
      a. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:
         1) Geotechnical report.
         2) Existing utilities and subsurface conditions.
         3) Proposed excavations.
         4) Proposed equipment.
         5) Monitoring of excavation support and protection system.
         6) Working area location and stability.
         7) Coordination with waterproofing.
         8) Abandonment or removal of excavation support and protection system.

1.06 PROJECT CONDITIONS

A. Interruption of Existing Utilities:
   1. Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
      a. Notify Construction Manager no fewer than two days in advance of proposed interruption of utility.
      b. Do not proceed with interruption of utility without Construction Manager's written permission.

B. Project-Site Information:
   1. A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.
      a. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
      b. The geotechnical report is referenced elsewhere in the Project Manual.

C. Survey Work:
   1. Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
      a. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:
   1. Provide materials that are either new or in serviceable condition.

B. Structural Steel:
   1. ASTM A36/A36M, ASTM A690/A690M, or ASTM A992/A992M.

C. Steel Sheet Piling:
   1. ASTM A328/A328M, ASTM A572/A572M, or ASTM A690/A690M; with continuous interlocks.

D. Wood Lagging:
   1. Lumber, mixed hardwood, nominal rough thickness of size and strength required for application

E. Shotcrete:
   1. Comply with specifications for shotcrete materials and mixes, reinforcement, and shotcrete application.

F. Cast-in-Place Concrete:
   1. ACI 301, of compressive strength required for application.

G. Reinforcing Bars:
   1. ASTM A615/A615M, Grade 60 (Grade 420), deformed.

H. Tiebacks:
   1. Steel bars, ASTM A722/A722M.
   2. Steel strand, ASTM A416/A416M.

PART 3 EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
   1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.

D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.02 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.03 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches (1,500 mm). Accurately align exposed faces of sheet piling to vary not more than 2 inches (50 mm) from a

horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

3.04 TIEBACKS

A. Drill, install, grout, and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.
   1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
   2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

3.05 BRACING

A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
   1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.
   2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
   3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.06 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
   1. Remove excavation support and protection systems to a minimum depth of 48 inches (1,200 mm) below overlaying construction and abandon remainder.
   2. Fill voids immediately with approved backfill compacted to density specified in Section 31 23 00.
   3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

B. Leave excavation support and protection systems permanently in place.

END OF SECTION

SECTION 32 12 16

REMOVING AND REPLACING ASPHALT PAVING

PART 1 GENERAL

1.01 SUMMARY

A. The work to be performed under this Section shall consist of removing and replacing existing pavement, sidewalks and curbs in paved areas where necessary for construction of utilities and all other water appurtenances and structures.

B. Existing pavement, sidewalks, and curbs shall be replaced to the current County standards or to match existing, whichever is more stringent.

1.02 SUBMITTALS

A. Certificates: Provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the asphalt producer and the Contractor.

1.03 CONDITIONS

A. Weather Limitations
   1. Apply bituminous prime and tack coats only when the ambient temperature has been at least 55 degrees F for 12 hours immediately prior to application.
   2. Do not conduct paving operations when surface is wet or contains excess of moisture which would prevent uniform distribution and required penetration.
   3. Construct asphaltic courses only when atmospheric temperature in the shade is above 40 degrees F, when the underlying base is dry and when weather is not rainy.
   4. Place base course when air temperature is above 35 degrees F and rising.

B. Grade Control: Establish and maintain the required lines and grades for each course during construction operations.

PART 2 PRODUCTS

2.01 MATERIALS AND CONSTRUCTION

A. Graded Aggregate Base Course: Graded aggregate base course shall be of uniform quality throughout and shall meet the requirements of Section 815.01 of the Georgia Department of Transportation Standard Specifications.

B. Black Base: Black base course shall be of uniform quality throughout and shall conform to the requirements of Section 828 of the Georgia Department of Transportation Standard Specifications.

C. Bituminous Tack Coat: The bituminous tack coat shall conform to the requirements of Section 400 of the Georgia Department of Transportation Standard Specifications.

D. Surface Course: The surface course for all asphaltic concrete pavement shall conform to the requirements of Section 400, 12.5mm SuperPave of the Georgia Department of Transportation Standard Specifications.

E. Concrete: Provide concrete and reinforcing for concrete pavement or base courses in accordance with the requirements of the Georgia Department of Transportation Standard Specifications, Section 430. Concrete shall be of the strength classifications shown on the Drawings.

F. Special Surfaces: Where driveways or roadways are disturbed or damaged which are constructed of specialty type surfaces, e.g., brick or stone, these driveways and roadways shall be restored utilizing similar, if not original, materials. Where the nature of these surfaces dictate, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

2.02 TYPES OF PAVEMENTS

A. General: All existing pavement removed, destroyed or damaged by construction shall be replaced with the same type and thickness of pavement as that existing prior to construction, unless otherwise directed by the Engineer. Materials, equipment and construction methods used for paving work shall conform to the Georgia Department of Transportation specifications applicable to the particular type required for replacement, repair or new pavements.

B. Aggregate Base: Aggregate base shall be constructed in accordance with the requirements of Section 310 of the Georgia Department of Transportation Standard Specifications. The maximum thickness to be laid in a single course shall be 6-inches compacted. If the design thickness of the base is more than 6-inches, it shall be constructed in two or more courses of approximate equal thickness. After the material placed has been shaped to line, grade and cross-section, it shall be rolled until the course has been uniformly compacted to at least 100 percent of the maximum dry density when Group 2 aggregate is used, or to at least 98 percent of maximum dry density when Group 1 aggregate is used.

C. Concrete Pavement: Concrete pavement or base courses shall be replaced with concrete. The surface finish of the replaced concrete pavement shall conform to that of the existing pavement. The surface of the replaced concrete base course shall be left rough. The slab depth shall be equivalent to the existing concrete pavement or base course, but in no case less than 6-inches thick. Transverse and longitudinal joints removed from concrete pavement shall be replaced at the same locations and to the same types and dimensions as those removed. Concrete pavements or concrete base courses shall be reinforced.

D. Asphaltic Concrete Base, Binder and Surface Course: Asphaltic concrete base, binder and surface course construction shall conform to Georgia Department of Transportation Standard Specifications, Section 400. The pavement mixture shall not be spread until the designated surface has been previously cleaned and prepared, is intact, firm, properly cured, dry and the tack coat has been applied. Apply and compact the base in maximum layer thickness by asphalt spreader equipment of design and operation approved by the Engineer. After compaction, the

black base shall be smooth and true to established profiles and sections. Apply and compact binder and the surface course in a manner approved by the Engineer. Immediately correct any high, low or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.

E. Surface Treatment Pavement: Bituminous penetration surface treatment pavement shall be replaced with a minimum thickness of 1.5-inch conforming to Section 424, Georgia Department of Transportation Standard Specifications.

F. Gravel Surfaces: Existing gravel road, drive and parking area replacement shall meet the requirements of graded aggregate base course. This surfacing may be authorized by the Engineer as a temporary surface for paved streets until replacement of hard surfaced pavement is authorized.

G. Temporary Measures: During the time period between pavement removal and complete replacement of permanent pavement, maintain highways, streets and roadways by the use of steel running plates anchored to prevent movement. The backfill above the pipe shall be compacted, as specified, up to the existing pavement surface to provide support for the steel running plates. All pavement shall be replaced within seven calendar days of its removal.

PART 3 EXECUTION

3.01 LOCATIONS FOR PAVEMENT REPLACEMENT

A. Pavement shall be removed and replaced with similar type and thickness as the original pavement, for the entire length of pipe laying and up to required trench width as per details shown on drawings.

3.02 REMOVING PAVEMENT

A. General: Remove existing pavement as necessary for installing the pipe line and appurtenances.

B. Marking: Before removing any pavement, mark the pavement neatly paralleling pipe lines and existing street lines. Space the marks the width of the trench.

C. Breaking: Break asphalt pavement along the marks using pavement shearing equipment, jack hammers or other suitable tools. Break concrete pavement along the marks by scoring with a rotary saw and breaking below the score by the use of jack hammers or other suitable tools.

D. Machine Pulling: Do not pull pavement with machines until the pavement is completely broken and separated from pavement to remain.

E. Damage to Adjacent Pavement: Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.

F. Sidewalk: Remove and replace any sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.

G. Curbs: Tunnel under or remove and replace any curb disturbed by construction to the nearest undisturbed joint.

H. Cutting: Before removing any existing pavement, saw cut the pavement in full thickness.

3.03 REPLACING PAVEMENT

A. Preparation of Subgrade: Upon completion of backfilling and compaction of the backfill, arrange to have the compaction tested by an independent testing laboratory approved by the Engineer. After compaction testing has been satisfactorily completed, replace all pavements, sidewalks and curbs removed.

1. The existing street pavement or surface shall be removed along the lines of the work for the allowable width specified for the trench or structure. After the installation of the water works facilities and after the backfill has been compacted suitably, the additional width of pavement to be removed, as shown on the Drawings, shall be done immediately prior to replacing the pavement.
2. Trench backfill shall be compacted for the full depth of the trench as specified in these Specifications.
3. Temporary trench backfill along streets and driveways shall include 6-inches of crushed stone or cherty clay as a temporary surfacing of the trenches. This temporary surface shall be maintained carefully at grade and dust-free by the Contractor until the backfill of the trench has thoroughly compacted in the opinion of the Engineer and permission is granted to replace the street pavement.
4. When temporary crushed stone or chert surface is considered by the Engineer to be sufficient surface for gravel pavement, the surface shall be graded smooth and to an elevation that will make the final permanent surfacing level with the adjacent surfacing that was undisturbed.

B. Pavement Replacement

1. Prior to replacing pavement, make a final cut in concrete pavement 12-inches back from the edge of the damaged pavement with a concrete saw. Remove asphalt pavement 12-inches back from the edge of the damaged pavement using pavement shearing equipment, jack hammers or other suitable tools. Pavement cuts shall be parallel or perpendicular to the road centerline as much as practical. On parallel installations the final cut shall be long and straight and consistent.
2. Replace all street and roadway pavement as shown on the Drawings. Replace driveways, sidewalks and curbs with the same material, to nearest existing undisturbed construction joint and to the same dimensions as those existing.
3. If the temporary crushed stone or chert surface is to be replaced, the top 6-inches shall be removed and the crushed stone surfacing for unpaved streets or the base for the bituminous surface shall be placed.
4. Following this preparation, the chert or crushed stone base shall be primed with a suitable bituminous material and surfaced with the proper type of bituminous surface treatment.

5. Where the paved surface is to be replaced with asphaltic concrete pavement, concrete pavement or with a concrete base and a surface course, the temporary chert or crushed stone surface and any necessary backfill material, additional existing paving and new excavation shall be removed to the depth and width shown on the Drawings. All edges of the existing pavement shall be cut to a straight, vertical edge. Care shall be used to get a smooth joint between the old and new pavement and to produce an even surface on the completed street. Concrete base slabs and crushed stone bases, if required, shall be placed and allowed to cure for three days before bituminous concrete surface courses are applied. Expansion joints, where applicable, shall be replaced in a manner equal to the original joint.
6. Where driveways or roadways, constructed of specialty type surfaces, e.g., brick or stone are disturbed or damaged, these driveways and roadways shall be restored utilizing similar materials. Where the nature of these surfaces dictate, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

C. Pavement Resurfacing:
1. Certain areas to be resurfaced are specified or noted on the Drawings. After all pipe line installations are complete and existing pavement has been removed and the trench route has been repaired, mill entire area to be resurfaced 1.5 inches, then apply tack coat and 1.5 inches of Type E surface course as specified. Where pavement to be resurfaced has been damaged with potholes, the Contractor shall remove all existing loose pavement material and fill the hole with black base, as specified, to the level of the existing pavement.
2. Resurfacing limits shall be perpendicular to the road centerline. The limits of resurfacing shall be 10 feet beyond the edge of the pavement replacement on the main road being resurfaced, and to the point of tangency of the pavement on the side streets.

D. Pavement Striping: Pavement striping removed or paved over shall be replaced with the same type, dimension and material as original unless directed otherwise by the Engineer.

3.04 SIDEWALK AND CURB REPLACEMENT

A. Construction
1. All concrete sidewalks and curbs shall be replaced with concrete.
2. Preformed joints shall be ½-inch thick, conforming to the latest edition of AASHTO M59 for sidewalks and AASHTO M 123 for curbs.
3. Forms for sidewalks shall be of wood or metal, shall be straight and free from warp, and shall be of sufficient strength, when in place, to hold the concrete true to line and grade without springing or distorting.
4. Forms for curbs shall be metal and of an approved section. They shall be straight and free from distortions, showing no vertical variation greater than 1/8-inch in 10 feet and no lateral variation greater than ¼-inch in 10 feet from the true plain surface on the vertical face of the form. Forms shall be of the full depth

of the structure and constructed such to permit the inside forms to be securely fastened to the outside forms.

5. Wood forms may be used on sharp turns and for special sections, as approved by the Engineer. Where wooden forms are used, they shall be free from warp and shall be the nominal depth of the structure.
6. All mortar and dirt shall be removed from forms and all forms shall be thoroughly oiled or wetted before any concrete is deposited.

B. When a section is removed, the existing sidewalk or curb shall be cut to a neat line, perpendicular to both the centerline and the surface of the concrete slab. Existing concrete shall be cut along the nearest existing construction joints; if such joints do not exist, the cut shall be made at minimum distances shown on the Drawings.

C. Existing concrete sidewalks and curbs that have been cut and removed for construction purposes shall be replaced with the same width and surface as the portion removed. Sidewalks shall have a minimum uniform thickness of 4-inches. The new work shall be neatly jointed to the existing concrete so that the surface of the new work shall form an even, unbroken plane with the existing surfaces.

D. The subgrade shall be formed by excavating to a depth equal to the thickness of the concrete, plus 2-inches. Subgrade shall be of such width as to permit the proper installation and bracing of the forms. Subgrades shall be compacted by hand tamping or rolling. Soft, yielding or unstable material shall be removed and backfilled with satisfactory material. Place 2-inches of porous crushed stone under all sidewalks and curbs and compacted thoroughly, then finish to a smooth, unyielding surface at proper line, grade and cross section.

E. Joint for Curbs
   1. Joints shall be constructed as indicated on the Drawings and as specified. Construct joints true to line with their faces perpendicular to the surface of the structure and within ¼-inch of their designated position.
   2. Thoroughly spade and compact the concrete at the faces of all joints filling all voids.
   3. Install expansion joint materials at the point of curve at all street returns. Install expansion joint material behind the curb at abutment to sidewalks and adjacent structures.
   4. Place contraction joints every 10 feet along the length of the curbs and gutters. Form contraction joints using steel templates or division plates which conform to the cross section of the structure. Leave the templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Contraction joint templates or plates shall not extend below the top of the steel reinforcement or they shall be notched to permit the reinforcement to be continuous through the joint. Contraction joints shall be a minimum of 1-1/2-inches deep.

F. Expansion joints shall be required to replace any removed expansion joints or in new construction wherever shown on the Drawings. Expansion joints shall be true and even, shall present a satisfactory appearance, and shall extend to within ½-inch of the top of finished concrete surface.

G. Finishing
   1. Strike off the surface with a template and finish the surface with a wood float using heavy pressure, after which, contraction joints shall be made and the surface finished with a wood float or steel trowel.
   2. Finish the face of the curbs at the top and bottom with an approved finishing tool of the radius indicated on the Drawings.
   3. Finish edges with an approved finishing tool having a ¼-inch radius.
   4. Provide a final broom finish by lightly combing with a stiff broom after troweling is complete.
   5. The finished surface shall not vary more than 1/8-inch in 10 feet from the established grade.

H. Driveway and Sidewalk Ramp Openings
   1. Provide driveway openings of the widths and at the locations indicated on the Drawings and as directed by the Engineer.
   2. Provide sidewalk ramp openings as indicated on the Drawings, in conformance with the applicable regulations and as directed by the Engineer.

I. Concrete shall be suitably protected from freezing and excessive heat. It shall be kept covered with burlap or other suitable material and kept wet until cured. Provide necessary barricades to protect the work. All damage caused by people, vehicles, animals, rain, the Contractor's operations and the like shall be repaired by the Contractor, at no additional expense to the Owner.

3.05 MAINTENANCE

A. The Contractor shall maintain the surfaces of roadways built and pavements replaced until the acceptance of the Project. Maintenance shall include replacement, scraping, reshaping, wetting and rerolling as necessary to prevent raveling of the road material, the preservation of reasonably smooth surfaces and the repair of damaged or unsatisfactory surfaces, to the satisfaction of the Engineer. Maintenance shall include sprinkling as may be necessary to abate dust from the gravel surfaces.

3.06 SUPERVISION AND APPROVAL

A. Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. Obtain agency approval of pavement restorations before requesting final payment.

B. Obtain the Engineer's approval of restoration of pavement, such as private roads and drives that are not the responsibility of a regulatory agency.

C. Complete pavement restoration as soon as possible after backfilling.

D. Failure of Pavement: Should any pavement restoration or repairs fail or settle during the life of the Contract, including the bonded period, promptly restore or repair defects.

3.07 CLEANING

A. The Contractor shall remove all surplus excavation materials and debris from the street surfaces and rights-of-way and shall restore street, roadway or sidewalk surfacing to its original condition. The right-of-way shall be restored to its original condition.

END OF SECTION

Insurance and Risk Management Provisions
Johns Creek Main Reuse Project

The following is the minimum insurance and limits that the Contractor/Vendor must maintain. If the Contractor/Vendor maintains higher limits that the minimum shown below, Fulton County Government requires and shall be entitled to coverage for the higher limits maintained by the Contractor/Vendor.

It is Fulton County Government's practice to obtain Certificates of Insurance from our Contractors and Vendors. Insurance must be written by a licensed agent in a company licensed to write insurance in the State of Georgia. Respondents shall submit with the bid/proposal evidence of insurability satisfactory to Fulton County Government as to form and content. Either of the following forms of evidence is acceptable:

- A letter from an insurance carrier stating that upon your firm/company being the successful Bidder/Respondent that a Certificate of Insurance shall be issued in compliance with the Insurance and Risk Management Provisions outlined below.
- A Certificate of Insurance complying with the Insurance and Risk Management Provisions outlined below (Request for Bid/Proposal number and Project Description must appear on the Certificate of Insurance).
- A combination of a specific policy written with an umbrella policy covering liabilities in excess of the required limits is acceptable to achieve the applicable insurance coverage levels.

Any and all Insurance Coverage(s) and Bonds required under the terms and conditions of the contract shall be maintained during the entire length of the contract, including any extensions or renewals thereto, and until all work has been completed to the satisfaction of Fulton County Government.

<u>Accordingly the Respondent shall provide a certificate evidencing the following:</u>

1. **WORKERS COMPENSATION/EMPLOYER'S LIABILITY INSURANCE – STATUTORY (In compliance with the Georgia Workers Compensation Acts and any other State or Federal Acts or Provisions in which jurisdiction may be granted)**

Employer's Liability Insurance	BY ACCIDENT	- EACH ACCIDENT	$500,000
Employer's Liability Insurance	BY DISEASE	- POLICY LIMIT	$500,000
Employer's Liability Insurance	BY DISEASE	- EACH EMPLOYEE	$500,000

2. **COMMERCIAL GENERAL LIABILITY INSURANCE (Including contractual Liability Insurance)**

Bodily Injury and Property Damage Liability	Each Occurrence	-	$1,000,000
(Other than Products/Completed Operations)	General Aggregate	-	$2,000,000
Products\Completed Operations	Aggregate Limit	-	$2,000,000
Personal and Advertising Injury	Limits	-	$1,000,000
Damage to Rented Premises	Limits	-	$100,000

3. **BUSINESS AUTOMOBILE LIABILITY INSURANCE**
   Property Damage and Bodily Injury Per Accident - $1,000,000
   (Including operations of non-owned, owned and hired automobiles)

4. **UMBRELLA LIABILITY** Each Occurrence - $2,000,000
(In excess of Auto, General Liability and Employers Liability)

Certificates

Contractor shall provide written notice to Fulton County Government immediately if it becomes aware of or receives notice from any insurance company that coverage afforded under such policy or policies shall expire, be cancelled or altered. Certificates of Insurance are to list Fulton County Government, Its Officials, Officers, Employees, and Agents as an Additional Insured (except for Workers' Compensation), using ISO Additional Insured Endorsement form CG 20 10 (11/85) version, its' equivalent or on a blanket basis.

The insurance shall apply as Primary Insurance before any other insurance or self-insurance, including any deductible, non-contributory, and Waiver of Subrogation provided in favor of Fulton County.

Additional Insured under the General Liability, Auto Liability, Umbrella Policies (with exception of Workers Compensation), with no Cross Suits exclusion.

If Fulton County Government shall so request, the Respondent, Contractor or Vendor will furnish the County for its inspection and approval such policies of insurance with all endorsements, or confirmed specimens thereof certified by the insurance company to be true and correct copies.

Such certificates and notices shall be sent to:

Fulton County Government – Purchasing Department
130 Peachtree Street, S.W.
Suite 1168
Atlanta, Georgia 30303-3459

Important:

It is understood that neither failure to comply nor full compliance with the foregoing insurance requirements shall limit or relieve the Contractor/Vendor from liability incurred as a result of their activities/operations in conjunction with the Contract and/or Scope of Work.

USE OF PREMISES

Contractor/Vendor shall confine its apparatus, the storage of materials and the operations of its workers to limits/requirements indicated by law, ordinance, permits and any restrictions of Fulton County Government and shall not unreasonably encumber the premises with its materials (Where applicable).

PROTECTION OF PROPERTY

Contractor/Vendor will adequately protect its own work from damage, will protect Fulton County Government's property from damage or loss and will take all necessary precautions during the progress of the work to protect all persons and the property of others from damage or loss.

Contractor/Vendor shall take all necessary precautions for the safety of employees of the work and shall comply with all applicable provisions of the Federal, State and local safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where work is being performed.

Contractor/Vendor shall erect and properly maintain at all times as required by the conditions and progress of the work, all necessary safeguards for the protection of its employees, Fulton County Government employees and the public and shall post all applicable signage and other warning devices to protect against potential hazards for the work being performed (Where applicable).

THE RESPONDENT ACKNOWLEDGES HAVING READ, UNDERSTANDING, AND AGREES TO COMPLY WITH THE ABOVE STATEMENTS, AND IS AUTHORIZED TO SIGN CONTRACTS ON BEHALF OF THE RESPONDING COMPANY.

COMPANY:_____ SIGNATURE:_____

NAME:_____ TITLE:_____

DATE:_____

PURCHASING FORMS & INSTRUCTIONS

This section contains the procurement forms that are required to be executed and submitted with the bid package. This section does not contain all forms required to be included with the bid package submittal.

To be deemed responsive to this ITB, Bidders must provide the information requested and complete in detail all Purchasing Forms. The appropriate individual(s) authorized to commit the Bidder to the Project must sign the Purchasing Forms. Bidders should reproduce each Purchasing Form, as required, and complete the appropriate portions of the forms provided in this section.

- Form A: Non-Collusion Affidavit of Prime Bidder/Offeror
- Form B: Certificate of Acceptance of Request for Bid/Proposal Requirements
- Form C: Professional License Certifications
  - Form C1 – Georgia Utility License Contractor License ***(applicable)***
- Form D: Certification Regarding Debarment
- Form E: Disclosure Form and Questionnaire
- Form F: Georgia Security and Immigration Contractor Affidavit and Agreement
- Form G: Georgia Security and Immigration Subcontractor Affidavit

FORM A: NON-COLLUSION AFFIDAVIT OF BIDDER/OFFEROR

STATE OF GEORGIA

COUNTY OF FULTON

I, _____ certify that pursuant to Fulton County Code Section 102-397, this bid or proposal is made without prior understanding, agreement or connection with any corporation, firm or person submitting a bid for the same work, labor or service to be done or the supplies, materials or equipment to be furnished and is in all respects fair and without collusion or fraud. I understand collusive bidding is a violation of state and federal law and can result in fines, prison sentences and civil damages awards. I agree to abide by all conditions of this bid or proposal and certify that I am authorized to sign this bid or proposal for the bidder.

Affiant further states that pursuant to O.C.G.A. Section 36-91-21 (d) and (e), _____ has not, by itself or with others, directly or indirectly, prevented or attempted to prevent competition in such bidding or proposals by any means whatsoever. Affiant further states that (s)he has not prevented or endeavored to prevent anyone from making a bid or offer on the project by any means whatever, nor has Affiant caused or induced another to withdraw a bid or offer for the work.

Affiant further states that the said offer of _____ is bona fide, and that no one has gone to any supplier and attempted to get such person or company to furnish the materials to the bidder only, or if furnished to any other bidder, that the material shall be at a higher price.

_____
(COMPANY NAME)

_____
(PRESIDENT/VICE PRESIDENT)

Sworn to and subscribed before me this _____ day of _____, 20__.

_____
(SECRETARY/ASSISTANT SECRETARY)

(Affix corporate seal here, if a corporation)

Notary Public: _____

County: _____

Commission Expires: _____

NOTE:

IF THE OFFEROR IS A PARTNERSHIP, ALL OF THE PARTNERS AND ANY OFFICER, AGENT, OR OTHER PERSON WHO MAY HAVE REPRESENTED OR ACTED FOR THEM IN BIDDING FOR OR PROCURING THE CONTRACT SHALL ALSO MAKE THIS OATH.

IF THE OFFEROR IS A CORPORATION, ALL OFFICERS, AGENTS, OR OTHER PERSONS WHO MAY HAVE ACTED FOR OR REPRESENTED THE CORPORATION IN BIDDING FOR OR PROCURING THE CONTRACT SHALL MAKE THE OATH.

FORM B: FULTON COUNTY CERTIFICATE OF ACCEPTANCE OF BID/PROPOSAL REQUIREMENTS

This is to certify that on this day, offeror acknowledges that he/she has read this solicitation document, pages #_____ to #_____ inclusive, including any addenda # _____ to #_____ exhibit(s) #_____ to #_____, attachment(s) # to #_____, and/or appendices #_____ to #,_____in its entirety, and agrees that no pages or parts of the document have been omitted, that he/she understands, accepts and agrees to fully comply with the requirements therein, and that the undersigned is authorized by the offeror to submit the proposal herein and to legally obligate the offeror thereto.

This is also to certify that the offeror has reviewed the form Fulton County contract included in the solicitation documents and agrees to be bound by its terms, or that the offeror certifies that it is submitting any proposed modification to the contract terms with its proposal. The offeror further certifies that the failure to submit proposed modifications with the proposal waives the offeror's right to submit proposed modifications later. The offeror also acknowledges that the indemnification and insurance provisions of Fulton County's contract included in the solicitation documents are non-negotiable and that proposed modifications to said terms may be reason to declare the offeror's proposal as non-responsive.

Company: _____

Signature: _____

Name: _____

Title: _____

Date: _____

(Corporate Seal)

FORM C1: CONTRACTOR'S GEORGIA UTILITY LICENSE CERTIFICATION

Contractor's Name: _____

Utility Contractor's Name: _____

Expiration Date of License: _____

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

Signed:

_____

Date:

_____

(ATTACH COPY OF LICENSE)

FORM D: CERTIFICATION REGARDING DEBARMENT

(1) The Offeror certifies that neither it or its subcontractors is presently debarred, suspended, proposed for debarment, declared ineligible, or otherwise excluded from doing business with any government agency. Any such exclusion may cause prohibition of your firm from participating in any procurement by the Fulton County Government.

(2) If the Offeror is unable to certify to any of the statements in this certification, such Offeror or subcontractor shall attach an explanation to this bid or proposal.

INSTRUCTIONS FOR CERTIFICATION

By signing and submitting this certification, the Offeror is providing the certification set out below:

(1) The certification in this clause is a material representation of fact upon which reliance will be placed. If it is later determined that the prospective vendor knowingly rendered a false certification, the Purchasing Agent may pursue all available remedies, including suspension and/or debarment, for withdrawal of award or termination of a contract.

(2) The prospective Offeror shall provide immediate written notice to the Purchasing Agent if at any time the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(3) Offeror shall be under a continuing duty to immediately inform the Purchasing Agent in writing of any changes, if as a result of such changes, the Offeror certification regarding debarment is affected.

DEBARMENT ORDINANCE

The following Section 102-449 of Fulton County Code of Laws establishes the procedure for the debarment of contractors.

(a) ***Authority to suspend.***

After reasonable notice to the entity involved and reasonable opportunity for that entity to be heard, the Purchasing Agent, after consultation with user department, the County Manager and the County Attorney shall have the authority to suspend an entity for cause from consideration for award of county contracts. As used in this section, the term entity means any business entity, individual, firm, contractor, subcontractor or business corporation, partnership, limited liability corporation, firm, contractor, subcontractor or business structured; provided, further, that any such entity shall also be subject to suspension under this section if any of its constituents, members, subcontractors at any tier of such entity's and the entity, or any constituent or member, knew or should have known of the commission of the act. The suspension shall be for a period not to exceed three (3) years unless cause is based on a felony conviction for an offense related or associated with fraudulent contracting or misappropriation of funds wherein the suspension shall not exceed seven (7) years.

(b) ***Causes for Suspension. The causes for suspension include:***

(1) Conviction for commission of a criminal offense as an incident to obtain or attempting to obtain a public or private contract or subcontract, or in performance of such contract or subcontract;

(2) Conviction of state or federal statutes of embezzlement, theft, forgery, bribery, falsification or destruction of records, receiving stolen property or other offense indicating a lack of business integrity or business honesty which currently, seriously and directly affects responsibility as a county contractor.

(3) Conviction of state or federal anti-trust statues arising out of the solicitation and submission of bids and proposals;

(4) Violation of contract provisions, as set forth below, of a character which is regarded by the Purchasing Agent to be so serious as to justify suspension action:

a. Failure to perform in accordance with the specifications within a time limit provided in a county contract;

b. A recent record of failure to perform or unsatisfactory performance in accordance with the terms of one or more contracts; provided, that failure to perform or unsatisfactory performance caused by acts beyond the control of the contractor shall not be considered to be a basis for suspension;

c. Material representation of the composition of the ownership or workforce or business entity certified to the county as a minority business enterprise; or

d. Falsification of any documents.

(5) For violation of the ethical standards set forth in Fulton County Code Chapter 9, Code of Ethics.

(6) Knowing misrepresentation to the county, of the use which a majority owned contractor intends to make a minority business enterprise (a business entity at least 51 percent of which is owned and controlled by minority persons, as defined in Fulton County Code Section 102-431) as a subcontractor or a joint venture partner, in performing work under contract with the County.

Failure to fully and truthfully provide the information required, may result in the disqualification of your bid/proposal from consideration or termination of the Contract, once awarded. This document must be completed and included as a part of the bid/proposal package along with other required documents.

[SIGNATURES ON NEXT PAGE]

Under penalty of perjury, I declare that I have examined this certification and all attachments hereto, if applicable, to the best of my knowledge and belief, and all statements contained hereto are true, correct, and complete.

On this _____ day of _____, 20____

_____
(Legal Name of Offeror) (Date)

_____
(Signature of Authorized Representative) (Date)

_____
(Title)

FORM E: DISCLOSURE FORM AND QUESTIONNAIRE

1. Please provide the names and business addresses of each of the Offeror's firm's officers and directors.

   For the purposes of this form, the term "Offeror" means an entity that responds to a solicitation for a County contract by either submitting a proposal in response to a Request for Proposal or a Request for Qualification or a Bid in response to an Invitation to Bid. Describe accurately, fully and completely, their respective relationships with said Offeror, including their ownership interests and their anticipated role in the management and operations of said Offeror.

2. Please describe the general development of said Offeror's business during the past five (5) years, or such shorter period of time that said Offeror has been in business.

3. Please state whether any employee, agent or representative of said Offeror who is or will be directly involved in the subject project has or has ever: (i) directly or indirectly had a business relationship with Fulton County; (ii) directly or indirectly received revenues from Fulton County; or (iii) directly or indirectly receives revenues from the result of conducting business on Fulton County property or pursuant to any contract with Fulton County. Please describe in detail any such relationship.

LITIGATION DISCLOSURE:

Failure to fully and truthfully disclose the information required, may result in the disqualification of your bid or proposal from consideration or termination of the Contract, once awarded.

1. Please state whether any of the following events have occurred in the last five (5) years with respect to said Offeror. If any answer is yes, explain fully the following:

   (a) whether a petition under the federal bankruptcy laws or state insolvency laws was filed by or against said Offeror, or a receiver fiscal agent or similar officer was appointed by a court for the business or property of said Offeror;

   Circle One: YES NO

   (b) whether Offeror was subject of any order, judgment, or decree not subsequently reversed, suspended or vacated by any court of competent jurisdiction, permanently enjoining said Offeror from engaging in any type of business practice, or otherwise eliminating any type of business practice; and

   Circle One: YES NO

   (c) whether said Offeror's business was the subject of any civil or criminal proceeding in which there was a final adjudication adverse to said or Offeror, which directly arose from activities conducted by the business unit or corporate division of said Offeror which submitted a bid or proposal for the subject project. If so please explain.

   Circle One: YES NO

2. Have you or any member of your firm or team to be assigned to this engagement ever been indicted or convicted of a criminal offense within the last five (5) years?

   Circle One: YES NO

3. Have you or any member of your firm or team been terminated (for cause or otherwise) from any work being performed for Fulton County or any other Federal, State or Local Government?

   Circle One: YES NO

4. Have you or any member of your firm or team been involved in any claim or litigation adverse to Fulton County or any other federal, state or local government, or private entity during the last three (3) years?

   Circle One: YES NO

5. Has any offeror, member of offeror's team, or officer of any of them (with respect to any matter involving the business practices or activities of his or her employer), been notified within the five (5) years preceding the date of this offer that any of them are the target of a criminal investigation, grand jury investigation, or civil enforcement proceeding?

Circle One: YES NO

If you have answered "YES" to any of the above questions, please indicate the name(s) of the person(s), the nature, and the status and/or outcome of the information, indictment, conviction, termination, claim or litigation, the name of the court and the file or reference number of the case, as applicable. Any such information should be provided on a separate page, attached to this form and submitted with your proposal.

NOTE: If any response to any question set forth in this questionnaire has been disclosed in any other document, a response may be made by attaching a copy of such disclosure. (For example, said Offeror's most recent filings with the Securities and Exchange Commission ("SEC") may be provided if they are responsive to certain items within the questionnaire.) However, for purposes of clarity, Offeror should correlate its responses with the exhibits by identifying the exhibit and its relevant text.

Disclosures must specifically address, completely respond and comply with all information requested and fully answer all questions requested by Fulton County. Such disclosure must be submitted at the time of the bid or proposal submission and included as a part of the bid/proposal submitted for this project. Disclosure is required for Offerors, joint venture partners and first-tier subcontractors.

Failure to provide required disclosure, submit officially signed and notarized documents or respond to any and all information requested/required by Fulton County can result in the bid/proposal declared as non-responsive. This document must be completed and included as a part of the bid/proposal package along with other required documents.

[SIGNATURES ON NEXT PAGE]

Under penalty or\f perjury, I declare that I have examined this questionnaire and all attachments hereto, if applicable, to the best of my knowledge and belief, and all statements contained hereto are true, correct, and complete.

On this _____ day of _____, 20__

_____
(Legal Name of Proponent) (Date)

_____
(Signature of Authorized Representative) (Date)

_____
(Title)

Sworn to and subscribed before me,

This _____ day of _____ , 20___

_____
(Notary Public) (Seal)

Commission Expires _____
(Date)

FORM F: GEORGIA SECURITY AND IMMIGRATION CONTRACTOR AFFIDAVIT AND AGREEMENT

Instructions:

Contractors must attest to compliance with the requirements of O.C.G.A 13-10-91 and the Georgia Department of Labor Rule 300-10-01-.02 by executing the Contractor Affidavit provided.

STATE OF GEORGIA

COUNTY OF FULTON

FORM F: GEORGIA SECURITY AND IMMIGRATION CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services[1] under a contract with **[insert name of prime contractor]** _____ on behalf of **Fulton County Government** has registered with and is participating in a federal work authorization program*,[2] 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 to this contract with **Fulton County Government**, contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the **Fulton County Government** at the time the subcontractor(s) is retained to perform such service.

_____
EEV/Basic Pilot Program* User Identification Number

_____
BY: Authorized Officer of Agent
(Insert Contractor Name)

_____
Title of Authorized Officer or Agent of Contractor

_____
Printed Name of Authorized Officer or Agent

Sworn to and subscribed before me this _____ day of _____, 20__.

Notary Public: _____

County: _____

Commission Expires: _____

[1]O.C.G.A.§ 13-10-90(4), as amended by Senate Bill 160, provides that "physical performance of services" means any performance of labor or services for a public employer (e.g., Fulton County) using a bidding process (e.g., ITB, RFQ, RFP, etc.) or contract wherein the labor or services exceed $2,499.99, except for those individuals licensed pursuant to title 26 or Title 43 or by the State Bar of Georgia and is in good standing when such contract is for service to be rendered by such individual.

[2]*[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].

FORM G: GEORGIA SECURITY AND IMMIGRATION SUBCONTRACTOR AFFIDAVIT

Instructions:

In the event that your company is awarded the contract for this project, and will be utilizing the services of any subcontractor(s) in connection with the physical performance of services pursuant to this contract, the following affidavit must be completed by such subcontractor(s). Your company must provide a copy of each such affidavit to Fulton County Government, Department of Purchasing & Contract Compliance with the proposal submittal.

All subcontractor affidavit(s) shall become a part of the contract and all subcontractor(s) affidavits shall be maintained by your company and available for inspection by Fulton County Government at any time during the term of the contract. All subcontractor(s) affidavit(s) shall become a part of any contractor/subcontractor agreement(s) entered into by your company.

STATE OF GEORGIA

COUNTY OF FULTON

FORM G: GEORGIA SECURITY AND IMMIGRATION SUBCONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services[3] under a contract with **[insert name of prime contractor]** _____behalf of **Fulton County Government** has registered with and is participating in a federal work authorization program*,[4] in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

_____
EEV/Basic Pilot Program* User Identification Number

_____
BY: Authorized Officer of Agent
(Insert Subcontractor Name)

_____
Title of Authorized Officer or Agent of Subcontractor

_____
Printed Name of Authorized Officer or Agent

Sworn to and subscribed before me this _____ day of _____, 20__.

Notary Public: _____

County: _____

Commission Expires: _____

[3]O.C.G.A.§ 13-10-90(4), as amended by Senate Bill 160, provides that "physical performance of services" means any performance of labor or services for a public employer (e.g., Fulton County) using a bidding process (e.g., ITB, RFQ, RFP, etc.) or contract wherein the labor or services exceed $2,499.99, except for those individuals licensed pursuant to title 26 or Title 43 or by the State Bar of Georgia and is in good standing when such contract is for service to be rendered by such individual.

[4]*[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].

SECTION 7

CONTRACT COMPLIANCE REQUIREMENTS

NON-DISCRIMINATION IN PURCHASING AND CONTRACTING

It is the policy of Fulton County Government that discrimination against businesses by reason of the race, color, gender or national origin of the ownership of any such business is prohibited. Furthermore, it is the policy of the Board of Commissioners ("Board") that Fulton County and all vendors and contractors doing business with Fulton County shall provide to all businesses the opportunity to participate in contracting and procurement paid, in whole or in part, with monetary appropriations of the Board without regard to the race, color, gender or national origin of the ownership of any such business. Similarly, it is the policy of the Board that the contracting and procurement practices of Fulton County should not implicate Fulton County as either an active or passive participant in the discriminatory practices engaged in by private contractors or vendors seeking to obtain contracts with Fulton County.

Implementation of Equal Employment Opportunity (EEO) Policy

Pursuant to Fulton County Code section §102-391, Equal Opportunity Clause, the County effectuates Equal Employment Opportunity. This policy considers racial and gender workforce availability. The availability of each workgroup is derived from the work force demographics set forth in the 2010 Census EEO file prepared by the United States Department of Commerce for the applicable labor pool normally utilized for the contract.

Monitoring of EEO Policy

Upon award of a contract with Fulton County, the successful bidder/proposer must complete Exhibit B, Equal Employment Opportunity Report ("EEOR"), describing the racial and gender make-up of the firm's work force. If the EEOR indicates that the firm's demographic composition indicates underutilization of employee's of a particular ethnic group for each job category, the EEOR will be submitted to the Division of Diversity and Civil Rights Compliance for further action.

EQUAL BUSINESS OPPORTUNITY PLAN (EBO PLAN)

In addition to the proposal submission requirements, each vendor **must** submit an Equal Business Opportunity Plan (EBO Plan) with their bid/proposal. The EBO Plan is designed to enhance the utilization of a particular racial, gender or ethnic group by a bidder/proposer, contractor, or vendor or by Fulton County. The respondent **must** outline a plan of action to encourage and achieve diversity and equality in the available procurement and contracting opportunities with *this solicitation*.

The EBO Plan **must** identify and include:

1. Potential opportunities within the scope of work of *this solicitation* that will allow for participation of racial, gender or ethnic groups.

2. Efforts that will be made by the bidder/proposer to encourage and solicit minority and female business utilization in *this solicitation*.

DETERMINATION OF GOOD FAITH EFFORTS

In accordance with Fulton County Code Section §102-426, the Prime Contractor **must** demonstrate that they have made all efforts reasonably possible to ensure that Minority and Female Business Enterprises (MFBE) have had a full and fair opportunity to compete and win subcontracts on this project. The Prime Contractor is required to include all outreach attempts that would demonstrate a "Good Faith Effort" in the solicitation of sub-consultants/subcontractors.

Written documentation demonstrating the Prime Contractor's outreach efforts to identify, contact, contract with or utilize Minority or Female owned businesses shall include holding pre-bid conferences, publishing advertisements in general circulation media, trade association publications, minority-focused media, and the County's bid board, as well as other efforts.

Include a list of publications where the advertisement was placed as well as a copy of the advertisement. Advertisement shall include at a minimum, scope of work, project location, location(s) of where plans and specifications may be viewed or obtained and trade or scopes of work for which subcontracts are being solicited.

PROMPT PAYMENT

The prime contractor must certify in writing and must document that all subcontractors, sub-consultants and suppliers have been promptly paid for work and materials, (less any retainage by the prime contractor prior to receipt of any further progress payments). In the event the prime contractor is unable to pay subcontractors, sub-consultants or suppliers until it has received a progress payment from Fulton County, the prime contractor shall pay all subcontractors, sub-consultants or suppliers funds due from said progress payment within ten days (10) of receipt of payment from Fulton County. In no event shall a subcontractor, sub-consultant or supplier be paid later than ten (10) days as provided for by state

REQUIRED FORMS (To be submitted with Technical Proposal)

In order to be compliant with the intent and provisions of the Fulton County Non-Discrimination in Purchasing and Contracting Policy, bidders/proposers **must** submit the following completed documents with the Technical Proposal.

- Exhibit A – Promise of Non-Discrimination
- Exhibit C – Schedule of Intended Subcontractor Utilization

The following documents must be completed as instructed if awarded the project:

- Exhibit B – Equal Employment Opportunity Report (EEOR)
- Exhibit D – Letter of Intent to Perform as a Subcontractor or Provide Materials or Services **(To be submitted only by subcontractor/sub-consultant/suppliers of winning Prime prior to contract execution)**
- Exhibit E – Prime Contractor's Subcontractor Utilization Report **(To be submitted monthly with pay applications)**

All Contract Compliance documents Exhibits A, C and the EBO Plan) are to be placed in a **separate sealed envelope** clearly marked **"CONTRACT COMPLIANCE"**. These documents are considered part of and must be submitted with the Technical Proposal.

EXHIBIT A – PROMISE OF NON-DISCRIMINATION

"Know all persons by these presents, that I/We (_____),
Name

_____ _____
Title Firm Name

Hereinafter "Company", in consideration of the privilege to bid on or obtain contracts funded, in whole or in part, by Fulton County, hereby consent, covenant and agree as follows:

1) No person shall be excluded from participation in, denied the benefit of, or otherwise discriminated against on the basis of race, color, national origin or gender in connection with any bid submitted to Fulton County for the performance of any resulting there from,

2) That it is and shall be the policy of this Company to provide equal opportunity to all businesses seeking to contract or otherwise interested in contracting with this Company without regard to the race, color, gender or national origin of the ownership of this business,

3) That the promises of non-discrimination as made and set forth herein shall be continuing in nature and shall remain in full force and effect without interruption,

4) That the promise of non-discrimination as made and set forth herein shall be made a part of, and incorporated by reference into, any contract or portion thereof which this Company may hereafter obtain,

5) 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 Board 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 owning on a contract; and

6) That the bidder shall provide such information as may be required by the Director of Purchasing & Contract Compliance pursuant to Section 102.436 of the Fulton County Non-Discrimination in Purchasing and Contracting Policy.

NAME: _____ **TITLE:** _____

SIGNATURE:_____

ADDRESS:_____

_____

PHONE NUMBER: _____ **EMAIL:** _____

EXHIBIT B – EMPLOYMENT REPORT

The demographic employment make-up for the bidder and all subcontractors performing work on this project must be submitted prior to the execution of the contract.

JOB CATEGORIES	**TOTAL EMPLOYED**		**TOTAL MINORITIES**		WHITE (Not Hispanic Origin)		BLACK or AFRICAN AMERICAN (Not of Hispanic Origin)		HISPANIC or LATINO		AMERICAN INDIAN or ALASKAN NATIVE (AIAN)		ASIAN		NATIVE HAWAIIAN or OTHER PACIFIC ISLANDER (NHOP)		TWO or MORE RACES	
	M	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
EXECUTIVE/SENIOR LEVEL OFFICIALS and MANAGERS																		
FIRST/MID LEVEL OFFICIALS and MANAGERS																		
PROFESSIONALS																		
TECHNICIANS																		
SALES WORKERS																		
ADMINISTRATIVE SUPPORT WORKERS																		
CRAFT WORKERS																		
OPERATIVES																		
LABORERS & HELPERS																		
SERVICE WORKERS																		
TOTAL																		

FIRM'S NAME: _____

ADDRESS: _____

CONTACT NAME: _____

EMAIL: _____ PHONE NUMBER: _____

SUBMITTED BY: _____

EXHIBIT C - SCHEDULE OF INTENDED SUBCONTRACTOR UTILIZATION

If the bidder/proposer intends to subcontract any portion of this scope of work/service(s), this form **must be** completed and **submitted with the bid/proposal.** All prime bidders/proposers **must** submit Letter(s) of Intent (Exhibit D) for all subcontractors who will be utilized under the scope of work/services prior to contract execution.

Prime Bidder/Proposer Company Name _____

ITB/RFP Name & Number:_____

1. My firm, as Prime Bidder/Proposer on this scope of work/service(s) is □, is not □a minority or female owned and controlled business enterprise. (Please indicate below the portion of work, including, percentage of bid/proposal amount that your firm will carry out directly):
   $_____ or _____%

2. This highlighted information below must be completed and submitted with the bid/proposal if a **joint venture (JV)** approach is to be undertaken. Please provide JV breakdown information below and attach a copy of the executed Joint Venture Agreement.

   JV Partner(s) information:

Business Name	**Business Name**	**Business Name**
_____	_____	_____
% of JV_____	**% of JV**_____	**% of JV** _____
Ethnicity_____	**Ethnicity**_____	**Ethnicity** _____
Gender_____	**Gender**_____	**Gender** _____
Phone#_____	**Phone#**_____	**Phone#** _____

3. Sub-Contractors (including suppliers) to be utilized in the performance of this scope of work/service(s), if awarded, are:

SUBCONTRACTOR NAME:_____
ADDRESS:_____
_____
PHONE:_____
CONTACT PERSON:_____
ETHNIC GROUP*:_____COUNTY CERTIFIED**_____
WORK TO BE PERFORMED:_____
_____
DOLLAR VALUE OF WORK: $_____ PERCENTAGE VALUE:_____%

***Ethnic Groups: African American (AABE); Asian American (ABE); Hispanic American (HBE); Native American (NABE); White Female American (WFBE); **If yes, please attach copy of recent certification.**

SUBCONTRACTOR NAME:_____
ADDRESS:_____
_____
PHONE:_____
CONTACT PERSON:_____
ETHNIC GROUP*:_____COUNTY CERTIFIED**_____
WORK TO BE PERFORMED:_____
_____
DOLLAR VALUE OF WORK: $_____ PERCENTAGE VALUE:_____%

SUBCONTRACTOR NAME:_____
ADDRESS:_____
_____
PHONE:_____
CONTACT PERSON:_____
ETHNIC GROUP*:_____COUNTY CERTIFIED**_____
WORK TO BE PERFORMED:_____
_____
DOLLAR VALUE OF WORK: $_____ PERCENTAGE VALUE:_____%

SUBCONTRACTOR NAME:_____
ADDRESS:_____
_____
PHONE:_____
CONTACT PERSON:_____
ETHNIC GROUP*:_____COUNTY CERTIFIED**_____
WORK TO BE PERFORMED:_____
_____
DOLLAR VALUE OF WORK: $_____ PERCENTAGE VALUE:_____%

SUBCONTRACTOR NAME:_____
ADDRESS:_____
_____
PHONE:_____
CONTACT PERSON:_____
ETHNIC GROUP*:_____COUNTY CERTIFIED**_____
WORK TO BE PERFORMED:_____
_____
DOLLAR VALUE OF WORK: $_____ PERCENTAGE VALUE:_____%

***Ethnic Groups: African American (AABE); Asian American (ABE); Hispanic American (HBE); Native American (NABE); White Female American (WFBE); **If yes, please attach copy of recent certification.**

Total Dollar Value of Subcontractor Agreements: ($)

Total Percentage of Subcontractor Value: (%)

CERTIFICATION: The undersigned certifies that he/she has read, understands and agrees to be bound by the Bid/Proposer provisions, including the accompanying Exhibits and other terms and conditions regarding sub-contractor utilization. The undersigned further certifies that he/she is legally authorized by the Bidder/Proposer to make the statement and representation in this Exhibit and that said statements and representations are true and correct to the best of his/her knowledge and belief. The undersigned understands and agrees that if any of the statements and representations are made by the Bidder/Proposer knowing them to be false, or if there is a failure of the intentions, objectives and commitments set forth herein without prior approval of the County, then in any such event the Contractor's acts or failure to act, as the case may be, shall constitute a material breach of the contract, entitling the County to terminate the Contract for default. The right to so terminate shall be in addition to, and in lieu of, any other rights and remedies the County may have for other defaults under the contract.

Signature:_____**Title**:_____

Business or Corporate Name:_____

Address:_____

_____

Telephone: ( )_____

Fax Number: ( )_____

Email Address:_____

EXHIBIT D

LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR
OR
PROVIDE MATERIALS OR SERVICES

This form **must** be completed by **ALL** known subcontractors and submitted only by subs of awarded Prime prior to contract execution.

To:_____
(Name of Prime Contractor Firm)

From:_____
(Name of Subcontractor Firm)

ITB/RFP Number:_____

Project Name:_____

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project (specify in detail particular work items, materials, or services to be performed or provided):

Description of Work	Project Commence Date	Project Completion Date	Estimated Dollar Amount

_____
(Prime Bidder)

Signature_____

Title_____

Date_____

_____
(Subcontractor)

Signature_____

Title_____

Date_____

EXHIBIT E - PRIME CONTRACTOR/SUB-CONTRACTOR UTILIZATION REPORT

This report **must** be submitted by the **tenth day** of each month, along with a copy of your monthly invoice (schedule of values/payment application) to Contract Compliance. Failure to comply **shall** result in the County commencing proceedings to impose sanctions to the prime contractor, in addition to pursuing any other available legal remedy. Sanctions may include the suspending of any payment or part thereof, termination or cancellation of the contract, and the denial of participation in any future contracts awarded by Fulton County.

REPORTING PERIOD		**PROJECT NAME:**	
FROM:		**PROJECT NUMBER:**	
TO:		**PROJECT LOCATION:**	

PRIME CONTRACTOR		**Contract Award Date**	**Contract Award Amount**	**Change Order Amount**	**Contract Period**	**% Complete to Date**
Name:						
Address:						
Phone #:						
Email:						

AMOUNT OF PAY APPLICATION THIS PERIOD: $
TOTAL PAYMENT(S) RECEIVED FROM COUNTY THIS PERIOD): $
TOTAL AMOUNT PAID YEAR TO DATE: $

SUBCONTRACTOR UTILIZATION (add additional rows as necessary)

Name of Sub-Contractor	**Description of Work**	**Contract Amount**	**Amount Paid To Date**	**Amount of Pay Application This Period**	**Contract Period Starting Date**	**Ending Date**
TOTALS						

Executed By: _____ _____
(Signature) ***(Printed Name)***

Notary: _____ **Date:** _____

My Commission Expires: _____

Should you have questions regarding any of the documents contained in Section 7, please feel free to contact the Office of Contract Compliance at (404) 612-6300, for further assistance.

SECTION 8

GENERAL CONDITIONS

00700-1 FAMILIARITY WITH SITE

Execution of this agreement by the Contractor is a representation that the Contractor has visited the site, has become familiar with the local conditions under which the work is to be performed, and has correlated personal observations with the requirements of this agreement.

00700-2 CONTRACT DOCUMENTS

This agreement consists of Owner's invitation for bid, instructions to bidders, bid form, performance bond, payment bond, acknowledgments, the contract, general conditions, special conditions, specifications, plans, drawings, exhibits, addenda, and written change orders.

A. Notice of Award of Contract:

B. Execution of Contract Documents

Upon notification of Award of Contract, the Owner shall furnish the Contractor the conformed copies of Contract Documents for execution by the Contractor and the Contractor's surety.

Within ten (10) days after receipt the Contractor shall return all the documents properly executed by the Contractor and the Contractor's surety. Attached to each document shall be an original power-of-attorney for the person executing the bonds for the surety and certificates of insurance for the required insurance coverage.

After receipt of the documents executed by the Contractor and his surety with the power-of-attorney and certificates of insurance, the Owner shall complete the execution of the documents. Distribution of the completed documents will be made upon completion.

Should the Contractor and/or Surety fail to execute the documents within the time specified; the Owner shall have the right to proceed on the Bid Bond accompanying the bid.

If the Owner fails to execute the documents within the time limit specified, the Contractor shall have the right to withdraw the Contractor's bid without penalty.

Drawings and Specifications:

The Drawings, Specifications, Contract Documents, and all supplemental documents, are considered essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to define, describe and provide for all Work necessary to complete the Project in an acceptable manner, ready for use, occupancy, or operation by the Owner.

In case of conflict between the Drawings and Specifications, the Specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings.

In cases where products or quantities are omitted from the Specifications, the description and quantities shown on the Drawings shall govern.

Any ambiguities or need for clarification of the Drawings or Specifications shall be immediately reported to the Construction Manager in writing. Any such ambiguity or need for clarification shall be handled by the Construction Manager in writing. No clarification of the Drawings and Specifications hereunder by the Construction Manager

shall entitle the Contractor to any additional monies unless a Change Order has been processed as provided by "Changes in the Contract" hereof.

Any work done by the Contractor following a discovery of such differing site condition or ambiguity or need for clarification in the Contract Drawings and Specifications prior to a written report to the Construction Manager shall not entitle the Contractor to additional monies and shall be done at the Contractor's risk.

The Construction Manager will furnish the Contractor five (5) copies of the Contract Drawings and the Specifications, one copy of which the Contractor shall have available at all times on the Project site.

00700-3 DEFINITIONS

The following terms as used in this agreement are defined as follows to the extent the definitions herein differ or conflict with those in the Instructions for Bidders, Section 00100, the definitions herein shall control.

Alternate bids – the amount stated in the bid or proposal to be added to or deducted from the amount of the base bid or base proposal if the corresponding change in project scope or alternate materials or methods of construction is accepted.

Base bid – the amount of money stated in the bid or proposal as the sum for which the bidder or proposer offers to perform the work.

Change Order - an alteration, addition, or deduction from the original scope of work as defined by the contract documents to address changes or unforeseen conditions necessary for project completion. A written order to the Contractor issued by the County pursuant to Fulton County Policy and Procedures 800-6 for changes in the work within the general scope of the contract documents, adjustment of the contract price, extension of the contract time, or reservation of determination of a time extension.

Construction Manager shall mean the individual designated in writing, by the Director of the Department of Public Works as the Construction Manager.

Contractor shall mean the party of the second part to the Contract Agreement or the authorized and legal representative of such party.

Contract Documents include the Contract Agreement, Contractor's Bid (including all documentation accompanying the Bid and any post-Bid documentation required by the County prior to the Notice of Award), Bonds, all Special Conditions, General Conditions, Supplementary Conditions, Specifications, Drawings and addenda, together with written amendments, change orders, field orders and the Construction Manager's written interpretations and clarifications issued in accordance with the General Conditions on or after the date of the Contract Agreement.

Shop drawing submittals reviewed in accordance with the General Conditions, geotechnical investigations and soils report and drawings of physical conditions in or relating to existing surface structures at or contiguous to the site are not Contract Documents.

Contract Price - The sum specified in the Agreement to be paid to the Contractor in consideration of the Work.

Contract Time shall mean the number of consecutive calendar days as provided in the Contract Agreement for completion of the Work, to be computed from the date of Notice to Proceed.

Owner or County shall mean Fulton County Government, party of the first part to the Contract Agreement, or its authorized and legal representatives.

Day - A calendar day of twenty-four hours lasting from midnight of one day to midnight the next day.

Director - Director of the Department of Public Works of Fulton County, Georgia or the designee thereof.

Engineer of Record – Brown and Caldwell, Inc. and Khafra, developed the specifications and drawings referred to herein.

Final Completion shall mean the completion of all work as required in accordance with the terms and conditions of the contract documents.

Liquidated Damages shall mean the amount, stated in the Contract Agreement, which the Contractor agrees to pay to the Owner for each consecutive calendar day beyond the Contract time required to complete the Project or for failing to comply with associated milestones. Liquidated Damages will end upon written notification from the Owner of Final Acceptance of the Project or upon written notification of from the Owner of completion of the milestone.

Notice to Proceed - A written communication issued by the County to the Contractor authorizing it to proceed with the work, establishing the date of commencement and completion of the work, and providing other direction to the Contractor.

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

Program Manager - Not used in this contract. Delete all references.

Project Manual - The Contract Documents.

Provide shall mean to furnish and install.

Substantial Completion - The date certified by the Construction Manager when all or a part of the work, as established pursuant to General Condition 0700-81, is sufficiently completed in accordance with the requirements of the contract documents so that the identified portion of the work can be utilized for the purposes for which it is intended.

Work or Project - All of the services specified, indicated, shown or contemplated by the contract documents, and furnishing by the Contractor of all materials, equipment, labor, methods, processes, construction and manufacturing materials and equipment, tools, plans, supplies, power, water, transportation and other things necessary to complete such services in accordance with the contract documents to insure a functional and complete facility.

00700-4 CODES

All codes, specifications, and standards referenced in the contract documents shall be the latest editions, amendments and revisions of such referenced standards in effect as of the date of the request for proposals for this contract.

00700-5 REVIEW OF CONTRACT DOCUMENTS

Before making its proposal to the County, and continuously after the execution of the agreement, the Contractor shall carefully study and compare the contract documents and shall at once report to the Construction Manager any error, ambiguity, inconsistency or omission that may be discovered, including any requirement which may be contrary to any law, ordinance, rule, or regulation of any public authority bearing on the performance

of the work. By submitting its proposal, the Contractor agrees that the contract documents, along with any supplementary written instructions issued by or through the Construction Manager that have become a part of the contract documents, appear accurate, consistent and complete insofar as can be reasonably determined. If the Contractor has timely reported in writing any error, inconsistency, or omission to the Construction Manager, has properly stopped the affected work until instructed to proceed, and has otherwise followed the instructions of the Construction Manager, the Contractor shall not be liable to the County for any damage resulting from any such error, inconsistency, or omission in the contract documents. The Contractor shall not perform any portion of the work without the contract documents, approved plans, specifications, products and data, or samples for such portion of the work. For purposes of this section "timely" is defined as the time period in which the contractor discovers, or should have discovered, the error, inconsistency, or omission, with the exercise of reasonable diligence.

00700-6 STRICT COMPLIANCE

No observation, inspection, test or approval of the County or Construction Manager shall relieve the Contractor from its obligation to perform the work in strict conformity with the contract documents except as provided in General Condition 00700-48.

00700-7 APPLICABLE LAW

All applicable State laws, County ordinances, codes, and rules and regulations of all authorities having jurisdiction over the construction of the project shall apply to this agreement. The Contractor shall comply with the requirements of any Fulton County program concerning non-discrimination in contracting. All work performed within the right of way of the Georgia Department of Transportation and any railroad crossing shall be in accordance with Georgia Department of Transportation regulations, policies and procedures and, where applicable, those of any affected railroad. The Contractor shall comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work as specified and the Contractor agrees to indemnify and hold harmless the County, its officers, agents and employees, as well as the Construction Manager and the Program Manager against any claim or liability arising from or based on the violation of any law, ordinance, regulation, order or decree affecting the conduct of the work, whether occasioned by the Contractor, his agents or employees.

00700-8 PERMITS, LICENSES AND BONDS

All permits and licenses necessary for the work shall be secured and paid for by the Contractor. If any permit, license or certificate expires or is revoked, terminated, or suspended as a result of any action on the part of the Contractor, the Contractor shall not be entitled to additional compensation or time. The Contractor shall obtain and keep in force at all times performance and payment bonds payable to Fulton County in penal amounts equal to 100% of the Contract price.

00700-9 TAXES

A. The Contractor shall pay all sales, retail, occupational, service, excise, old age benefit and unemployment compensation taxes, consumer, use and other similar taxes, as well as any other taxes or duties on the materials, equipment, and labor for the work provided by the Contractor which are legally enacted by any municipal, county, state or federal authority, department or agency at the time bids are received, whether or not yet effective. The Contractor shall maintain records pertaining to such taxes and levies as well as payment thereof and shall

make the same available to the County at all reasonable times for inspection and copying. The Contractor shall apply for any and all tax exemptions which may be applicable and shall timely request from the County such documents and information as may be necessary to obtain such tax exemptions. The County shall have no liability to the Contractor for payment of any tax from which it is exempt.

B. The Contractor is obligated to comply with all local and State Sales and Use Tax laws. The Contractor shall provide the Owner with documentation to assist the Owner in obtaining sales and/or use tax refunds for eligible machinery and equipment used for the primary purpose of reducing or eliminating air or water pollution as provided for in Chapter 48-8-3 (36) and (37) of the Official Code of Georgia. All taxes shall be paid by the Contractor. All refunds will accrue to the Owner.

Acceptance of the project as complete and final payment will not be made by the Owner until the Contractor has fully complied with this requirement.

00700-10 DELINQUENT CONTRACTORS

The County shall not pay any claim, debt, demand or account whatsoever to any person firm or corporation who is in arrears to the County for taxes. The County shall be entitled to a counterclaim, back charge, and offset for any such debt in the amount of taxes in arrears, and no assignment or transfer of such debt after the taxes become due shall affect the right of the County to offset any taxes owed against said debt.

00700-11 LIEN WAIVERS

The Contractor shall furnish the County with evidence that all persons who have performed work or furnished materials pursuant to this agreement have been paid in full prior to submitting its demand for final payment pursuant to this agreement. A final affidavit, Exhibit A, must be completed, and submitted to comply with requirements of 00700-11. In the event that such evidence is not furnished, the County may retain sufficient sums necessary to meet all lawful claims of such laborers and materialmen. The County assumes no obligation nor in any way undertakes to pay such lawful claims from any funds due or that may become due to the Contractor.

00700-12 MEASUREMENT

All items of work to be paid for per unit of measurement shall be subject to inspection, measurement, and confirmation by the Construction Manager.

00700-13 ASSIGNMENT

The Contractor shall not assign any portion of this agreement or moneys due there from (include factoring of receivables) without the prior written consent of the County. The Contractor shall retain personal control and shall provide personal attention to the fulfillment of its obligations pursuant to this agreement. Any assignment without the express written consent of the County shall render this contract voidable at the sole option of the County.

00700-14 FOREIGN CONTRACTORS

In the event that the Contractor is a foreign corporation, partnership, or sole proprietorship, the Contractor hereby irrevocably appoints the Secretary of State of Georgia as its agent for service of all legal process for the purpose of this contract only.

00700-15 INDEMNIFICATION

The Contractor hereby assumes the entire responsibility and liability for any and all injury to or death of any and all persons, including the Contractor's agents, servants, and employees, and in addition thereto, for any and all damages to property caused by or resulting from or arising out of any act or omission in connection with this contract or the prosecution of work hereunder, whether caused by the Contractor or the Contractor's agents, Servants, or employees, or by any of the Contractor's subcontractors or suppliers, and the Contractor shall indemnify and hold harmless the County, the Construction Manager, County's Commissioners, officers, employees, successors, assigns and agents, or any of their subcontractors from and against any and all loss and/or expense which they or any of them may suffer or pay as a result of claims or suits due to, because of, or arising out of any and all such injuries, deaths and/or damage, irrespective of County or Construction Manager negligence (except that no party shall be indemnified for their own sole negligence). The Contractor, if requested, shall assume and defend at the Contractor's own expense, any suit, action or other legal proceedings arising there from, and the Contractor hereby agrees to satisfy, pay, and cause to be discharged of record any judgment which may be rendered against the County and the Construction Manager arising there from.

In the event of any such loss, expense, damage, or injury, or if any claim or demand for damages as heretofore set forth is made against the County or the Construction Manager, the County may withhold from any payment due or thereafter to become due to the Contractor under the terms of this Contract, an amount sufficient in its judgment to protect and indemnify it and the Construction Manager, County's Commissioners, officers, employees, successors, assigns and agents from any and all claims, expense, loss, damages, or injury; and the County, in its discretion, may require the Contractor to furnish a surety bond satisfactory to the County providing for such protection and indemnity, which bond shall be furnished by the Contractor within five (5) days after written demand has been made therefore. The expense of said Bond shall be borne by the Contractor.

00700-16 SUPERVISION OF WORK AND COORDINATION WITH OTHERS

The Contractor shall supervise and direct the work using the Contractor's best skill and attention. The Contractor shall be solely responsible for all construction methods and procedures and shall coordinate all portions of the work pursuant to the contract subject to the overall coordination of the Construction Manager. All work pursuant to this agreement shall be performed in a skillful and workmanlike manner.

The County reserves the right to perform work related to the Project with the County's own forces and to award separate contracts in connection with other portions of the project, other work on the site under these or similar conditions of the contract, or work which has been extracted from the Contractor's work by the County.

When separate contracts are awarded for different portions of the project or other work on the site, the term "separate contractor" in the Contract Documents in each case shall mean the contractor who executes each separate County Agreement.

The Contractor shall cooperate with the County and separate contractors in arranging the introduction and storage of materials and equipment and execution of their work, and shall cooperate in coordinating connection of its work with theirs as required by the Contract Documents.

If any part of the Contractor's Work depends for proper execution or results upon the work of the County or any separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results **within fourteen (14) days** of discovery of such discrepancy or defect. Failure of the Contractor to so report in writing shall constitute an acceptance of the County's or separate contractor's work as fit and proper to receive the Work, except as to any defects which may subsequently become apparent in such work by others.

Any costs caused by defective or untimely work shall be borne by the party responsible therefore.

Should the Contractor wrongfully cause damage to the work or property of the County or to other work or property on the site, including the work of separate contractors, the Contractor shall promptly remedy such damage at the Contractor's expense.

Should the Contractor be caused damage by any other contractor on the Project, by reason of such other contractor's failure to perform properly his contract with the County, no action shall lie against the County or the Construction Manager inasmuch as the parties to this agreement are the only beneficiaries hereof and there are no third party beneficiaries and neither the County nor the Construction Manager shall have liabilities therefore, but the Contractor may assert his claim for damages solely against such other contractor. The Contractor shall not be excused from performance of the contract by reason of any dispute as to damages with any other contractor or third party.

Where the Work of this Contract shall be performed concurrently in the same areas as other construction work, the Contractor shall coordinate with the Construction Manager and the separate contractors in establishing mutually acceptable schedules and procedures that shall permit all jobs to proceed with minimum interference.

If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up, the County may clean up and charge the cost thereof to the Contractor or contractors responsible therefore as the County shall determine to be just.

00700-17 ADMINISTRATION OF CONTRACT

The Program Manager and the Construction Manager shall provide administration services as hereinafter described.

For the administration of this Contract, the Construction Manager shall serve as the County's primary representative during design and construction and until final payment to the Contractor is due. The Construction Manager shall advise and consult with the County and the Program Manager. The primary point of contact for the Contractor shall be the Construction Manager. All correspondence from the Contractor to the County shall be forwarded through the Construction Manager. Likewise, all correspondence and instructions to the Contractor shall be forwarded through the Construction Manager.

The Construction Manager will determine in general that the construction is being performed in accordance with design and engineering requirements, and will endeavor to guard the County against defects and deficiencies in the Work.

The Construction Manager will not be responsible for or have control or charge of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, nor will it be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

The Construction Manager will not be responsible for or have control or charge over the acts or omissions of the Contractor, its engineers, consultants, subcontractors, or any of their agents or employees, or any other persons performing the Work.

Based on the Construction Manager's observations regarding the Contractor's Applications for Payment, the Construction Manager shall determine the amounts owing to the Contractor, in accordance with the payment terms of the Contract, and shall issue Certificates for Payment in such amount to the County.

The Construction Manager shall render interpretations necessary for the proper execution or progress of the Work. Either party to the Contract may make written requests to the Construction Manager for such interpretations.

Claims, disputes and other matters in question between the Contractor and the County relating to the progress of the Work or the interpretation of the Contract Documents shall be referred to the Construction Manager for interpretation.

All interpretations of the Construction Manager shall be consistent with the intent of and reasonably inferable from the Contract Documents and shall be in writing or in graphic form.

Except as otherwise provided in this Contract, the Construction Manager shall issue a decision on any disagreement concerning a question of fact arising under this Contract. The Construction Manager shall reduce the decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Construction Manager shall be final and conclusive unless, within thirty (30) days from the date of receipt of such copy, the Contractor files a written appeal with the Director of Public Works and mails or otherwise furnishes the Construction Manager a copy of such appeal. The decision of the Director of Public Works or the Director's duly authorized representative for the determination of such appeals shall be final and conclusive. Such final decision shall not be pleaded in any suit involving a question of fact arising under this Contract, provided such is not fraudulent, capricious, arbitrary, so grossly erroneous as necessarily implying bad faith, or is not supported by substantial evidence. In connection with any appeal proceeding under this Article, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of Contractor's appeal. Pending any final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract as directed by the Construction Manager.

The Construction Manager shall have authority to reject Work which does not conform to the Contract Documents. Whenever, in the Construction Manager's opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, the County shall have authority to require special inspection or testing of the Work whether or not such Work be then fabricated, installed or completed. The Contractor shall pay for such special inspection or testing if the Work so inspected or tested is found not to comply with the requirements of the contract; the County shall pay for special inspection and testing if the Work is found to comply with the contract. Neither the Construction Manager's authority to act under this Subparagraph, nor any decision made by the Construction Manager in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Construction Manager to the Contractor, any subcontractor, any of their agents or employees, or any other person performing any of the Work.

The Contractor shall provide such shop drawings, product data, and samples as may be required by the Construction Manager and/or as required by these Contract Documents.

The Construction Manager shall conduct inspections to determine Substantial Completion and Final Completion, and shall receive and forward to the County for review written warranties and related documents required by the Contract Documents and assembled by the Contractor. The Construction Manager shall approve and issue Certificates for Payment upon compliance with Substantial and Final Completion requirements indicated in General Conditions 00700-81, 00700-82, 00700-84 and 00700-85 of this Agreement.

Except as provided in General Condition 00700-48, the Contractor shall not be relieved from the Contractor's obligations to perform the work in accordance with the contract documents by the activities or duties of the County or any of its officers, employees, or agents, including inspections, tests or approvals, required or performed pursuant to this agreement.

00700-18 RESPONSIBILITY FOR ACTS OF EMPLOYEES

The Contractor shall employ only competent and skilled personnel. The Contractor shall, upon demand from the Construction Manager, immediately remove any superintendent, foreman or workman whom the Construction Manager may consider incompetent or undesirable.

The Contractor shall be responsible to the County for the acts and omissions of the Contractor's employees, subcontractors, and agents as well as any other persons performing work pursuant to this agreement for the Contractor.

00700-19 LABOR, MATERIALS, SUPPLIES, AND EQUIPMENT

Unless otherwise provided in this agreement, the Contractor shall make all arrangements with necessary support agencies and utility companies provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the execution and completion of the work.

00700-20 DISCIPLINE ON WORK SITE

The Contractor shall enforce strict discipline and good order among its employees and subcontractors at all times during the performance of the work, to include compliance with the Fulton County Drug Free Work Place Policy. The Contractor shall not employ any subcontractor who is not skilled in the task assigned to it. The Construction Manager may, by written notice, require the Contractor to remove from the work any subcontractor or employee deemed by the Construction Manager to be incompetent.

00700-21 HOURS OF OPERATION

All work at the construction site shall be performed during regular business hours of the Fulton County government, except upon the Construction Manager's prior written consent to other work hours. It is further understood that the Contractor's construction schedule is based on a normal 40 hours, five day work week, less Fulton County-recognized holidays. Contractors work schedule shall not violate Fulton County Noise Ordinance by working hours inconsistent with the Fulton County Noise Ordinance. The County's current noise ordinance or other applicable ordinance shall govern. If the Contractor desires to work in excess of this limit, the Contractor shall submit a written request to the Construction Manager, a minimum of five days prior to the desired work date. The Contractor shall be responsible for any additional expenses incurred by the Owner as a result of the extended work hours, including resident inspection overtime.

The cost associated with resident inspector overtime shall be deducted from the Contractor monthly payment request.

00700-22 FAMILIARITY WITH WORK CONDITIONS

The Contractor shall take all steps necessary to ascertain the nature and location of the work and the general and local conditions which may affect the work or the cost thereof. The Contractor's failure to fully acquaint itself with the conditions which may affect the work, including, but not limited to conditions relating to transportation, handling, storage of materials, availability of utilities, labor, water, roads, weather, topographic and subsurface conditions, other separate contracts to be entered into by the County relating to the project which may affect the work of the Contractor, applicable provisions of law, and the character and availability of equipment and facilities necessary prior to and during the performance of the work shall not relieve the Contractor of its responsibilities pursuant to this agreement and shall not constitute a basis for an equitable adjustment of the contract terms. The County reserves the right to perform with its own forces or to contract with other entities for other portions of the project work, in which case the Contractor's responsibility to assure its familiarity with work conditions hereunder shall include all coordination with such other contractors and the County necessary to insure that there is no interference between contractors as will delay or hinder any contractor in its prosecution of work on the project. The County assumes no responsibility for any understandings or representations concerning conditions of the work made by any of its officers, agents, or employees prior to the execution of this agreement.

00700-23 RIGHT OF ENTRY

The County reserves the right to enter the site of the work by such agent, including the Construction Manager, as it may elect for the purpose of inspecting the work or installing such collateral work as the County may desire. The Contractor shall provide safe facilities for such access so that the County and its agents may perform their functions.

00700-24 NOTICES

Any notice, order, instruction, claim or other written communication required pursuant to this agreement shall be deemed to have been delivered or received as follows:

Upon personal delivery to the Contractor, its authorized representative, or the Construction Manager on behalf of the County. Personal delivery may be accomplished by in-person hand delivery or bona fide overnight express service.

Three days after depositing in the United States mail a certified letter addressed to the Contractor or the Construction Manager for the County. For purposes of mailed notices, the County's mailing address shall be 141 Pryor Street, 6th Floor, Atlanta, Georgia 30303, or as the County shall have otherwise notified the Contractor. The Contractor's mailing address shall be the address stated in its proposal or as it shall have most recently notified the Construction Manager in writing.

00700-25 SAFETY

A. SAFETY, HEALTH AND LOSS PREVENTION

The Contractor shall be responsible for implementing a comprehensive project-specific safety, health and loss prevention program and employee substance abuse program for this project. All Sub-Contractors must either implement their own program or follow the Contractor's safety, health and loss prevention program and employee substance abuse program.

The Contractor's safety, health and loss prevention program and employee substance abuse program must meet or exceed all governmental regulations (OSHA, EPA, DOT, State, local), and any other specific Fulton County requirements

B. COUNTY'S SAFETY, HEALTH, AND LOSS PREVENTION PROCESS GUIDELINES AND REQUIREMENTS

The County and its agents reserve the right, but assume no duty, to establish and enforce safety, health, and loss prevention guidelines and to make the appropriate changes in the guidelines, for the protection of persons and property and to review the efficiency of all protective measures taken by the Contractor. The Contractor shall comply with all safety, health, and loss prevention process guidelines and requirements and changes made by the County or its agent(s). The issuance of any such guidelines or changes by the County or its agent(s) shall not relieve the Contractor of its duties and responsibilities under this Agreement, and the County or its agent(s) shall not thereby assume, nor be deemed to have assumed, any such duties or responsibilities of the Contractor.

C. COMPLIANCE OF WORK, EQUIPMENT, AND PROCEDURES WITH ALL APPLICABLE LAWS and REGULATIONS

All Work, whether performed by the Contractor or its Sub-Contractors of any tier, or anyone directly or indirectly employed by any of them, and all equipment, appliances, machinery, materials, tools and like items incorporated or used in the Work, shall be in compliance with and conform to:

1. All applicable laws, ordinances, rules, regulations and orders of any public, quasi-public or other governmental authority relating to the safety of persons and their protection against injury, specifically including, but in no event limited to, the Federal Occupational Safety and Health Act of 1970, as amended, and all rules and regulations now or hereafter in effect pursuant to said Act.

2. All rules, regulations, and requirements of the County or its agent(s) and its insurance carriers relating there to. In the event of a conflict or differing requirements the more stringent shall govern.

D. PROTECTION OF THE WORK

1. The Contractor shall, throughout the performance of the Work, maintain adequate and continuous protection of all Work and temporary facilities against loss or damage from whatever cause, shall protect the property of the County and third parties from loss or damage from whatever cause arising out of the performance of the Work, and shall comply with the requirements of the County or its agent(s) and its insurance carriers, and with all applicable laws, codes, rules and regulations, (as same may be amended) with respect to the prevention of loss or damage to property as a result of fire or other hazards.

2. The County or its agent(s) may, but shall not be required to, make periodic inspections of the Project work area. In such event, however, the Contractor shall not be relieved of its aforesaid responsibilities and the County or its agent(s) shall not assume, nor shall it be deemed to have assumed, any responsibility otherwise imposed upon the assurance of Contractor by this Agreement.

E. SAFETY EQUIPMENT

1. The Contractor shall provide to each worker on the Project work area the proper safety equipment for the duties being performed by that worker and will not permit any worker on the Project work area who fails or refuses to use the same. The County or its agent shall have the right, but not the obligation, to order the removal of a worker from the Project work site for his/her failure to comply with safe practices or substance abuse policies.

F. EMERGENCIES

1. In any emergency affecting the safety of persons or property, or in the event of a claimed violation of any federal or state safety or health law or regulation, arising out of or in any way connected with the Work or its performance, the Contractor shall act immediately to prevent threatened damage, injury or loss and to remedy said violation. Failing such action the County or its agent(s) may immediately take whatever steps it deems necessary including, but not limited to, suspending the Work as provided in this Agreement.

2. The County or its agent(s) may offset any and all costs or expenses of whatever nature, including attorneys' fees, paid or incurred by the County or its agent(s) (whether such fees are for in-house counsel or counsel retained by the County or its agent), in taking the steps authorized by Section 00700-25(G) (1) above against any sums then or thereafter due to the Contractor. The Contractor shall defend, indemnify and hold the County, its officers, agents, and employees harmless against any and all costs or expenses caused by or arising from the exercise by the County of its authority to act in an emergency as set out herein. If the Contractor shall be entitled to any additional compensation or extension of time change order on account of emergency work not due to the fault or neglect of the Contractor or its Sub-Contractors, such additional compensation or extension of time shall be determined in accordance with General Condition 00700-52 and General Condition 00700-87 of this Agreement.

G. SUSPENSION OF THE WORK

1. Should, in the judgment of the County or its agent(s), the Contractor or any Sub-Contractor fail to provide a safe and healthy work place, the County or its agent shall have the right, but not the obligation, to suspend work in the unsafe areas until deficiencies are corrected. All costs of any nature (including, without limitation, overtime pay, liquidated damages or other costs arising out of delays) resulting from the suspension, by whomsoever incurred, shall be borne by the Contractor.

2. Should the Contractor or any Sub-Contractor fail to provide a safe and healthy work place after being formally notified in writing by the County or its agents of such non-compliance, the contract may be terminated following the termination provision of the contract.

H. CONTRACTOR’S INDEMNITY OF THE COUNTY FOR CONTRACTOR’S NON-COMPLIANCE WITH SAFETY PROGRAM

1. The Contractor recognizes that it has sole responsibility to assure its Safety Program is implemented and to assure its construction services are safely provided. The Contractor shall indemnify, defend and hold the County and its agents harmless, from and against any and all liability (whether public or private), penalties (contractual or otherwise), losses, damages, costs, attorneys' fees, expenses, causes of action, claims or judgments resulting, either in whole or in part, from any failure of the Contractor, its Sub-Contractors of any tier or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, to comply with the safety requirements of the contract. The Contractor shall not be relieved of its responsibilities under the safety requirements of the Contract should the County or its agent(s) act or fail to act pursuant to its rights hereunder.
2. The Contractor shall not raise as a defense to its obligation to indemnify under this Subparagraph I any failure of those indemnified hereunder to assure Contractor operates safely, it being understood and agreed that no such failure shall relieve the Contractor from its obligation to assure safe operations or from its obligation to so indemnify. The Contractor also hereby waives any rights it may have to seek contribution, either directly or indirectly, from those indemnified hereunder.
3. In any and all claims against those indemnified hereunder by any employee of the Contractor, any Sub-Contractor of any tier or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Subparagraph I shall not be limited in any way as to the amount or type of damages, compensation or benefits payable by or for the Contractor or any Sub-Contractor of any tier under any workers' compensation act, disability benefit or other employee benefit acts.

00700-26 BLASTING AND EXCAVATION

The Contractor acknowledges that it is fully aware of the contents and requirements of O.C.G.A. § 25-9-1 through 25-9-12 concerning blasting and excavation near underground gas pipes and facilities and shall fully comply therewith.

00700-27 HIGH VOLTAGE LINES

The Contractor acknowledges that it is fully aware of the contents and requirements O.C.G.A. § 46-3-30 through 46-3-39 concerning safeguards against contact with high voltage lines, and the Contractor shall fully comply with said provisions.

00700-28 SCAFFOLDING AND STAGING

The Contractor acknowledges that it is the person responsible for employing and directing others to perform labor within the meaning of O.C.G.A. § 34-1-1 and agrees to comply with said provisions.

00700-29 CLEAN-UP

The Contractor shall clean up all refuse, rubbish, scrap materials, and debris caused by its operations to the end that the site of the work shall present a neat, orderly and workmanlike appearance at all times.

00700-30 PROTECTION OF WORK

The Contractor shall be responsible for maintenance and protection of the work, which shall include any County-furnished supplies, material, equipment, until final completion of this agreement and acceptance of the work as defined herein. Any portion of the work suffering injury, damage or loss shall be considered defective and shall be corrected or replaced by the Contractor without additional cost to the County.

00700-31 REJECTED WORK

The Contractor shall promptly remove from the project all work rejected by the Construction Manager for failure to comply with the contract documents and the Contractor shall promptly replace and re-execute the work in accordance with the contract documents and without expense to the County. The Contractor shall also bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.

00700-32 DEFECTIVE WORK

If the Contractor defaults or neglects to carry out any portion of the work in accordance with the contract documents, and fails within three days after receipt of written notice from the Construction Manager to commence and continue correction of such default or neglect with diligence and promptness, the County may, after three days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy the County may have, make good such deficiencies and complete all or any portion of any work through such means as the County may select, including the use of a separate Contractor. In such case, an appropriate change order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies. In the event the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the County on demand.

The County may, at its option, accept defective or nonconforming work instead of requiring its removal or correction. In such case, a change order shall be issued reducing the price due the contractor to the extent appropriate and equitable. Such contract price adjustment shall be effected whether or not final payment has been made.

00700-33 WARRANTY OF NEW MATERIALS

The Contractor warrants to the County that all materials and equipment furnished under this contract will be new unless otherwise specified, and the Contractor further warrants that all work will be of good quality, free from faults and defects, and in conformance with the contract documents. The warranty set forth in this paragraph shall survive final acceptance of the work.

00700-34 CONTRACTOR'S WARRANTY OF THE WORK

If within one year after the date of issuance of the certificate of final payment pursuant to General Condition 84, or within such longer period of time as may be prescribed by law or by the term of any applicable special warranty required by the contract documents, any of the work is found to be defective or not in accordance with the contract documents, the Contractor shall correct such work promptly after receipt of written notice from the Construction Manager to do so. This obligation shall survive both final payment for the work and termination of the contract.

00700-35 ASSIGNMENT OF MANUFACTURERS' WARRANTIES

Without limiting the responsibility or liability of the Contractor pursuant to this agreement, all warranties given by manufacturers on materials or equipment incorporated in the work are hereby assigned by the Contractor to the County. If requested, the Contractor shall execute formal assignments of said manufacturer's warranties to the County. All such warranties shall be directly enforceable by the County.

00700-36 WARRANTIES IMPLIED BY LAW

The warranties contained in this agreement, as well as those warranties implied by law, shall be deemed cumulative and shall not be deemed alternative or exclusive. No one or more of the warranties contained herein shall be deemed to alter or limit any other.

00700-37 STOP WORK ORDERS

In the event that the Contractor fails to correct defective work as required by the contract documents or fails to carry out the work in accordance with contract documents, the Construction Manager, in writing, may order the Contractor to stop work until the cause for such order has been eliminated. This right of the County to stop work shall not give rise to any duty on the part of the County or the Construction Manager to execute this right for the benefit of the Contractor or for any other person or entity.

00700-38 TERMINATION FOR CAUSE

If the Contractor is adjudged bankrupt, makes a general assignment for the benefit of creditors, suffers the appointment of a receiver on account of its insolvency, fails to supply sufficient properly skilled workers or materials, fails to make prompt payment to subcontractors or materialmen, disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, fails to diligently prosecute the work, or is otherwise guilty of a material violation of this agreement and fails within seven days after receipt of written notice to commence and continue correction of such default, neglect, or violation with diligence and promptness, the County may, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy the County may have, terminate the employment of the Contractor and take possession of the site as well as all materials, equipment, tools, construction equipment and machinery thereon. The County may finish the work by whatever methods the County deems expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is completed. If the unpaid balance of the contract price exceeds the cost of completing the work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the County on demand. This obligation for payment shall survive the termination of the contract. Termination of this agreement pursuant to this paragraph may result in disqualification of the Contractor from bidding on future County contracts.

00700-39 TERMINATION FOR CONVENIENCE

The County may, at any time upon written notice to the Contractor, terminate the whole or any portion of the work for the convenience of the County. The effective data of the terminations shall be provided in the written notice. Said termination shall be without prejudice to any right or remedy of the County provided herein. In addition, in the event this agreement has been terminated due to the default of the Contractor, and if it is later determined that the Contractor was not in default pursuant to the provisions of this agreement at the time of termination, then such termination shall be considered a termination for convenience pursuant to this paragraph.

00700-40 TERMINATION FOR CONVENIENCE - PAYMENT

If the Contract is terminated for convenience by the Owner as provided in this article, Contractor will be paid compensation for those services actually performed as approved by the Owner or his representative. Partially completed tasks will be compensated for based on a signed statement of completion prepared by the Project Manager and submitted to the Contractor which shall itemize each task element and briefly state what work has been completed and what work remains to be done. Contractor shall also be paid for reasonable costs for the orderly filing and closing of the project.

00700-41 TERMINATION FOR CONVENIENCE - PAYMENT LIMITATIONS

Except for normal spoilage, and except to the extent that the County shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor the fair value, as determined by the Construction Manager, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the County or to another buyer.

00700-42 COST TO CURE

If the County terminates for cause the whole or any part of the work pursuant to this agreement, then the County may procure upon such terms and in such manner as the Construction Manager may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the County for any excess costs for such similar supplies or services. The Contractor shall continue the performance of this agreement to the extent not terminated hereunder.

00700-43 ATTORNEY'S FEES

Should the Contractor default pursuant to any of the provisions of this agreement, the Contractor and its surety shall pay to the County such reasonable attorney's fees as the County may expend as a result thereof and all costs, expenses, and filing fees incidental thereto.

00700-44 CONTRACTOR'S RESPONSIBILITIES UPON TERMINATION

After receipt of a notice of termination from the County, and except as otherwise directed by the Construction Manager, 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 for completion of such portion of the work under the agreement 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 County in the manner, at the times, and to the extent directed by the Construction Manager, all of the rights, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the County shall have the right, at its discretion, to settle or pay any and all claims arising out of the termination of such orders or subcontracts;
5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts with the approval or ratification of

the Construction Manager, to the extent the Construction Manager may require, which approval or ratification shall be final for all purposes;

6. Transfer title and deliver to the entity or entities designated by the Construction Manager, in the manner, at the times, and to the extent, if any, directed by the Construction Manager, and to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the work as has been terminated:

   a. The fabricated or un-fabricated parts, work, and progress, partially completed supplies, and equipment, materials, parts, tools, dyes, jigs, and other fixtures, completed work, supplies, and other material produced as a 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 to the work.

7. Use its best efforts to sell in the manner, at the times, to the extent, and at the prices directed or authorized by the Construction Manager, any property described in Section 6 of this paragraph, provided, however, that the Contractor shall not be required to extend credit to any buyer and further provided that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the County to the Contractor pursuant to this agreement.

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 Construction Manager may direct, for the protection and preservation of the property related to the agreement which is in the possession of the Contractor and in which the County has or may acquire an interest.

00700-45 RECORDS

The Contractor shall preserve and make available to the County all of its records, books, documents and other evidence bearing on the costs and expenses of the Contractor and any subcontractor pursuant to this agreement upon three days advance notice to the Contractor.

00700-46 DEDUCTIONS

In arriving at any amount due the Contractor pursuant to the terms of this agreement, there shall be deducted all liquidated damages, advance payments made to the Contractor applicable to the termination portion of the contract, the amount of any claim which the County may have against the Contractor, the amount determined

By the Construction Manager to be necessary to protect the County against loss due to outstanding potential liens or claims, and the agreed price of any materials acquired or sold by the Contractor and not otherwise recovered by or credited to the County.

00700-47 REIMBURSEMENT OF THE COUNTY

In the event of termination, the Contractor shall refund to the County any amount paid by the County to the Contractor in excess of the costs properly reimbursable to the Contractor.

00700-48 SUSPENSION, INTERRUPTION, DELAY, DAMAGES

The Contractor shall be entitled to only those damages and that relief from termination by the County as specifically set forth in this agreement. The Construction Manager may issue a written order requiring the Contractor to suspend, delay or interrupt all or any part of the work for such period of time as the County may determine to be appropriate for the convenience of the County. If the performance of the work is interrupted for an unreasonable period of time by an act of the County or any of its officers, agents, employees, contractors, or consultants in the administration of this agreement, an equitable adjustment shall be made for any increase in the Contractor's costs of performance and any increase in the time required for performance of the work necessarily caused by the unreasonable suspension, delay, or interruption. Any equitable adjustment shall be reduced to writing and shall constitute a modification to this agreement. In no event, however, shall an equitable adjustment be made to the extent that performance of this agreement would have been suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor. No claim for an equitable adjustment pursuant to this paragraph shall be permitted before the Contractor shall have notified the Construction Manager in writing of the act or failure to act involved, and no claim shall be allowed unless asserted in writing to the Construction Manager within ten days after the termination of such suspension, delay or interruption.

00700-49 COMMENCEMENT AND DURATION OF WORK

The County may issue a Notice to Proceed at any time within 120 days following execution of the contract by the County. The Contractor shall commence work pursuant to this agreement within ten days of mailing or delivery of written notice to proceed. The Contractor shall diligently prosecute the work to completion within the time specified therefore in the Agreement. The capacity of the Contractor's construction and manufacturing equipment and plan, sequence and method of operation and forces employed, including management and supervisory personnel, shall be such as to insure completion of the work within the time specified in the Agreement. The Contractor and County hereby agree that the contract time for completion of the work is reasonable taking into consideration the average climatic conditions prevailing in the locality of the work and anticipated work schedules of other contractors whose activities are in conjunction with or may affect the work under this contract.

00700-50 TIME OF THE ESSENCE

All time limits stated in this agreement are of the essence of this contract.

00700-51 IMPACT DAMAGES

Except as specifically provided pursuant to a stop work order or change order, the Contractor shall not be entitled to payment or compensation of any kind from the County for direct or indirect or impact damages including, but not limited to, costs of acceleration arising because of delay, disruption, interference or hindrance from any cause whatsoever whether such delay, disruption, interference or hindrance is reasonable or unreasonable, foreseeable or unforeseeable, or avoidable, provided, however, that this provision shall not preclude the recovery of damages by the Contractor for hindrances or delays due solely to fraud or bad faith on the part of the County, its agents, or employees. The Contractor shall be entitled only to extensions in the time required for performance of the work as specifically provided in the contract.

00700-52 DELAY

The Contractor may be entitled to an extension of the contract time, but not an increase in the contract price or damages, for delays arising from unforeseeable causes beyond the control and without the fault or negligence of the Contractor or its subcontractors for labor strikes, acts of God, acts of the public enemy, acts of the state, federal or local government in its sovereign capacity, by acts of another separate contractor, or by an act or neglect of the County.

00700-53 INCLEMENT WEATHER

The Contractor shall not be entitled to an extension of the contract time due to normal inclement weather. Unless the Contractor can substantiate to the satisfaction of the Construction Manager that there was greater than normal inclement weather and that such greater than normal inclement weather actually delayed the work, the Contractor shall not be entitled to an extension of time therefore. The following shall be considered the normal inclement weather days for each month listed, and extensions of time shall be granted in increments of not less than one half day only for inclement weather in excess of the days set out.

January	10 days
February	10 days
March	7 days
April	6 days
May	4 days
June	3 days
July	4 days
August	2 days
September	2 days
October	3 days
November	6 days
December	9 days

00700-54 DELAY - NOTICE AND CLAIM

The Contractor shall not receive an extension of time unless a Notice of Delay is filed with the Construction Manager within ten days of the first instance of such delay, disruption, interference or hindrance and a written Statement of the Claim is filed with the Construction Manager within 20 days of the first such instance. In the event that the Contractor fails to comply with this provision, it waives any claim which it may have for an extension of time pursuant to this agreement.

00700-55 STATEMENT OF CLAIM - CONTENTS

The Statement of Claim referenced in Article 00700-54 shall include specific information concerning the nature of the delay, the date of commencement of the delay, the construction activities affected by the delay, the person or organization responsible for the delay, the anticipated extent of the delay, and any recommended action to avoid or minimize the delay.

00700-56 WORK BEHIND SCHEDULE, REMEDY BY CONTRACTOR

If the work actually in place falls behind the currently updated and approved schedule, and it becomes apparent from the current schedule that work will not be completed within the contract time, the Contractor agrees that it will, as necessary, or as directed by the Construction Manager, take action at no additional cost to the County to improve the progress of the work, including increasing manpower, increasing the number of working hours per shift or shifts per working day, increasing the amount of equipment at the site, and any other measure reasonably required to complete the work in a timely fashion.

00700-57 DILIGENCE

The Contractor's failure to substantially comply with the requirements of the preceding paragraph may be grounds for determination by the County that the Contractor is failing to prosecute the work with such diligence as will insure its completion within the time specified. In such event, the County shall have the right to furnish, from its own forces or by contract, such additional labor and materials as may be required to comply with the schedule after 48 hours written notice to the Contractor, and the Contractor shall be liable for such costs incurred by the County.

00700-58 SET-OFFS

Any monies due to the Contractor pursuant to the preceding paragraph of this agreement may be deducted by the County against monies due from the County to the Contractor.

00700-59 REMEDIES CUMULATIVE

The remedies of the County under Articles 00700-56, 00700-57, and 00700-58 are in addition to and without prejudice to all of the rights and remedies of the County at law, in equity, or contained in this agreement.

00700-60 TITLE TO MATERIALS

No materials or supplies shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sales contract or other agreement by which any interest is retained by the seller. The Contractor hereby warrants that it has good and marketable title to all materials and supplies used by it in the work, and the Contractor further warrants that all materials and supplies shall be free from all liens, claims, or encumbrances at the time of incorporation in the work.

00700-61 INSPECTION OF MATERIALS

All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards and in accordance with the requirements of the contract documents. Additional tests performed after the rejection of materials or equipment shall be at the Contractor's expense.

00700-62 CONSTRUCTION MANAGER’S PRESENCE DURING TESTING

All tests performed by the Contractor shall be witnessed by the Construction Manager unless the requirement therefore is waived in writing. The Construction Manager may perform additional tests on materials previously tested by the Contractor, and the Contractor shall furnish samples for this purpose as requested.

00700-63 MATERIALS INCORPORATED IN WORK

The Contractor shall furnish all materials and equipment to be incorporated in the work. All such materials or equipment shall be new and of the highest quality available.

Manufactured materials and equipment shall be obtained from sources which are currently manufacturing such materials, except as otherwise specifically approved by the Construction Manager.

00700-64 STORAGE OF MATERIALS

Materials and equipment to be incorporated in the work shall be stored in such a manner as to preserve their quality and fitness for the work and to facilitate inspection.

00700-65 PAYROLL REPORTS

The Contractor may be required to furnish payroll reports to the Construction Manager as required by the Owner Controlled Insurance Program.

00700-66 CONTRACTORS' REPRESENTATIVE

Before beginning work, the Contractor shall notify the Construction Manager in writing of one person within its organization who shall have complete authority to supervise the work, receive orders from the Construction Manager, and represent the Contractor in all matters arising pursuant to this agreement. The Contractor shall not remove its representative without first designating in writing a new representative. The Contractor's representative shall normally be present at or about the site of work while the work is in progress. When neither the Contractor nor its representative is present at the work site, the superintendent, foreman, or other of the Contractor' employee in charge of the work shall be an authorized representative of the Contractor.

00700-67 SPECIALTY SUB-CONTRACTORS

The Contractor may utilize the services of specialty subcontractors on those parts of the project which, under normal contracting practices, are performed by specialty subcontractors. The Contractor shall not award more than seventy-five percent of the work to subcontractors.

00700-68 INSPECTION BY THE CONSTRUCTION MANAGER

All work pursuant to this agreement shall be subject to inspection by the Construction Manager for conformity with contract drawings and specifications. The Contractor shall give the Construction Manager reasonable advance notice of operations requiring special inspection of a portion of the work.

00700-69 WORK COVERED PRIOR TO CONSTRUCTION MANAGER'S INSPECTION

In the event that work is covered or completed without the approval of the Construction Manager, and such approval is required by the specifications or required in advance by the Construction Manager, the Contractor shall bear all costs involved in inspection notwithstanding conformance of such portion of the work to the contract drawings and specifications.

00700-70 SCHEDULING OF THE WORK

The work of this contract shall be planned, scheduled, executed, and reported as required by the Contract Documents.

00700-71 PROGRESS ESTIMATES

The Contractor shall prepare a written report for the Construction Manager's approval, on County forms, of the total value of work performed and materials and equipment obtained to the date of submission. Such a report must accompany each request for a progress payment and is subject to review and approval by the Construction Manager.

Approval of a progress estimate or tendering of a progress payment shall not be considered an approval or acceptance of any work performed, and all estimates and payments shall be subject to correction in subsequent estimates. Progress payments shall be made for all completed activities and for materials suitably stored on-site.

00700-72 PROGRESS PAYMENTS

Upon approval of each monthly estimate of work performed and materials furnished, the Construction Manager shall approve payment to the Contractor for the estimated value of such work, materials, and equipment, less the amount of all prior payments and any liquidated damages. The Contractor will be paid 100 percent, less retainage, of the cost of materials received and properly stored on-site but not incorporated into the work. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale to establish the County's title to such materials or equipment. The Contractor's request for payment shall provide sufficient detail as to the work completed or materials purchased for which payment is requested to permit meaningful review by the Construction Manager.

00700-73 TIME OF PAYMENT

The Contractor will be paid within 45 days following receipt of an approved Progress Estimate. The Contractor expressly agrees that the payment provisions within this Contract shall supersede the rates of interest, payment periods, and contract and subcontract terms provided for under the Georgia Prompt Pay Act, O.C.G.A. §13-11-1 et seq., and that the rates of interest, payment periods, and contract and subcontract terms provided for under the Prompt Pay Act shall have no application to this Contract. The County shall not be liable for any late payment interest or penalty.

Submittal of Invoices: Invoices shall be submitted as follows:

Via Mail:
Fulton County Government
141 Pryor Street, SW
Suite 7001
Atlanta, Georgia 30303
Attn: Finance Department – Accounts Payable

OR

Via Email:
Email: Accounts.Payable@fultoncountyga.gov

At minimum, original invoices must reference all of the following information:

1) Vendor Information
    a. Vendor Name
    b. Vendor Address
    c. Vendor Code
    d. Vendor Contact Information
    e. Remittance Address

2) Invoice Details
    a. Invoice Date
    b. Invoice Number (uniquely numbered, no duplicates)

c. Purchase Order Reference Number
d. Date(s) of Services Performed
e. A written report of the total value of work performed and materials and equipment obtained to the date of submission

3) Fulton County Department Information (needed for invoice approval)
a. Department Name
b. Department Representative Name

00700-74 RETAINAGE

The County shall retain from each progress payment ten percent of the estimated value of the work performed until the progress payments, including retainage, total 50 percent of the contract price. If a contract includes two or more projects or assignments that have been separately priced and have separate budgets, and the performances of such projects or assignments are not related to or dependent upon the performance of any other, the 50 per cent limit shall be based upon the price for each individual project or assignment. Thereafter, no further retainage shall be withheld so long as the Contractor is making satisfactory progress to insure completion of the work within the time specified therefore. The County may reinstate the ten percent retainage in the event the Construction Manager determines that the Contractor is not making satisfactory progress to complete the work within the time specified in this agreement or in the event that the Construction Manager provides a specific cause for such withholding. The County may also withhold retainage upon substantial completion of the work as provided in O.C.G.A. §13-10-81(c). Interest may be paid upon the retainage in accordance with Georgia law.

00700-75 PAYMENT OF SUBCONTRACTORS

The Contractor shall promptly pay each subcontractor upon the receipt of payment from the County. Such payment shall be made from the amount paid to the Contractor pursuant to the subcontractor's work. The Contractor shall also maintain the records of the percentage retained from payments to the Contractor pursuant to such subcontractor's work. The Contractor shall procure agreements from each subcontractor requiring each subcontractor to pay their subcontractors, agents and employees in a similar manner. The County reserves the right to inquire of any subcontractor, supplier, materialmen, or subconsultant, the status of any indebtedness of the Contractor. The County further reserves the right to require the Contractor to designate on each instrument of payment exceeding $400.00 to subcontractors, suppliers, materialmen, and subconsultants that such payment is on account of the work under this Contract.

00700-76 COUNTY'S RESPONSIBILITIES TO SUBCONTRACTORS

Neither the County nor the Construction Manager shall have any obligation to pay any subcontractor except as otherwise required by law.

00700-77 PROGRESS PAYMENTS - ACCEPTANCE OF WORK

Certification of progress payments, as well as the actual payment thereof, shall not constitute the County’s acceptance of work performed pursuant to this agreement.

00700-78 PAYMENTS IN TRUST

All sums paid to the Contractor pursuant to this agreement are hereby declared to constitute trust funds in the hands of the contractor to be applied first to the payment of

claims of subcontractors, laborers, and suppliers arising out of the work, to claims for utilities furnished and taxes imposed, and to the payment of premiums on surety and other bonds and on insurance for any other application.

00700-79 JOINT PAYMENTS

The County reserves the right to issue any progress payment or final payment by check jointly to the Contractor and any subcontractor or supplier.

00700-80 RIGHT TO WITHHOLD PAYMENT

The Construction Manager may decline to approve payment and may withhold payment in whole or in part to the extent reasonable and necessary to protect the County against loss due to defective work, probable or actual third party claims, the Contractor's failure to pay subcontractors or materialmen, reasonable evidence that the work will not be completed within the contract time or contract price or damage to the County or any other contractor on the project.

00700-81 CERTIFICATE OF SUBSTANTIAL COMPLETION

Upon the Contractor's submission of a request for a certificate of Substantial Completion, the Construction Manager shall inspect the work and determine whether the work is Substantially Complete. If the work is Substantially Complete, the Construction Manager shall issue a certificate of Substantial Completion of the work which shall establish the date of Substantial Completion, shall state the responsibilities of the County and the Contractor for security, maintenance, heat, utilities, damage to the work and insurance, and shall fix the time within which the Contractor shall complete the items submitted by the Contractor as requiring correction or further work. The certificate of substantial completion of the work shall be submitted to the County and the Contractor for their written acceptance of the responsibilities assigned to them pursuant to such certificate.

If in the sole opinion of the Construction Manager, the work is not substantially complete, the Construction Manager shall notify the Contractor of such, in writing, and outline requirements to be met to achieve Substantial Completion.

00700-82 PAYMENT UPON SUBSTANTIAL COMPLETION

Upon Substantial Completion of the work and upon application by the Contractor and approval by the Construction Manager, the County shall make payment reflecting 100% work completed, less value of work remaining as determined by Construction Manager and any authorized retainage.

00700-83 COMMENCEMENT OF WARRANTIES

Warranties required by this agreement shall commence on the date of final completion of the project as determined under Article 00700-84 unless otherwise provided in the certificate of Substantial Completion.

00700-84 FINAL PAYMENT - WAIVER OF CLAIMS, DISPUTE OF FINAL PAYMENT

The acceptance of the Substantial Completion payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of application for payment at Substantial Completion and except for the retainage sums due at final acceptance. Following the Construction Manager’s issuance of the certificate of Substantial Completion and the Contractor's completion of the work pursuant to this agreement, the Contractor shall forward to the Construction Manager a written notice that the work is ready for final inspection and

acceptance. If after inspection the Construction Manager certifies that the work is complete and issues written notification of such to the Contractor, the Contractor shall forward to the Construction Manager a final application for payment. The Construction Manager shall issue a certificate for payment, which shall approve final payment to the Contractor and shall establish the date of final completion.

In the event the Contractor timely disputes the amount of the final payment, the amount due the Contractor shall be deemed by the Contractor and the County to be an unliquidated sum and no interest shall accrue or be payable on the sum finally determined to be due to the Contractor for any period prior to final determination of such sum, whether such determination be by agreement of the Contractor and the County or by final judgment of the proper court in the event of litigation between the County and the Contractor. The Contractor specifically waives and renounces any and all rights it may have under O.C.G.A. §13-6-13 and agrees that in the event suit is brought by the Contractor against the County for any sum claimed by the Contractor under the Contract or for any extra or additional work, no interest shall be awarded on any sum found to be due from the County to the Contractor in the final judgment entered in such suit. All final judgments shall draw interest at the legal rate, as specified by law.

00700-85 DOCUMENTATION OF COMPLETION OF WORK

Neither the final payment nor the remaining retainage shall become due until the Contractor submits the following documents to the Construction Manager:

a. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work have been paid other otherwise satisfied;

b. The surety's consent to final payment; and

c. Any other data reasonably required by the County or Construction Manager establishing payment or satisfaction of all such obligations, including releases, waivers of liens, and documents of satisfaction of debts.

In the event that a subcontractor refuses to furnish a release or waiver as required by the County or Construction Manager, the Contractor may furnish a bond satisfactory to the County to indemnify the County against such loss. In the event that any lien or indebtedness remains unsatisfied after all payments are made, the contractor shall refund to the County all moneys that the County may become compelled to pay in discharging such lien or other indebtedness, including all costs and reasonable attorney's fees.

00700-86 GOVERNING LAW

Each and every provision of this agreement shall be construed in accordance with and governed by Georgia law. The parties acknowledge that this contract is executed in Fulton County, Georgia and that the contract is to be performed in Fulton County, Georgia. Each party hereby consents to the Fulton Superior Court's sole jurisdiction over any dispute which arises as a result of the execution or performance of this agreement, and each party hereby waives any and all objections to venue in the Fulton Superior Court.

00700-87 CHANGES IN THE WORK

A. CHANGE ORDERS

1. A Change Order is a written order to the Contractor signed to show the approval and the authorization of the County, issued after execution of the Contract, authorizing a change in the Work and/or an adjustment in the Contract Sum or the Contract Time. Change Orders shall be written using forms designated by the County with Contractor providing supporting documentation as required by the Construction Manager. The Contract Sum and the Contract Time may be changed only by approved Change Order pursuant to Fulton County Procedure 800-6. The amount payable by the Change Order is payment in full for all direct and indirect costs incurred and related to the work under said Change Order, including but not limited to delays, imports, acceleration, disruption and extended overhead. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including the adjustment in either or both of the Contract Sum or the Contract Time.

2. The County, without invalidating the Contract, may order changes in the Work within the general scope of the Contract as defined herein. The time allowed for performance of the work and the contract price to be paid to the Contractor may be adjusted accordingly.

3. The cost or credit to the County resulting from a change in the Work shall be determined in one or more of the following ways:

   a. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

   b. By unit prices stated in the Contract Documents or subsequently agreed upon;

   c. By cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

   d. By the method provided in Subparagraph A4 below.

4. If none of the methods set forth in Subparagraphs 3a, 3b, or 3c above is agreed upon, the Contractor, provided a written order signed by the Construction Manager is received, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Construction Manager on basis of the reasonable expenditures and savings of those performing the Work attributable to the change. The cost of the change shall include only the items listed in Subparagraph 5a below, and in the case of either a decrease or an increase in the Contract Sum, an allowance for overhead and profit in accordance with the schedules set forth in Subparagraphs 5b and 6 below shall be applied to the cost or credit.

   a. In such case, and also under Subparagraph 3a above, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting of all actual costs expended, together with appropriate supporting data for inclusion in a Change Order.

b. All hourly rate charges shall be submitted to the Construction Manager for prior review and approval. All hourly rate charges shall be properly supported as required by the Construction Manager with certified payrolls, or their acceptable equivalent. When authorized to proceed for a given change and actual expenditures have been made prior to execution of a Change Order for the entire change, such actual expenditures may be summarized monthly, and if approved, incorporated into a Change Order. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase or decrease, if any, with respect to that change.

5. In Subparagraphs 3 and 4 above, the items included in "Cost and "Overhead" shall be based on the following schedule:

a. Unless otherwise provided in the Contract Documents, "Cost" shall be limited to the following: cost of materials incorporated into the Work, including sales tax and cost of delivery; cost of direct labor (labor cost may include a pro rata share of foreman's account of the change) including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; workers' or workmen's compensation insurance; rental value of equipment and machinery; costs for preparing Shop Drawings.

b. Unless otherwise provided in the Contract Documents, "Overhead" shall include the following: bond and insurance premiums including increase and decreases from change in the Work, supervision, superintendence, construction parking, wages of timekeepers, watchmen and clerks, small tools, consumable supplies, expendables, incidentals, general office expense, the cost of additional reproduction for the Contractor's subcontractors beyond that agreed upon in the Contract Documents, construction parking, any additional costs of craft supervision by the Contractor's or subcontractors' superintendents, and overhead charges which would be customary and expended regardless of the change in the Work due to other overlapping activities which are included as part of the original Contract, and all other expenses not included in "Cost" above.

c. In the event that a change is issued by the County which would require the expenditure of substantial amounts of special supervision (beyond the foreman level) by the Contractor, the Contractor may, at the sole direction of the Construction Manager, be allowed to incorporate these charges into the agreement cost for the change.

6. In Subparagraphs 3 and 4 above, the allowance for overhead and profit combined, included in the total cost or credit to the County, shall be based on the following schedule:

a. For the Contractor, for any work performed by the Contractor's own forces, <u>ten (10) percent</u> of the cost.

b. For the Contractor, for any work performed by a Contractor's subcontractor, five (5) percent of the amount due the subcontractor.

c. For each subcontractor or sub-subcontractor involved, for any work performed by that subcontractor's or sub-subcontractor's own forces, ten (10) percent of the cost.

d. For each subcontractor, for work performed by a sub-subcontractor, five (5) percent of the amount due to the sub-subcontractor.

e. Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 5 above unless modified otherwise.

7. In order to facilitate checking of quotations for extras or credits, all proposals or bids, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs, including labor cost, materials and subcontracts. Labor and materials shall be itemized in the manner defined in Subparagraph 4 above. Where major cost items are subcontracts, they shall be itemized also. <u>In no case shall a change be approved without such itemization</u>.

8. No payment shall be made for any changes to the contract that are not included in a fully executed Change Order.

B. CONCEALED, UNKNOWN AND DIFFERING CONDITIONS

1. Should concealed conditions be encountered in the performance of the Work below the surface of the ground, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or concealed or unknown conditions in an existing structure 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, be encountered, the Contract Sum and Contract Time shall be equitably adjusted by Change Order upon request by either party made **<u>within twenty (20) days after the first observance</u>** of the conditions. No such request for equitable adjustment shall be valid unless the Contractor complies with this (20) days' notice and Subparagraph C.1. below.

2. The Contractor shall promptly, and before such conditions are disturbed, notify the Construction Manager in writing of any claim of concealed, unknown or differing conditions pursuant to this paragraph. The Construction Manager shall authorize the Engineer to investigate the conditions, and if it is found that such conditions do materially so 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 recommended to the Construction Manager.

3. No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above, prior to disturbing the condition.

4. No claim by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this Contract.

5. Any materially differing site condition as between what is shown on the Drawings and Specifications and actually found on site shall be immediately reported to the Construction Manager in writing prior to the commencement of Work at the site. Failure of the Contractor to notify the Construction Manager in writing of the differing site condition prior to performance of Work at the site shall constitute a waiver of any claim for additional monies. Any Change Order necessitated by the differing site condition shall be processed as provided under "Changes in the Contract".

C. REQUESTS FOR ADDITIONAL COST

1. If the Contractor wishes to request an increase in the Contract Sum, the Contractor shall give the Construction Manager written notice thereof within twenty (20) days after the occurrence of the event, or identification of the conditions, giving rise to such request. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Article 00700-25 and Subparagraph A.4 above. No such request shall be valid unless so made within the twenty (20) days specified above. If the County and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Construction Manager. Any change in the Contract Sum resulting from such claim shall be documented by Change Order.

2. If the Contractor claims that addition cost is involved because of, but not limited to (1) any written interpretation pursuant to General Condition 00700-17 of this Agreement, (2) any order by the County to stop the Work pursuant to Articles 00700-25 and 00700-37 of this Agreement where the Contractor was not at fault, or any such order by the Construction Manager as the County's agent, or (3) any written order for a minor change in the Work issued pursuant to Paragraph D below, the Contractor shall submit a request for an increase in the Contract Sum as provided in Subparagraph C.1 above. No such claim shall be valid unless the Contractor complies with Subparagraph C.1 above and approved by the County pursuant to Change Order Policy 800-6.

D. MINOR CHANGES IN THE WORK

The Construction Manager may order minor changes in the Work not involving an adjustment in the Contract Price, extension of the time allowed for performance of the work and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by a written Change Directive issued by the Construction Manager, and shall be binding on the County and the Contractor. The Contractor shall carry out such written orders promptly.

E. BONDS

If any change order results in an increase in the contract price, the contractor shall increase the penal sum of the performance and payment bonds to equal the increased price.

00700-88 DISAGREEMENT WITH ORDERS FOR CHANGE

Contractor's written acceptance of a Change Order or other order for changes shall constitute his final and binding agreement to the provisions thereof and a waiver of all claims in connection therewith, whether direct or consequential in nature. Should Contractor disagree with any order for changes, he may submit a notice of potential claim to the Construction Manager, at such time as the order is set forth in the form of a Change Order. Disagreement with the provisions of an order for changes shall not relieve Contractor of his obligation under Article 00700-87 of this Agreement.

00700-89 NO WAIVER OF REMEDIES

Exercise by the County of any remedy is not exclusive of any other remedy available to County and shall not constitute a waiver of any such other remedies. Failure of the County to exercise any remedy, including breach of contract remedies, shall not preclude the County from exercising such remedies in similar circumstances in the future.

00700-90 LAND AND RIGHTS-OF-WAY

The owner will provide, as indicated in the Contract Documents and prior to Notice to Proceed, the lands upon which the work is to be done, right-of-way for access thereto, and such other lands which are designated for the use of the Contractor. The Contractor shall confine the Contractor's work and all associated activities to the easements and other areas designated for the Contractor's use. The Contractor shall comply with any limits on construction methods and practices which may be required by easement agreements. If, due to some unforeseen reason, the necessary easements are not obtained, the Contractor shall receive an equitable extension of contract time dependent upon the effect on the critical path of the project schedule or the County may terminate the Contract for its convenience.

00700-91 COORDINATION WITH STATE DEPARTMENT OF TRANSPORTATION

No clearing or grading shall be completed by Contractor within the State Department of Transportation (DOT) area under construction. The Contractor must coordinate his construction scheduling with DOT.

If the Contractor begins work before DOT's completion date, he must obtain the approval of DOT before starting work in the area. The state DOT has the right to stop the Contractor's work the DOT area.

The Contractor shall receive no additional compensation or damages resulting from delay or work stoppage from DOT actions or scheduling.

Contractor shall obtain DOT drawings of the DOT, project area for verification of road geometry, storm drains, etc. from Georgia Department of Transportation or Fulton County. The Contractor is responsible for obtaining any pertinent DOT revisions.

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EXHIBIT A

FINAL AFFIDAVIT

TO FULTON COUNTY, GEORGIA

I, _____, hereby certify that all suppliers of materials, equipment and service, subcontractors, mechanic, and laborers employed by _____ or any of his subcontractors in connection with the design and/or construction of _____ at Fulton County have been paid and satisfied in full as of _____, 20___, and that there are no outstanding obligations or claims of any kind for the payment of which Fulton County on the above-named project might be liable, or subject to, in any lawful proceeding at law or in equity.

_____
Signature

_____
Title

Personally appeared before me this _____ day of _____, 20_____. _____, who under Oath deposes and says that he is _____of the firm of _____, that he has read the above statement and that to the best of his knowledge and belief same is an exact true statement.

_____
Notary Public

_____
My Commission expires

END OF SECTION

00700-1 FAMILIARITY WITH SITE

Execution of this agreement by the Contractor is a representation that the Contractor has visited the site, has become familiar with the local conditions under which the work is to be performed, and has correlated personal observations with the requirements of this agreement.

00700-2 CONTRACT DOCUMENTS

This agreement consists of Owner's invitation for bid, instructions to bidders, bid form, performance bond, payment bond, acknowledgments, the contract, general conditions, special conditions, specifications, plans, drawings, exhibits, addenda, and written change orders.

A. Notice of Award of Contract:

B. Execution of Contract Documents

Upon notification of Award of Contract, the Owner shall furnish the Contractor the conformed copies of Contract Documents for execution by the Contractor and the Contractor's surety.

Within ten (10) days after receipt the Contractor shall return all the documents properly executed by the Contractor and the Contractor's surety. Attached to each document shall be an original power-of-attorney for the person executing the bonds for the surety and certificates of insurance for the required insurance coverage.

After receipt of the documents executed by the Contractor and his surety with the power-of-attorney and certificates of insurance, the Owner shall complete the execution of the documents. Distribution of the completed documents will be made upon completion.

Should the Contractor and/or Surety fail to execute the documents within the time specified; the Owner shall have the right to proceed on the Bid Bond accompanying the bid.

If the Owner fails to execute the documents within the time limit specified, the Contractor shall have the right to withdraw the Contractor's bid without penalty.

Drawings and Specifications:

The Drawings, Specifications, Contract Documents, and all supplemental documents, are considered essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to define, describe and provide for all Work necessary to complete the Project in an acceptable manner, ready for use, occupancy, or operation by the Owner.

In case of conflict between the Drawings and Specifications, the Specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings.

In cases where products or quantities are omitted from the Specifications, the description and quantities shown on the Drawings shall govern.

Any ambiguities or need for clarification of the Drawings or Specifications shall be immediately reported to the Construction Manager in writing. Any such ambiguity or need for clarification shall be handled by the Construction Manager in writing. No clarification of the Drawings and Specifications hereunder by the Construction Manager

shall entitle the Contractor to any additional monies unless a Change Order has been processed as provided by "Changes in the Contract" hereof.

Any work done by the Contractor following a discovery of such differing site condition or ambiguity or need for clarification in the Contract Drawings and Specifications prior to a written report to the Construction Manager shall not entitle the Contractor to additional monies and shall be done at the Contractor's risk.

The Construction Manager will furnish the Contractor five (5) copies of the Contract Drawings and the Specifications, one copy of which the Contractor shall have available at all times on the Project site.

00700-3 DEFINITIONS

The following terms as used in this agreement are defined as follows to the extent the definitions herein differ or conflict with those in the Instructions for Bidders, Section 00100, the definitions herein shall control.

Alternate bids – the amount stated in the bid or proposal to be added to or deducted from the amount of the base bid or base proposal if the corresponding change in project scope or alternate materials or methods of construction is accepted.

Base bid – the amount of money stated in the bid or proposal as the sum for which the bidder or proposer offers to perform the work.

Change Order - an alteration, addition, or deduction from the original scope of work as defined by the contract documents to address changes or unforeseen conditions necessary for project completion. A written order to the Contractor issued by the County pursuant to Fulton County Policy and Procedures 800-6 for changes in the work within the general scope of the contract documents, adjustment of the contract price, extension of the contract time, or reservation of determination of a time extension.

Construction Manager shall mean the individual designated in writing, by the Director of the Department of Public Works as the Construction Manager.

Contractor shall mean the party of the second part to the Contract Agreement or the authorized and legal representative of such party.

Contract Documents include the Contract Agreement, Contractor's Bid (including all documentation accompanying the Bid and any post-Bid documentation required by the County prior to the Notice of Award), Bonds, all Special Conditions, General Conditions, Supplementary Conditions, Specifications, Drawings and addenda, together with written amendments, change orders, field orders and the Construction Manager's written interpretations and clarifications issued in accordance with the General Conditions on or after the date of the Contract Agreement.

Shop drawing submittals reviewed in accordance with the General Conditions, geotechnical investigations and soils report and drawings of physical conditions in or relating to existing surface structures at or contiguous to the site are not Contract Documents.

Contract Price - The sum specified in the Agreement to be paid to the Contractor in consideration of the Work.

Contract Time shall mean the number of consecutive calendar days as provided in the Contract Agreement for completion of the Work, to be computed from the date of Notice to Proceed.

Owner or County shall mean Fulton County Government, party of the first part to the Contract Agreement, or its authorized and legal representatives.

Day - A calendar day of twenty-four hours lasting from midnight of one day to midnight the next day.

Director - Director of the Department of Public Works of Fulton County, Georgia or the designee thereof.

Engineer of Record – Brown and Caldwell, Inc., developed the specifications and drawings referred to herein.

Final Completion shall mean the completion of all work as required in accordance with the terms and conditions of the contract documents.

Liquidated Damages shall mean the amount, stated in the Contract Agreement, which the Contractor agrees to pay to the Owner for each consecutive calendar day beyond the Contract time required to complete the Project or for failing to comply with associated milestones. Liquidated Damages will end upon written notification from the Owner of Final Acceptance of the Project or upon written notification of from the Owner of completion of the milestone.

Notice to Proceed - A written communication issued by the County to the Contractor authorizing it to proceed with the work, establishing the date of commencement and completion of the work, and providing other direction to the Contractor.

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

Program Manager - Not used in this contract. Delete all references.

Project Manual - The Contract Documents.

Provide shall mean to furnish and install.

Substantial Completion - The date certified by the Construction Manager when all or a part of the work, as established pursuant to General Condition 0700-81, is sufficiently completed in accordance with the requirements of the contract documents so that the identified portion of the work can be utilized for the purposes for which it is intended.

Work or Project - All of the services specified, indicated, shown or contemplated by the contract documents, and furnishing by the Contractor of all materials, equipment, labor, methods, processes, construction and manufacturing materials and equipment, tools, plans, supplies, power, water, transportation and other things necessary to complete such services in accordance with the contract documents to insure a functional and complete facility.

00700-4 CODES

All codes, specifications, and standards referenced in the contract documents shall be the latest editions, amendments and revisions of such referenced standards in effect as of the date of the request for proposals for this contract.

00700-5 REVIEW OF CONTRACT DOCUMENTS

Before making its proposal to the County, and continuously after the execution of the agreement, the Contractor shall carefully study and compare the contract documents and shall at once report to the Construction Manager any error, ambiguity, inconsistency or omission that may be discovered, including any requirement which may be contrary to any law, ordinance, rule, or regulation of any public authority bearing on the performance

of the work. By submitting its proposal, the Contractor agrees that the contract documents, along with any supplementary written instructions issued by or through the Construction Manager that have become a part of the contract documents, appear accurate, consistent and complete insofar as can be reasonably determined. If the Contractor has timely reported in writing any error, inconsistency, or omission to the Construction Manager, has properly stopped the affected work until instructed to proceed, and has otherwise followed the instructions of the Construction Manager, the Contractor shall not be liable to the County for any damage resulting from any such error, inconsistency, or omission in the contract documents. The Contractor shall not perform any portion of the work without the contract documents, approved plans, specifications, products and data, or samples for such portion of the work. For purposes of this section "timely" is defined as the time period in which the contractor discovers, or should have discovered, the error, inconsistency, or omission, with the exercise of reasonable diligence.

00700-6 STRICT COMPLIANCE

No observation, inspection, test or approval of the County or Construction Manager shall relieve the Contractor from its obligation to perform the work in strict conformity with the contract documents except as provided in General Condition 00700-48.

00700-7 APPLICABLE LAW

All applicable State laws, County ordinances, codes, and rules and regulations of all authorities having jurisdiction over the construction of the project shall apply to this agreement. The Contractor shall comply with the requirements of any Fulton County program concerning non-discrimination in contracting. All work performed within the right of way of the Georgia Department of Transportation and any railroad crossing shall be in accordance with Georgia Department of Transportation regulations, policies and procedures and, where applicable, those of any affected railroad. The Contractor shall comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work as specified and the Contractor agrees to indemnify and hold harmless the County, its officers, agents and employees, as well as the Construction Manager and the Program Manager against any claim or liability arising from or based on the violation of any law, ordinance, regulation, order or decree affecting the conduct of the work, whether occasioned by the Contractor, his agents or employees.

00700-8 PERMITS, LICENSES AND BONDS

All permits and licenses necessary for the work shall be secured and paid for by the Contractor. If any permit, license or certificate expires or is revoked, terminated, or suspended as a result of any action on the part of the Contractor, the Contractor shall not be entitled to additional compensation or time. The Contractor shall obtain and keep in force at all times performance and payment bonds payable to Fulton County in penal amounts equal to 100% of the Contract price.

00700-9 TAXES

A. The Contractor shall pay all sales, retail, occupational, service, excise, old age benefit and unemployment compensation taxes, consumer, use and other similar taxes, as well as any other taxes or duties on the materials, equipment, and labor for the work provided by the Contractor which are legally enacted by any municipal, county, state or federal authority, department or agency at the time bids are received, whether or not yet effective. The Contractor shall maintain records pertaining to such taxes and levies as well as payment thereof and shall

make the same available to the County at all reasonable times for inspection and copying. The Contractor shall apply for any and all tax exemptions which may be applicable and shall timely request from the County such documents and information as may be necessary to obtain such tax exemptions. The County shall have no liability to the Contractor for payment of any tax from which it is exempt.

B. The Contractor is obligated to comply with all local and State Sales and Use Tax laws. The Contractor shall provide the Owner with documentation to assist the Owner in obtaining sales and/or use tax refunds for eligible machinery and equipment used for the primary purpose of reducing or eliminating air or water pollution as provided for in Chapter 48-8-3 (36) and (37) of the Official Code of Georgia. All taxes shall be paid by the Contractor. All refunds will accrue to the Owner.

Acceptance of the project as complete and final payment will not be made by the Owner until the Contractor has fully complied with this requirement.

00700-10 DELINQUENT CONTRACTORS

The County shall not pay any claim, debt, demand or account whatsoever to any person firm or corporation who is in arrears to the County for taxes. The County shall be entitled to a counterclaim, back charge, and offset for any such debt in the amount of taxes in arrears, and no assignment or transfer of such debt after the taxes become due shall affect the right of the County to offset any taxes owed against said debt.

00700-11 LIEN WAIVERS

The Contractor shall furnish the County with evidence that all persons who have performed work or furnished materials pursuant to this agreement have been paid in full prior to submitting its demand for final payment pursuant to this agreement. A final affidavit, Exhibit A, must be completed, and submitted to comply with requirements of 00700-11. In the event that such evidence is not furnished, the County may retain sufficient sums necessary to meet all lawful claims of such laborers and materialmen. The County assumes no obligation nor in any way undertakes to pay such lawful claims from any funds due or that may become due to the Contractor.

00700-12 MEASUREMENT

All items of work to be paid for per unit of measurement shall be subject to inspection, measurement, and confirmation by the Construction Manager.

00700-13 ASSIGNMENT

The Contractor shall not assign any portion of this agreement or moneys due there from (include factoring of receivables) without the prior written consent of the County. The Contractor shall retain personal control and shall provide personal attention to the fulfillment of its obligations pursuant to this agreement. Any assignment without the express written consent of the County shall render this contract voidable at the sole option of the County.

00700-14 FOREIGN CONTRACTORS

In the event that the Contractor is a foreign corporation, partnership, or sole proprietorship, the Contractor hereby irrevocably appoints the Secretary of State of Georgia as its agent for service of all legal process for the purpose of this contract only.

00700-15 INDEMNIFICATION

The Contractor hereby assumes the entire responsibility and liability for any and all injury to or death of any and all persons, including the Contractor's agents, servants, and employees, and in addition thereto, for any and all damages to property caused by or resulting from or arising out of any act or omission in connection with this contract or the prosecution of work hereunder, whether caused by the Contractor or the Contractor's agents, Servants, or employees, or by any of the Contractor's subcontractors or suppliers, and the Contractor shall indemnify and hold harmless the County, the Construction Manager, County's Commissioners, officers, employees, successors, assigns and agents, or any of their subcontractors from and against any and all loss and/or expense which they or any of them may suffer or pay as a result of claims or suits due to, because of, or arising out of any and all such injuries, deaths and/or damage, irrespective of County or Construction Manager negligence (except that no party shall be indemnified for their own sole negligence). The Contractor, if requested, shall assume and defend at the Contractor's own expense, any suit, action or other legal proceedings arising there from, and the Contractor hereby agrees to satisfy, pay, and cause to be discharged of record any judgment which may be rendered against the County and the Construction Manager arising there from.

In the event of any such loss, expense, damage, or injury, or if any claim or demand for damages as heretofore set forth is made against the County or the Construction Manager, the County may withhold from any payment due or thereafter to become due to the Contractor under the terms of this Contract, an amount sufficient in its judgment to protect and indemnify it and the Construction Manager, County's Commissioners, officers, employees, successors, assigns and agents from any and all claims, expense, loss, damages, or injury; and the County, in its discretion, may require the Contractor to furnish a surety bond satisfactory to the County providing for such protection and indemnity, which bond shall be furnished by the Contractor within five (5) days after written demand has been made therefore. The expense of said Bond shall be borne by the Contractor.

00700-16 SUPERVISION OF WORK AND COORDINATION WITH OTHERS

The Contractor shall supervise and direct the work using the Contractor's best skill and attention. The Contractor shall be solely responsible for all construction methods and procedures and shall coordinate all portions of the work pursuant to the contract subject to the overall coordination of the Construction Manager. All work pursuant to this agreement shall be performed in a skillful and workmanlike manner.

The County reserves the right to perform work related to the Project with the County's own forces and to award separate contracts in connection with other portions of the project, other work on the site under these or similar conditions of the contract, or work which has been extracted from the Contractor's work by the County.

When separate contracts are awarded for different portions of the project or other work on the site, the term "separate contractor" in the Contract Documents in each case shall mean the contractor who executes each separate County Agreement.

The Contractor shall cooperate with the County and separate contractors in arranging the introduction and storage of materials and equipment and execution of their work, and shall cooperate in coordinating connection of its work with theirs as required by the Contract Documents.

If any part of the Contractor's Work depends for proper execution or results upon the work of the County or any separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results **within fourteen (14) days** of discovery of such discrepancy or defect. Failure of the Contractor to so report in writing shall constitute an acceptance of the County's or separate contractor's work as fit and proper to receive the Work, except as to any defects which may subsequently become apparent in such work by others.

Any costs caused by defective or untimely work shall be borne by the party responsible therefore.

Should the Contractor wrongfully cause damage to the work or property of the County or to other work or property on the site, including the work of separate contractors, the Contractor shall promptly remedy such damage at the Contractor's expense.

Should the Contractor be caused damage by any other contractor on the Project, by reason of such other contractor's failure to perform properly his contract with the County, no action shall lie against the County or the Construction Manager inasmuch as the parties to this agreement are the only beneficiaries hereof and there are no third party beneficiaries and neither the County nor the Construction Manager shall have liabilities therefore, but the Contractor may assert his claim for damages solely against such other contractor. The Contractor shall not be excused from performance of the contract by reason of any dispute as to damages with any other contractor or third party.

Where the Work of this Contract shall be performed concurrently in the same areas as other construction work, the Contractor shall coordinate with the Construction Manager and the separate contractors in establishing mutually acceptable schedules and procedures that shall permit all jobs to proceed with minimum interference.

If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up, the County may clean up and charge the cost thereof to the Contractor or contractors responsible therefore as the County shall determine to be just.

00700-17 ADMINISTRATION OF CONTRACT

The Program Manager and the Construction Manager shall provide administration services as hereinafter described.

For the administration of this Contract, the Construction Manager shall serve as the County's primary representative during design and construction and until final payment to the Contractor is due. The Construction Manager shall advise and consult with the County and the Program Manager. The primary point of contact for the Contractor shall be the Construction Manager. All correspondence from the Contractor to the County shall be forwarded through the Construction Manager. Likewise, all correspondence and instructions to the Contractor shall be forwarded through the Construction Manager.

The Construction Manager will determine in general that the construction is being performed in accordance with design and engineering requirements, and will endeavor to guard the County against defects and deficiencies in the Work.

The Construction Manager will not be responsible for or have control or charge of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, nor will it be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

The Construction Manager will not be responsible for or have control or charge over the acts or omissions of the Contractor, its engineers, consultants, subcontractors, or any of their agents or employees, or any other persons performing the Work.

Based on the Construction Manager's observations regarding the Contractor's Applications for Payment, the Construction Manager shall determine the amounts owing to the Contractor, in accordance with the payment terms of the Contract, and shall issue Certificates for Payment in such amount to the County.

The Construction Manager shall render interpretations necessary for the proper execution or progress of the Work. Either party to the Contract may make written requests to the Construction Manager for such interpretations.

Claims, disputes and other matters in question between the Contractor and the County relating to the progress of the Work or the interpretation of the Contract Documents shall be referred to the Construction Manager for interpretation.

All interpretations of the Construction Manager shall be consistent with the intent of and reasonably inferable from the Contract Documents and shall be in writing or in graphic form.

Except as otherwise provided in this Contract, the Construction Manager shall issue a decision on any disagreement concerning a question of fact arising under this Contract. The Construction Manager shall reduce the decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Construction Manager shall be final and conclusive unless, within thirty (30) days from the date of receipt of such copy, the Contractor files a written appeal with the Director of Public Works and mails or otherwise furnishes the Construction Manager a copy of such appeal. The decision of the Director of Public Works or the Director's duly authorized representative for the determination of such appeals shall be final and conclusive. Such final decision shall not be pleaded in any suit involving a question of fact arising under this Contract, provided such is not fraudulent, capricious, arbitrary, so grossly erroneous as necessarily implying bad faith, or is not supported by substantial evidence. In connection with any appeal proceeding under this Article, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of Contractor's appeal. Pending any final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract as directed by the Construction Manager.

The Construction Manager shall have authority to reject Work which does not conform to the Contract Documents. Whenever, in the Construction Manager's opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, the County shall have authority to require special inspection or testing of the Work whether or not such Work be then fabricated, installed or completed. The Contractor shall pay for such special inspection or testing if the Work so inspected or tested is found not to comply with the requirements of the contract; the County shall pay for special inspection and testing if the Work is found to comply with the contract. Neither the Construction Manager's authority to act under this Subparagraph, nor any decision made by the Construction Manager in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Construction Manager to the Contractor, any subcontractor, any of their agents or employees, or any other person performing any of the Work.

The Contractor shall provide such shop drawings, product data, and samples as may be required by the Construction Manager and/or as required by these Contract Documents.

The Construction Manager shall conduct inspections to determine Substantial Completion and Final Completion, and shall receive and forward to the County for review written warranties and related documents required by the Contract Documents and assembled by the Contractor. The Construction Manager shall approve and issue Certificates for Payment upon compliance with Substantial and Final Completion requirements indicated in General Conditions 00700-81, 00700-82, 00700-84 and 00700-85 of this Agreement.

Except as provided in General Condition 00700-48, the Contractor shall not be relieved from the Contractor's obligations to perform the work in accordance with the contract documents by the activities or duties of the County or any of its officers, employees, or agents, including inspections, tests or approvals, required or performed pursuant to this agreement.

00700-18 RESPONSIBILITY FOR ACTS OF EMPLOYEES

The Contractor shall employ only competent and skilled personnel. The Contractor shall, upon demand from the Construction Manager, immediately remove any superintendent, foreman or workman whom the Construction Manager may consider incompetent or undesirable.

The Contractor shall be responsible to the County for the acts and omissions of the Contractor's employees, subcontractors, and agents as well as any other persons performing work pursuant to this agreement for the Contractor.

00700-19 LABOR, MATERIALS, SUPPLIES, AND EQUIPMENT

Unless otherwise provided in this agreement, the Contractor shall make all arrangements with necessary support agencies and utility companies provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the execution and completion of the work.

00700-20 DISCIPLINE ON WORK SITE

The Contractor shall enforce strict discipline and good order among its employees and subcontractors at all times during the performance of the work, to include compliance with the Fulton County Drug Free Work Place Policy. The Contractor shall not employ any subcontractor who is not skilled in the task assigned to it. The Construction Manager may, by written notice, require the Contractor to remove from the work any subcontractor or employee deemed by the Construction Manager to be incompetent.

00700-21 HOURS OF OPERATION

All work at the construction site shall be performed during regular business hours of the Fulton County government, except upon the Construction Manager's prior written consent to other work hours. It is further understood that the Contractor's construction schedule is based on a normal 40 hours, five day work week, less Fulton County-recognized holidays. Contractors work schedule shall not violate Fulton County Noise Ordinance by working hours inconsistent with the Fulton County Noise Ordinance. The County's current noise ordinance or other applicable ordinance shall govern. If the Contractor desires to work in excess of this limit, the Contractor shall submit a written request to the Construction Manager, a minimum of five days prior to the desired work date. The Contractor shall be responsible for any additional expenses incurred by the Owner as a result of the extended work hours, including resident inspection overtime.

The cost associated with resident inspector overtime shall be deducted from the Contractor monthly payment request.

00700-22 FAMILIARITY WITH WORK CONDITIONS

The Contractor shall take all steps necessary to ascertain the nature and location of the work and the general and local conditions which may affect the work or the cost thereof. The Contractor's failure to fully acquaint itself with the conditions which may affect the work, including, but not limited to conditions relating to transportation, handling, storage of materials, availability of utilities, labor, water, roads, weather, topographic and subsurface conditions, other separate contracts to be entered into by the County relating to the project which may affect the work of the Contractor, applicable provisions of law, and the character and availability of equipment and facilities necessary prior to and during the performance of the work shall not relieve the Contractor of its responsibilities pursuant to this agreement and shall not constitute a basis for an equitable adjustment of the contract terms. The County reserves the right to perform with its own forces or to contract with other entities for other portions of the project work, in which case the Contractor's responsibility to assure its familiarity with work conditions hereunder shall include all coordination with such other contractors and the County necessary to insure that there is no interference between contractors as will delay or hinder any contractor in its prosecution of work on the project. The County assumes no responsibility for any understandings or representations concerning conditions of the work made by any of its officers, agents, or employees prior to the execution of this agreement.

00700-23 RIGHT OF ENTRY

The County reserves the right to enter the site of the work by such agent, including the Construction Manager, as it may elect for the purpose of inspecting the work or installing such collateral work as the County may desire. The Contractor shall provide safe facilities for such access so that the County and its agents may perform their functions.

00700-24 NOTICES

Any notice, order, instruction, claim or other written communication required pursuant to this agreement shall be deemed to have been delivered or received as follows:

Upon personal delivery to the Contractor, its authorized representative, or the Construction Manager on behalf of the County. Personal delivery may be accomplished by in-person hand delivery or bona fide overnight express service.

Three days after depositing in the United States mail a certified letter addressed to the Contractor or the Construction Manager for the County. For purposes of mailed notices, the County's mailing address shall be 141 Pryor Street, 6th Floor, Atlanta, Georgia 30303, or as the County shall have otherwise notified the Contractor. The Contractor's mailing address shall be the address stated in its proposal or as it shall have most recently notified the Construction Manager in writing.

00700-25 SAFETY

A. SAFETY, HEALTH AND LOSS PREVENTION

The Contractor shall be responsible for implementing a comprehensive project-specific safety, health and loss prevention program and employee substance abuse program for this project. All Sub-Contractors must either implement their own program or follow the Contractor's safety, health and loss prevention program and employee substance abuse program.

The Contractor's safety, health and loss prevention program and employee substance abuse program must meet or exceed all governmental regulations (OSHA, EPA, DOT, State, local), and any other specific Fulton County requirements

B. COUNTY'S SAFETY, HEALTH, AND LOSS PREVENTION PROCESS GUIDELINES AND REQUIREMENTS

The County and its agents reserve the right, but assume no duty, to establish and enforce safety, health, and loss prevention guidelines and to make the appropriate changes in the guidelines, for the protection of persons and property and to review the efficiency of all protective measures taken by the Contractor. The Contractor shall comply with all safety, health, and loss prevention process guidelines and requirements and changes made by the County or its agent(s). The issuance of any such guidelines or changes by the County or its agent(s) shall not relieve the Contractor of its duties and responsibilities under this Agreement, and the County or its agent(s) shall not thereby assume, nor be deemed to have assumed, any such duties or responsibilities of the Contractor.

C. COMPLIANCE OF WORK, EQUIPMENT, AND PROCEDURES WITH ALL APPLICABLE LAWS and REGULATIONS

All Work, whether performed by the Contractor or its Sub-Contractors of any tier, or anyone directly or indirectly employed by any of them, and all equipment, appliances, machinery, materials, tools and like items incorporated or used in the Work, shall be in compliance with and conform to:

1. All applicable laws, ordinances, rules, regulations and orders of any public, quasi-public or other governmental authority relating to the safety of persons and their protection against injury, specifically including, but in no event limited to, the Federal Occupational Safety and Health Act of 1970, as amended, and all rules and regulations now or hereafter in effect pursuant to said Act.

2. All rules, regulations, and requirements of the County or its agent(s) and its insurance carriers relating there to. In the event of a conflict or differing requirements the more stringent shall govern.

D. PROTECTION OF THE WORK

1. The Contractor shall, throughout the performance of the Work, maintain adequate and continuous protection of all Work and temporary facilities against loss or damage from whatever cause, shall protect the property of the County and third parties from loss or damage from whatever cause arising out of the performance of the Work, and shall comply with the requirements of the County or its agent(s) and its insurance carriers, and with all applicable laws, codes, rules and regulations, (as same may be amended) with respect to the prevention of loss or damage to property as a result of fire or other hazards.

2. The County or its agent(s) may, but shall not be required to, make periodic inspections of the Project work area. In such event, however, the Contractor shall not be relieved of its aforesaid responsibilities and the County or its agent(s) shall not assume, nor shall it be deemed to have assumed, any responsibility otherwise imposed upon the assurance of Contractor by this Agreement.

E. SAFETY EQUIPMENT

1. The Contractor shall provide to each worker on the Project work area the proper safety equipment for the duties being performed by that worker and will not permit any worker on the Project work area who fails or refuses to use the same. The County or its agent shall have the right, but not the obligation, to order the removal of a worker from the Project work site for his/her failure to comply with safe practices or substance abuse policies.

F. EMERGENCIES

1. In any emergency affecting the safety of persons or property, or in the event of a claimed violation of any federal or state safety or health law or regulation, arising out of or in any way connected with the Work or its performance, the Contractor shall act immediately to prevent threatened damage, injury or loss and to remedy said violation. Failing such action the County or its agent(s) may immediately take whatever steps it deems necessary including, but not limited to, suspending the Work as provided in this Agreement.

2. The County or its agent(s) may offset any and all costs or expenses of whatever nature, including attorneys' fees, paid or incurred by the County or its agent(s) (whether such fees are for in-house counsel or counsel retained by the County or its agent), in taking the steps authorized by Section 00700-25(G) (1) above against any sums then or thereafter due to the Contractor. The Contractor shall defend, indemnify and hold the County, its officers, agents, and employees harmless against any and all costs or expenses caused by or arising from the exercise by the County of its authority to act in an emergency as set out herein. If the Contractor shall be entitled to any additional compensation or extension of time change order on account of emergency work not due to the fault or neglect of the Contractor or its Sub-Contractors, such additional compensation or extension of time shall be determined in accordance with General Condition 00700-52 and General Condition 00700-87 of this Agreement.

G. SUSPENSION OF THE WORK

1. Should, in the judgment of the County or its agent(s), the Contractor or any Sub-Contractor fail to provide a safe and healthy work place, the County or its agent shall have the right, but not the obligation, to suspend work in the unsafe areas until deficiencies are corrected. All costs of any nature (including, without limitation, overtime pay, liquidated damages or other costs arising out of delays) resulting from the suspension, by whomsoever incurred, shall be borne by the Contractor.

2. Should the Contractor or any Sub-Contractor fail to provide a safe and healthy work place after being formally notified in writing by the County or its agents of such non-compliance, the contract may be terminated following the termination provision of the contract.

H. CONTRACTOR’S INDEMNITY OF THE COUNTY FOR CONTRACTOR’S NON-COMPLIANCE WITH SAFETY PROGRAM

1. The Contractor recognizes that it has sole responsibility to assure its Safety Program is implemented and to assure its construction services are safely provided. The Contractor shall indemnify, defend and hold the County and its agents harmless, from and against any and all liability (whether public or private), penalties (contractual or otherwise), losses, damages, costs, attorneys' fees, expenses, causes of action, claims or judgments resulting, either in whole or in part, from any failure of the Contractor, its Sub-Contractors of any tier or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, to comply with the safety requirements of the contract. The Contractor shall not be relieved of its responsibilities under the safety requirements of the Contract should the County or its agent(s) act or fail to act pursuant to its rights hereunder.
2. The Contractor shall not raise as a defense to its obligation to indemnify under this Subparagraph I any failure of those indemnified hereunder to assure Contractor operates safely, it being understood and agreed that no such failure shall relieve the Contractor from its obligation to assure safe operations or from its obligation to so indemnify. The Contractor also hereby waives any rights it may have to seek contribution, either directly or indirectly, from those indemnified hereunder.
3. In any and all claims against those indemnified hereunder by any employee of the Contractor, any Sub-Contractor of any tier or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Subparagraph I shall not be limited in any way as to the amount or type of damages, compensation or benefits payable by or for the Contractor or any Sub-Contractor of any tier under any workers' compensation act, disability benefit or other employee benefit acts.

00700-26 BLASTING AND EXCAVATION

The Contractor acknowledges that it is fully aware of the contents and requirements of O.C.G.A. § 25-9-1 through 25-9-12 concerning blasting and excavation near underground gas pipes and facilities and shall fully comply therewith.

00700-27 HIGH VOLTAGE LINES

The Contractor acknowledges that it is fully aware of the contents and requirements O.C.G.A. § 46-3-30 through 46-3-39 concerning safeguards against contact with high voltage lines, and the Contractor shall fully comply with said provisions.

00700-28 SCAFFOLDING AND STAGING

The Contractor acknowledges that it is the person responsible for employing and directing others to perform labor within the meaning of O.C.G.A. § 34-1-1 and agrees to comply with said provisions.

00700-29 CLEAN-UP

The Contractor shall clean up all refuse, rubbish, scrap materials, and debris caused by its operations to the end that the site of the work shall present a neat, orderly and workmanlike appearance at all times.

00700-30 PROTECTION OF WORK

The Contractor shall be responsible for maintenance and protection of the work, which shall include any County-furnished supplies, material, equipment, until final completion of this agreement and acceptance of the work as defined herein. Any portion of the work suffering injury, damage or loss shall be considered defective and shall be corrected or replaced by the Contractor without additional cost to the County.

00700-31 REJECTED WORK

The Contractor shall promptly remove from the project all work rejected by the Construction Manager for failure to comply with the contract documents and the Contractor shall promptly replace and re-execute the work in accordance with the contract documents and without expense to the County. The Contractor shall also bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.

00700-32 DEFECTIVE WORK

If the Contractor defaults or neglects to carry out any portion of the work in accordance with the contract documents, and fails within three days after receipt of written notice from the Construction Manager to commence and continue correction of such default or neglect with diligence and promptness, the County may, after three days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy the County may have, make good such deficiencies and complete all or any portion of any work through such means as the County may select, including the use of a separate Contractor. In such case, an appropriate change order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies. In the event the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the County on demand.

The County may, at its option, accept defective or nonconforming work instead of requiring its removal or correction. In such case, a change order shall be issued reducing the price due the contractor to the extent appropriate and equitable. Such contract price adjustment shall be effected whether or not final payment has been made.

00700-33 WARRANTY OF NEW MATERIALS

The Contractor warrants to the County that all materials and equipment furnished under this contract will be new unless otherwise specified, and the Contractor further warrants that all work will be of good quality, free from faults and defects, and in conformance with the contract documents. The warranty set forth in this paragraph shall survive final acceptance of the work.

00700-34 CONTRACTOR'S WARRANTY OF THE WORK

If within one year after the date of issuance of the certificate of final payment pursuant to General Condition 84, or within such longer period of time as may be prescribed by law or by the term of any applicable special warranty required by the contract documents, any of the work is found to be defective or not in accordance with the contract documents, the Contractor shall correct such work promptly after receipt of written notice from the Construction Manager to do so. This obligation shall survive both final payment for the work and termination of the contract.

00700-35 ASSIGNMENT OF MANUFACTURERS' WARRANTIES

Without limiting the responsibility or liability of the Contractor pursuant to this agreement, all warranties given by manufacturers on materials or equipment incorporated in the work are hereby assigned by the Contractor to the County. If requested, the Contractor shall execute formal assignments of said manufacturer's warranties to the County. All such warranties shall be directly enforceable by the County.

00700-36 WARRANTIES IMPLIED BY LAW

The warranties contained in this agreement, as well as those warranties implied by law, shall be deemed cumulative and shall not be deemed alternative or exclusive. No one or more of the warranties contained herein shall be deemed to alter or limit any other.

00700-37 STOP WORK ORDERS

In the event that the Contractor fails to correct defective work as required by the contract documents or fails to carry out the work in accordance with contract documents, the Construction Manager, in writing, may order the Contractor to stop work until the cause for such order has been eliminated. This right of the County to stop work shall not give rise to any duty on the part of the County or the Construction Manager to execute this right for the benefit of the Contractor or for any other person or entity.

00700-38 TERMINATION FOR CAUSE

If the Contractor is adjudged bankrupt, makes a general assignment for the benefit of creditors, suffers the appointment of a receiver on account of its insolvency, fails to supply sufficient properly skilled workers or materials, fails to make prompt payment to subcontractors or materialmen, disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, fails to diligently prosecute the work, or is otherwise guilty of a material violation of this agreement and fails within seven days after receipt of written notice to commence and continue correction of such default, neglect, or violation with diligence and promptness, the County may, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy the County may have, terminate the employment of the Contractor and take possession of the site as well as all materials, equipment, tools, construction equipment and machinery thereon. The County may finish the work by whatever methods the County deems expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is completed. If the unpaid balance of the contract price exceeds the cost of completing the work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the County on demand. This obligation for payment shall survive the termination of the contract. Termination of this agreement pursuant to this paragraph may result in disqualification of the Contractor from bidding on future County contracts.

00700-39 TERMINATION FOR CONVENIENCE

The County may, at any time upon written notice to the Contractor, terminate the whole or any portion of the work for the convenience of the County. The effective data of the terminations shall be provided in the written notice. Said termination shall be without prejudice to any right or remedy of the County provided herein. In addition, in the event this agreement has been terminated due to the default of the Contractor, and if it is later determined that the Contractor was not in default pursuant to the provisions of this agreement at the time of termination, then such termination shall be considered a termination for convenience pursuant to this paragraph.

00700-40 TERMINATION FOR CONVENIENCE - PAYMENT

If the Contract is terminated for convenience by the Owner as provided in this article, Contractor will be paid compensation for those services actually performed as approved by the Owner or his representative. Partially completed tasks will be compensated for based on a signed statement of completion prepared by the Project Manager and submitted to the Contractor which shall itemize each task element and briefly state what work has been completed and what work remains to be done. Contractor shall also be paid for reasonable costs for the orderly filing and closing of the project.

00700-41 TERMINATION FOR CONVENIENCE - PAYMENT LIMITATIONS

Except for normal spoilage, and except to the extent that the County shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor the fair value, as determined by the Construction Manager, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the County or to another buyer.

00700-42 COST TO CURE

If the County terminates for cause the whole or any part of the work pursuant to this agreement, then the County may procure upon such terms and in such manner as the Construction Manager may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the County for any excess costs for such similar supplies or services. The Contractor shall continue the performance of this agreement to the extent not terminated hereunder.

00700-43 ATTORNEY'S FEES

Should the Contractor default pursuant to any of the provisions of this agreement, the Contractor and its surety shall pay to the County such reasonable attorney's fees as the County may expend as a result thereof and all costs, expenses, and filing fees incidental thereto.

00700-44 CONTRACTOR'S RESPONSIBILITIES UPON TERMINATION

After receipt of a notice of termination from the County, and except as otherwise directed by the Construction Manager, 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 for completion of such portion of the work under the agreement 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 County in the manner, at the times, and to the extent directed by the Construction Manager, all of the rights, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the County shall have the right, at its discretion, to settle or pay any and all claims arising out of the termination of such orders or subcontracts;
5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts with the approval or ratification of

the Construction Manager, to the extent the Construction Manager may require, which approval or ratification shall be final for all purposes;

6. Transfer title and deliver to the entity or entities designated by the Construction Manager, in the manner, at the times, and to the extent, if any, directed by the Construction Manager, and to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the work as has been terminated:

   a. The fabricated or un-fabricated parts, work, and progress, partially completed supplies, and equipment, materials, parts, tools, dyes, jigs, and other fixtures, completed work, supplies, and other material produced as a 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 to the work.

7. Use its best efforts to sell in the manner, at the times, to the extent, and at the prices directed or authorized by the Construction Manager, any property described in Section 6 of this paragraph, provided, however, that the Contractor shall not be required to extend credit to any buyer and further provided that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the County to the Contractor pursuant to this agreement.

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 Construction Manager may direct, for the protection and preservation of the property related to the agreement which is in the possession of the Contractor and in which the County has or may acquire an interest.

00700-45 RECORDS

The Contractor shall preserve and make available to the County all of its records, books, documents and other evidence bearing on the costs and expenses of the Contractor and any subcontractor pursuant to this agreement upon three days advance notice to the Contractor.

00700-46 DEDUCTIONS

In arriving at any amount due the Contractor pursuant to the terms of this agreement, there shall be deducted all liquidated damages, advance payments made to the Contractor applicable to the termination portion of the contract, the amount of any claim which the County may have against the Contractor, the amount determined

By the Construction Manager to be necessary to protect the County against loss due to outstanding potential liens or claims, and the agreed price of any materials acquired or sold by the Contractor and not otherwise recovered by or credited to the County.

00700-47 REIMBURSEMENT OF THE COUNTY

In the event of termination, the Contractor shall refund to the County any amount paid by the County to the Contractor in excess of the costs properly reimbursable to the Contractor.

00700-48 SUSPENSION, INTERRUPTION, DELAY, DAMAGES

The Contractor shall be entitled to only those damages and that relief from termination by the County as specifically set forth in this agreement. The Construction Manager may issue a written order requiring the Contractor to suspend, delay or interrupt all or any part of the work for such period of time as the County may determine to be appropriate for the convenience of the County. If the performance of the work is interrupted for an unreasonable period of time by an act of the County or any of its officers, agents, employees, contractors, or consultants in the administration of this agreement, an equitable adjustment shall be made for any increase in the Contractor's costs of performance and any increase in the time required for performance of the work necessarily caused by the unreasonable suspension, delay, or interruption. Any equitable adjustment shall be reduced to writing and shall constitute a modification to this agreement. In no event, however, shall an equitable adjustment be made to the extent that performance of this agreement would have been suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor. No claim for an equitable adjustment pursuant to this paragraph shall be permitted before the Contractor shall have notified the Construction Manager in writing of the act or failure to act involved, and no claim shall be allowed unless asserted in writing to the Construction Manager within ten days after the termination of such suspension, delay or interruption.

00700-49 COMMENCEMENT AND DURATION OF WORK

The County may issue a Notice to Proceed at any time within 120 days following execution of the contract by the County. The Contractor shall commence work pursuant to this agreement within ten days of mailing or delivery of written notice to proceed. The Contractor shall diligently prosecute the work to completion within the time specified therefore in the Agreement. The capacity of the Contractor's construction and manufacturing equipment and plan, sequence and method of operation and forces employed, including management and supervisory personnel, shall be such as to insure completion of the work within the time specified in the Agreement. The Contractor and County hereby agree that the contract time for completion of the work is reasonable taking into consideration the average climatic conditions prevailing in the locality of the work and anticipated work schedules of other contractors whose activities are in conjunction with or may affect the work under this contract.

00700-50 TIME OF THE ESSENCE

All time limits stated in this agreement are of the essence of this contract.

00700-51 IMPACT DAMAGES

Except as specifically provided pursuant to a stop work order or change order, the Contractor shall not be entitled to payment or compensation of any kind from the County for direct or indirect or impact damages including, but not limited to, costs of acceleration arising because of delay, disruption, interference or hindrance from any cause whatsoever whether such delay, disruption, interference or hindrance is reasonable or unreasonable, foreseeable or unforeseeable, or avoidable, provided, however, that this provision shall not preclude the recovery of damages by the Contractor for hindrances or delays due solely to fraud or bad faith on the part of the County, its agents, or employees. The Contractor shall be entitled only to extensions in the time required for performance of the work as specifically provided in the contract.

00700-52 DELAY

The Contractor may be entitled to an extension of the contract time, but not an increase in the contract price or damages, for delays arising from unforeseeable causes beyond the control and without the fault or negligence of the Contractor or its subcontractors for labor strikes, acts of God, acts of the public enemy, acts of the state, federal or local government in its sovereign capacity, by acts of another separate contractor, or by an act or neglect of the County.

00700-53 INCLEMENT WEATHER

The Contractor shall not be entitled to an extension of the contract time due to normal inclement weather. Unless the Contractor can substantiate to the satisfaction of the Construction Manager that there was greater than normal inclement weather and that such greater than normal inclement weather actually delayed the work, the Contractor shall not be entitled to an extension of time therefore. The following shall be considered the normal inclement weather days for each month listed, and extensions of time shall be granted in increments of not less than one half day only for inclement weather in excess of the days set out.

January	10 days
February	10 days
March	7 days
April	6 days
May	4 days
June	3 days
July	4 days
August	2 days
September	2 days
October	3 days
November	6 days
December	9 days

00700-54 DELAY - NOTICE AND CLAIM

The Contractor shall not receive an extension of time unless a Notice of Delay is filed with the Construction Manager within ten days of the first instance of such delay, disruption, interference or hindrance and a written Statement of the Claim is filed with the Construction Manager within 20 days of the first such instance. In the event that the Contractor fails to comply with this provision, it waives any claim which it may have for an extension of time pursuant to this agreement.

00700-55 STATEMENT OF CLAIM - CONTENTS

The Statement of Claim referenced in Article 00700-54 shall include specific information concerning the nature of the delay, the date of commencement of the delay, the construction activities affected by the delay, the person or organization responsible for the delay, the anticipated extent of the delay, and any recommended action to avoid or minimize the delay.

00700-56 WORK BEHIND SCHEDULE, REMEDY BY CONTRACTOR

If the work actually in place falls behind the currently updated and approved schedule, and it becomes apparent from the current schedule that work will not be completed within the contract time, the Contractor agrees that it will, as necessary, or as directed by the Construction Manager, take action at no additional cost to the County to improve the progress of the work, including increasing manpower, increasing the number of working hours per shift or shifts per working day, increasing the amount of equipment at the site, and any other measure reasonably required to complete the work in a timely fashion.

00700-57 DILIGENCE

The Contractor's failure to substantially comply with the requirements of the preceding paragraph may be grounds for determination by the County that the Contractor is failing to prosecute the work with such diligence as will insure its completion within the time specified. In such event, the County shall have the right to furnish, from its own forces or by contract, such additional labor and materials as may be required to comply with the schedule after 48 hours written notice to the Contractor, and the Contractor shall be liable for such costs incurred by the County.

00700-58 SET-OFFS

Any monies due to the Contractor pursuant to the preceding paragraph of this agreement may be deducted by the County against monies due from the County to the Contractor.

00700-59 REMEDIES CUMULATIVE

The remedies of the County under Articles 00700-56, 00700-57, and 00700-58 are in addition to and without prejudice to all of the rights and remedies of the County at law, in equity, or contained in this agreement.

00700-60 TITLE TO MATERIALS

No materials or supplies shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sales contract or other agreement by which any interest is retained by the seller. The Contractor hereby warrants that it has good and marketable title to all materials and supplies used by it in the work, and the Contractor further warrants that all materials and supplies shall be free from all liens, claims, or encumbrances at the time of incorporation in the work.

00700-61 INSPECTION OF MATERIALS

All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards and in accordance with the requirements of the contract documents. Additional tests performed after the rejection of materials or equipment shall be at the Contractor's expense.

00700-62 CONSTRUCTION MANAGER’S PRESENCE DURING TESTING

All tests performed by the Contractor shall be witnessed by the Construction Manager unless the requirement therefore is waived in writing. The Construction Manager may perform additional tests on materials previously tested by the Contractor, and the Contractor shall furnish samples for this purpose as requested.

00700-63 MATERIALS INCORPORATED IN WORK

The Contractor shall furnish all materials and equipment to be incorporated in the work. All such materials or equipment shall be new and of the highest quality available.

Manufactured materials and equipment shall be obtained from sources which are currently manufacturing such materials, except as otherwise specifically approved by the Construction Manager.

00700-64 STORAGE OF MATERIALS

Materials and equipment to be incorporated in the work shall be stored in such a manner as to preserve their quality and fitness for the work and to facilitate inspection.

00700-65 PAYROLL REPORTS

The Contractor may be required to furnish payroll reports to the Construction Manager as required by the Owner Controlled Insurance Program.

00700-66 CONTRACTORS' REPRESENTATIVE

Before beginning work, the Contractor shall notify the Construction Manager in writing of one person within its organization who shall have complete authority to supervise the work, receive orders from the Construction Manager, and represent the Contractor in all matters arising pursuant to this agreement. The Contractor shall not remove its representative without first designating in writing a new representative. The Contractor's representative shall normally be present at or about the site of work while the work is in progress. When neither the Contractor nor its representative is present at the work site, the superintendent, foreman, or other of the Contractor' employee in charge of the work shall be an authorized representative of the Contractor.

00700-67 SPECIALTY SUB-CONTRACTORS

The Contractor may utilize the services of specialty subcontractors on those parts of the project which, under normal contracting practices, are performed by specialty subcontractors. The Contractor shall not award more than seventy-five percent of the work to subcontractors.

00700-68 INSPECTION BY THE CONSTRUCTION MANAGER

All work pursuant to this agreement shall be subject to inspection by the Construction Manager for conformity with contract drawings and specifications. The Contractor shall give the Construction Manager reasonable advance notice of operations requiring special inspection of a portion of the work.

00700-69 WORK COVERED PRIOR TO CONSTRUCTION MANAGER'S INSPECTION

In the event that work is covered or completed without the approval of the Construction Manager, and such approval is required by the specifications or required in advance by the Construction Manager, the Contractor shall bear all costs involved in inspection notwithstanding conformance of such portion of the work to the contract drawings and specifications.

00700-70 SCHEDULING OF THE WORK

The work of this contract shall be planned, scheduled, executed, and reported as required by the Contract Documents.

00700-71 PROGRESS ESTIMATES

The Contractor shall prepare a written report for the Construction Manager's approval, on County forms, of the total value of work performed and materials and equipment obtained to the date of submission. Such a report must accompany each request for a progress payment and is subject to review and approval by the Construction Manager.

Approval of a progress estimate or tendering of a progress payment shall not be considered an approval or acceptance of any work performed, and all estimates and payments shall be subject to correction in subsequent estimates. Progress payments shall be made for all completed activities and for materials suitably stored on-site.

00700-72 PROGRESS PAYMENTS

Upon approval of each monthly estimate of work performed and materials furnished, the Construction Manager shall approve payment to the Contractor for the estimated value of such work, materials, and equipment, less the amount of all prior payments and any liquidated damages. The Contractor will be paid 100 percent, less retainage, of the cost of materials received and properly stored on-site but not incorporated into the work. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale to establish the County's title to such materials or equipment. The Contractor's request for payment shall provide sufficient detail as to the work completed or materials purchased for which payment is requested to permit meaningful review by the Construction Manager.

00700-73 TIME OF PAYMENT

The Contractor will be paid within 45 days following receipt of an approved Progress Estimate. The Contractor expressly agrees that the payment provisions within this Contract shall supersede the rates of interest, payment periods, and contract and subcontract terms provided for under the Georgia Prompt Pay Act, O.C.G.A. §13-11-1 et seq., and that the rates of interest, payment periods, and contract and subcontract terms provided for under the Prompt Pay Act shall have no application to this Contract. The County shall not be liable for any late payment interest or penalty.

Submittal of Invoices: Invoices shall be submitted as follows:

Via Mail:
Fulton County Government
141 Pryor Street, SW
Suite 7001
Atlanta, Georgia 30303
Attn: Finance Department – Accounts Payable

OR

Via Email:
Email: Accounts.Payable@fultoncountyga.gov

At minimum, original invoices must reference all of the following information:

1) Vendor Information
    a. Vendor Name
    b. Vendor Address
    c. Vendor Code
    d. Vendor Contact Information
    e. Remittance Address

2) Invoice Details
    a. Invoice Date
    b. Invoice Number (uniquely numbered, no duplicates)

c. Purchase Order Reference Number
d. Date(s) of Services Performed
e. A written report of the total value of work performed and materials and equipment obtained to the date of submission

3) Fulton County Department Information (needed for invoice approval)
a. Department Name
b. Department Representative Name

00700-74 RETAINAGE

The County shall retain from each progress payment ten percent of the estimated value of the work performed until the progress payments, including retainage, total 50 percent of the contract price. If a contract includes two or more projects or assignments that have been separately priced and have separate budgets, and the performances of such projects or assignments are not related to or dependent upon the performance of any other, the 50 per cent limit shall be based upon the price for each individual project or assignment. Thereafter, no further retainage shall be withheld so long as the Contractor is making satisfactory progress to insure completion of the work within the time specified therefore. The County may reinstate the ten percent retainage in the event the Construction Manager determines that the Contractor is not making satisfactory progress to complete the work within the time specified in this agreement or in the event that the Construction Manager provides a specific cause for such withholding. The County may also withhold retainage upon substantial completion of the work as provided in O.C.G.A. §13-10-81(c). Interest may be paid upon the retainage in accordance with Georgia law.

00700-75 PAYMENT OF SUBCONTRACTORS

The Contractor shall promptly pay each subcontractor upon the receipt of payment from the County. Such payment shall be made from the amount paid to the Contractor pursuant to the subcontractor's work. The Contractor shall also maintain the records of the percentage retained from payments to the Contractor pursuant to such subcontractor's work. The Contractor shall procure agreements from each subcontractor requiring each subcontractor to pay their subcontractors, agents and employees in a similar manner. The County reserves the right to inquire of any subcontractor, supplier, materialmen, or subconsultant, the status of any indebtedness of the Contractor. The County further reserves the right to require the Contractor to designate on each instrument of payment exceeding $400.00 to subcontractors, suppliers, materialmen, and subconsultants that such payment is on account of the work under this Contract.

00700-76 COUNTY'S RESPONSIBILITIES TO SUBCONTRACTORS

Neither the County nor the Construction Manager shall have any obligation to pay any subcontractor except as otherwise required by law.

00700-77 PROGRESS PAYMENTS - ACCEPTANCE OF WORK

Certification of progress payments, as well as the actual payment thereof, shall not constitute the County’s acceptance of work performed pursuant to this agreement.

00700-78 PAYMENTS IN TRUST

All sums paid to the Contractor pursuant to this agreement are hereby declared to constitute trust funds in the hands of the contractor to be applied first to the payment of

claims of subcontractors, laborers, and suppliers arising out of the work, to claims for utilities furnished and taxes imposed, and to the payment of premiums on surety and other bonds and on insurance for any other application.

00700-79 JOINT PAYMENTS

The County reserves the right to issue any progress payment or final payment by check jointly to the Contractor and any subcontractor or supplier.

00700-80 RIGHT TO WITHHOLD PAYMENT

The Construction Manager may decline to approve payment and may withhold payment in whole or in part to the extent reasonable and necessary to protect the County against loss due to defective work, probable or actual third party claims, the Contractor's failure to pay subcontractors or materialmen, reasonable evidence that the work will not be completed within the contract time or contract price or damage to the County or any other contractor on the project.

00700-81 CERTIFICATE OF SUBSTANTIAL COMPLETION

Upon the Contractor's submission of a request for a certificate of Substantial Completion, the Construction Manager shall inspect the work and determine whether the work is Substantially Complete. If the work is Substantially Complete, the Construction Manager shall issue a certificate of Substantial Completion of the work which shall establish the date of Substantial Completion, shall state the responsibilities of the County and the Contractor for security, maintenance, heat, utilities, damage to the work and insurance, and shall fix the time within which the Contractor shall complete the items submitted by the Contractor as requiring correction or further work. The certificate of substantial completion of the work shall be submitted to the County and the Contractor for their written acceptance of the responsibilities assigned to them pursuant to such certificate.

If in the sole opinion of the Construction Manager, the work is not substantially complete, the Construction Manager shall notify the Contractor of such, in writing, and outline requirements to be met to achieve Substantial Completion.

00700-82 PAYMENT UPON SUBSTANTIAL COMPLETION

Upon Substantial Completion of the work and upon application by the Contractor and approval by the Construction Manager, the County shall make payment reflecting 100% work completed, less value of work remaining as determined by Construction Manager and any authorized retainage.

00700-83 COMMENCEMENT OF WARRANTIES

Warranties required by this agreement shall commence on the date of final completion of the project as determined under Article 00700-84 unless otherwise provided in the certificate of Substantial Completion.

00700-84 FINAL PAYMENT - WAIVER OF CLAIMS, DISPUTE OF FINAL PAYMENT

The acceptance of the Substantial Completion payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of application for payment at Substantial Completion and except for the retainage sums due at final acceptance. Following the Construction Manager’s issuance of the certificate of Substantial Completion and the Contractor's completion of the work pursuant to this agreement, the Contractor shall forward to the Construction Manager a written notice that the work is ready for final inspection and

acceptance. If after inspection the Construction Manager certifies that the work is complete and issues written notification of such to the Contractor, the Contractor shall forward to the Construction Manager a final application for payment. The Construction Manager shall issue a certificate for payment, which shall approve final payment to the Contractor and shall establish the date of final completion.

In the event the Contractor timely disputes the amount of the final payment, the amount due the Contractor shall be deemed by the Contractor and the County to be an unliquidated sum and no interest shall accrue or be payable on the sum finally determined to be due to the Contractor for any period prior to final determination of such sum, whether such determination be by agreement of the Contractor and the County or by final judgment of the proper court in the event of litigation between the County and the Contractor. The Contractor specifically waives and renounces any and all rights it may have under O.C.G.A. §13-6-13 and agrees that in the event suit is brought by the Contractor against the County for any sum claimed by the Contractor under the Contract or for any extra or additional work, no interest shall be awarded on any sum found to be due from the County to the Contractor in the final judgment entered in such suit. All final judgments shall draw interest at the legal rate, as specified by law.

00700-85 DOCUMENTATION OF COMPLETION OF WORK

Neither the final payment nor the remaining retainage shall become due until the Contractor submits the following documents to the Construction Manager:

a. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work have been paid other otherwise satisfied;

b. The surety's consent to final payment; and

c. Any other data reasonably required by the County or Construction Manager establishing payment or satisfaction of all such obligations, including releases, waivers of liens, and documents of satisfaction of debts.

In the event that a subcontractor refuses to furnish a release or waiver as required by the County or Construction Manager, the Contractor may furnish a bond satisfactory to the County to indemnify the County against such loss. In the event that any lien or indebtedness remains unsatisfied after all payments are made, the contractor shall refund to the County all moneys that the County may become compelled to pay in discharging such lien or other indebtedness, including all costs and reasonable attorney's fees.

00700-86 GOVERNING LAW

Each and every provision of this agreement shall be construed in accordance with and governed by Georgia law. The parties acknowledge that this contract is executed in Fulton County, Georgia and that the contract is to be performed in Fulton County, Georgia. Each party hereby consents to the Fulton Superior Court's sole jurisdiction over any dispute which arises as a result of the execution or performance of this agreement, and each party hereby waives any and all objections to venue in the Fulton Superior Court.

00700-87 CHANGES IN THE WORK

A. CHANGE ORDERS

1. A Change Order is a written order to the Contractor signed to show the approval and the authorization of the County, issued after execution of the Contract, authorizing a change in the Work and/or an adjustment in the Contract Sum or the Contract Time. Change Orders shall be written using forms designated by the County with Contractor providing supporting documentation as required by the Construction Manager. The Contract Sum and the Contract Time may be changed only by approved Change Order pursuant to Fulton County Procedure 800-6. The amount payable by the Change Order is payment in full for all direct and indirect costs incurred and related to the work under said Change Order, including but not limited to delays, imports, acceleration, disruption and extended overhead. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including the adjustment in either or both of the Contract Sum or the Contract Time.

2. The County, without invalidating the Contract, may order changes in the Work within the general scope of the Contract as defined herein. The time allowed for performance of the work and the contract price to be paid to the Contractor may be adjusted accordingly.

3. The cost or credit to the County resulting from a change in the Work shall be determined in one or more of the following ways:

   a. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

   b. By unit prices stated in the Contract Documents or subsequently agreed upon;

   c. By cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

   d. By the method provided in Subparagraph A4 below.

4. If none of the methods set forth in Subparagraphs 3a, 3b, or 3c above is agreed upon, the Contractor, provided a written order signed by the Construction Manager is received, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Construction Manager on basis of the reasonable expenditures and savings of those performing the Work attributable to the change. The cost of the change shall include only the items listed in Subparagraph 5a below, and in the case of either a decrease or an increase in the Contract Sum, an allowance for overhead and profit in accordance with the schedules set forth in Subparagraphs 5b and 6 below shall be applied to the cost or credit.

   a. In such case, and also under Subparagraph 3a above, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting of all actual costs expended, together with appropriate supporting data for inclusion in a Change Order.

b. All hourly rate charges shall be submitted to the Construction Manager for prior review and approval. All hourly rate charges shall be properly supported as required by the Construction Manager with certified payrolls, or their acceptable equivalent. When authorized to proceed for a given change and actual expenditures have been made prior to execution of a Change Order for the entire change, such actual expenditures may be summarized monthly, and if approved, incorporated into a Change Order. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase or decrease, if any, with respect to that change.

5. In Subparagraphs 3 and 4 above, the items included in "Cost and "Overhead" shall be based on the following schedule:

a. Unless otherwise provided in the Contract Documents, "Cost" shall be limited to the following: cost of materials incorporated into the Work, including sales tax and cost of delivery; cost of direct labor (labor cost may include a pro rata share of foreman's account of the change) including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; workers' or workmen's compensation insurance; rental value of equipment and machinery; costs for preparing Shop Drawings.

b. Unless otherwise provided in the Contract Documents, "Overhead" shall include the following: bond and insurance premiums including increase and decreases from change in the Work, supervision, superintendence, construction parking, wages of timekeepers, watchmen and clerks, small tools, consumable supplies, expendables, incidentals, general office expense, the cost of additional reproduction for the Contractor's subcontractors beyond that agreed upon in the Contract Documents, construction parking, any additional costs of craft supervision by the Contractor's or subcontractors' superintendents, and overhead charges which would be customary and expended regardless of the change in the Work due to other overlapping activities which are included as part of the original Contract, and all other expenses not included in "Cost" above.

c. In the event that a change is issued by the County which would require the expenditure of substantial amounts of special supervision (beyond the foreman level) by the Contractor, the Contractor may, at the sole direction of the Construction Manager, be allowed to incorporate these charges into the agreement cost for the change.

6. In Subparagraphs 3 and 4 above, the allowance for overhead and profit combined, included in the total cost or credit to the County, shall be based on the following schedule:

a. For the Contractor, for any work performed by the Contractor's own forces, <u>ten (10) percent</u> of the cost.

b. For the Contractor, for any work performed by a Contractor's subcontractor, five (5) percent of the amount due the subcontractor.

c. For each subcontractor or sub-subcontractor involved, for any work performed by that subcontractor's or sub-subcontractor's own forces, ten (10) percent of the cost.

d. For each subcontractor, for work performed by a sub-subcontractor, five (5) percent of the amount due to the sub-subcontractor.

e. Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 5 above unless modified otherwise.

7. In order to facilitate checking of quotations for extras or credits, all proposals or bids, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs, including labor cost, materials and subcontracts. Labor and materials shall be itemized in the manner defined in Subparagraph 4 above. Where major cost items are subcontracts, they shall be itemized also. <u>In no case shall a change be approved without such itemization</u>.

8. No payment shall be made for any changes to the contract that are not included in a fully executed Change Order.

B. CONCEALED, UNKNOWN AND DIFFERING CONDITIONS

1. Should concealed conditions be encountered in the performance of the Work below the surface of the ground, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or concealed or unknown conditions in an existing structure 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, be encountered, the Contract Sum and Contract Time shall be equitably adjusted by Change Order upon request by either party made **<u>within twenty (20) days after the first observance</u>** of the conditions. No such request for equitable adjustment shall be valid unless the Contractor complies with this (20) days' notice and Subparagraph C.1. below.

2. The Contractor shall promptly, and before such conditions are disturbed, notify the Construction Manager in writing of any claim of concealed, unknown or differing conditions pursuant to this paragraph. The Construction Manager shall authorize the Engineer to investigate the conditions, and if it is found that such conditions do materially so 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 recommended to the Construction Manager.

3. No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above, prior to disturbing the condition.

4. No claim by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this Contract.

5. Any materially differing site condition as between what is shown on the Drawings and Specifications and actually found on site shall be immediately reported to the Construction Manager in writing prior to the commencement of Work at the site. Failure of the Contractor to notify the Construction Manager in writing of the differing site condition prior to performance of Work at the site shall constitute a waiver of any claim for additional monies. Any Change Order necessitated by the differing site condition shall be processed as provided under "Changes in the Contract".

C. REQUESTS FOR ADDITIONAL COST

1. If the Contractor wishes to request an increase in the Contract Sum, the Contractor shall give the Construction Manager written notice thereof within twenty (20) days after the occurrence of the event, or identification of the conditions, giving rise to such request. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Article 00700-25 and Subparagraph A.4 above. No such request shall be valid unless so made within the twenty (20) days specified above. If the County and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Construction Manager. Any change in the Contract Sum resulting from such claim shall be documented by Change Order.

2. If the Contractor claims that addition cost is involved because of, but not limited to (1) any written interpretation pursuant to General Condition 00700-17 of this Agreement, (2) any order by the County to stop the Work pursuant to Articles 00700-25 and 00700-37 of this Agreement where the Contractor was not at fault, or any such order by the Construction Manager as the County's agent, or (3) any written order for a minor change in the Work issued pursuant to Paragraph D below, the Contractor shall submit a request for an increase in the Contract Sum as provided in Subparagraph C.1 above. No such claim shall be valid unless the Contractor complies with Subparagraph C.1 above and approved by the County pursuant to Change Order Policy 800-6.

D. MINOR CHANGES IN THE WORK

The Construction Manager may order minor changes in the Work not involving an adjustment in the Contract Price, extension of the time allowed for performance of the work and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by a written Change Directive issued by the Construction Manager, and shall be binding on the County and the Contractor. The Contractor shall carry out such written orders promptly.

E. BONDS

If any change order results in an increase in the contract price, the contractor shall increase the penal sum of the performance and payment bonds to equal the increased price.

00700-88 DISAGREEMENT WITH ORDERS FOR CHANGE

Contractor's written acceptance of a Change Order or other order for changes shall constitute his final and binding agreement to the provisions thereof and a waiver of all claims in connection therewith, whether direct or consequential in nature. Should Contractor disagree with any order for changes, he may submit a notice of potential claim to the Construction Manager, at such time as the order is set forth in the form of a Change Order. Disagreement with the provisions of an order for changes shall not relieve Contractor of his obligation under Article 00700-87 of this Agreement.

00700-89 NO WAIVER OF REMEDIES

Exercise by the County of any remedy is not exclusive of any other remedy available to County and shall not constitute a waiver of any such other remedies. Failure of the County to exercise any remedy, including breach of contract remedies, shall not preclude the County from exercising such remedies in similar circumstances in the future.

00700-90 LAND AND RIGHTS-OF-WAY

The owner will provide, as indicated in the Contract Documents and prior to Notice to Proceed, the lands upon which the work is to be done, right-of-way for access thereto, and such other lands which are designated for the use of the Contractor. The Contractor shall confine the Contractor's work and all associated activities to the easements and other areas designated for the Contractor's use. The Contractor shall comply with any limits on construction methods and practices which may be required by easement agreements. If, due to some unforeseen reason, the necessary easements are not obtained, the Contractor shall receive an equitable extension of contract time dependent upon the effect on the critical path of the project schedule or the County may terminate the Contract for its convenience.

00700-91 COORDINATION WITH STATE DEPARTMENT OF TRANSPORTATION

No clearing or grading shall be completed by Contractor within the State Department of Transportation (DOT) area under construction. The Contractor must coordinate his construction scheduling with DOT.

If the Contractor begins work before DOT's completion date, he must obtain the approval of DOT before starting work in the area. The state DOT has the right to stop the Contractor's work the DOT area.

The Contractor shall receive no additional compensation or damages resulting from delay or work stoppage from DOT actions or scheduling.

Contractor shall obtain DOT drawings of the DOT, project area for verification of road geometry, storm drains, etc. from Georgia Department of Transportation or Fulton County. The Contractor is responsible for obtaining any pertinent DOT revisions.

I N D E X

SUBJECT	GENERAL CONDITION ARTICLE #
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Codes	4
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EXHIBIT A

FINAL AFFIDAVIT

TO FULTON COUNTY, GEORGIA

I, _____, hereby certify that all suppliers of materials, equipment and service, subcontractors, mechanic, and laborers employed by _____ or any of his subcontractors in connection with the design and/or construction of _____ at Fulton County have been paid and satisfied in full as of _____, 20___, and that there are no outstanding obligations or claims of any kind for the payment of which Fulton County on the above-named project might be liable, or subject to, in any lawful proceeding at law or in equity.

_____
Signature

_____
Title

Personally appeared before me this _____ day of _____, 20_____. _____, who under Oath deposes and says that he is _____of the firm of _____, that he has read the above statement and that to the best of his knowledge and belief same is an exact true statement.

_____
Notary Public

_____
My Commission expires

END OF SECTION

SECTION 9

SPECIAL CONDITIONS

The overall Johns Creeks Reuse Main Project includes the construction and installation of approximately **29,300 Linear Feet** of new pipeline. The Project's activities are divided into three phases.

Phase one (1): includes the installation of **8,000 LF, 24 inches dia. D.I.P and 300 LF, 20 inches dia. D.I.P.,** which will enter the County Club of the South, through their Maintenance Entrance Road off Barnwell Road and to be connected to the existing 20 inches dia. Reuse Main stub – out on Old Alabama Road, as shown by the stations and limit on the Project's Construction/Bid Drawings.

Phase Two (2): includes the installation of **16,000LF, 24 inches dia. D.I.P,** which will be pumped from the Johns Creek Environmental Campus (JCEC) site, and to be connected into Phase One (1), as it enters into County Club of the South Maintenance Entrance Road off Barnwell Road, as shown by the stations and limit on Project's Construction/Bid Drawings.

Phase Three (3): includes the installation of **5,000 LF, 20 inches dia. D.I.P,** to be connected with the existing twenty (20) inches dia. Reuse Main near the intersection of the tributary and Chattahoochee River, and to be connected to the existing Reuse Main near Bell Road and Boles Road Round – a- bout, at Boles Road and Bell Road intersection, as shown by the stations and limit on Project's Construction/Bid Drawings.

After mobilization, in order to facilitate local public, private concerns, schools, minimizing existing roadway usage limitation and access, and construction activities, each phase construction, and installation work hours, including its duration can be adjusted and will be prioritized.

<u>Phases Construction Time Limitations, Conditions and Priority</u>:

- **Phase One (1):** complete construction activities and including associated project activities within **ten (10) weeks – a five (5) consecutive calendar days work week**; the contractor is responsible to provide applicable field staffing level; provide applicable documentation to support field staffing production level with their submittals, as part of the Instruction to Bidders. **Construction Starting - First Priority. This Phase Construction Completion time includes its milling and resurfacing of all disturbed paved surfaces, and the restoration of the construction site to its pre-construction site condition. The Phase beginning date will be established at the Project's Preconstruction Meeting.**
- **Phase Two (2):** includes completing the stream crossing construction activities at the existing bridge along Barnwell Road and its affected areas construction activities within **three (3) weeks** - **a five (5) consecutive calendar days work week**; contractor is responsible to provide applicable field staffing level; provide applicable documentation to support field staffing production level with their submittals, as part of the Instruction to Bidders; the stream crossing construction activities time schedule priority will be set, including any possible adjustment, at **Project's Preconstruction Meeting**. **Construction Starting - Third Priority.**

Phase beginning date will be established at the Project's Preconstruction Meeting.

- **Phase Three (3):** complete construction activities within **eight (8) weeks** – **a five (5) consecutive calendar days work week**; the contractor is responsible to provide applicable field staffing level; provide the applicable documentation to support field staffing production level with their submittals, as part of the Instruction to Bidders. **Note**: **1**. the Section between **Stations 8 +00 and 15 +00,** see Project Construction Drawings, will be scheduled as a priority for construction purpose, **its start date will be established at the Project's Preconstruction Meeting**. **Construction Starting** – **Second Priority**. **Phase beginning date will be established at the Project's Preconstruction Meeting.**

Note: 2.
Due to the location, and construction time limitation of each phase, section (s) of Phase Two (2) Construction can be schedule concurrently with Phase One (1) and/or Phase Three (3) . The Contractor is responsible to provide the applicable field staffing level.

The Contractor is responsible to field locate and verify Reuse Main low and high points locations, prior to their installation, (i.e. where Wash Out and Air Release Valves are shown on Project Drawing and their actual field locations).

STATEMENT OF BIDDER'S QUALIFICATIONS AND SAFETY RECORD FORM

STATEMENT OF BIDDER'S QUALIFICATIONS

This Statement is to accompany bids submitted for the following project:
16ITB110716K-DB; Johns Creek Reuse Main.

1. NAME OF BIDDER: _____

2. BUSINESS ADDRESS: _____

_____

3. TELEPHONE NUMBER: _____

4. OFFICIAL REPRESENTATIVE AND TITLE: _____

_____

5. Using the form provided at the end of this Section, list previously completed projects which are similar in scope and complexity to this project which were completed or assigned to your firm or joint venture, including: Name of project, location of project, owner's name, address and phone number, description of work performed, initial contract amount, final contract amount, start date, scheduled completion date and actual completion date. (If a joint venture, list separately for each joint venture partner.) Limit to 5.

   Contractors must have successfully completed at least two contracts involving construction of a 16-inch water or reuse water mains or larger with a length of not less than 5,000 linear feet and a construction value of not less than $2,500,000.00.

6. Provide the following information for the organization proposed for this project:

   a. Organizational chart.

   b. Indicate the participation by the various members in the organization, as shown on the organizational chart, in the management and in the division of work (If a joint venture, indicate percent of man hours and percent of project cost to be performed by each joint venture member).

7. Using the form provided at the end of this Section, provide information for the Project Manager and the Project Superintendent.

   a. Project Manager must have been project manager for duration of project and successfully completed at least two contracts involving construction of a 16-inch water or reuse water mains or larger with a length of not less than 5,000 linear feet and a construction value of not less than $2,500,000.00.

b. Project Superintendent must have successfully completed at least two contracts involving construction of a 16-inch water or reuse water mains or larger with a length of not less than 5,000 linear feet and a construction value of not less than $2,500,000.00.

8. The Contractor must have an established Safety Program. Complete the attached form entitled *"CONTRACTOR SAFETY RECORD FORM".*

9. The Contractor's Workman's Compensation Ratings (EMR-Experience Modification Rate)

Year	**Experience Modification Rate (EMR)**
Average:	

10. The Contractor's OSHA Incidence Rates. Note: the Industry Standard for Construction, published by the U.S. Department of Labor (2012) for Heavy and Civil Engineering Construction, all industries, list the Recordable Incidence Rate of 3.2 and the Days Away from Work Incidence Rate of 1.7, per OSHA definition and calculation, as the industry averages.

Year	**Total Recordable Incidents**	**Total Hours Worked**	**OSHA Incidence Rate***
Average			

Year	Total Days Away from Work Incidents	Total Hours Worked	OSHA Incidence Rate*
Average			

* Use your OSHA Form No. 200 and the formula:

(Total Incidents x 200,000 hours) ÷ (Number of hours worked) = Incidence Rate

11. If there have been any fatalities during the last five (5) years on any projects performed by the Contractor or on any work performed under the direct supervision of a proposed Project Manager and the Contractor or proposed Project Manager was cited by OSHA for "Willful", in performing the work in which the fatality occurred, the Contractor may be disqualified based on the County's review. The Contractor may also be disqualified in the event that a Recordable Incident occurred due to the same condition that existed when a previous fatality occurred and resulted in an OSHA citation for failure to implement a corrective action plan.

a. Fatalities during the last five years where Contractor was cited by OSHA for "Willful" Violation _____

b. Fatalities during the last five years where the proposed Project Manager was cited by OSHA for "Willful" Violation._____

The previous statements and attachments are true, correct, and complete to the best of my knowledge.

Date: _____

Firm Name: _____

By: _____

Title: _____

Sworn to and subscribed before me

this ____ day of _____ , 2016

Notary Public

CONTRACTOR SAFETY RECORD FORM

A. General Information

Name of Firm:	
Business Address:	
Telephone:	Fax:
Prepared by/Title:	Date prepared:

II. Experience Modification Rates

List your firm's Workers Compensation Experience Modification Rates (EMR) for the last three years.

Year	Experience Modification Rate (EMR)

III. OSHA Incidence Rates

A. List your firm's Occupational Safety Health Administration (OSHA) incidence rates for the last three years.

Year	Total Recordable Incidents	Total Hours Worked	OSHA Incidence Rate*

* Use your OSHA Form No. 200 and the formula:

(Total Incidents x 200,000 hours) ÷ (Number of hours worked) = Incidence Rate

B. Provide your incidence rates over the last three years for the following categories:

	Incidence Rate by Year*		
Category	**Year** _____	**Year** _____	**Year** _____
Fatalities			
Injuries and Illnesses with Lost Work Days			
Injuries and Illnesses with Restricted Work Days			

* Use your OSHA Form No. 200 and the formula:

(Total Incidents x 200,000 hours) ÷ (Number of hours worked) = Incidence Rate

C. Does your firm have any upheld OSHA citations in the past five years?

Yes ☐No ☐ (If yes, attach explanation)

IV. Safety Program Information

A. Do you have a written safety program?

Yes ☐No ☐ (If yes, attach outline)

B. Which of the following does your safety program contain:

1. Does your company require health and safety training of its subcontractors?

Yes ☐No ☐

2. Is documentation of health and safety training required?

Yes ☐No ☐

3. Do you have a Hazard Communication Program (29 CFR 1910.1200, CCR Title 8 Section 5194)?

Yes ☐No ☐

4. Do you have a Confined Space Entry and Rescue Program (29 CFR 1910.146, CCR Title 8 Section 5156-5159)?

Yes ☐No ☐ (If yes, attach explanation)

5. Do you have a "Hot Work" permit program (29 CFR 1910.146, CCR Title 8 5156-5159)?

Yes ☐No ☐ (If yes, attach explanation)

IV. Safety Program Information (cont'd)

B. Which of the following does your safety program contain (cont'd):

6. Do you have a "Lock-Out/Tag-Out" program (29 CFR 1910.417)?

Yes ☐ No ☐ (If yes, attach explanation)

C. Do you have an Equipment Maintenance Program for the following:

1. Miscellaneous construction tools and equipment? Yes ☐ No ☐

2. Ladders? Yes ☐ No ☐

3. Scaffolds? Yes ☐ No ☐

4. Heavy Equipment? Yes ☐ No ☐

5. Vehicles? Yes ☐ No ☐

D. Do you have a new employee safety orientation program?

Yes ☐ No ☐

1. If yes, does it include instruction in the following:

(a) Company Safety Policy Yes ☐ No ☐
(b) Company Safety Rules Yes ☐ No ☐
(c) Safety Meeting Attendance Yes ☐ No ☐
(d) Company Safety Record Yes ☐ No ☐
(e) Hazard Recognition Yes ☐ No ☐
(f) Hazard Reporting Yes ☐ No ☐
(g) Injury Reporting Yes ☐ No ☐
(h) Non-Injury Accident Reporting Yes ☐ No ☐
(i) Personal Protective Equipment Yes ☐ No ☐
(j) Respiratory Protection Yes ☐ No ☐
(k) Fire Protection Yes ☐ No ☐
(l) Housekeeping Yes ☐ No ☐
(m) Toxic Substance Yes ☐ No ☐
(n) Electrical Safety Yes ☐ No ☐
(o) Fall Protection Yes ☐ No ☐
(p) First-Aid/CPR Yes ☐ No ☐
(q) Driving Safety Yes ☐ No ☐
(r) Hearing Conservation Yes ☐ No ☐
(s) Lock-Out/Tag-Out Yes ☐ No ☐

(t) Bloodborne Pathogens Yes ☐ No ☐
(u) Asbestos Yes ☐ No ☐
(v) Confined Spaces Yes ☐ No ☐
(w) Hazard Communication Yes ☐ No ☐

IV. Safety Program Information (cont'd)

E. Do you conduct safety meetings for your employees? Yes ☐ No ☐

1. If yes, how often:

Daily ☐ Weekly ☐ Bi-weekly ☐ Monthly☐ As Needed ☐

F. Do you conduct health and safety audits of work in progress?

Yes ☐ No ☐

1. If yes, who conducts the audits?

_____

2. How often are the audits conducted?

_____

G. Do you notify all employees of accidents and precautions related to accidents and near misses?

Yes ☐No ☐

1. If yes, how is this notification accomplished?

(a) Safety meetings Yes ☐ No ☐
(b) Post notification in office Yes ☐ No ☐
(c) Post notification at the site where the incident occurred Yes ☐ No ☐
(d) Other _____

H. Is safety a criteria in evaluating the performance of:

1. Employees Yes ☐ No ☐
2. Supervisors Yes ☐ No ☐
3. Management Yes ☐ No ☐

I. Does your firm hold "tailgate" safety meetings? Yes ☐ No ☐

1. If yes, how often:

Daily ☐ Weekly ☐ Bi-weekly ☐ Monthly☐ As Needed ☐

J. Does your company have a drug and alcohol testing policy?

Yes ☐No ☐

K. Does your company require that subcontractors participate in a drug surveillance/testing program?

Yes ☐No ☐

L. Does your company have a method of disseminating safety information?

Yes ☐No ☐

STATEMENT OF BIDDER'S QUALIFICATIONS
COMPANY PROJECT EXPERIENCE
(Complete Form Only For Projects That Meet Minimum Criteria)

Project Name	
Project Location	
Contractor's Project Manager	
Contractor's Project Superintendent	
Owners Representative & Phone Number	
Design Engineer Representative Name & Phone Number	
Water or Reuse Water Length (feet)	
Initial Contract Amount	$
Final Contract Amount	$
Project Duration	Date Started: Date Completed: Time Extensions:
Was Project Completed on Time?	
Description of Major Project Components:	

STATEMENT OF BIDDER'S QUALIFICATIONS
PROJECT MANAGER'S EXPERIENCE
(Complete Form Only For Projects That Meet Minimum Criteria)

Project Name	
Project Location	
Contractor's Project Manager	
Owners Representative & Phone Number	
Design Engineer Representative Name & Phone Number	
Water or Reuse Water Length (feet)	
Initial Contract Amount	$
Final Contract Amount	$
Project Duration	Date Started: Date Completed: Time Extensions:
Was Project Completed on Time?	
Description of Major Project Components:	

STATEMENT OF BIDDER'S QUALIFICATIONS
PROJECT SUPERINTENDENT'S EXPERIENCE
(Complete Form Only For Projects That Meet Minimum Criteria)

Project Name	
Project Location	
Contractor's Project Superintendent	
Owners Representative & Phone Number	
Design Engineer Representative Name & Phone Number	
Water or Reuse Water Length (feet)	
Initial Contract Amount	$
Final Contract Amount	$
Project Duration	Date Started: Date Completed: Time Extensions:
Was Project Completed on Time?	
Description of Major Project Components:	

END OF SECTION

SECTION 10

EXHIBITS

Exhibit 1 Construction Drawings – Brown and Caldwell
Exhibit 2 Construction Drawings – Khafra Engineering, Inc.

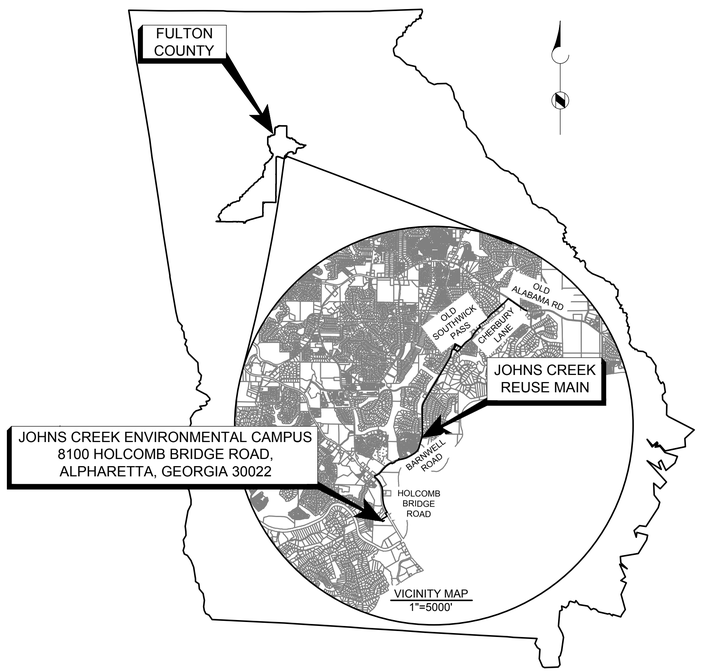
PERMIT SET
NOT FOR CONSTRUCTION

FULTON COUNTY

JOHNS CREEK REUSE MAIN

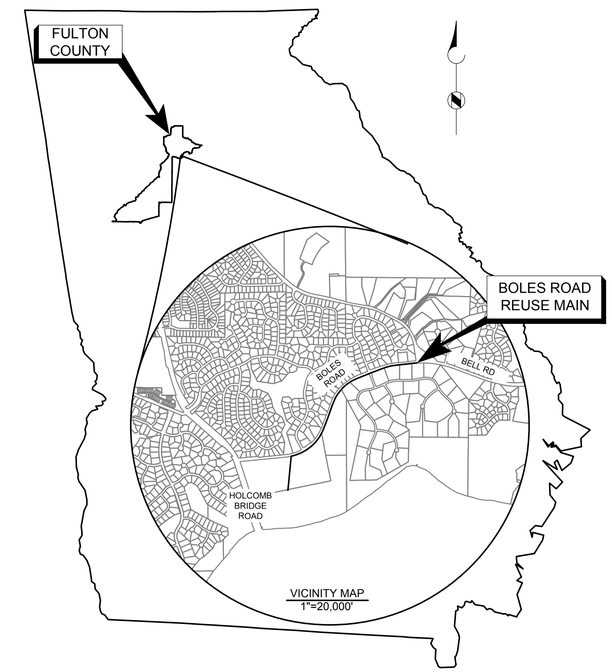
SEPTEMBER 2016

FCDWR PROJECT □15E-BC04



DISTRICT 1
SECTION 1, LAND LOTS: 20, 21, 22, 23, 27, 28, 2□, 63, 64, 70, 71
SECTION 2, LAND LOTS: 882, 883, 884, 885, 886, □32, □36
TOTAL DISTURBED AREA = □7 AC
TOTAL PROJECT AREA = 45.1 AC

PHASE 1 □ 2



DISTRICT 1
LAND LOTS: 3□0, F44, 3□1, 3□2, 411, 414
TOTAL DISTURBED AREA = 2.1 AC
TOTAL PROJECT AREA = 5.2 AC

PHASE 3

OWNER:
FULTON COUNTY
DIVISION OF WATER RESOURCES
141 PRYOR STREET
ATLANTA, GA 30303
CONTACT: EARL BURRELL
(404) 612-7462

PREPARED BY:

Brown AND Caldwell

Environmental Engineers and Consultants
□□0 Ha□□ond Dri□e, Suite 400, Atlanta, GA 30328
Phone: 770-3□4-2□□7 Fa□: 770-3□6-□4□5

BC PROJECT NO. 148787

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

COLOR CODES FOR UTILITY LOCATING
RED ELECTRIC
YELLOW GAS-OIL
ORANGE TELEPHONE-CATV
BLUE WATER
GREEN SEWER
IF YOU DIG GEORGIA CALL US FIRST: 811 It's The Law. Utilities Protection Center,Inc.

THREE WORKING DAYS BEFORE YOU DIG GEORGIA CALL
Utilities Protection Center,Inc.
811
It's The Law.

Se 28, 2016 - 11:54a□
\\ cal □01\ ro ects\Fulton\148787 - Reuse Water Line\ CAD\2-SHEETS\G-GENERAL\COVER.dwg

INDE□ OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE
GENERAL	
COVER	---
G-001	INDE□ OF DRAWINGS, LEGEND, AND SYMBOLS
G-002	FLOOD INSURANCE RATE MAPS
G-003	GENERAL NOTES
CIVIL	
C-001	CONSTRUCTION DETAILS
C-002	CONSTRUCTION DETAILS
C-003	CONSTRUCTION DETAILS
C-004	CONSTRUCTION DETAILS
C-005	CONSTRUCTION DETAILS
C-100	PHASE 1 KEY MAP
C-101	PHASE 1 REUSE MAIN PLAN / PROFILE
C-102	PHASE 1 REUSE MAIN PLAN / PROFILE
C-103	PHASE 1 REUSE MAIN PLAN / PROFILE
C-104	PHASE 1 REUSE MAIN PLAN / PROFILE
C-105	PHASE 1 REUSE MAIN PLAN / PROFILE
C-106	PHASE 1 REUSE MAIN PLAN / PROFILE
C-107	PHASE 1 REUSE MAIN PLAN / PROFILE
C-108	PHASE 1 DETAILED PLAN VIEWS
C-200	PHASE 2 KEY MAP
C-201	PHASE 2 REUSE MAIN PLAN / PROFILE
C-202	PHASE 2 REUSE MAIN PLAN / PROFILE
C-203	PHASE 2 REUSE MAIN PLAN / PROFILE
C-204	PHASE 2 REUSE MAIN PLAN / PROFILE
C-205	PHASE 2 REUSE MAIN PLAN / PROFILE
C-206	PHASE 2 REUSE MAIN PLAN / PROFILE
C-207	PHASE 2 REUSE MAIN PLAN / PROFILE
C-208	PHASE 2 REUSE MAIN PLAN / PROFILE
C-20□	PHASE 2 REUSE MAIM PLAN / PROFILE
C-210	PHASE 2 REUSE MAIN PLAN / PROFILE
C-211	PHASE 2 REUSE MAIN PLAN / PROFILE
C-212	PHASE 2 REUSE MAIN PLAN / PROFILE
C-213	PHASE 2 REUSE MAIN PLAN/PROFILE
C-300	PHASE 3 KEY MAP
C-301	PHASE 3 REUSE MAIN PLAN / PROFILE
C-302	PHASE 3 REUSE MAIN PLAN / PROFILE
C-303	PHASE 3 REUSE MAIN PLAN / PROFILE
C-304	PHASE 3 REUSE MAIN PLAN / PROFILE
C-305	PHASE 3 REUSE MAIN PLAN / PROFILE
EROSION SEDIMENT AND POLLUTION CONTROL	
EC-001	EROSION □ SEDIMENT CONTROL NOTES
EC-002	ES □ PC NOTES
EC-003	ES □ PC LEGEND AND SCHEDULE
EC-004	ES □ PC DETAILS (VEGETATIVE)
EC-005	ES □ PC DETAILS (STRUCTURAL)
EC-100	KEY PLAN PHASE I
EC-101	PHASE I ES □ PC PLAN
EC-102	PHASE I ES □ PC PLAN
EC-103	PHASE I ES □ PC PLAN
EC-104	PHASE I ES □ PC PLAN
EC-200	KEY PLAN PHASE II
EC-201	PHASE II ES □ PC PLAN
EC-202	PHASE II ES □ PC PLAN
EC-203	PHASE II ES □ PC PLAN
EC-204	PHASE II ES □ PC PLAN
EC-205	PHASE II ES □ PC PLAN
EC-206	PHASE II ES □ PC PLAN
EC-207	PHASE II ES □ PC PLAN
EC-300	KEY PLAN PHASE III
EC-301	PHASE III ES □ PC PLAN
EC-302	PHASE III ES □ PC PLAN
EC-303	PHASE III ES □ PC PLAN

INDE□ OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE
TRAFFIC CONTROL	
TC-001	TRAFFIC NOTES
TC-101	PHASE I OVERALL TRAFFIC MANAGEMENT PLAN SHEET 1 OF 2
TC-102	PHASE I OVERALL TRAFFIC MANAGEMENT PLAN SHEET 2 OF 2
TC-103	PHASE I TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 1 OF 2
TC-104	PHASE I TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 2 OF 2
TC-105	PHASE I TRAFFIC MANAGEMENT DETAIL STA. 142□00 TO STA. 146□50
TC-106	PHASE I TRAFFIC MANAGEMENT DETAIL STA. 146□50 TO STA. 14□□50
TC-201	PHASE II OVERALL TRAFFIC MANAGEMENT PLAN SHEET 1 OF 3
TC-202	PHASE II OVERALL TRAFFIC MANAGEMENT PLAN SHEET 2 OF 3
TC-203	PHASE II OVERALL TRAFFIC MANAGEMENT PLAN SHEET 3 OF 3
TC-204	PHASE II TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 1 OF 3
TC-205	PHASE II TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 2 OF 3
TC-206	PHASE II TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 3 OF 3
TC-207	PHASE II TRAFFIC MANAGEMENT DETAIL STA. 8□50 TO STA. 11□00
TC-301	PHASE III OVERALL TRAFFIC MANAGEMENT PLAN
TC-302	PHASE III TRAFFIC MANAGEMENT TYPICAL DETAILS
TC-303	PHASE III TRAFFIC MANAGEMENT DETAIL STA. 33□00 TO STA. 37□50

LEGEND

IPF = IRON PIN FOUND
IPS = IRON PIN SET (1/2"REBAR)
OT = OPEN TOP PIPE
CT = CRIMP TOP PIPE
CMF = CONCRETE MONUMENT FOUND
R/W = RIGHT OF WAY
P/L = PROPERTY LINE
C/L = CENTERLINE
LL = LAND LOT
LLL = LAND LOT LINE
N/F = NOW OR FORMERLY
DB = DEED BOOK
PB = PLAT BOOK
—X— = FENCE LINE
NTS = NOT TO SCALE
A = A□ALEA
B = BIRCH
BH = BEECH
BP = BRADFORD PEAR
C = CHERRY
CA = CRAB APPLE
CD = CEDAR
CM = CREPE MYRTLE
DW = DOGWOOD
E = ELM
FG = FIG
GRS = GRASSED AREA
GUBV = GROWN UP
H = HICKORY
HR = HEDGE ROW
HY = HOLLY
JM = JAPANESE MAPLE
L = LOCUST
LA = LANDSCAPED AREA
LY = LEYLAND CYPRESS
M = MULBERRY

MG = MAGNOLIA
MP = MAPLE
O = OAK
OR = ORNAMENTAL
P = PINE
PC = PECAN
PL = POPLAR
PO = POST OAK
PR = PEAR
RBH = RIVER BIRCH
RT = REDTOP
R□ = ROSE BUSH
SG = SWEETGUM
SH = SHRUB
SP = SPRUCE
SY = SYCAMORE
UHW = UNIDENTIFIED HARDWOOD
W = WILLOW
WL = WALNUT
WO = WATER OAK
WP = WHITE PINE
DWS = DETECTABLE WARNING SURFACE
PU = PLANT URN
—o— = SIGN
FOC = FIBER OPTIC CABLE
SSMH = SANITARY SEWER MANHOLE
—S— = SANITARY SEWER LINE
U.G. = UNDERGROUND
= TRAFFIC LIGHT
CP = CAMERA POLE
SP = TRAFFIC POLE
TSB = TRAFFIC SIGNAL BO□
Ⓔ = ELECTRIC MANHOLE
= MAIL BO□
E = ELECTRIC BO□
PIV = POST INDICATOR VALVE

= FIRE HYDRANT
WVM = WATER VALVE MONUMENT
WM = WATER METER
—W— = WATER LINE
WV = WATER VALVE
= STORMWATER LINE
CI = CURB INLET
DI = DRAIN INLET
JB = JUNCTION BO□
CMP = CORRUGATED METAL PIPE
RCP = REINFORCED CONCRETE PIPE
FES = FLARED END SECTION
CIP = CAST IRON PIPE
DIP = DUCTILE IRON PIPE
FFE = FINISHED FLOOR ELEVATION
D.E. = DRAINAGE EASEMENT
S.S.E. = SANITARY SEWER EASEMENT
Ⓒ = CABLE TV BO□
P.P. = POWER POLE
LP = LIGHT POLE
YL = YARD LIGHT
= GUY WIRE ANCHOR
TP = TELEPHONE POLE
TELE.MH Ⓣ = TELEPHONE MANHOLE
SB = SOUTHERN BELL (BELL SOUTH)
= TRANSFORMER
—P— = OVERHEAD POWER
—T— = OVERHEAD TELEPHONE
—P/T— = OVERHEAD POWER □ TELE
—UGP— = UNDERGROUND POWER
—UGT— = UNDERGROUND TELEPHONE
—UGC— = U.G. COMMUNICATIONS
—G— = UNDERGROUND GAS
TT T = TELEPHONE TERMINAL
TPD Ⓣ = TELEPHONE PEDESTAL

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
G-001.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT □ 15E-BC04

GENERAL

INDE□ OF DRAWINGS, LEGEND, AND SYMBOLS

DRAWING NUMBER
G-001

SHEET NUMBER
2 OF 77

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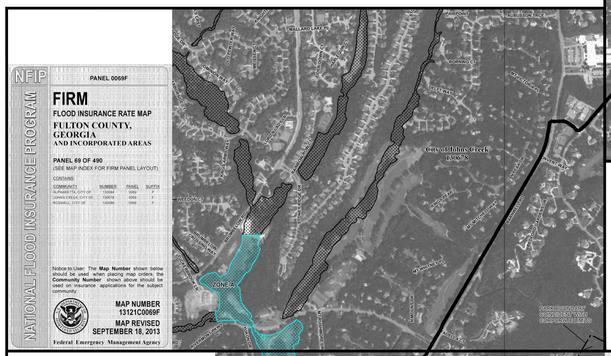
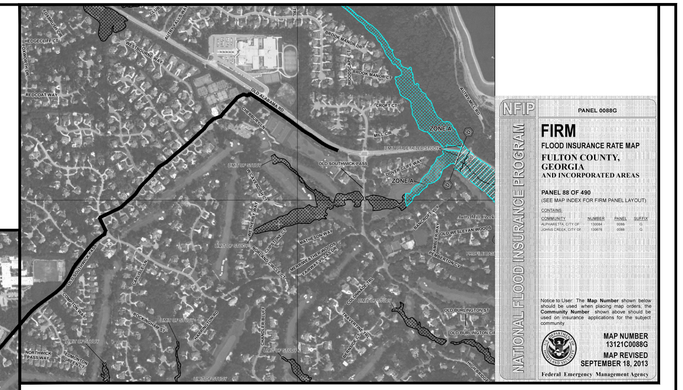
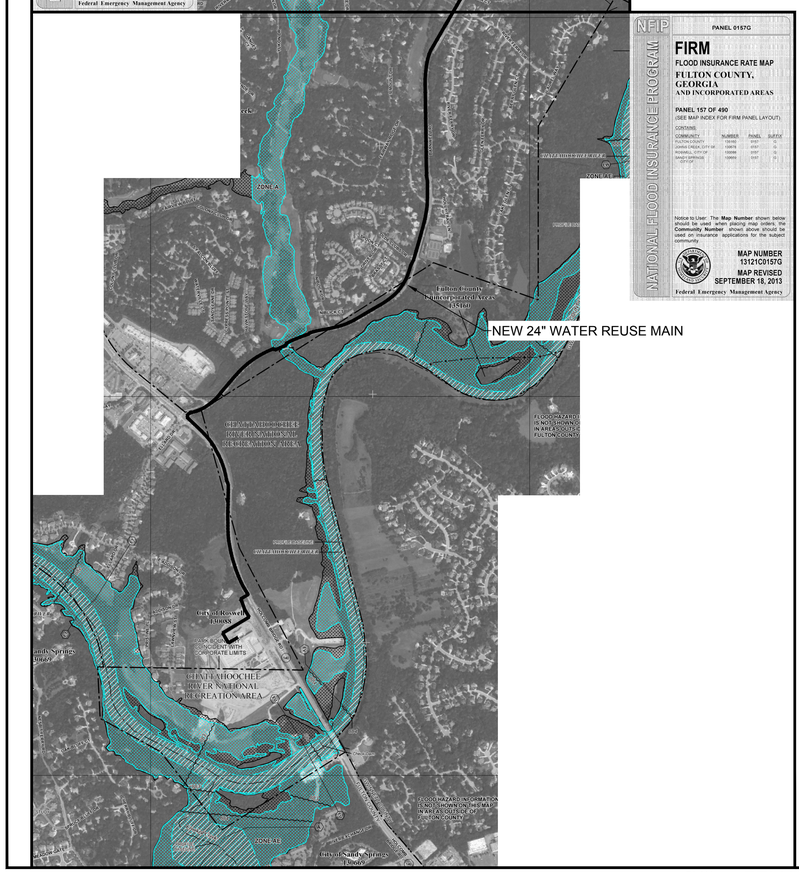
Fulton Logo w-na□e□g







PLAN NORTH

FEMA FLOOD MAPS - PHASES 1 2

SCALE: 1" = 1000'

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

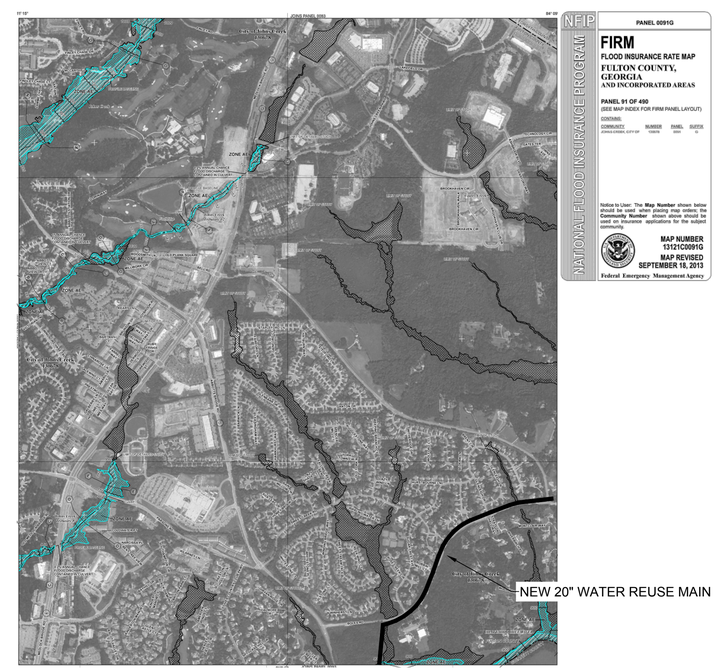
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
	Culvert
	Bridge
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Georgia State Plane West Zone (FIPS Zone 1002), Transverse Mercator projection
4489000m N	1000-meter Universal Transverse Mercator grid values, zone 16
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile
7NX1000 ♦	Junction – Points defining locations of flow accumulation or hydraulic connectivity. The letter designation is the Junction name and corresponds to the lettered cross-section in the Floodway Data Table in the Flood Insurance Study and on the Flood Profile exhibits.

MAP REPOSITORIES
Refer to Map Repositories list on Map Index
EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
June 22, 1998

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
June 18, 2010
September 18, 2013 - to add Special Flood Hazard Areas, to add Base Flood Elevations, to reflect updated topographic information and to add floodway.
For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



PLAN NORTH

FEMA FLOOD MAPS - PHASE 3

SCALE: 1" = 500'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER PE 038551 DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME G-002.DWG
BC PROJECT NUMBER 148787
CLIENT PROJECT NUMBER FCDWR PROJECT 15E-BC04

GENERAL

FLOOD INSURANCE RATE MAPS

DRAWING NUMBER
G-002

SHEET NUMBER
3 OF 77

Path: \\BCATLFP01\PROJECTS\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\G-GENERAL FILENAME: G-002.DWG PLOT DATE: /28/2016 11:56 AM CAD USER: JOHNATHAN JACKSON
Fulton Logo w-na e...g

GENERAL NOTES

1. OWNER: FULTON COUNTY DIVISION OF WATER RESOURCES
141 PRYOR STREET
ATLANTA, GA 30303
CONTACT: EARL BURRELL
PHONE: (404) 612-7462

2. ENGINEER: BROWN AND CALDWELL
□□0 HAMMOND DRIVE, SUITE 400
ATLANTA, GA 30328
CONTACT: DANIEL MURPHY
PHONE: (770) 673-3614

3. A PRECONSTRUCTION CONFERENCE MUST BE HELD WITH MEMBERS OF DWR AND THE CONTRACTOR OF RECORD BEFORE ANY WORK CAN BE DONE ON SITE. CONTRACTOR TO NOTIFY THE FULTON COUNTY PROJECT MANAGER 48 HOURS BEFORE THE BEGINNING OF EACH PHASE OF CONSTRUCTION.

4. ALL WORK SHALL COMPLY WITH THE SPECIFICATIONS AND THE FULTON COUNTY DWR REGULATIONS AND STANDARDS IN ADDITION TO APPLICABLE STATE, FEDERAL AND LOCAL CODES. ALL NECESSARY LICENSES AND PERMITS SHALL BE OBTAINED BY THE CONTRACTOR AT HIS OWN E□PENSE UNLESS PREVIOUSLY OBTAINED BY DWR.

5. CONTRACTOR SHALL IMMEDIATELY INFORM ENGINEER OF ANY DISCREPANCIES OR ERRORS THAT HE DISCOVERS IN THE PLANS.

6. DEVIATION FROM THESE PLANS WITHOUT THE PRIOR CONSENT OF DWR OR HIS REPRESENTATIVE OR THE ENGINEER MAY BE CAUSE FOR THE WORK TO BE UNACCEPTABLE.

7. SURVEY INFORMATION: TOPOGRAPHIC INFORMATION WAS TAKEN FROM A SURVEY BY MORELAND ALTOBELLI ASSOCIATES, INC., DATED JUNE 2, 2016. STATE PLANE COORDINATES AND ELEVATIONS ARE GEORGIA WEST □ONE NAD83/NAVD88 AS ESTABLISHED BY RTK METHODS USING A LEICA 1200 GPS UNIT CONNECTED TO A BASE STATION ON THE LEICA SMARTNET AND ARE BASED ON GEOID 2012A, USING AN AVERAGE OF TWO READINGS TAKEN 4 HOURS APART.

8. LOCATION OF LOT LINES, PROPERTY LINES, RIGHT-OF-WAY LINES, AND OTHER LAND DIVISION REFERENCES WERE OBTAINED FROM FULTON COUNTY GIS, FINAL PLATS, AND LAND USE OBSERVATIONS. THE LAND DIVISIONS WERE NOT FIELD CHECKED. THEREFORE, THEY MUST ONLY BE CONSIDERED TO APPRO□IMATELY REPRESENT THE ACTUAL LAND DIVISIONS, PROPERTY AND/OR EASEMENTS.

□. UTILITIES SHOWN HEREON ARE BASED ON UTILITY LOCATION MARKINGS, RECORD DRAWINGS AND ABOVE GROUND FIELD EVIDENCE. SI□E OF THE UTILITIES SHOWN ARE BASED ON RECORD INFORMATION. THERE MAY BE LATERALS OR SERVICE LINES THAT ARE NOT SHOWN.

10. GEOTECHNICAL INVESTIGATION BY □□□□□□□□□□□□. DATE: □□□□□□□□□□□□□.

11. E□ISTING UTILITIES, CONDUITS AND OTHER STRUCTURES SHOWN ON THESE DRAWINGS WERE TAKEN FROM AVAILABLE INFORMATION. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE HORI□ONTAL OR VERTICAL ACCURACY OF SAID UTILITIES OR THE POSSIBILITY THAT UNDERGROUND UTILITIES OTHER THAN THE ONES SHOWN MAY E□IST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE LOCATION AND SI□E OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR WHO SHALL BE RESPONSIBLE TO SUPPORT AND PROTECT ALL PIPES, CONDUITS, AND OTHER STRUCTURES WHICH MAY BE ENCOUNTERED DURING THE CONSTRUCTION OF WORK. ANY DAMAGES TO E□ISTING FACILITIES MUST BE REPAIRED WITHOUT DELAY AND THE COST OF SUCH REPAIRS SHALL BE PAID FOR BY THE CONTRACTOR.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ADJUSTMENT OR RELOCATION OF ALL E□ISTING UTILITIES. ALL COSTS AND/OR FEES RESULTING FROM UTILITY ADJUSTMENT OR RELOCATION SHALL BE PAID FOR BY THE CONTRACTOR.

13. IF THE CONTRACTOR DAMAGES ANY E□ISTING UTILITIES DURING CONSTRUCTION, HE SHALL, AT HIS OWN E□PENSE, HAVE REPLACED OR REPAIRED THE UTILITIES TO THEIR ORIGINAL OR BETTER CONDITION AND □UALITY, AS APPROVED BY THE REPRESENTATIVE OF THE APPROPRIATE UTILITY COMPANY.

14. CONTRACTOR IS TO MEET ALL LOCAL UTILITY COMPANY REGULATIONS IN ANY READJUSTMENT OR RELOCATION OF E□ISTING SERVICES.

15. FIBER OPTIC COMMUNICATIONS LINES E□IST WITHIN THE PROJECT AREA.

16. PIPELINE SHALL BE INSTALLED WITH A MINIMUM OF 5 FOOT OF COVER AND A MINIMUM OF TWO FEET BELOW THE PAVEMENT ELEVATION, UNLESS OTHERWISE SPECIFIED ON THE PLAN/PROFILE SHEETS.

17. WHEN CROSSING STORM SEWER LINES, A MINIMUM OF THREE FEET OF COVER SHALL BE MAINTAINED OR THE PIPELINE SHALL BE INSTALLED UNDER THE E□ISTING STORM LINE. CONTRACTOR SHALL MAINTAIN A MINIMUM OF SI□ INCHES OF VERTICAL SEPARATION FROM NEW PIPELINE AND STORM SEWER LINES.

18. THE METHOD OF INSTALLING THE PROPOSED PIPELINE ACROSS DRIVEWAYS SHALL BE DETERMINED BY THE CONTRACTOR. IN THE CASE OF OPEN CUT, THE CONTRACTOR SHALL REPLACE PAVED DRIVEWAYS FROM THE CURB TO THE NEAREST CONCRETE JOINT OR 10 FEET FROM THE EDGE OF THE TRENCH CUT AS RE□UIRED. ALTERNATELY, THE CONTRACTOR MAY INSTALL DRIVEWAY CROSSINGS VIA BORING AT THEIR OWN DISCRETION. THE COST FOR DRIVEWAY CROSSINGS SHALL BE INCLUDED IN THE UNIT PRICE FOR PIPE INSTALLATION.

1□. WHERE CONCRETE IS USED FOR BLOCKING, SUPPORTING, BACKFILLING, OR ANY APPLICATION WHERE IT MAY CONTACT PROPOSED OR E□ISTING FITTINGS OR VALVES THE FITTING OR VALVE SHALL BE WRAPPED IN POLYETHYLENE TO PREVENT BONDING.

20. CONTRACTOR SHALL ADJUST NEW PIPELINE LOCATION BASED ON FIELD CONDITIONS AND FIELD INSPECTOR RE□UIREMENTS.

21. THE NOTE IN THE TITLEBLOCK OF THE DRAWING WHICH READS "TWO INCHES AT FULL SCALE" APPEARS ON DRAWINGS FOR IDENTIFICATION OF SCALE DISTORTIONS ON HALF SI□E DRAWINGS AND DRAWING REPRODUCTIONS. IT SHALL MEAN THAT THE DRAWING IS FULL SI□E AND THE DRAWING SCALES ACCURATE WHEN THE LENGTH OF THIS LINE IS TWO INCHES. IF THE LENGTH IS OTHER THAN TWO INCHES, DRAWING SCALES MUST BE ADJUSTED ACCORDINGLY.

22. N/A

23. N/A

24. SEE ADDITIONAL GENERAL NOTES THROUGHOUT DRAWING SET.

25. CONTRACTOR TO NOTIFY THE UTILITY PROTECTION AGENCY 72 HOURS PRIOR TO START OF WORK. PHONE 811.

26. WHEN CONSTRUCTION INVOLVES THE REMOVAL OF FENCES, POLES, SIDEWALKS, DRIVES, TEMPORARY OR FI□ED STRUCTURES: THE CONTRACTOR AT HIS E□PENSE SHALL PROVIDE FOR TEMPORARY SERVICE OR CONTAINMENT TO THE AFFECTED PROPERTY, AND SHALL REPLACE SUCH ITEMS WITH SIMILAR OR BETTER MATERIALS AS SOON AS PRACTICAL FOLLOWING UTILITY INSTALLATION.

27. THE CONTRACTOR SHALL RESTORE OR HAVE RESTORED, AT HIS E□PENSE, ALL E□ISTING FACILITIES WHICH HAVE BEEN DAMAGED DUE TO HIS CONSTRUCTION ACTIVITIES, TO THE ORIGINAL OR BETTER CONDITION. THE CONTRACTOR SHALL UTILI□E THE SAME MATERIAL COMPOSITION AS E□ISTING TO REPLACE THE E□ISTING FACILITIES UNLESS APPROVED OTHERWISE BY THE OWNER.

28. WHEN CONSTRUCTION IS THROUGH A DEVELOPED AREA, ALL ORNAMENTAL PLANTINGS AND LANDSCAPING BUSHES, TERRACES, FENCES, ETC. SHALL BE PROTECTED AND/OR REMOVED AND REPLACED. ANY ORNAMENTAL PLANTINGS THAT HAVE BEEN DAMAGED OR DESTROYED DURING CONSTRUCTION SHALL BE REPLACED IN KIND BY THE CONTRACTOR AT HIS E□PENSE. TRANSPLANTED AND/OR REPLACED ITEMS SHALL BE GUARANTEED FOR ONE YEAR AFTER WORK IS COMPLETED.

2□. CLEANUP SHALL BE ACCOMPLISHED AT THE END OF EACH WORK DAY WITH ACCESS TO ALL FACILITIES FULLY RESTORED.

30. TYPE OF GRASS OR SOD USED WILL BE RE□UIRED TO MATCH THE DISTURBED TYPE OF GRASS OR SOD WHICH IS IN PLACE PRIOR TO CONSTRUCTION. NO SEPARATE PAYMENT SHALL BE MADE FOR ANY COST INCURRED TO COMPLY WITH THIS RE□UIREMENT.

31. THE CONTRACTOR SHALL MAINTAIN ALL BENCHMARKS, MONUMENTS AND OTHER REFERENCE MARKERS. THE CONTRACTOR SHALL RE-ESTABLISH ANY REFERENCE OR CONTROL POINT THAT IS DISTURBED OR DESTROYED.

32. THE CONTRACTOR SHALL ENSURE THAT POSITIVE AND ADE□UATE DRAINAGE IS MAINTAINED AT ALL TIMES WITHIN THE PROJECT LIMITS. THIS MAY INCLUDE, BUT NOT BE LIMITED TO, REPLACEMENT OR RECONSTRUCTION OF E□ISTING DRAINAGE STRUCTURES THAT HAVE BEEN DAMAGED OR REMOVED OR RE-GRADED AS RE□UIRED BY THE ENGINEER. E□CEPT FOR THOSE DRAINAGE ITEMS SHOWN AT SPECIFIC LOCATIONS IN THE PLANS AND HAVING SPECIFIC PAY ITEMS IN THE DETAILED ESTIMATE, NO SEPARATE PAYMENT WILL BE MADE FOR ANY COSTS INCURRED TO COMPLY WITH THIS RE□UIREMENT.

33. ALL SPOIL MATERIALS, REFUSE, AND DEBRIS SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED OF AT AN APPROPRIATE OFFSITE LOCATION BY CONTRACTOR. BURNING OF REFUSE, DEBRIS, OR SPOIL MATERIAL AT THE PROJECT SITE IS NOT ALLOWED.

34. ALL CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO PUBLIC RIGHTS-OF-WAYS AND AREAS SHOWN ON THE PLANS. IF ADDITIONAL CONSTRUCTION ACCESS OR STAGING AND STORAGE IS RE□UIRED BY THE CONTRACTOR, THE CONTRACTOR IS RESPONSIBLE FOR SUCH AT CONTRACTOR'S E□PENSE.

35. CLEANUP AND GRASSING SHALL FOLLOW A MA□IMUM OF 500 FEET BEHIND PIPE INSTALLATION. THE CONTRACTOR SHALL NOT HAVE MORE THAN 500 OF TRENCH OPEN AT ANY GIVEN TIME.

36. CONTRATOR SHALL PARK VEHICLES IN A SAFE MANNER AND SHALL NOT RESTRICT TRAFFIC FLOW OR SIGHT DISTANCE.

37. CONTRACTOR MUST COMPLY WITH LOCAL NOISE ORDINANCE THAT MAY RESTRICT THE HOURS OF CONSTRUCTION ACTIVITY, AS WELL AS THE ALLOWABLE NOISE LEVELS EMITTED FROM EACH PIECE OF E□UIPMENT. VEHICLES AND MACHINERY MUST BE EFFECTIVELY MUFFLED TO REDUCE NOISE.

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE. 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES
AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
G-003.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

GENERAL

GENERAL NOTES

DRAWING NUMBER
G-003

SHEET NUMBER
4 OF 77

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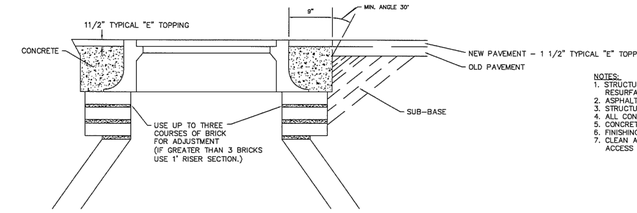
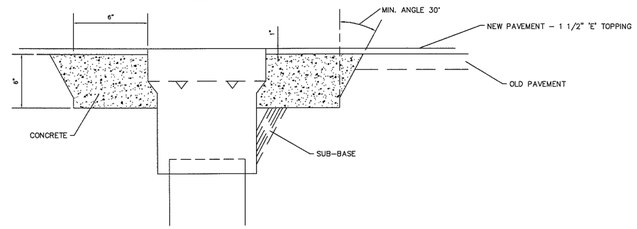


MANHOLE
N.T.S.



VALVE
N.T.S.

NOTES:
1. STRUCTURES SHALL NOT BE ADJUSTED FOR A PERIOD OF 24 HOURS AFTER RESURFACING IS COMPLETED IN THAT AREA.
2. ASPHALT SHALL BE SAWCUT TO MAKE A SMOOTH, EVEN EDGE.
3. STRUCTURE COVER SHALL BE ADJUSTED TO FIT FLUSH WITH STREET SURFACE.
4. ALL CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 PSI.
5. CONCRETE WILL BE USED TO BACKFILL THE ENTIRE WORKING AREA.
6. FINISHING CONCRETE SHALL BE DONE BY USE OF A TROWEL OR FLOAT.
7. CLEAN ALL ASPHALT OFF SEWER MANHOLES AT TIME OF PAVING TO ALLOW ACCESS TO SYSTEM AT ALL TIMES.

FULTON COUNTY STANDARD DETAIL 105
STRUCTURE ADJUSTMENT

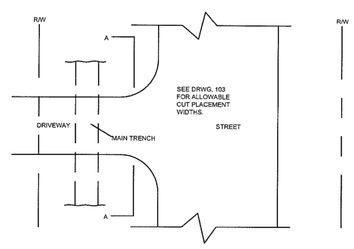
DATE	REVISIONS	DATE	REVISIONS

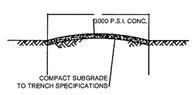
DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

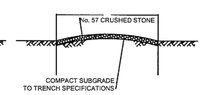
DRAWING NO. 105





CONCRETE
"A" - "A"

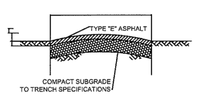
– FINISH SURFACE OF REPAIRED AREA TO MATCH EXISTING SURFACE. EDGES OF CUT TO BE SAWN VERTICAL. EXPANSION MATERIAL TO BE USED AS DIRECTED.



GRAVEL
"A" - "A"

NOTE:
1. FINISHED GRADE TO BE FLUSH WITH THE EDGE OF THE DRIVE - TYPICAL ALL DRIVES.

(SEE DRWG. 110 FOR STREET CUT REPAIRS)



ASPHALT
"A" - "A"

FULTON COUNTY STANDARD DETAIL 131
DRIVEWAY CUT REPAIRS CONCRETE, GRAVEL & ASPHALT

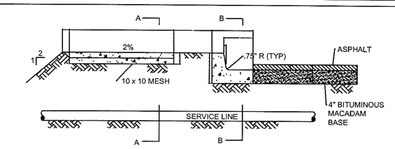
DATE	REVISIONS	DATE	REVISIONS

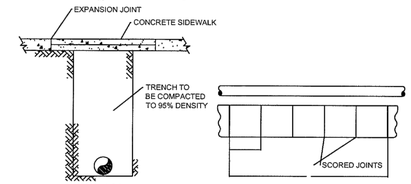
DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

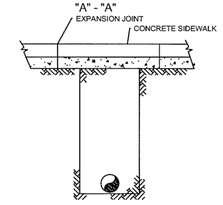
FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 131



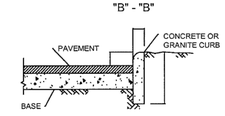


"A" - "A"



"B" - "B"

NOTES:
1. DETAILS ARE TYPICAL.
2. REPLACE SIDEWALKS, CURB AND GUTTER AND CURBING TO MATCH EXISTING MATERIALS AS DIRECTED.



FULTON COUNTY STANDARD DETAIL 134
SIDEWALK, CURB AND GUTTER REPAIRS

DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 134

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: D. MURPHY
DRAWN: C. STANFIELD
CHECKED: D. MURPHY
CHECKED: S. ADAMS
APPROVED: A. PANDYA

FILENAME
C-001.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT □ 15E-BC04

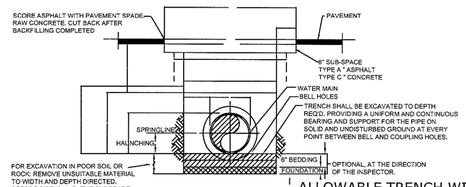
CIVIL

CONSTRUCTION DETAILS

DRAWING NUMBER
C-001

SHEET NUMBER
5 OF 77

Path: \\BCATLFP01\PROJECTS\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-001.DWG PLOT DATE: /28/2016 12:00 PM CAD USER: JOHNATHAN JACKSON
Fulton Logo w-na □ e □ g



NOTES:

1. COMPACTION: BACKFILLS SHALL BE BUILT-UP IN LAYERS AND EACH LAYER SHALL BE THOROUGHLY COMPACTED BEFORE BEGINNING ANOTHER LAYER. LAYERS SHALL BE NO MORE THAN 6" IN DEPTH. PUDDLING WILL NOT BE PERMITTED, NOR WILL FROZEN OR WET MATERIAL BE PLACED IN TRENCHES.
2. COMPACTION STANDARDS: ALL BACKFILL MATERIALS USED SHALL CONTAIN A SUFFICIENT AMOUNT OF MOISTURE FOR PROPER COMPACTION AND THESE MATERIALS SHALL BE COMPACTED AT NOT LESS THAN 95% OF THEIR OPTIMUM COMPACTION FOR ANY SPECIFIC SOIL CLASSIFICATION AS DETERMINED BY THE MODIFIED PROCTOR TEST A STM. D698
3. COMPACTION TESTS: COMPACTION TESTS MAY BE REQUIRED IN EXISTING OR PROPOSED STREETS, SIDEWALKS, DRIVES AND OTHER EXISTING OR PROPOSED PAVED AREAS AT VARYING DEPTHS AND AT INTERVALS AS DETERMINED BY THE ENGINEER WITH A MINIMUM OF ONE TEST PER JOB, AND A MAXIMUM OF ONE REQUIRED TEST FOR EACH 400' OR LESS OF WATER MAIN CONSTRUCTION, UNLESS SOIL CONDITIONS OR CONSTRUCTION PRACTICES, IN THE OPINION OF THE ENGINEER, WARRANT THE NEED FOR ADDITIONAL TESTS.
4. NO BOULDERS OR LOOSE ROCKS PERMITTED IN THE BACKFILL AT THE BOTTOM OF PIPE TRENCH TO 2'-0" ABOVE PIPE.
5. ALL DESIGNS BASED ON FULLY COMPACTED BACKFILL AND UNIFORMLY SUPPORTED PIPE.
7. FOR PAVEMENT CUT REPAIRS SEE DRAWING 109.

ALLOWABLE TRENCH WIDTHS

PIPE SIZE (NOM)	A SIDE CLEARANCE INCH		B DITCH WIDTH INCH				C SHORING WIDTH (ADDITIONAL-INCH)	D CUT REPAIR WIDTH FEET			
			SOIL		ROCK			SOIL		ROCK	
	SOIL	ROCK	MJ	SJ	MJ	SJ		MJ	SJ	MJ	SJ
3/4"-2"	2	6	NA	8	NA	14	AS APPROVED	NA	3.00	NA	3.17
4"	9	12	25	23	27	23	AS APPROVED	4.08	3.92	4.25	4.06
6"	9	12	28	28	30	30	AS APPROVED	4.33	4.33	4.50	4.50
8"	9	12	32	30	34	32	AS APPROVED	4.67	4.50	4.63	4.67
10"	9	12	34	32	36	34	AS APPROVED	4.83	4.67	5.00	4.83
12"	9	12	36	34	38	36	AS APPROVED	5.00	4.83	5.17	5.00
14"	9	14	39	36	41	38	AS APPROVED	5.23	5.00	5.42	5.17
16"	9	14	42	38	44	40	AS APPROVED	5.50	5.17	5.57	5.33
20"	9	14	45	44	47	46	AS APPROVED	5.75	5.67	5.92	5.63
24"	9	14	50	48	52	50	AS APPROVED	6.17	6.00	6.33	6.17
30"	9	18	58	54	60	56	AS APPROVED	6.83	6.50	7.00	6.67
36"	9	18	64	61	66	63	AS APPROVED	7.33	7.08	7.50	7.25
42"	9	18	72	64	74	66	AS APPROVED	8.00	7.33	8.17	7.50
48"	9	18	78	73	80	76	AS APPROVED	8.50	8.08	9.34	8.25

FULTON COUNTY STANDARD DETAIL 103
ALLOWABLE TRENCH WIDTHS

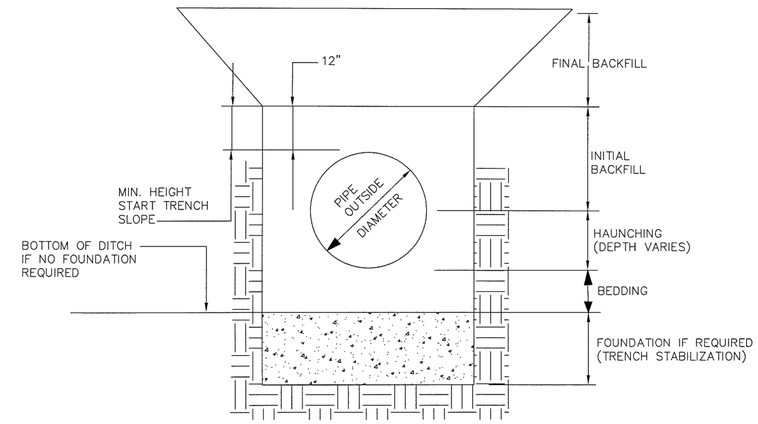
DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 103



NOTE: SEE DETAIL # 103 AND #109 FOR DIMENSIONS AND MATERIALS

FULTON COUNTY STANDARD DETAIL 108
TRENCH TERMINOLOGY

DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: JM
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
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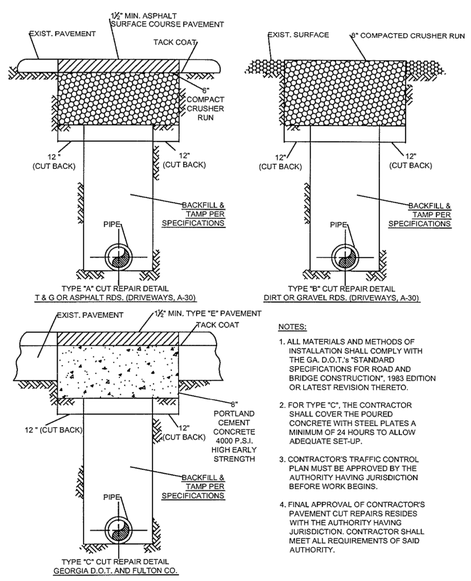
DRAWING NO. 108



NOTES:

1. ALL MATERIALS AND METHODS OF INSTALLATION SHALL COMPLY WITH THE GA. D.O.T.'s "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", 1983 EDITION OR LATEST REVISION THERETO.
2. FOR TYPE "C", THE CONTRACTOR SHALL COVER THE POURED CONCRETE WITH STEEL PLATES A MINIMUM OF 24 HOURS TO ALLOW ADEQUATE SET-UP.
3. CONTRACTOR'S TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE AUTHORITY HAVING JURISDICTION BEFORE WORK BEGINS.
4. FINAL APPROVAL OF CONTRACTOR'S PAVEMENT CUT REPAIRS RESIDES WITH THE AUTHORITY HAVING JURISDICTION. CONTRACTOR SHALL MEET ALL REQUIREMENTS OF SAID AUTHORITY.

FULTON COUNTY STANDARD DETAIL 109
PAVEMENT CUT REPAIRS
TYPE A, B & C

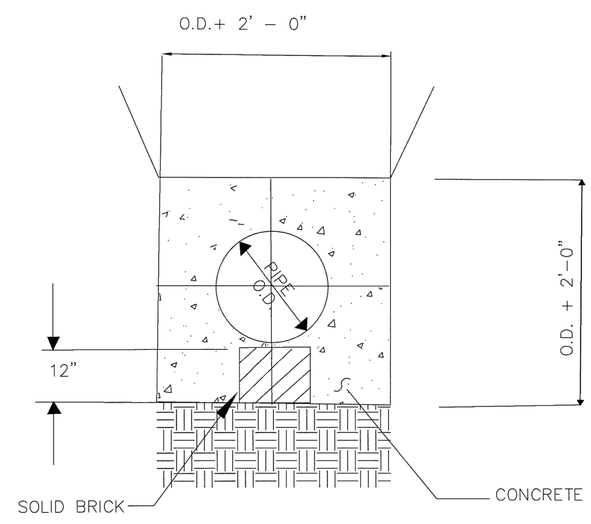
DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 109



FULTON COUNTY STANDARD DETAIL 110
CONCRETE ENCASEMENT

DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: JM
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 110

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME C-002.DWG
BC PROJECT NUMBER 148787
CLIENT PROJECT NUMBER FCDWR PROJECT □ 15E-BC04

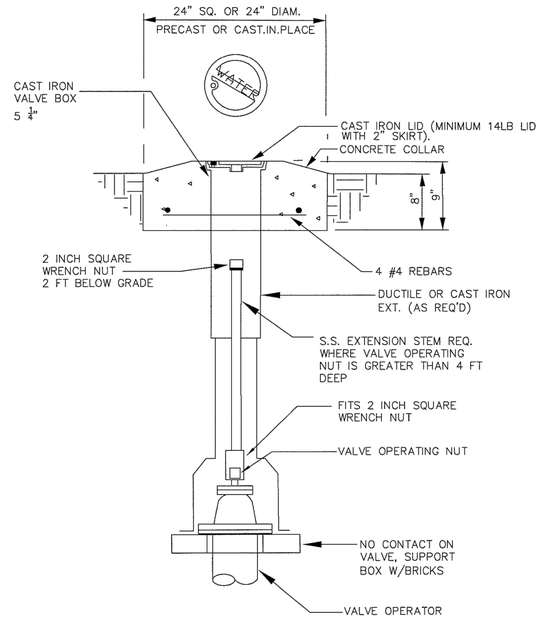
CIVIL

CONSTRUCTION DETAILS

DRAWING NUMBER
C-002

SHEET NUMBER
6 OF 77

Path: \\BCATLFP01\PROJECTS\FULTON\148787 - REUSE WATER LINE\.CAD\2-SHEETS\C-CIVIL FILENAME: C-002.DWG PLOT DATE: /28/2016 12:00 PM CAD USER: JOHNATHAN JACKSON
Fulton Logo w-ta □ e □ g



FULTON COUNTY STANDARD DETAIL 819
UNDERGROUND VALVE BOX

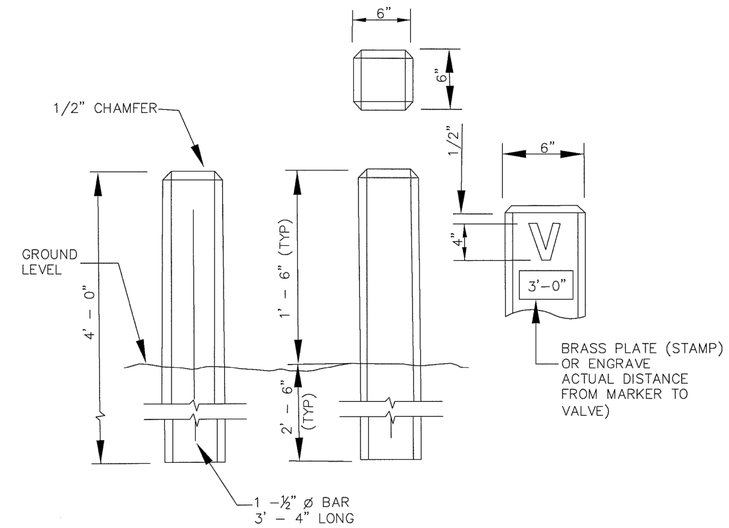
DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: REB
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 819



FULTON COUNTY STANDARD DETAIL 821
WATER VALVE MARKER

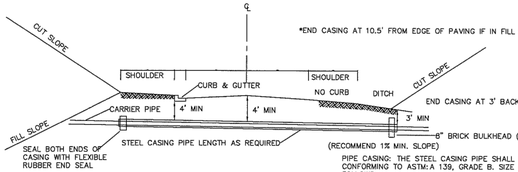
DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: REB
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 821



SECTION
N.T.S.

PIPE CASING: THE STEEL CASING PIPE SHALL BE MANUFACTURED FROM STEEL CONFORMING TO ASTM:A 139, GRADE B. SIZE AND THICKNESS SHALL BE AS FOLLOWS:

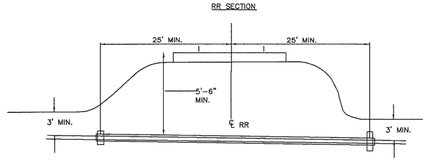
UNDER RAILROADS

PIPE DIAMETER INCHES (I.D)	CASING DIAMETER INCHES (I.D.) MIN.	WALL THICKNESS INCHES
6	14	0.250
8	18	0.375
10	20	0.375
12	22	0.375
14	24	0.375
16	30	0.406
18	30	0.406
20	32	0.469
24	36	0.469
30	42	0.500

BORING NOTES:

CASING TO BE STEEL PIPE (ROUND) WITH 45° BEVELED EDGES.
ALL CUTS TO BE SQUARED TO END.
JOIN ALL PIPE WITH DOUBLE BEAD BUTT WELDS.
AUGER HEAD DIAMETER CANNOT EXCEED DIAMETER OF CASING BY MORE THAN 2".
BORING AND CASING SHALL BE INSTALLED SIMULTANEOUSLY.
ANYTHING 6" OR LARGER REQUIRES BORE AND CASE.
CASING PIPE SHALL HAVE A PROTECTIVE COATING CONSISTING OF A COAL-TAR PRIMER COAT AND AN APPLICATION OF HOT COAL-TAR ENAMEL $\frac{1}{8}$" ($\pm\frac{1}{32}$") THICK PLUS A BONDED 15 LB. ASBESTOS WRAP.
PIT TO BE NO CLOSER THAN 4' BEHIND CURB OR EDGE OF PAVEMENT.
TYPICAL PIT IS 32' LONG BY 10' WIDE.
CASING SHALL BE MANUFACTURED FROM STEEL CONFORMING TO ASTM:A 139, GRADE B.
2 STAINLESS STEEL CASING SPACERS REQUIRED PER JOINT.
ALL BORING MUST BE APPROVED AND A PERMIT OBTAINED FROM PUBLIC WORKS (404) 730-7400.
CARRIER PIPE SHALL BE DUCTILE IRON.

RR SECTION



UNDER HIGHWAYS

PIPE DIAMETER INCHES (I.D)	CASING DIAMETER INCHES (I.D.) MIN.	WALL THICKNESS INCHES
6	12	0.250
8	16	0.250
10	18	0.250
12	20	0.375
16	24	0.375
18	30	0.375
20	30	0.375
24	36	0.375
30	42	0.375

FULTON COUNTY STANDARD DETAIL 107
ROADWAY CROSSING
BORE AND CASE DETAIL

DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

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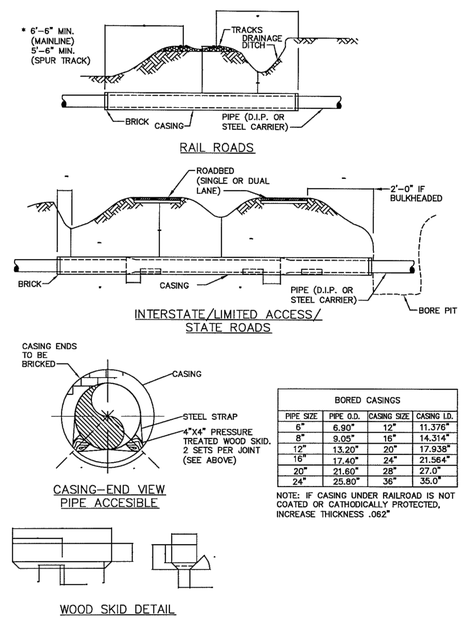
DRAWING NO. 107



BORED CASINGS

PIPE SIZE	PIPE O.D.	CASING SIZE	CASING I.D.
6"	6.90"	12"	11.376"
8"	9.05"	16"	14.314"
12"	13.20"	20"	17.938"
16"	17.40"	24"	21.564"
20"	21.60"	28"	27.0"
24"	25.80"	36"	35.0"

NOTE: IF CASING UNDER RAILROAD IS NOT COATED OR CATHODICALLY PROTECTED, INCREASE THICKNESS .062"

FULTON COUNTY STANDARD DETAIL 129
CASING/PIPE SUPPORT INSTALLATION

DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 129

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-003.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT □ 15E-BC04

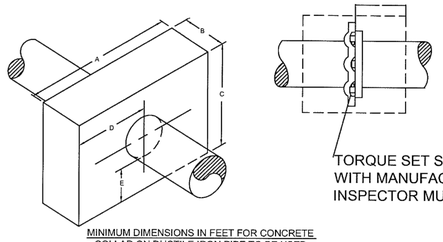
CIVIL

CONSTRUCTION DETAILS

DRAWING NUMBER
C-003

SHEET NUMBER
7 OF 77

Path: \\BCATLFP01\PROJECTS\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-003.DWG PLOT DATE: /28/2016 11:5 :AM CAD USER: JOHNATHAN JACKSON
Fulton Logo w=la : e : g



MINIMUM DIMENSIONS IN FEET FOR CONCRETE COLLAR ON DUCTILE IRON PIPE TO BE USED WITH EMBEDDED DUCTILE IRON RETAINER GLAND

PIPE SIZE	A	B	C	D	E	VOLUME CU. YDS.	CONC. WT.	THRUST
4"	3'-6"	3'-0"	1'-5"	1'-6"	1'-0"	0.55	2230	3150
6"	4'-0"	3'-0"	2'-7"	2'-0"	1'-0"	1.15	4650	7070
8"	4'-6"	3'-0"	3'-0"	2'-3"	1'-3"	1.50	6075	12,570
10"	5'-2"	3'-0"	3'-2"	2'-7"	1'-3"	1.81	7330	19,635
12"	5'-9"	3'-0"	3'-8"	2'-10½"	1'-8"	2.34	9475	28,775
14"	6'-6"	3'-0"	4'-0"	3'-3"	1'-9"	2.89	11,700	38,490
16"	6'-9"	3'-0"	4'-9"	3'-3"	2'-3"	3.56	14,410	50,270

NOTES:

1. ALL MAINS GREATER THAN 13" I.D. SHALL BE INDIVIDUALLY CALCULATED BY THE FULTON COUNTY ENGINEERING DEPARTMENT.
2. SOIL CONDITIONS SHALL BE VERIFIED BY THE ENGINEER BEFORE THRUST RESTRAINT DESIGN IS IMPLEMENTED.
3. PIPE MUST BE DUCTILE IRON.

DESIGN DATA:

1. DIMENSION OF THRUST RESTRAINT IN FEET BASED ON 2000 POUNDS PER SQUARE FOOT SOIL BEARING PRESSURE AND 230 PER SQUARE INCH TEST PRESSURE. ACTUAL INSIDE DIAMETER OF DUCTILE IRON PIPE, CLASS 31, USED AS STANDARD.
2. CONCRETE SHALL BE CLASS A, 3000 P.S.I.
3. UNDER ADVERSE CONTRUCTION CONDITIONS, CONCRETE SHALL BE "HIGH EARLY" TYPE.

FULTON COUNTY STANDARD DETAIL 125
THRUST RESTRAINT CONCRETE COLLAR

DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 125

	PIPE SIZE	ROD DIA.	NO. RODS	TOTAL THRUST (Lbs)
TEES, PLUGS & VALVES	6"	3/4"	2/3	5,655
	8"	3/4"	2/3	10,055
	10"	3/4"	3	15,710
	12"	3/4"	4	22,620
	14"	3/4"	6	30,800
	16"	3/4"	4	40,215
	20"	3/4"	6	62,835
	24"	3/4"	8	90,480
	30"	1"	6	141,375
	36"	1"	6	203,595
11¼° B	6"	3/4"	2	1,110
	8"	3/4"	2	1,970
	10"	3/4"	2	3,080
	12"	3/4"	2	4,435
	14"	3/4"	2	6,035
	16"	3/4"	2	7,885
	20"	3/4"	2	12,320
	24"	3/4"	2	17,740
	30"	1"	2	27,720
	36"	1"	2	39,910
22½° B	6"	3/4"	2	2,210
	8"	3/4"	2	3,925
	10"	3/4"	2	6,130
	12"	3/4"	2	8,825
	14"	3/4"	2	12,015
	16"	3/4"	2	15,690
	20"	3/4"	2	24,515
	24"	3/4"	2	35,305
	30"	1"	2	55,160
	36"	1"	2	79,435
45° B	6"	3/4"	2/3	4,430
	8"	3/4"	2/3	7,700
	10"	3/4"	2	12,025
	12"	3/4"	4	17,312
	14"	3/4"	4	23,565
	16"	3/4"	4	30,780
	20"	3/4"	4	48,090
	24"	3/4"	6	69,250
	30"	1"	4	108,205
	36"	1"	6	155,810
90°B	6"	3/4"	2/3	8,000
	8"	3/4"	3	14,220
	10"	3/4"	4	22,214
	12"	3/4"	6	32,000
	14"	3/4"	6	43,540
	16"	3/4"	4	56,870
	20"	3/4"	6	88,860
	24"	3/4"	8	127,960
	30"	1"	6	199,930
	36"	1"	6	287,900

NOTES:

1. ON PIPE SIZES 6"-14" ROD AND NUT WILL HAVE MIN. YIELD STRENGTH OF 50,000 PSI. ON PIPE SIZES 16"-24" ROD AND NUT WILL HAVE MIN. YIELD STRENGTH OF 100,000 PSI.
2. RODS HAVE 6" OF THREAD ON EACH END.
3. ALL METAL TO BE CLEANED AND COATED WITH AN APPROVED PROTECTIVE COATING FOLLOWING INSTALLATION AND PRIOR TO BACKFILLING. SEE NOTE 3, DRWG. 127.

FULTON COUNTY STANDARD DETAIL 126
THRUST RESTRAINTS: TIE ROD CHART

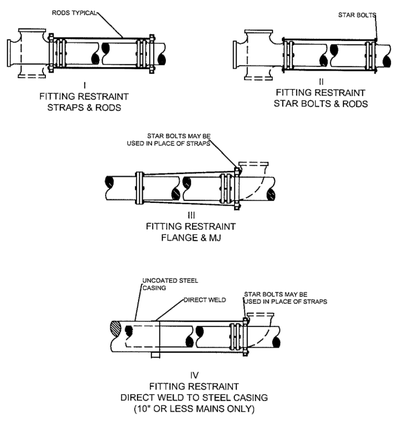
DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 126



NOTES:

1. SEE DWG. 126 FOR NUMBER AND DIAMETER OF RODS REQUIRED.
2. NO FLANGES ARE TO BE BURIED.
3. AFTER INSTALLATION, TIE-RODS AND CLAMP ASSEMBLIES SHALL BE CLEANED SND THOROUGHLY COATED WITH ROYSTON LABORATIORIES, INC. ROSKOTE PLASTIC NO. A 939 OR KOPPERS CO. , INC. BITUMASTIC SUPERSERVICE BLACK OR APPROVED EQUIVALENT.
4. WHEN RESTRAINING FITTINGS TO STEEL CASING PIPE, THE TIE-RODS MUST BE DIRECT WELDED TO THE CASING - USE OF STAR BOLTS PROHIBITED. CASING MUST BE FULLY WELDED THROUGHOUT ITS LENGTH AND BE A MINIMUM OF 30' IN LENGTH. AREA TO BE WELDED MUST BE COMPLETELY BARE AND FREE OF ANY COATING MATERIAL.

FULTON COUNTY STANDARD DETAIL 127
THRUST RESTRAINTS: TIE-ROD INSTALLATION

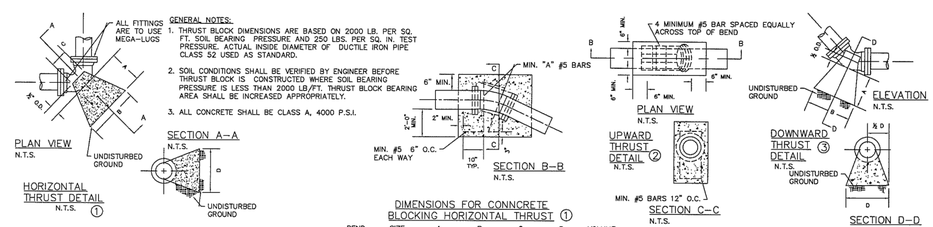
DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: CMS
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 127



GENERAL NOTES:

1. THRUST BLOCK DIMENSIONS ARE BASED ON 2000 LB. PER SQ. FT. SOIL BEARING PRESSURE AND 250 LBS. PER SQ. IN. TEST PRESSURE. ACTUAL INSIDE DIAMETER OF DUCTILE IRON PIPE CLASS 52 USED AS STANDARD.
2. SOIL CONDITIONS SHALL BE VERIFIED BY ENGINEER BEFORE THRUST BLOCK IS CONSTRUCTED WHERE SOIL BEARING PRESSURE IS LESS THAN 2000 LB/FT. THRUST BLOCK BEARING AREA SHALL BE INCREASED APPROPRIATELY.
3. ALL CONCRETE SHALL BE CLASS A, 4000 P.S.I.

DIMENSIONS FOR CONCRETE BLOCKING FOR BENDS-DOWNWARD THRUST

BEND	SIZE	A (FT)	B (FT)	C (IN)	D (FT)	VOLUME (CU. YD.)
11 ¼°	6"	1.0	2.0	7"	1.0	0.04
	8"	1.0	2.0	7"	1.0	0.05
	12"	1.0	2.0	11"	2.0	0.1
	16"	2.0	3.0	15"	2.0	0.3
	20"	2.0	3.0	19"	3.0	0.5
22 ½°	6"	1.0	2.0	7"	1.0	0.05
	8"	1.0	2.0	7"	2.0	0.1
	12"	2.0	3.0	11"	2.0	0.3
	16"	2.0	4.0	15"	3.0	0.6
	20"	3.0	5.0	19"	3.0	1.0
45°	6"	1.5	2.0	7"	1.5	0.11
	8"	2.0	3.0	7"	2.0	0.3
	12"	2.0	4.0	11"	3.0	0.7
	16"	3.0	5.0	15"	4.0	1.4
	20"	4.0	8.0	19"	5.0	2.8
90°	6"	1.75	2.5	7"	2.0	0.2
	8"	2.0	3.0	7"	3.0	0.4
	12"	4.0	6.0	11"	4.0	2.1
	16"	4.0	7.0	15"	5.0	3.1
	20"	5.0	8.0	19"	7.0	5.3

DIMENSIONS FOR CONNCRETE BLOCKING HORIZONTAL THRUST 1

BEND	SIZE	A (FT)	B (FT)	C (IN)	D (FT)	VOLUME (CU.YD.)
11 ¼°	6"	1.0	2.0	7"	1.0	0.04
	8"	1.0	2.0	7"	1.0	0.05
	12"	1.0	2.0	11"	2.0	0.1
	18"	2.0	3.0	15"	2.0	0.3
	20"	2.0	3.0	19"	3.0	0.5
22 ½°	6"	1.0	2.0	7"	1.0	0.05
	8"	1.0	2.0	7"	2.0	0.1
	12"	2.0	3.0	11"	2.0	0.3
	18"	2.0	4.0	15"	3.0	0.6
	20"	3.0	5.0	19"	3.0	1.0
45°	6"	1.5	2.0	7"	1.5	0.11
	8"	2.0	3.0	7"	2.0	0.3
	12"	2.0	4.0	11"	3.0	0.7
	18"	3.0	5.0	15"	4.0	1.4
	20"	4.0	6.0	19"	5.0	2.6
90°	6"	1.75	2.5	7"	2.0	0.2
	8"	2.0	3.0	7"	3.0	0.4
	12"	4.0	6.0	11"	4.0	2.1
	18"	4.0	7.0	15"	5.0	3.1
	20"	5.0	8.0	19"	7.0	5.3
TEE BRANCHES PLUGS & CAPS (FOR ALL CIRCUMSTANCES)	6"	1.5	2.0	7"	1.75	0.13
	8"	2.0	3.0	7"	2.0	0.3
	12"	2.0	4.0	11"	4.0	0.8
	18	3.0	5.0	15"	5.0	1.5
	20"	4.0	7.0	19"	6.0	3.9

CONCRETE REQUIRED TO RESIST UPWARD THRUST

BEND	SIZE	VOLUME (CU. YD.)	"A" NO. OF VERT. BARS REQ'D.
11 ¼°	6"	0.3	2
	8"	0.5	2
	12"	1.4	2
	16"	2.4	3
	20"	3.8	3
22 ½°	6"	0.7	2
	8"	1.2	2
	12"	2.7	2
	16"	4.8	3
	20"	7.4	3
45°	6"	1.2	2
	8"	2.2	2
	12"	4.9	2
	16"	8.8	3
	20"	13.7	3
90°	6"	1.8	2
	8"	3.1	2
	12"	7.0	3
	16"	12.4	3
	20"	19.4	4

FULTON COUNTY STANDARD DETAIL 132
STANDARD THRUST BLOCKS FOR WATER

DATE	REVISIONS	DATE	REVISIONS

DGS/DRN/CHKD: REB
APPROVED: REW
DATE: 12-2-05

FULTON COUNTY

FULTON COUNTY PUBLIC WORKS
141 PRYOR ST. ATLANTA, GA. 30303
404-730-7400 FAX: 404-224-0498

DRAWING NO. 132

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: D. MURPHY
DRAWN: C. STANFIELD
CHECKED: D. MURPHY
CHECKED: S. ADAMS
APPROVED: A. PANDYA

FILENAME C-004.DWG
BC PROJECT NUMBER 148787
CLIENT PROJECT NUMBER FCDWR PROJECT □ 15E-BC04

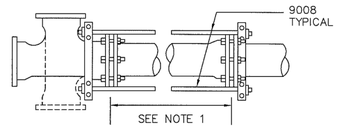
CIVIL

CONSTRUCTION DETAILS

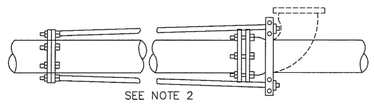
DRAWING NUMBER
C-004

SHEET NUMBER
8 OF 77

Path: \\BCATLFP01\PROJECTS\FULTON\148787 - REUSE WATER LINE\.CAD\2-SHEETS\C-CIVIL FILENAME: C-004.DWG PLOT DATE: /28/2016 11:5 :AM CAD USER: JOHNATHAN JACKSON
Fulton Logo w-ta : e : g



TEE ANCHOR
N.T.S.



PIPE OR BEND ANCHOR TO FLANGE SPIGOT
N.T.S.

NOTES:

1. IN THE ASSEMBLIES OF RODS AND CLAMPS SHOWN, RODS RUN FROM A LUG ON THE FITTING (OR A CLAMP BEHIND THE HUB OF A BELL) TO A CLAMP AGAINST THE FACE OF A BELL. NOTE THAT THIS ARRANGEMENT ANCHORS ONLY ONE JOINT. THE STABILITY OF THE JOINT WHERE THE CLAMP IS AGAINST THE FACE OF THE BELL DEPENDS ON HAVING SOIL ABOVE A RELATIVELY LONG PIECE OF PIPE ON BOTH SIDES OF THE JOINT. CONSEQUENTLY, IF THE DISTANCE BETWEEN THE FIRST AND SECOND JOINT IS LESS THAN 12 FEET, THE SECOND JOINT SHOWN SHALL BE ANCHORED BY A CLAMP BEHIND THE HUB OF THE BELL AND RODS TO A CLAMP AT THE FACE OF THE NEXT BELL.
2. IN THE ASSEMBLIES SHOWN FOR RODS TO FLANGED FITTINGS, NOTE THAT THE FLANGED FITTING IS NOT TO BE BURIED IN SOIL.
3. AFTER INSTALLATION TIE RODS AND CLAMP ASSEMBLY SHALL BE THOROUGHLY COVERED WITH ROYSTON LABORATORIES INC. ROSKOTE MASTIC NO. A-938 OR KOPPERS CO INC. BITUMASTIC SUPERSERVICE BLACK OR APPROVED EQUIVALENT.
4. RODS TO BE HIGH TENSILE, HOT ROLLED STEEL WITH TENSILE STRENGTH OF 150,000 P.S.I. AND A MINIMUM YIELD STRENGTH OF 130,000 P.S.I.

FULTON COUNTY STANDARD DETAIL 818 TYPICAL ANCHORS	DATE	REVISIONS	DATE	REVISIONS	DGS/DRN/CHKD: REB APPROVED: REW DATE: 12-2-05	FULTON COUNTY 141 PRYOR ST. ATLANTA, GA. 30303 404-730-7400 FAX: 404-224-0498	DRAWING NO. 818

ASSUMPTIONS FOR STANDARD LENGTHS

PIPE: DUCTILE IRON, AWWA C-151
SOIL: GC & SC, CLAYEY GRAVELS, CLAYEY SANDS, GRAVEL-SAND-CLAY MIXTURES, SAND-CLAY MIXTURES.
AVERAGE DEPTH OF BURY: 4 FT
TRENCH TYPE: 4
TEST PRESSURE: 250 PSI
SAFETY FACTOR: 1.5:1 (BASED ON TEST PRESSURE)

NOTES:

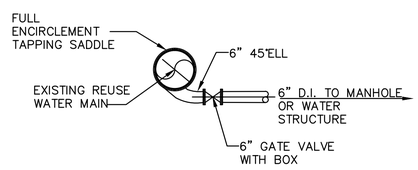
1. A FULL LENGTH OF PIPE ATTACHED TO EACH SIDE RUN OR BRANCH OUTLET SHALL BE INSTALLED, NO CUT OR PIECE OF PIPE SHALL BE USED.
2. WHERE FILL DIRT HAS BEEN ADDED TO SHOULDER, DEADMAN WILL BE INSTALLED 10 FT. FROM ANY BRANCH OUTLET OR END PIPE.
3. ALL JOINTS THAT FALL WITHIN THESE STANDARD LENGTH SHOULD BE RESTRAINED. (ON EACH SIDE OF BENDS ON THE BRANCH OUTLET OF TEES, AND BEFORE DEAD-ENDS).
4. STANDARD LENGTHS SHALL BE MODIFIED IF ACTUAL CONDITIONS DO NOT MEET MINIMUM REQUIREMENTS IN "ASSUMPTIONS FOR STANDARD LENGTHS".

RECOMMENDED RESTRAINED LENGTHS OF DUCTILE IRON PIPE

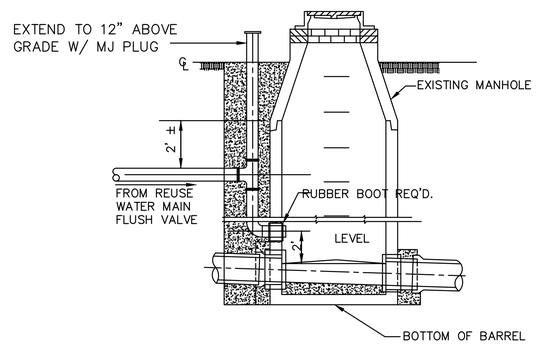
NOM. PIPE SIZE (IN)	90 DEG. BEND	45 DEG. BEND	22.5 DEG. BEND	11.25 DEG. BEND	SIZE ON SIZE TEE*	VALVE/ DEAD-END
6	19 FT	8 FT	4 FT	2 FT	3 FT	35 FT
8	25 FT	11 FT	5 FT	3 FT	13 FT	46 FT
10	30 FT	13 FT	6 FT	3 FT	23 FT	56 FT
12	36 FT	15 FT	7 FT	4 FT	34 FT	67 FT
14	41 FT	17 FT	8 FT	4 FT	43 FT	77 FT
16	46 FT	19 FT	9 FT	5 FT	53 FT	87 FT
18	51 FT	21 FT	10 FT	5 FT	63 FT	96 FT
20	56 FT	23 FT	11 FT	6 FT	72 FT	106 FT
24	65 FT	27 FT	13 FT	7 FT	91 FT	126 FT

*RECOMMENDED RESTRAINED LENGTHS FOR TEES ARE FOR THE BRANCH OUTLET AND ASSUME A MINIMUM 10 FT. SECTION OF PIPE ATTACHED TO EACH SIDE OF THE RUN. RESTRAINT DEVICES SHOULD ALSO BE INSTALLED ON BOTH RUN JOINTS OF THE TEE ITSELF.

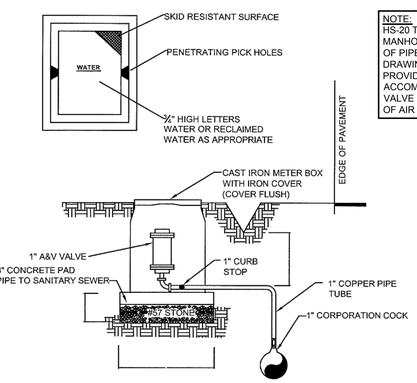
FULTON COUNTY STANDARD DETAIL 823 RESTRAINED JOINT PIPE STANDARD LENGTHS	DATE	REVISIONS	DATE	REVISIONS	DGS/DRN/CHKD: REB APPROVED: REW DATE: 12-2-05	FULTON COUNTY 141 PRYOR ST. ATLANTA, GA. 30303 404-730-7400 FAX: 404-224-0498	DRAWING NO. 823



REUSE TAP AND VALVE DETAIL



FULTON COUNTY STANDARD DETAIL 613 IN LINE FLUSH POINT DETAIL	DATE 8/08	REVISIONS NRR	DATE	REVISIONS	DGS/DRN/CHKD: CMS APPROVED: ML DATE: 12-2-05	FULTON COUNTY 141 PRYOR ST. ATLANTA, GA. 30303 404-612-7400 FAX: 404-224-0498	DRAWING NO. 613



NOTE:
HS-20 TRAFFIC RATED 6' DIAMETER MANHOLE SHALL BE PLACED ON TOP OF PIPELINE WHERE INDICATED ON DRAWINGS. CONTRACTOR SHALL PROVIDE MANHOLE DEPTH TO ACCOMMODATE FOR AIR RELEASE VALVE (12" MIN. CLEARANCE FROM TOP OF AIR RELEASE VALVE).

NOTES:

1. VALVE MARKER REQUIRED.
2. A&V VALVE AND COPPER SHALL BE SIZED IN ACCORDANCE WITH VALVE MANUFACTURER'S RECOMMENDATIONS.
3. METER BOX SHALL BE CDR 10 X 15HC OR APPROVED EQUAL
4. A & V VALVE SHALL BE VENT-O-MAT SERIES RBX OR EQUAL

FULTON COUNTY STANDARD DETAIL 817 A & V RELEASE VALVE ASSEMBLY 1" OR 2"	DATE	REVISIONS	DATE	REVISIONS	DGS/DRN/CHKD: CMS APPROVED: REW DATE: 12-2-05	FULTON COUNTY 141 PRYOR ST. ATLANTA, GA. 30303 404-730-7400 FAX: 404-224-0498	DRAWING NO. 817

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES
AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-005.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

CONSTRUCTION
DETAILS

DRAWING NUMBER
C-005

SHEET NUMBER
OF 77

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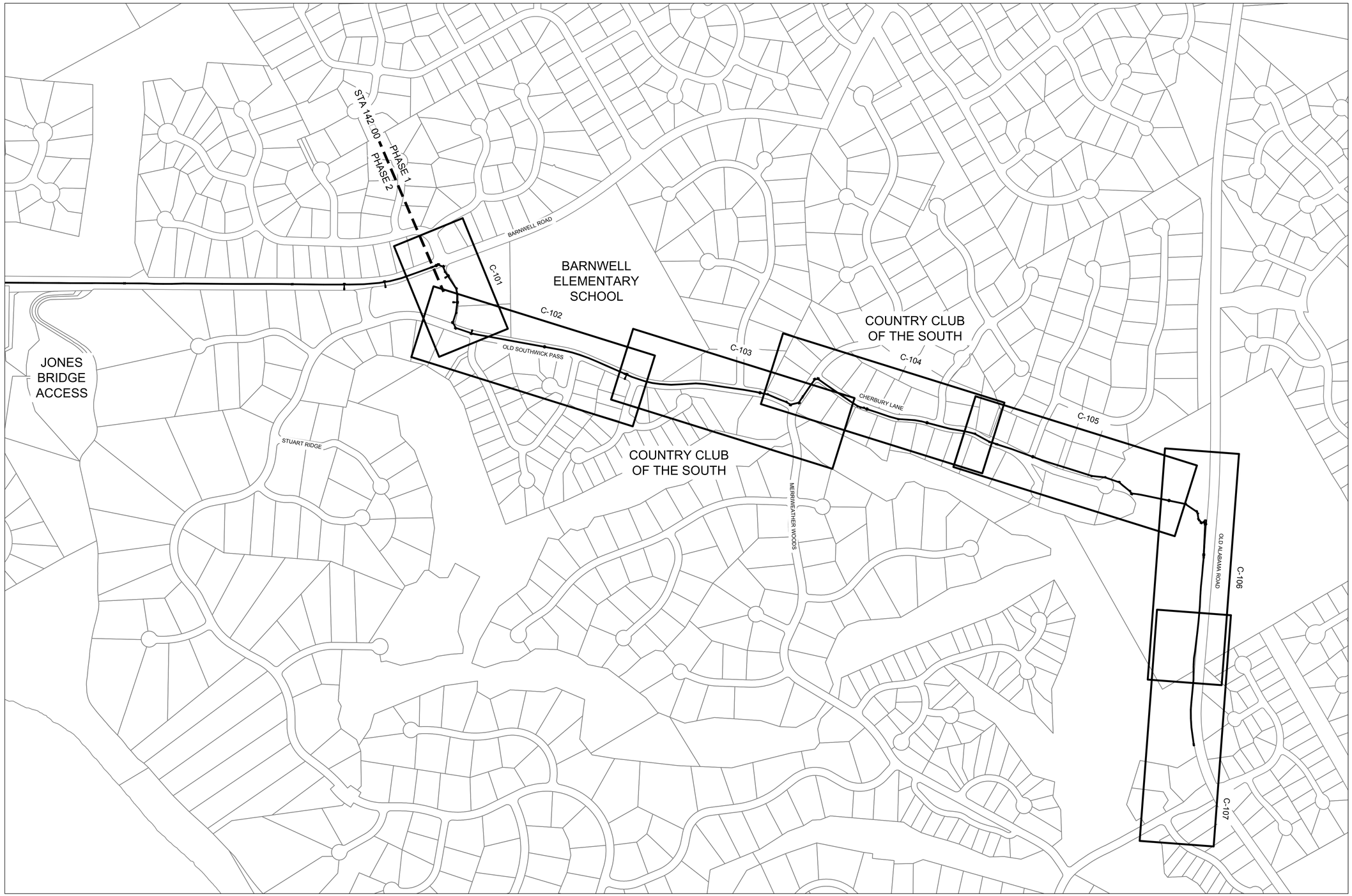

REUSE MAIN KEY MAP

SCALE: 1" = 300'

NORTH ARROW

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BROWN-CALDWELL.DWG

Brown AND Caldwell

990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE. 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES
AT FULL SI E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

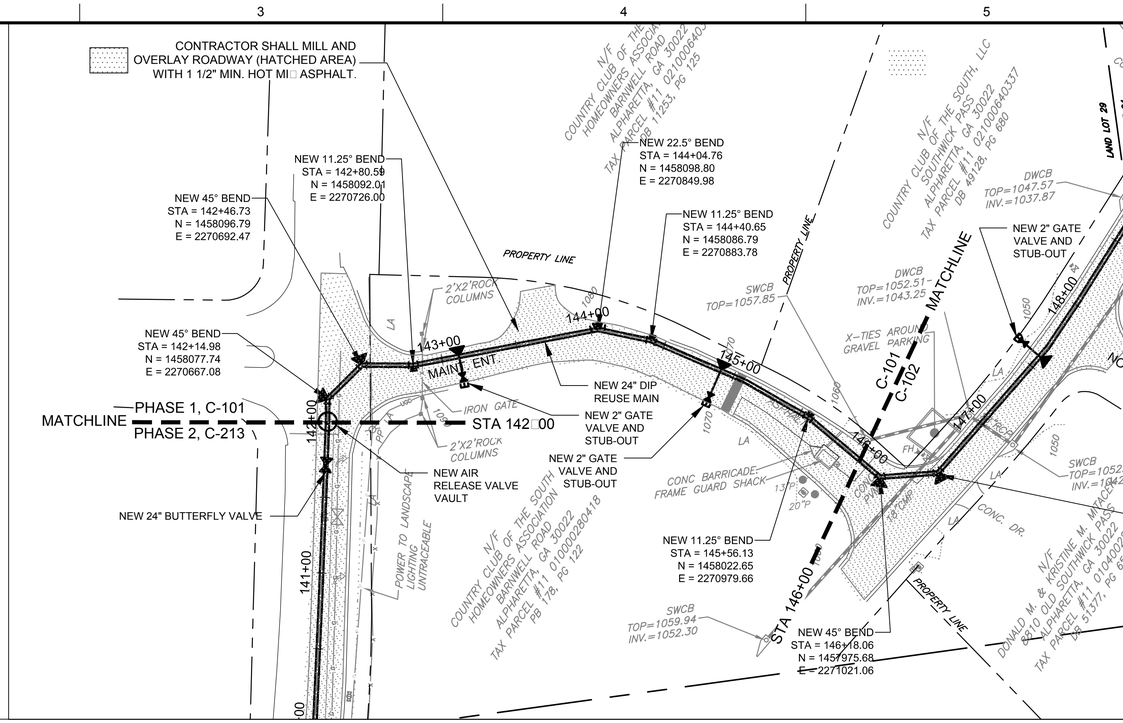
CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

PHASE 1
KEY MAP

DRAWING NUMBER
C-100

SHEET NUMBER
10 OF 77



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NORTH ARROW

NOTE:
SEE SHEET C-108 FOR ADDITIONAL DETAILS.

NOTES:

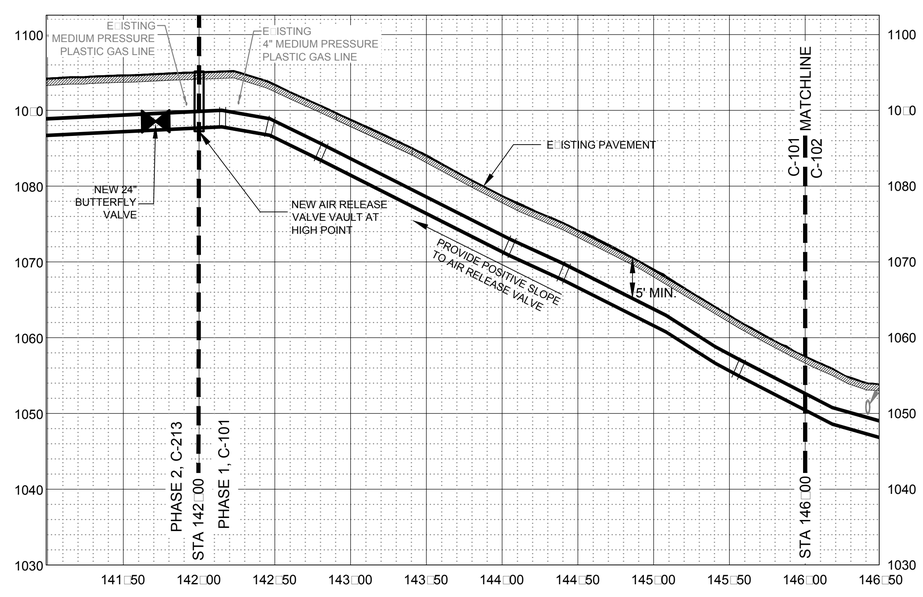
1. MULTIPLE WATER SERVICE LINES, GAS SERVICE LINES AND OTHER UTILITIES ALONG THE ROUTE, ALL OF WHICH MAY NOT BE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING UTILITY SERVICES TO CUSTOMERS ALONG THE ROUTE, INCLUDING THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED SERVICES AS SOON AS POSSIBLE.
2. EXISTING UTILITIES ARE SHOWN AS APPROXIMATE ON PLAN AND PROFILE VIEWS. CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES.
3. DUCTILE IRON PIPE SHALL BE WRAPPED WITH POLYETHYLENE PIPE WRAP IN PHASE 1 FROM STA 146+50 TO EXISTING TIE-IN, IN PHASE 2 FROM STA. 6+00 TO STA. 37+00, AND WHERE WITHIN 10 FEET OF AN EXISTING STEEL GAS LINE.
4. THE TOP 60% OF THE NEW REUSE MAIN TO BE PAINTED PURPLE FOR THE ENTIRE LENGTH OF PIPE PER THE SPECIFICATIONS.

COLOR CODES FOR UTILITY LOCATING
RED — ELECTRIC
YELLOW — GAS-OIL
ORANGE — TELEPHONE/CATV
BLUE — WATER
GREEN — SEWER
IF YOU DIG GEORGIA CALL US FIRST.
811 It's The Law.
Utilities Protection Center,Inc.

THREE WORKING DAYS BEFORE YOU DIG GEORGIA CALL
Utilities Protection Center,Inc.
811 It's The Law.

PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 1
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-101

SHEET NUMBER
11 OF 77

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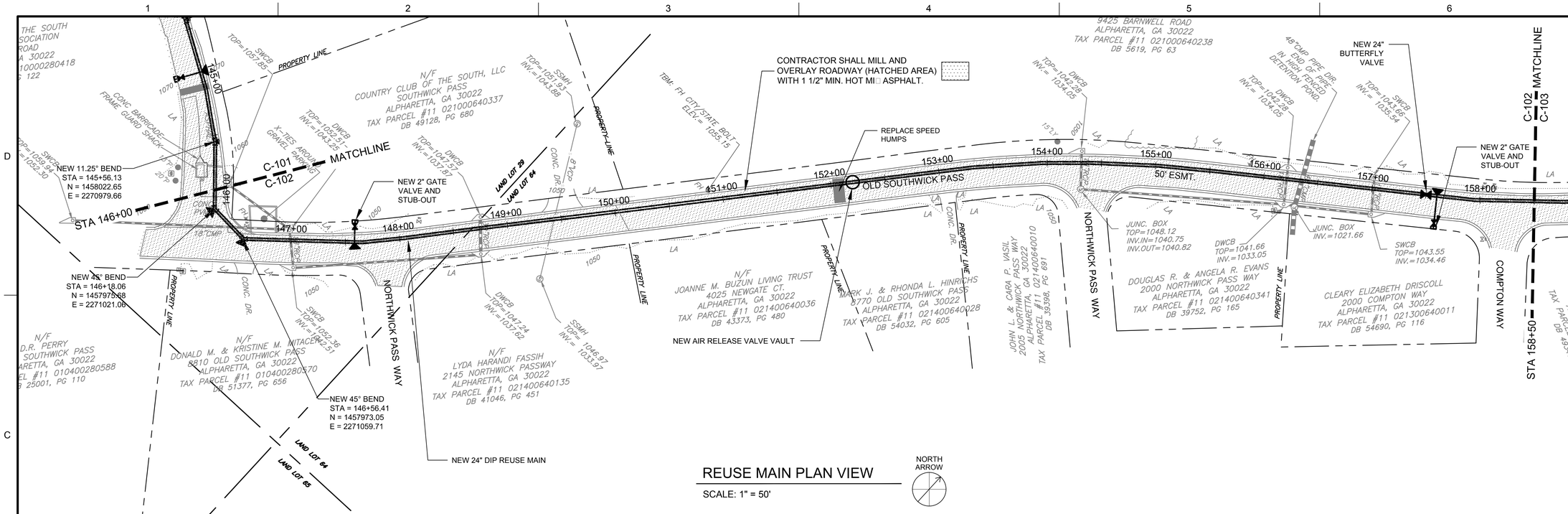


REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

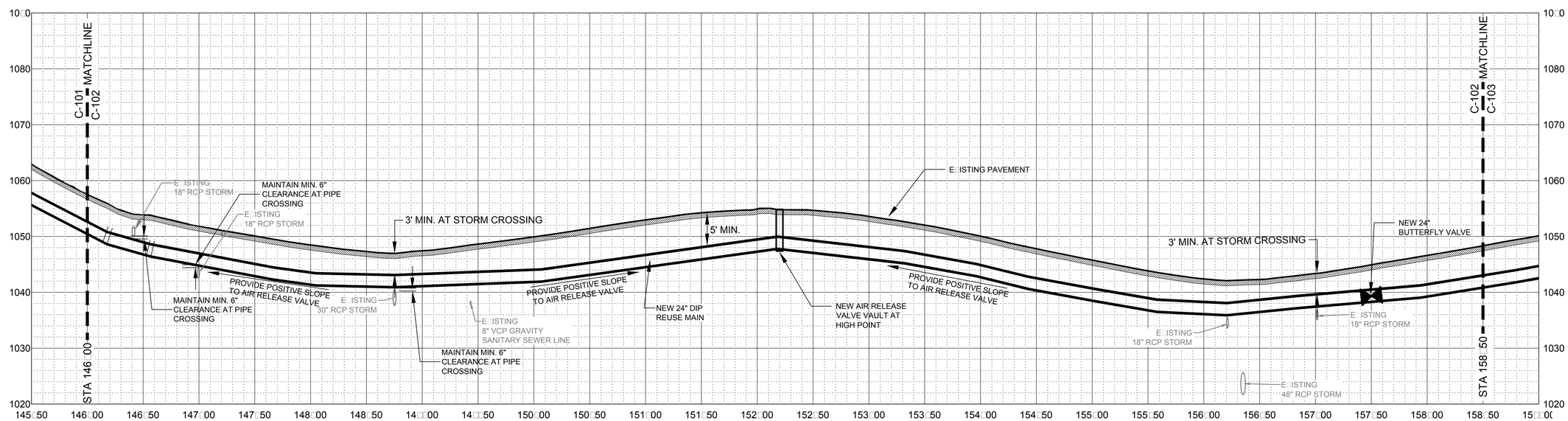
1. MULTIPLE WATER SERVICE LINES, GAS SERVICE LINES AND OTHER UTILITIES ALONG THE ROUTE, ALL OF WHICH MAY NOT BE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING UTILITY SERVICES TO CUSTOMERS ALONG THE ROUTE, INCLUDING THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED SERVICES AS SOON AS POSSIBLE.
2. EXISTING UTILITIES ARE SHOWN AS APPROXIMATE ON PLAN AND PROFILE VIEWS. CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES.
3. DUCTILE IRON PIPE SHALL BE WRAPPED WITH POLYETHYLENE PIPE WRAP IN PHASE 1 FROM STA 146+50 TO EXISTING TIE-IN, IN PHASE 2 FROM STA. 6+00 TO STA. 37+00, AND WHERE WITHIN 10 FEET OF AN EXISTING STEEL GAS LINE.
4. THE TOP 60% OF THE NEW REUSE MAIN TO BE PAINTED PURPLE FOR THE ENTIRE LENGTH OF PIPE PER THE SPECIFICATIONS.

COLOR CODES FOR UTILITY LOCATING
RED — ELECTRIC
YELLOW — GAS-OIL
ORANGE — TELEPHONE/CATV
BLUE — WATER
GREEN — SEWER
IF YOU DIG GEORGIA CALL US FIRST.
811 It's The Law.
Utilities Protection Center,Inc.

THREE WORKING DAYS BEFORE YOU DIG GEORGIA CALL
Utilities Protection Center,Inc.
811 It's The Law.

PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER 148787
CLIENT PROJECT NUMBER FCDWR PROJECT 15E-BC04

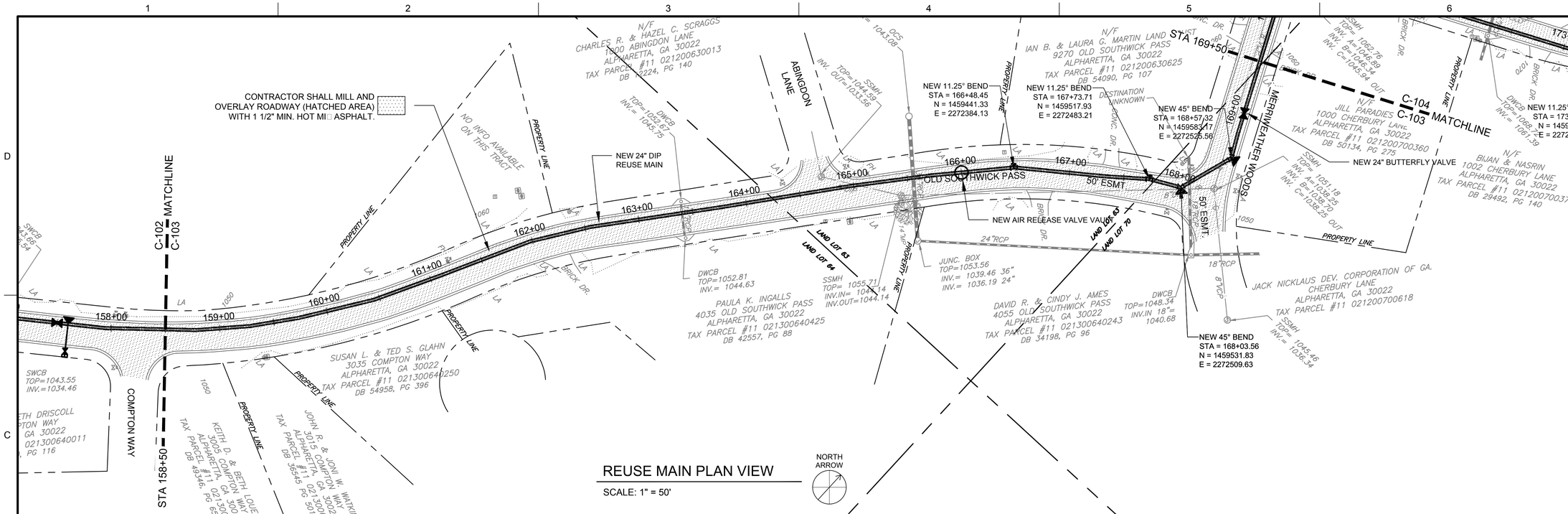
CIVIL

PHASE 1
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-102

SHEET NUMBER
12 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 1:24 PM CAD USER: KATHRYNA CLARKE



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NORTH ARROW

NOTES:

1. MULTIPLE WATER SERVICE LINES, GAS SERVICE LINES AND OTHER UTILITIES ALONG THE ROUTE, ALL OF WHICH MAY NOT BE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING UTILITY SERVICES TO CUSTOMERS ALONG THE ROUTE, INCLUDING THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED SERVICES AS SOON AS POSSIBLE.
2. EXISTING UTILITIES ARE SHOWN AS APPROXIMATE ON PLAN AND PROFILE VIEWS. CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES.
3. DUCTILE IRON PIPE SHALL BE WRAPPED WITH POLYETHYLENE PIPE WRAP IN PHASE 1 FROM STA 1[illegible]6[illegible]50 TO EXISTING TIE-IN, IN PHASE 2 FROM STA. 6[illegible]00 TO STA. 37[illegible]00, AND WHERE WITHIN 10 FEET OF AN EXISTING STEEL GAS LINE.
4. THE TOP 60[illegible] OF THE NEW REUSE MAIN TO BE PAINTED PURPLE FOR THE ENTIRE LENGTH OF PIPE PER THE SPECIFICATIONS.

COLOR CODES FOR UTILITY LOCATING
RED — ELECTRIC
YELLOW — GAS-OIL
ORANGE — TELEPHONE/CATV
BLUE — WATER
GREEN — SEWER
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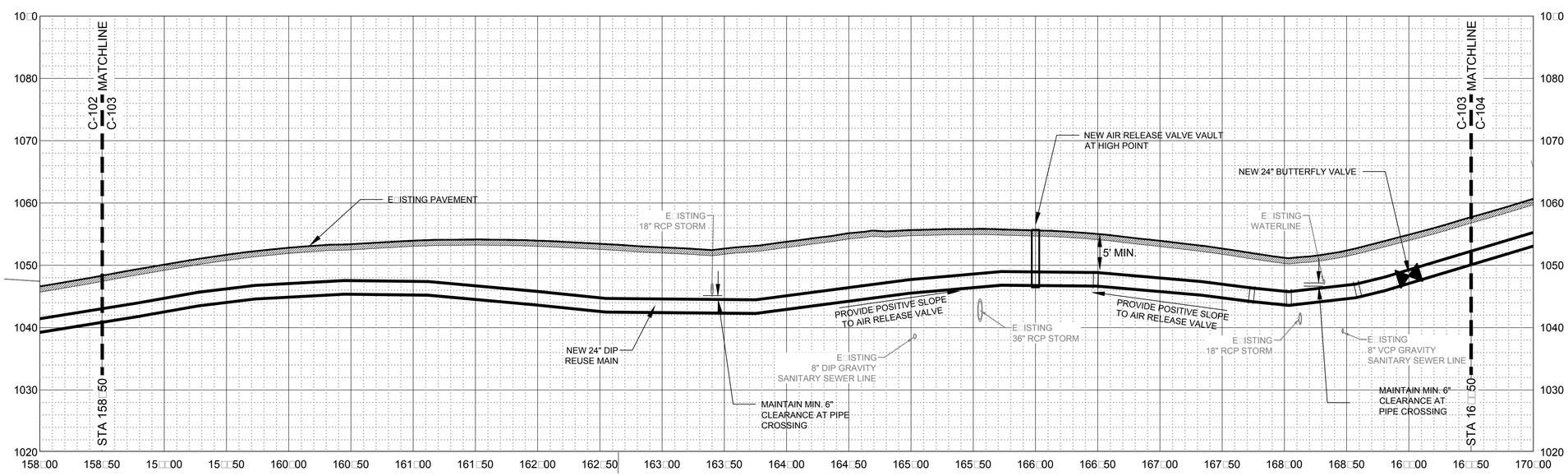
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER
PE 038551
DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT [illegible]15E-BC04

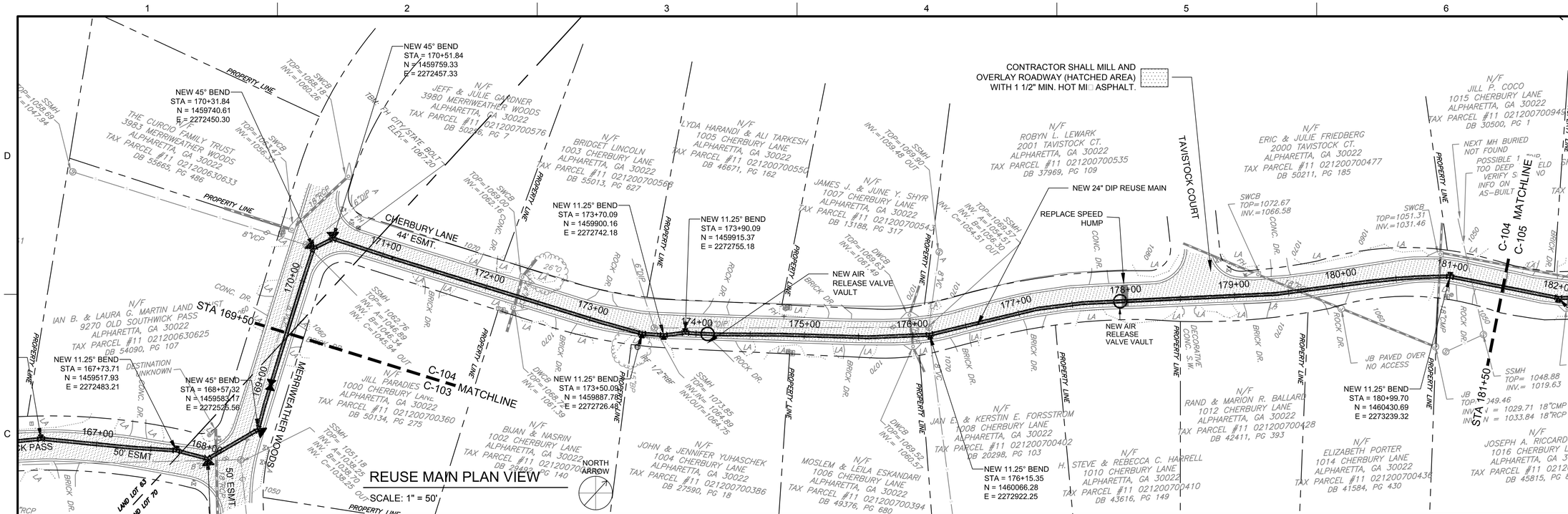
CIVIL

PHASE 1
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-103

SHEET NUMBER
13 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: [illegible]/28/2016 1:26 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e[illegible]g CCGS FOD H[illegible]



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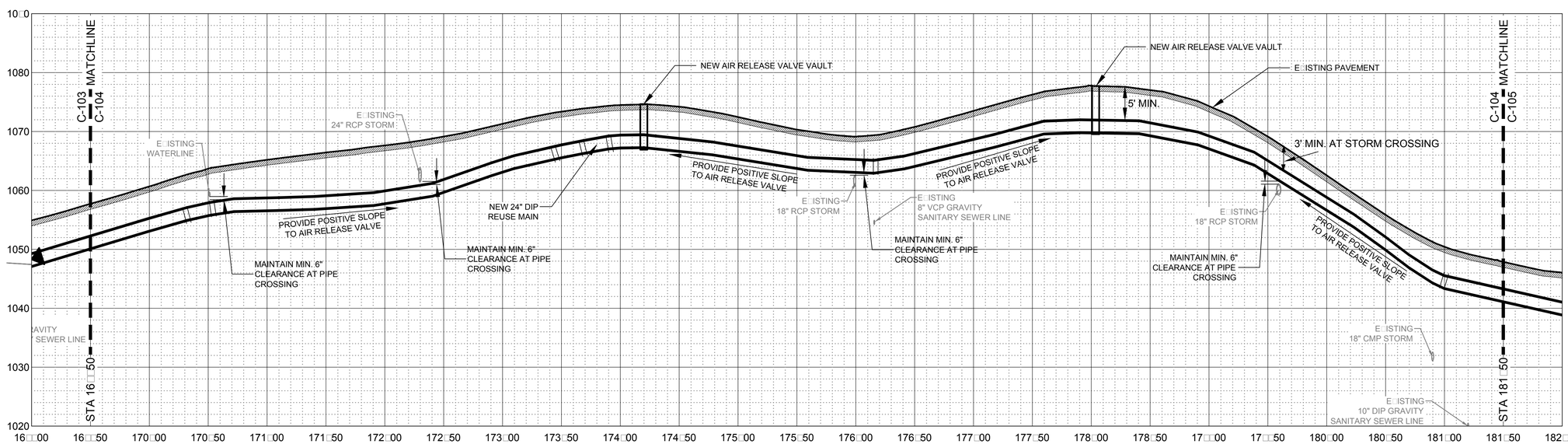
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORI□ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

PHASE 1
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-104

SHEET NUMBER
14 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: □/28/2016 1:27 PM CAD USER: KATHRYNA CLARKE
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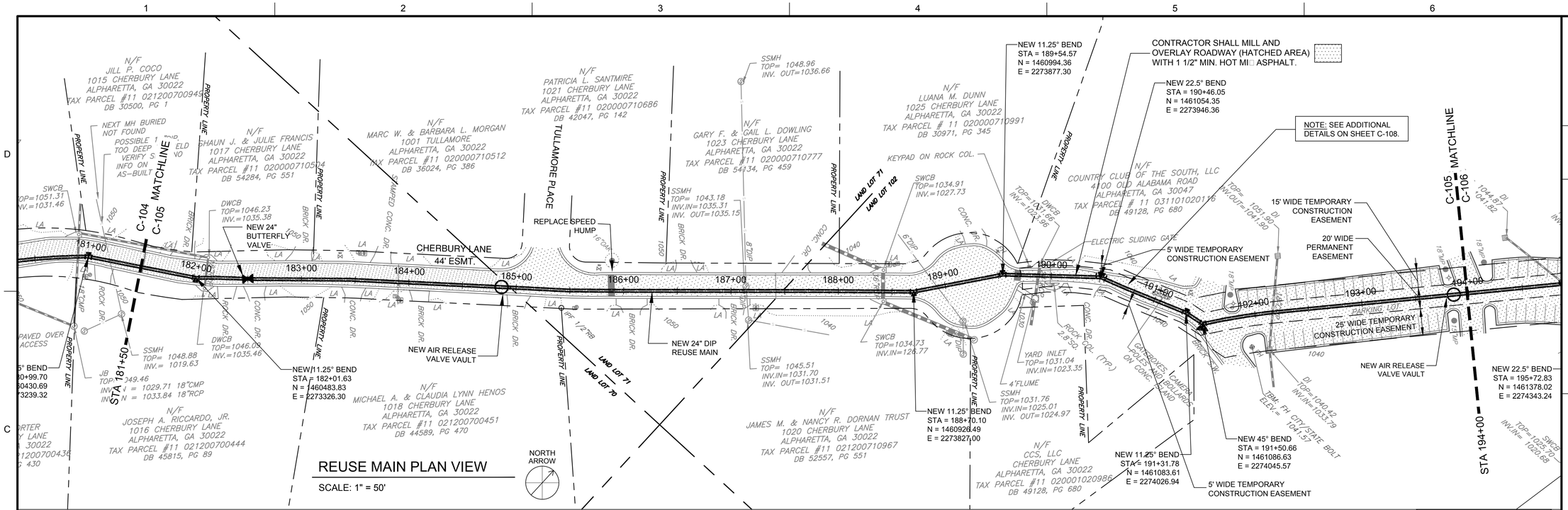

REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

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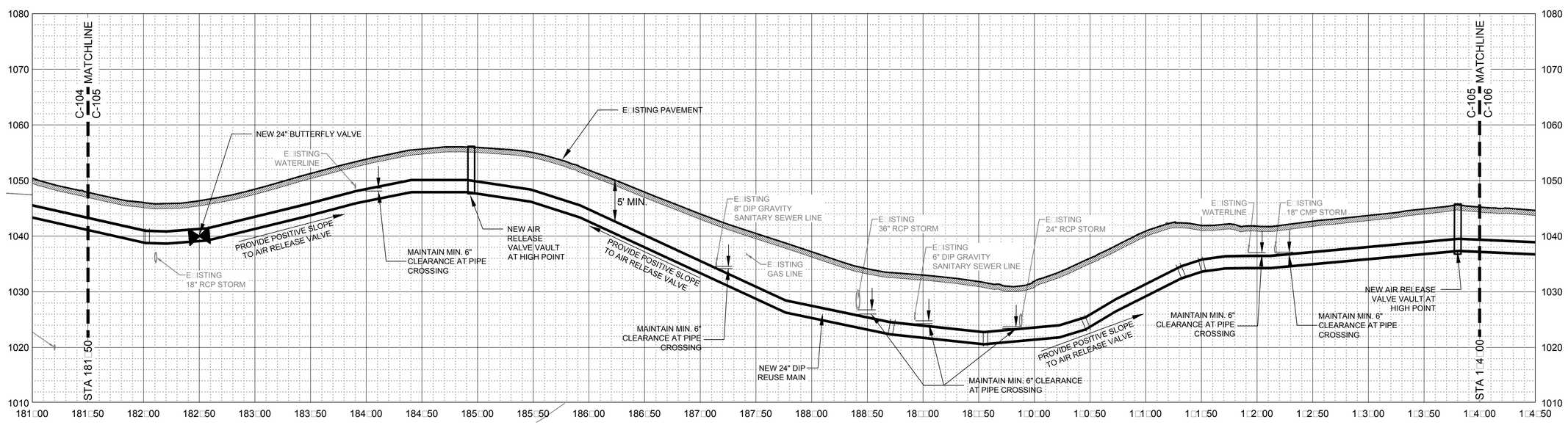
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORI□ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

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NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

PHASE 1
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-105

SHEET NUMBER
15 OF 77

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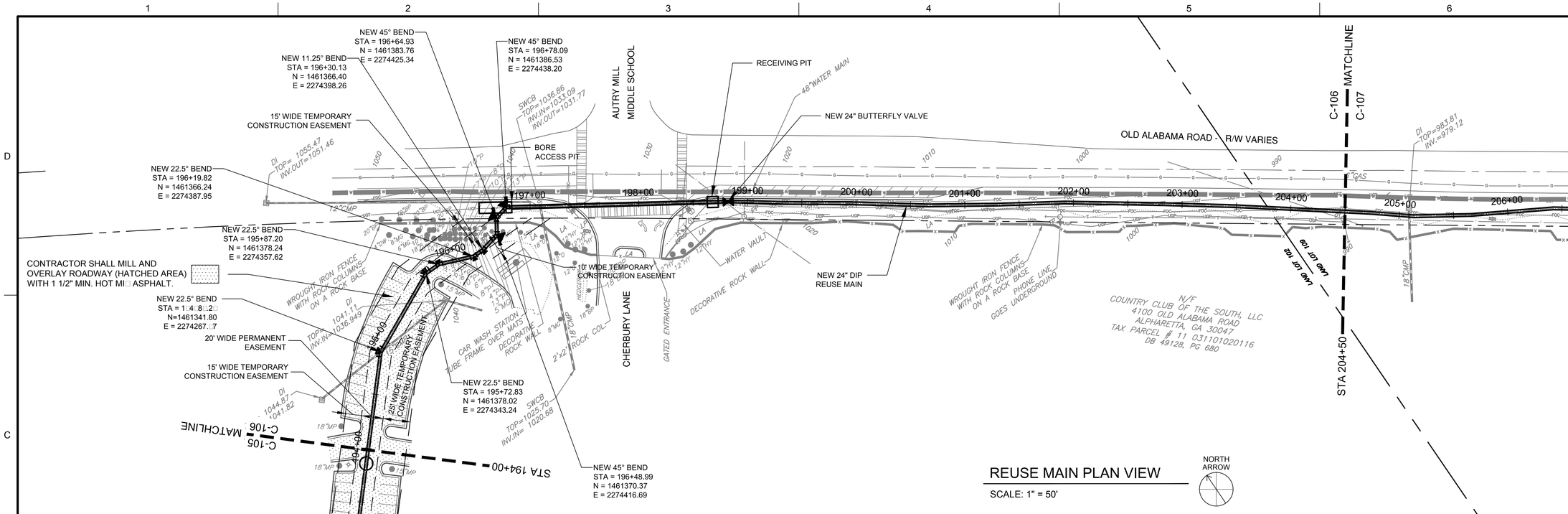
CCOS POD H□□



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NORTH ARROW

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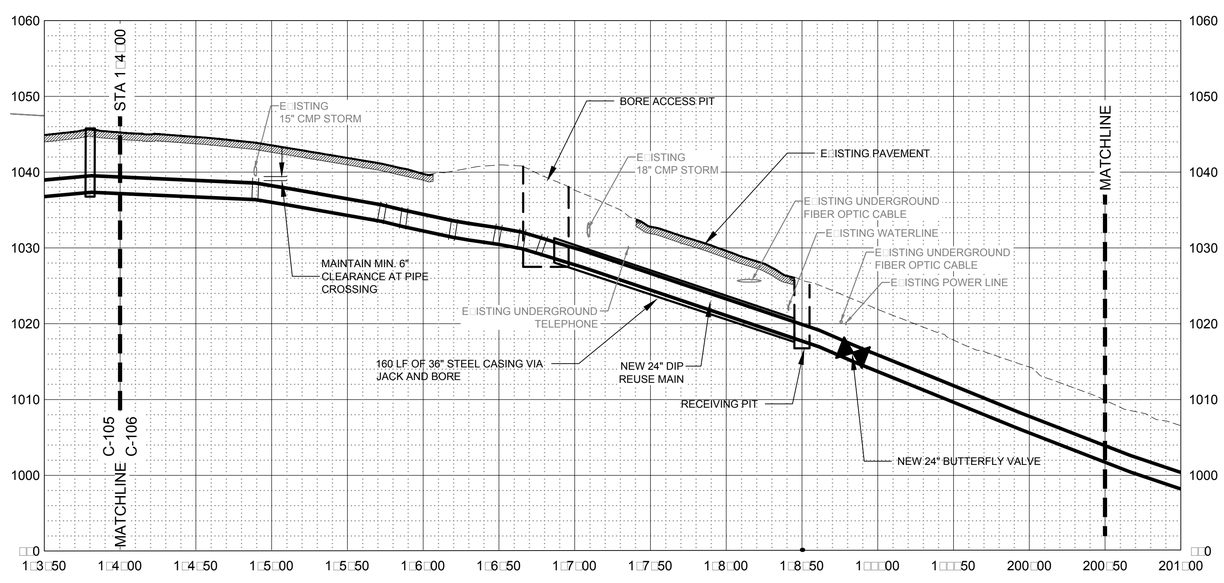
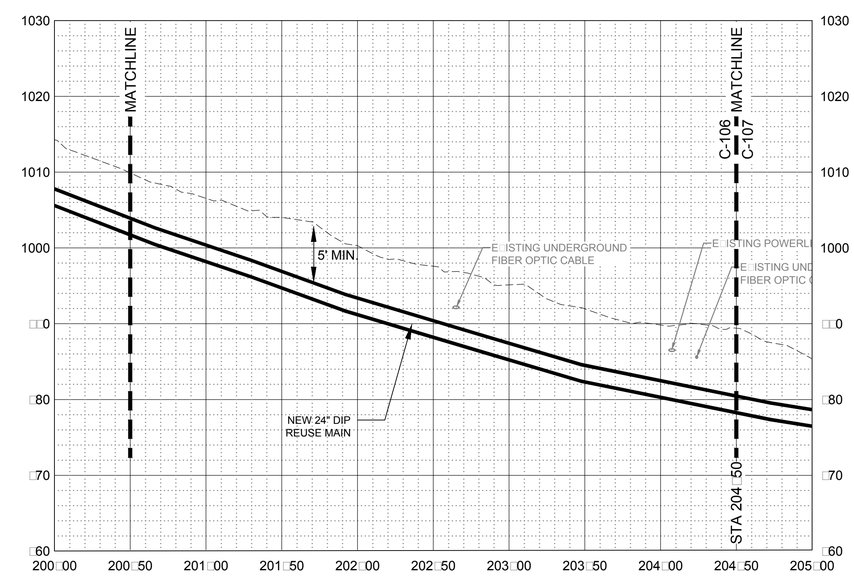
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'



Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

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GEORGIA REGISTERED PE. 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 1
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-106

SHEET NUMBER
16 OF 77

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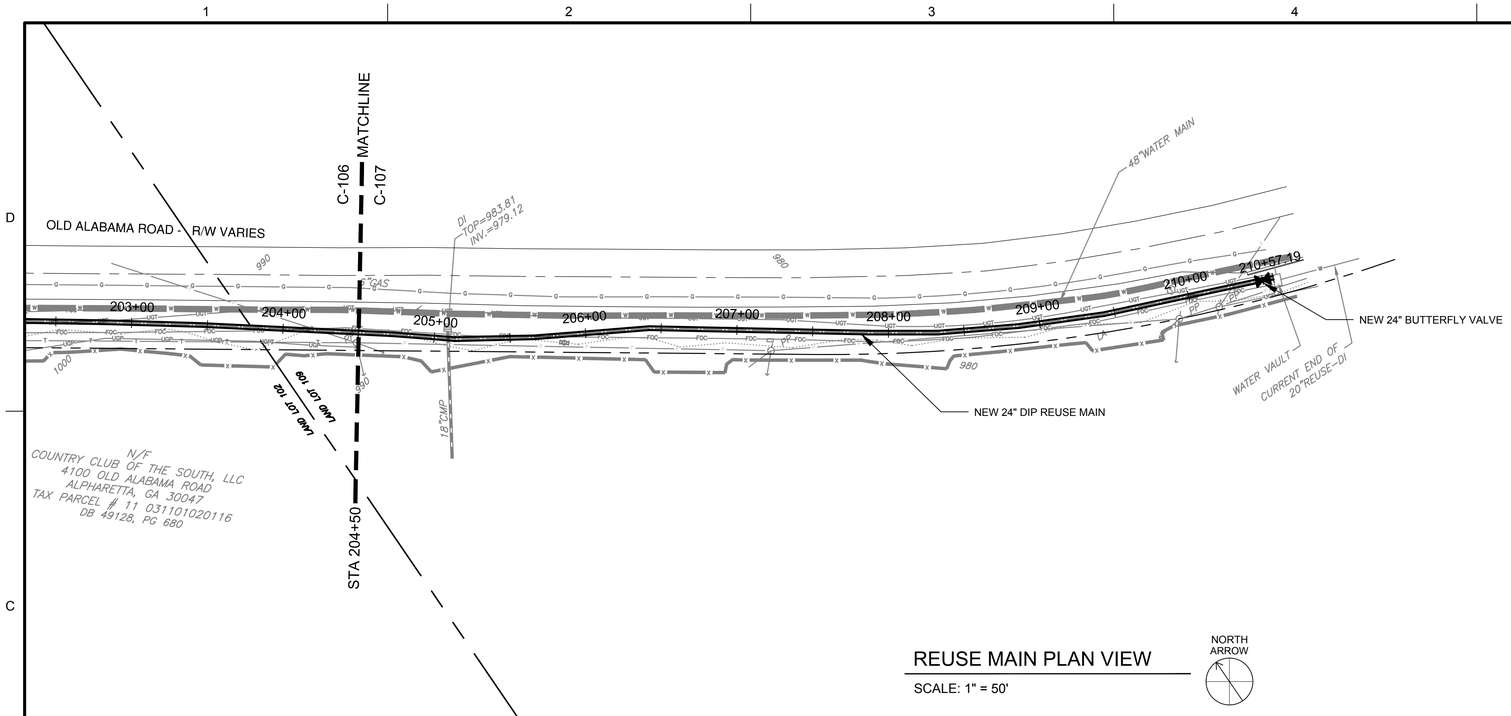
CCOS FOD HLS



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NORTH ARROW

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ORANGE TELEPHONE/CATV
BLUE WATER
GREEN SEWER
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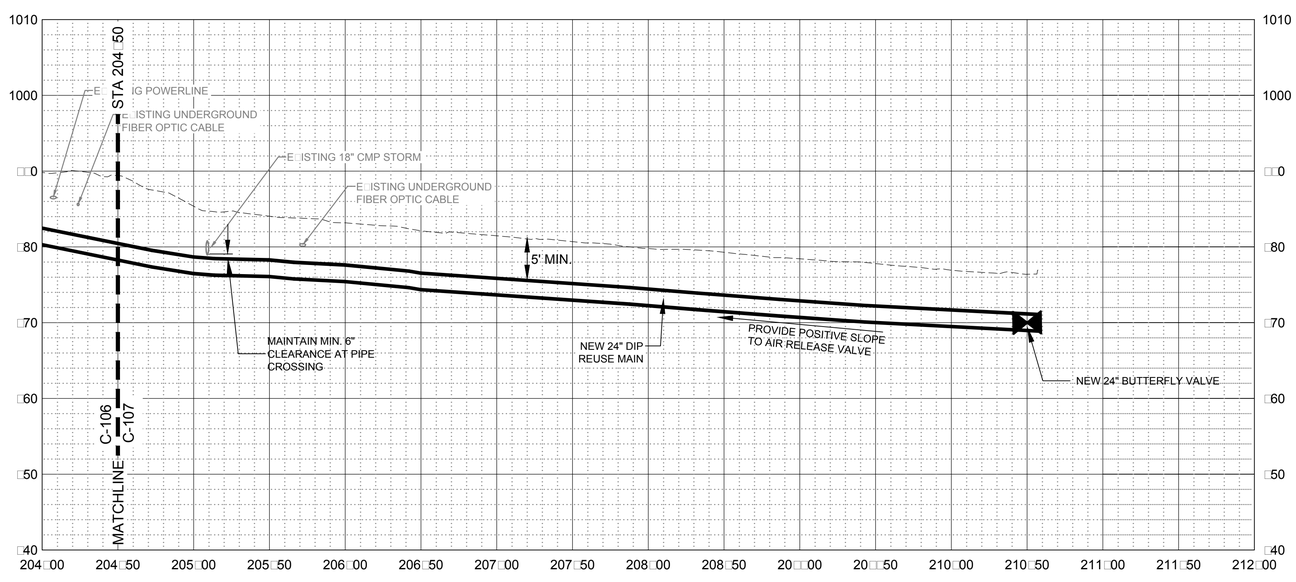
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORI□ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
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SUITE 400
ATLANTA, GEORGIA

PERMIT SET
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GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
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FILENAME
C-RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

PHASE 1
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-107

SHEET NUMBER
17 OF 77

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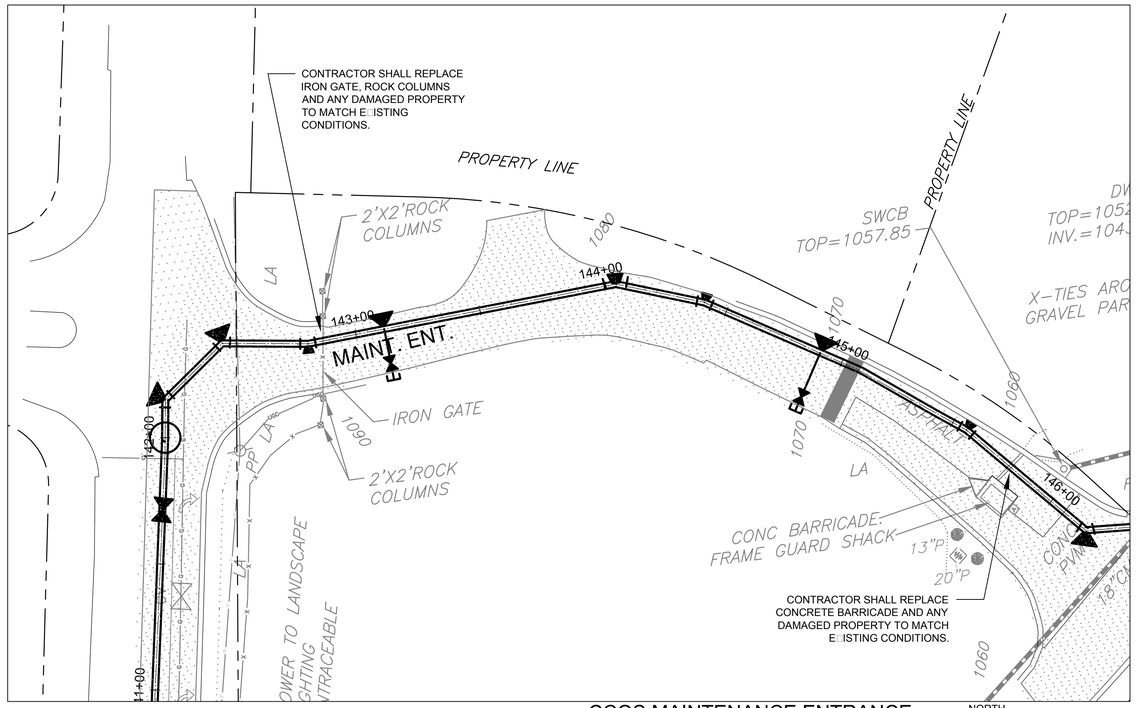
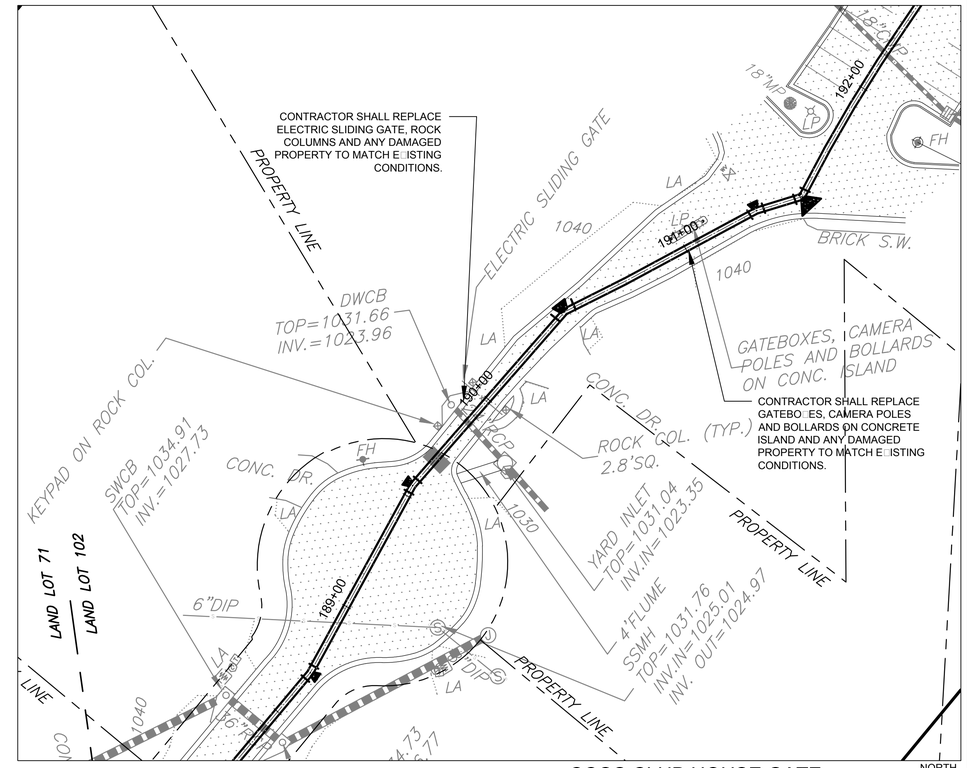
Fulton Logo w-na - e□g
CCGS POD HLS



CCOS MAINTENANCE ENTRANCE GATE AREA (STA. 142 TO 147)

SCALE: 1" = 30'

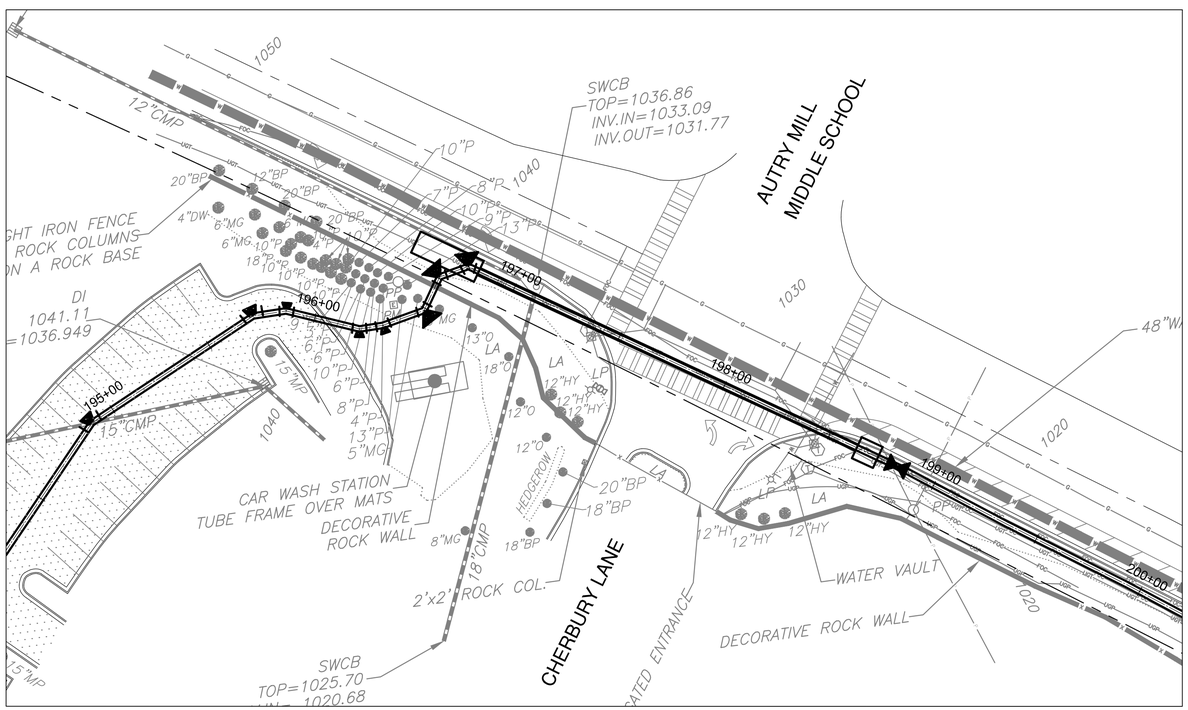
NORTH ARROW



CCOS CLUB HOUSE GATE ENTRANCES (STA. 18□50 TO 1□2)

SCALE: 1" = 30'

NORTH ARROW



CCOS REUSE MAIN E□IT AND BORE ALONG OLD ALABAMA ROAD (STA. 1□5□50 TO 1□□□50)

SCALE: 1" = 30'

NORTH ARROW

NOTE:
CONTRACTOR SHALL REPLACE ANY DAMAGED STRUCTURES, PROPERTY, LANDSCAPING, UTILITIES, ETC. TO E□UAL OR BETTER CONDITION.

COLOR CODES FOR UTILITY LOCATING
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YELLOW GAS-OIL
ORANGE TELEPHONE/CATV
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GREEN SEWER
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GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
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FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

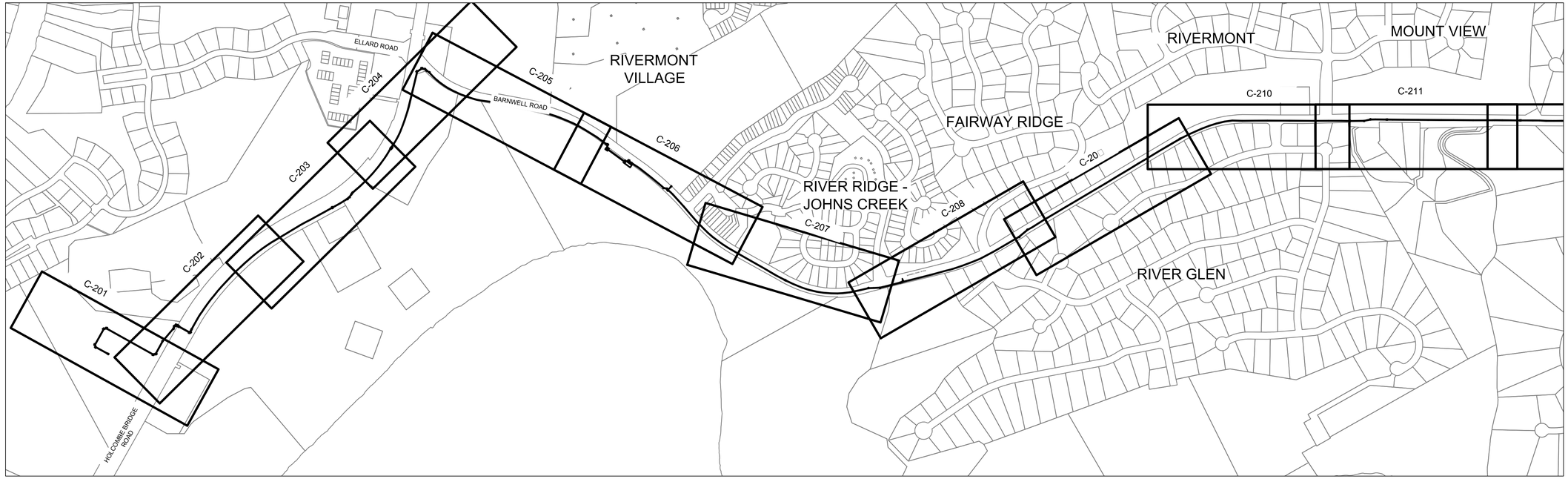
CIVIL

PHASE 1
DETAILED PLAN VIEWS

DRAWING NUMBER
C-108

SHEET NUMBER
18 OF 77

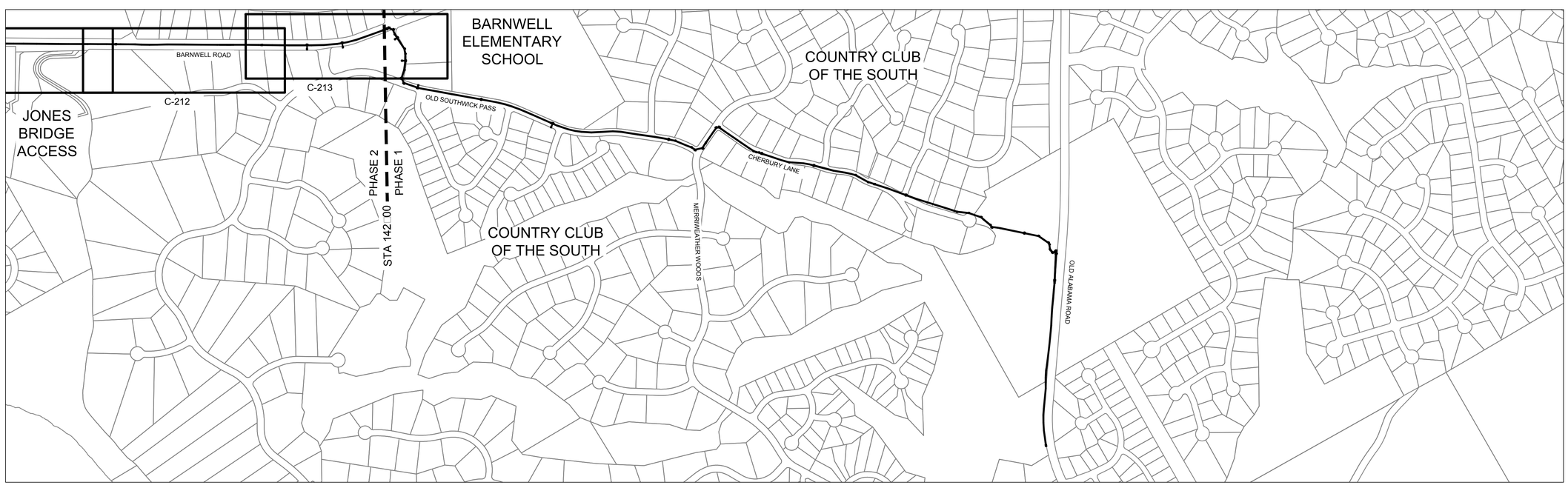
Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: □/28/2016 1:33 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w:na e□g
CCOS POD H□g
CCOS Rev□ses.dwg



REUSE MAIN KEY MAP 1

SCALE: 1" = 400'

NORTH ARROW



REUSE MAIN KEY MAP 2

SCALE: 1" = 400'

NORTH ARROW

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SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 2
KEY MAP

DRAWING NUMBER
C-200

SHEET NUMBER
1 OF 77

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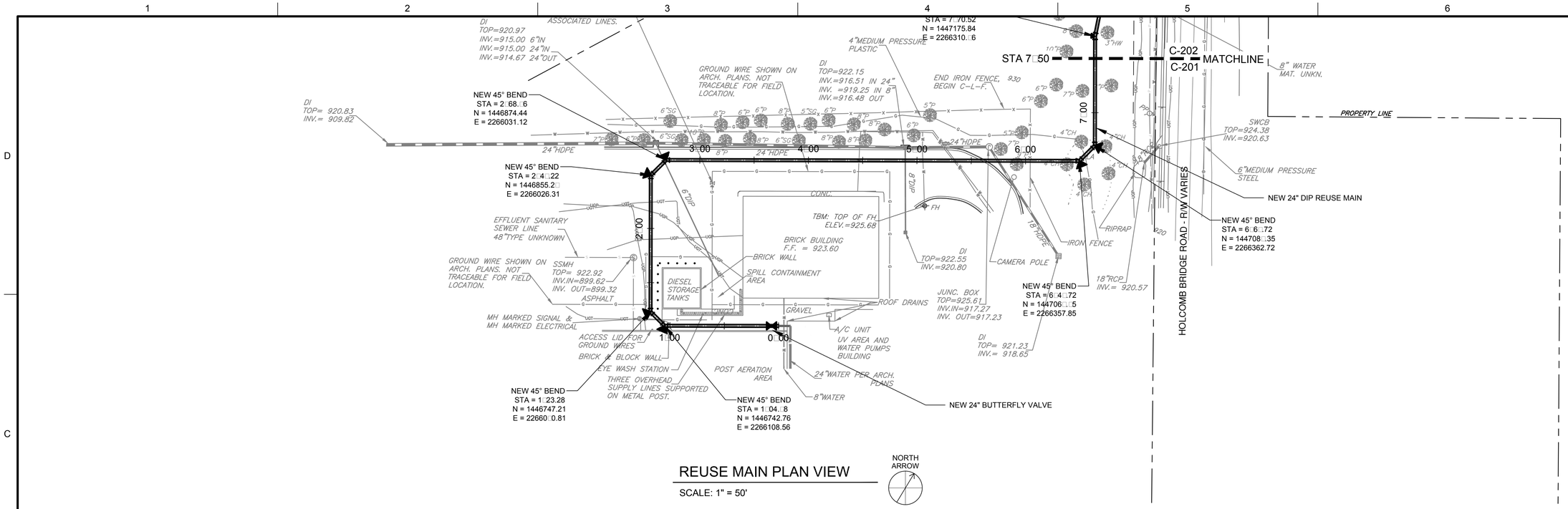
Fulton Logo w-na e g
CCOS POD Hi g
Brown AND Caldwell



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

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4. THE TOP 60 OF THE NEW REUSE MAIN TO BE PAINTED PURPLE FOR THE ENTIRE LENGTH OF PIPE PER THE SPECIFICATIONS.

COLOR CODES FOR UTILITY LOCATING
RED ELECTRIC
YELLOW GAS-OIL
ORANGE TELEPHONE/CTV
BLUE WATER
GREEN SEWER
IF YOU DIG GEORGIA CALL US FIRST.
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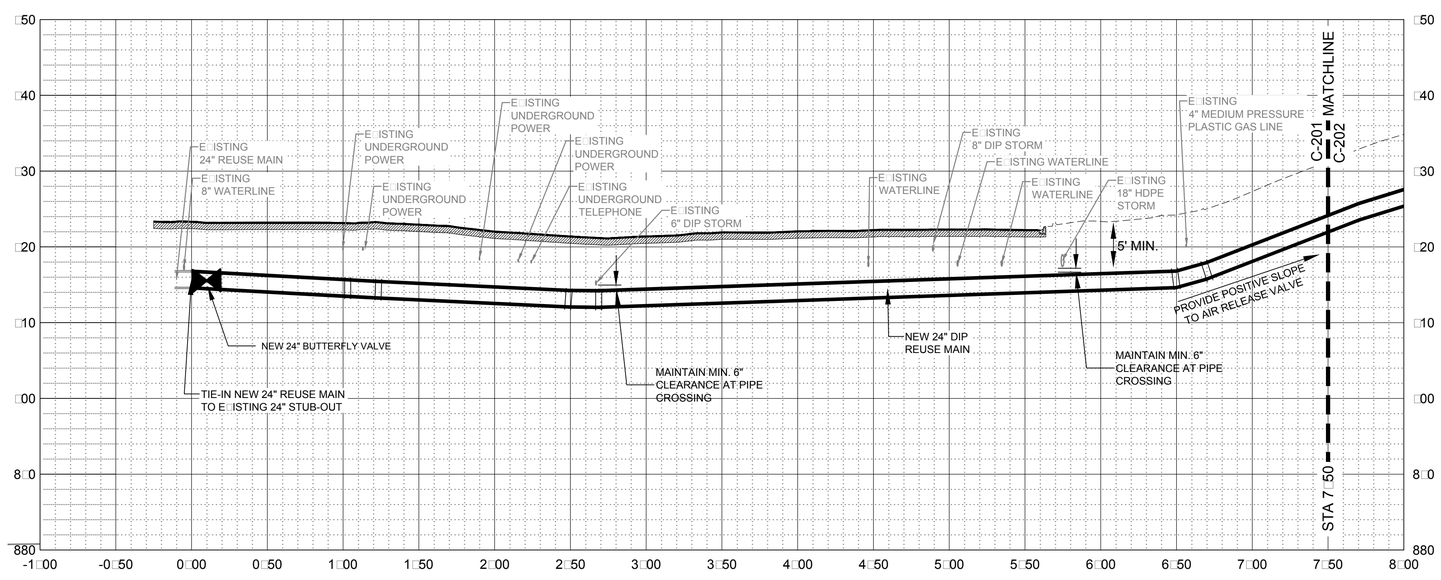
811 It's The Law.

PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORI ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER
PE 038551
DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SI E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-201

SHEET NUMBER
20 OF 77

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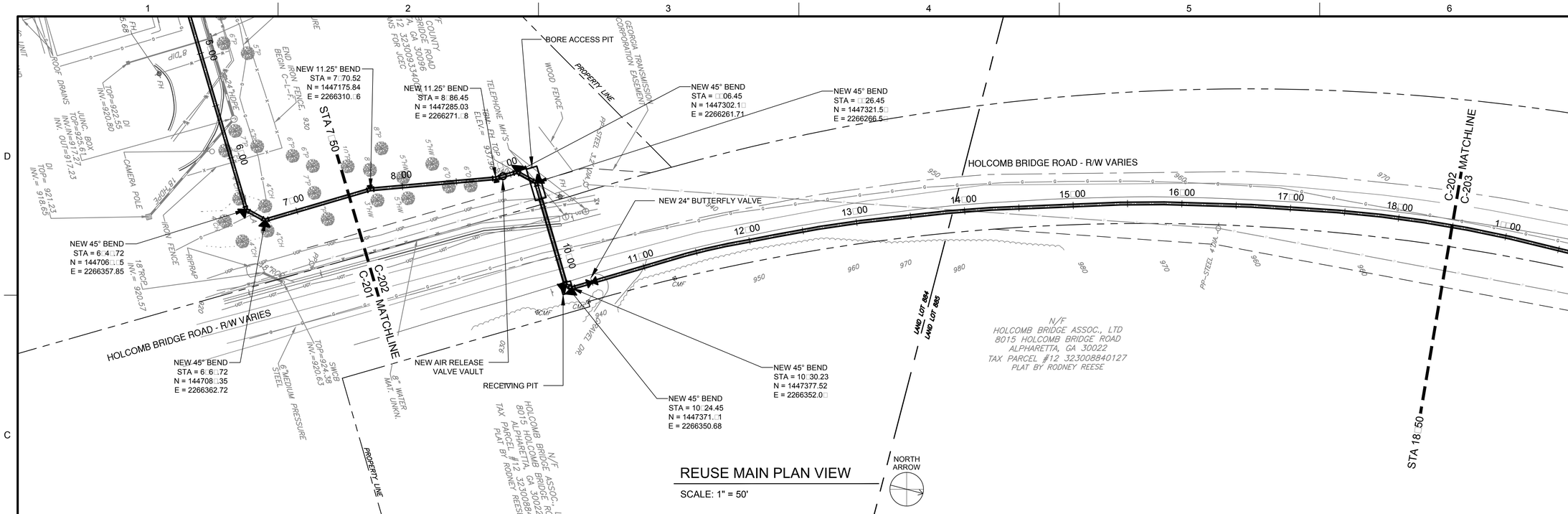
Fulton Logo w.na e g CCGS POD HORIZ 1:50



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

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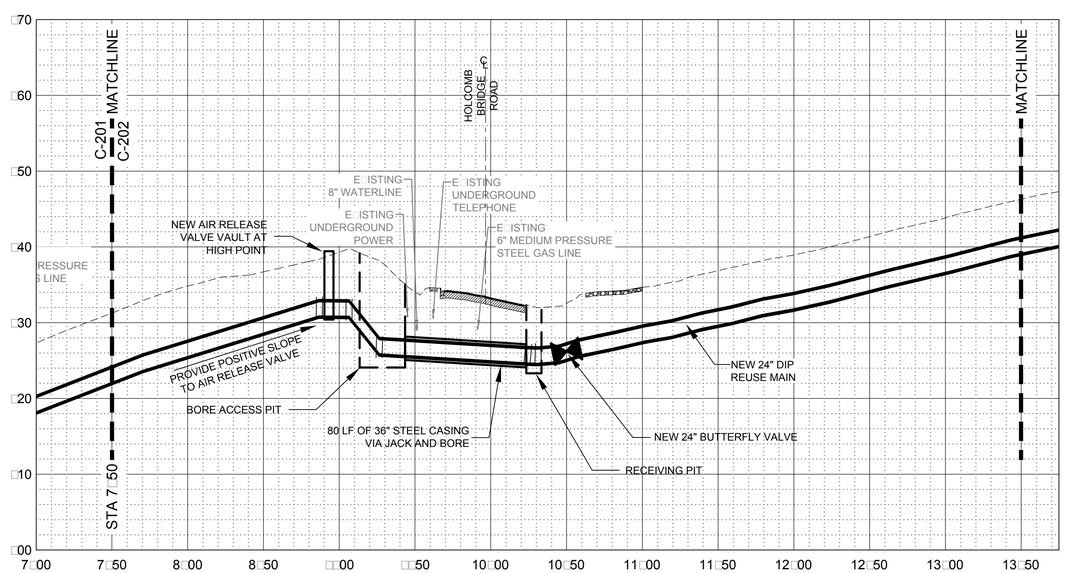
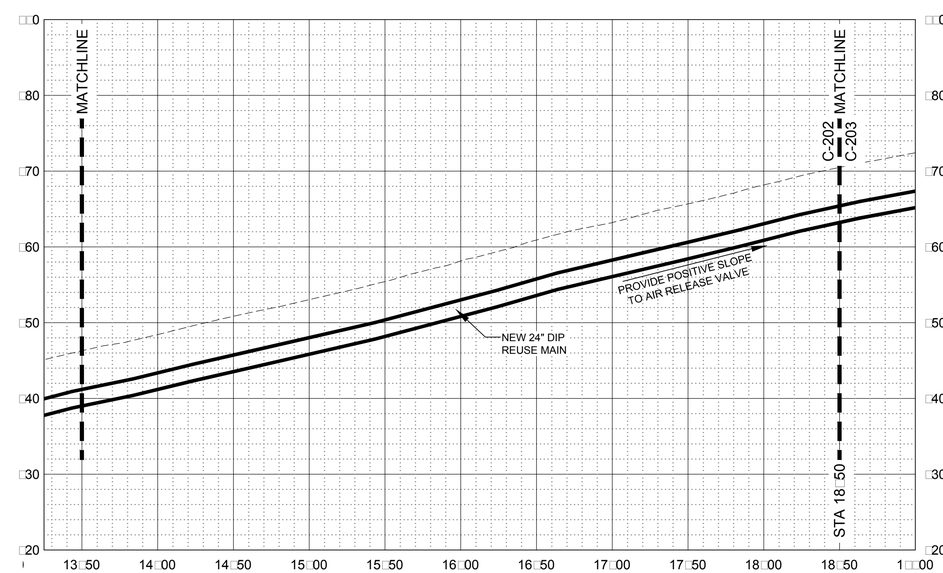
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI ONTAL SCALE 1:50
VERTICAL SCALE 1:10





REUSE MAIN PROFILE VIEW

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Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
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LINE IS 2 INCHES AT FULL SI E

DESIGNED: D. MURPHY
DRAWN: C. STANFIELD
CHECKED: D. MURPHY
CHECKED: S. ADAMS
APPROVED: A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-202

SHEET NUMBER
21 OF 77

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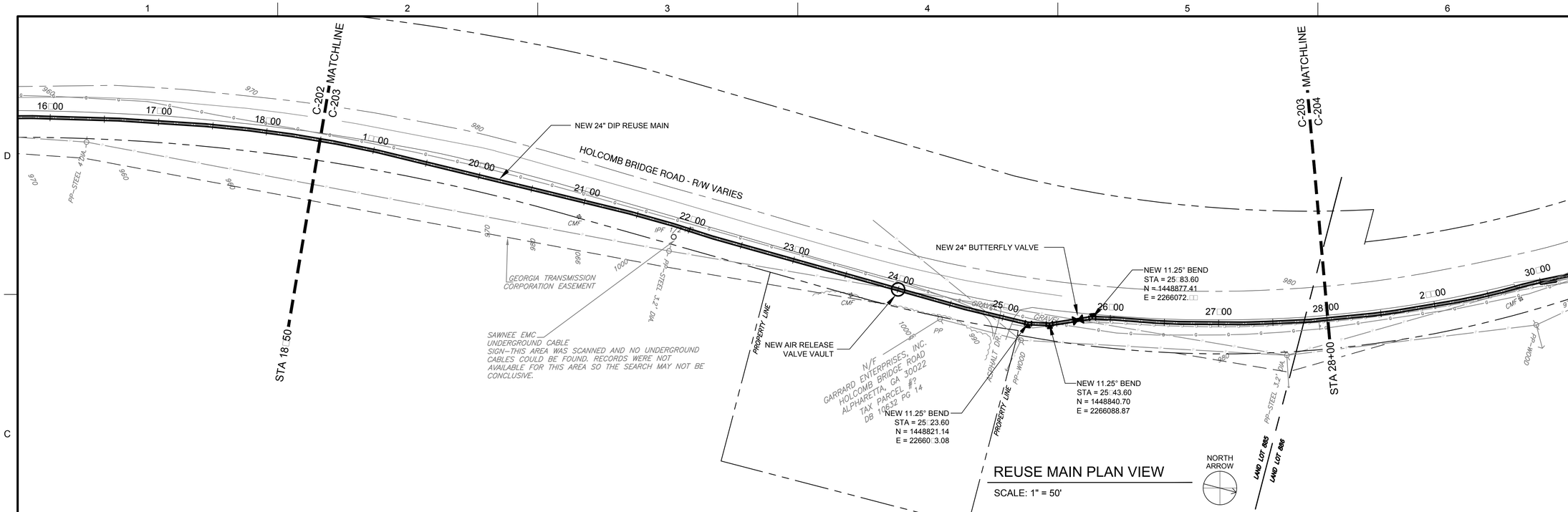
Fulton Logo w na e g
CCGS FOD HORIZ



REUSE MAIN PLAN VIEW

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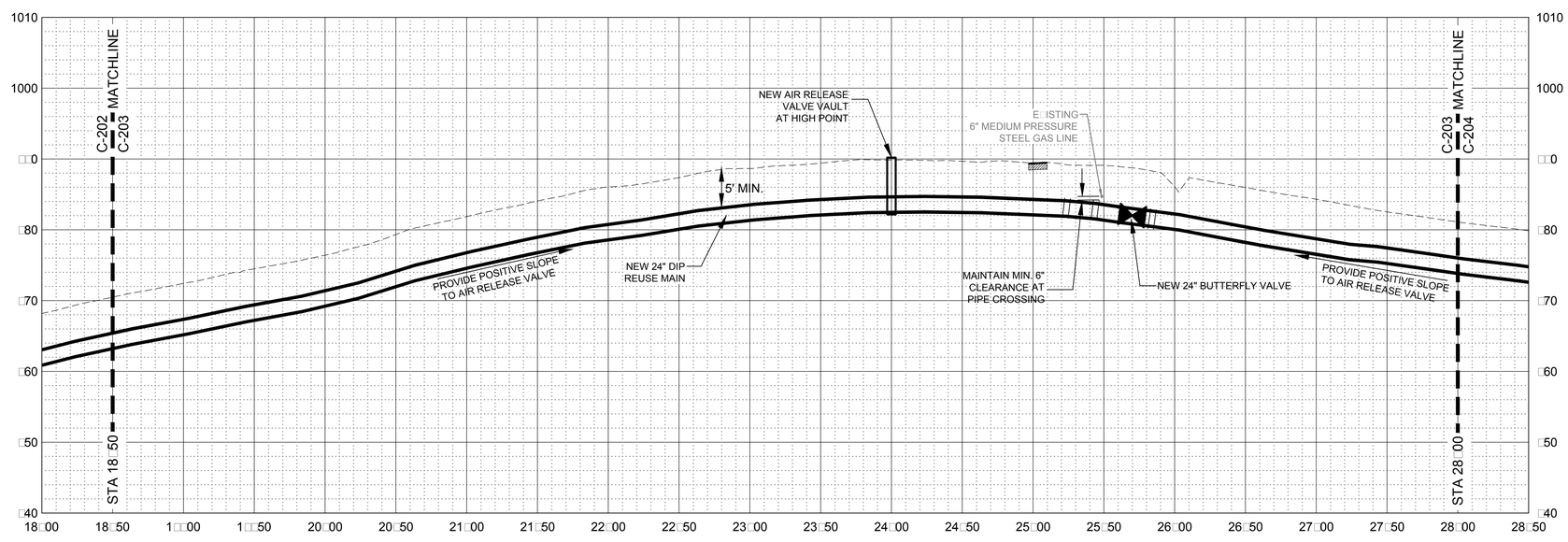
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10



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Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
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GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
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LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-203

SHEET NUMBER
22 OF 77

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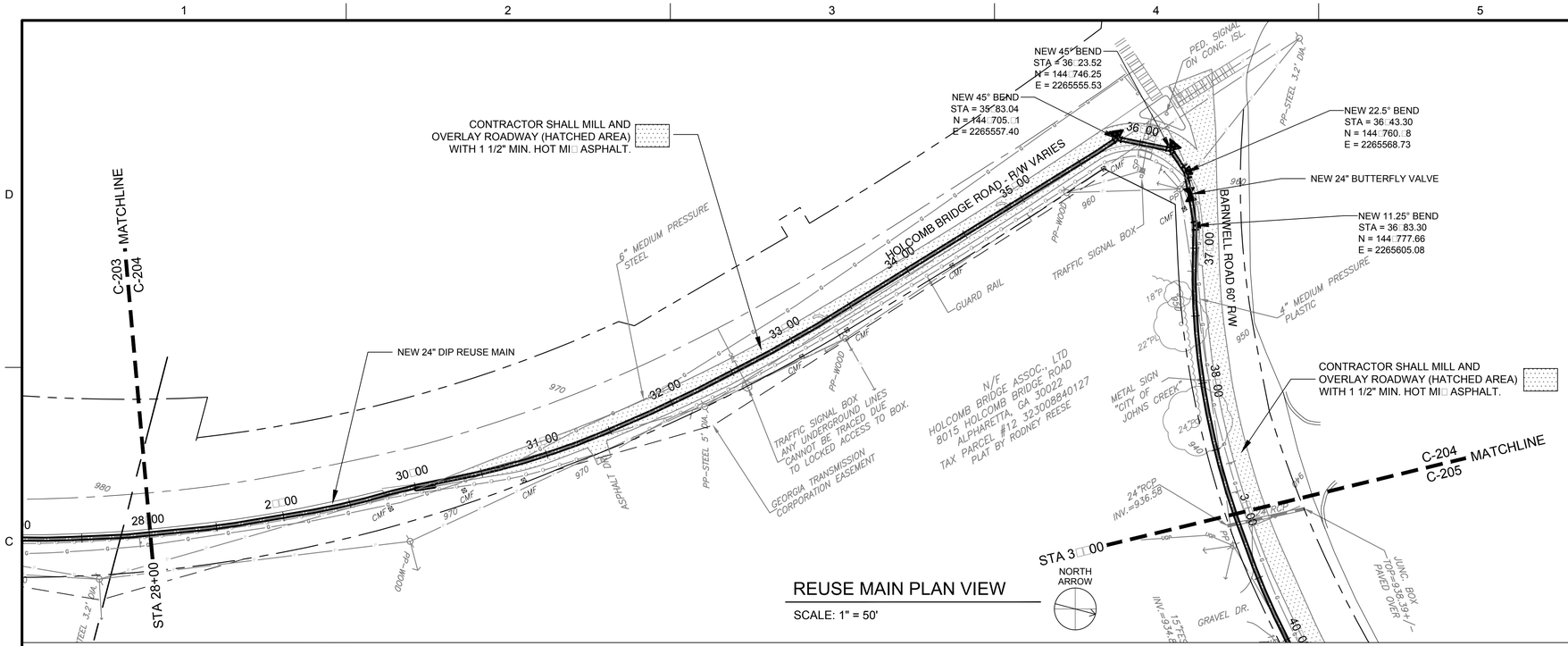
CCGS-FOD-H□□



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

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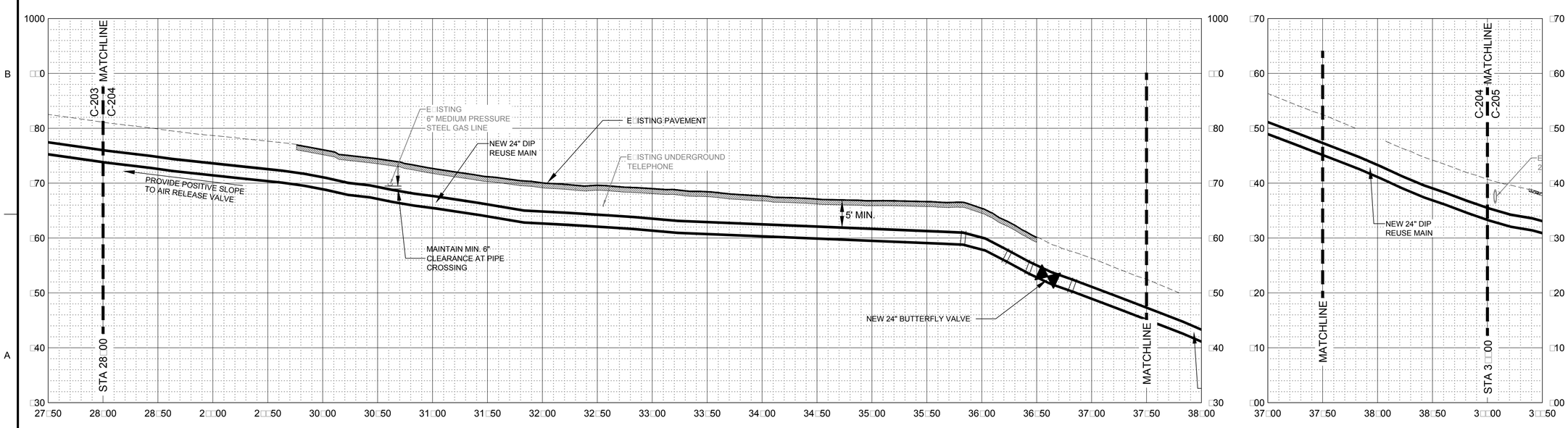
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

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Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-204

SHEET NUMBER
23 OF 77

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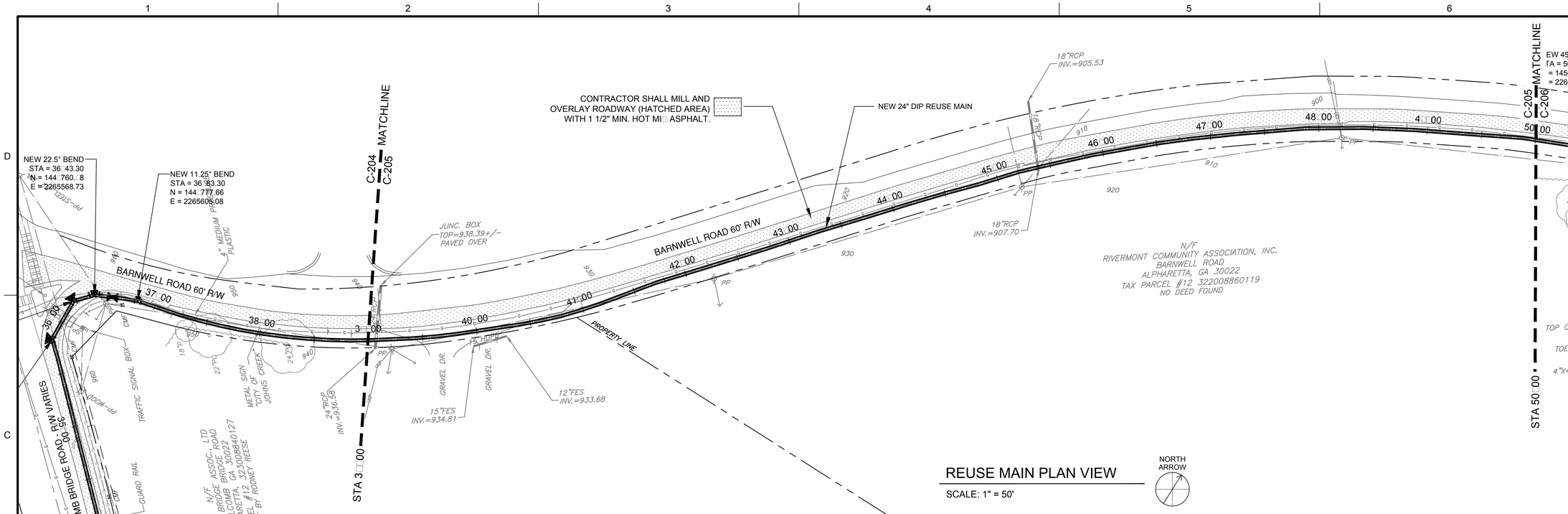
Fulton Logo w-na □e□g CCOS FOD HORIZ.DWG



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NORTH ARROW

NOTES:

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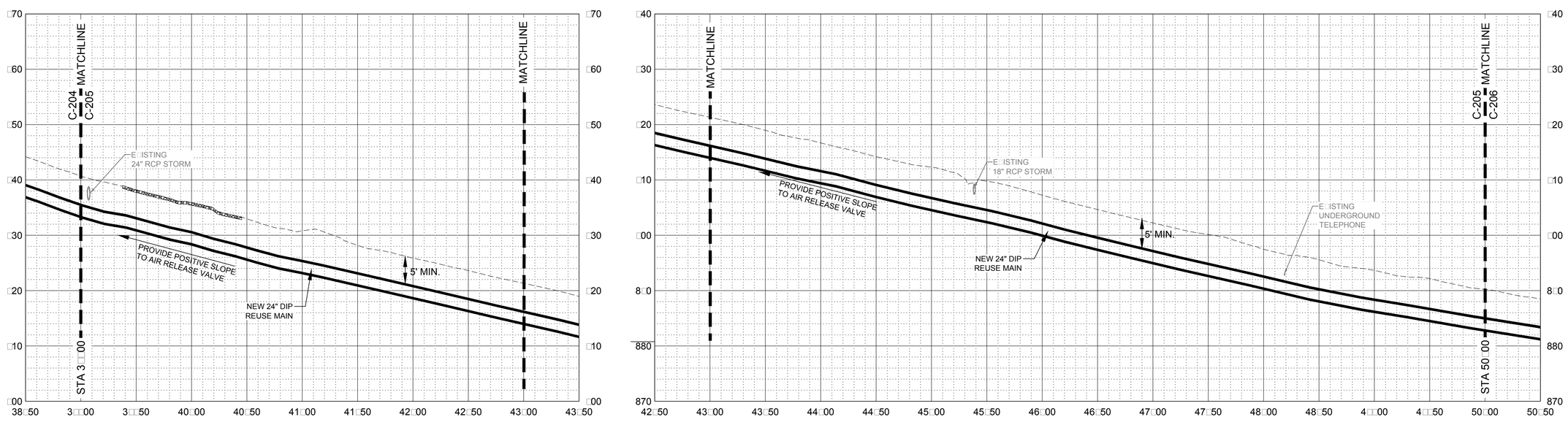
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

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Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
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FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

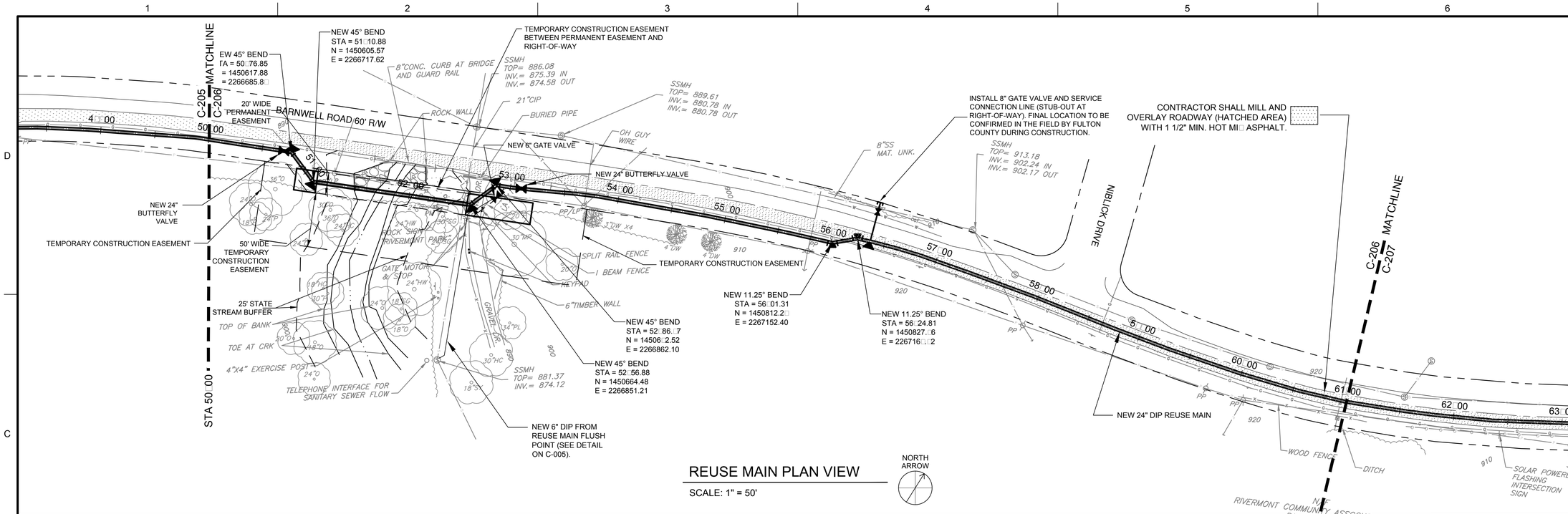
CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-205

SHEET NUMBER
24 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 2:20 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e g
CCGS FOD HLS



REUSE MAIN PLAN VIEW

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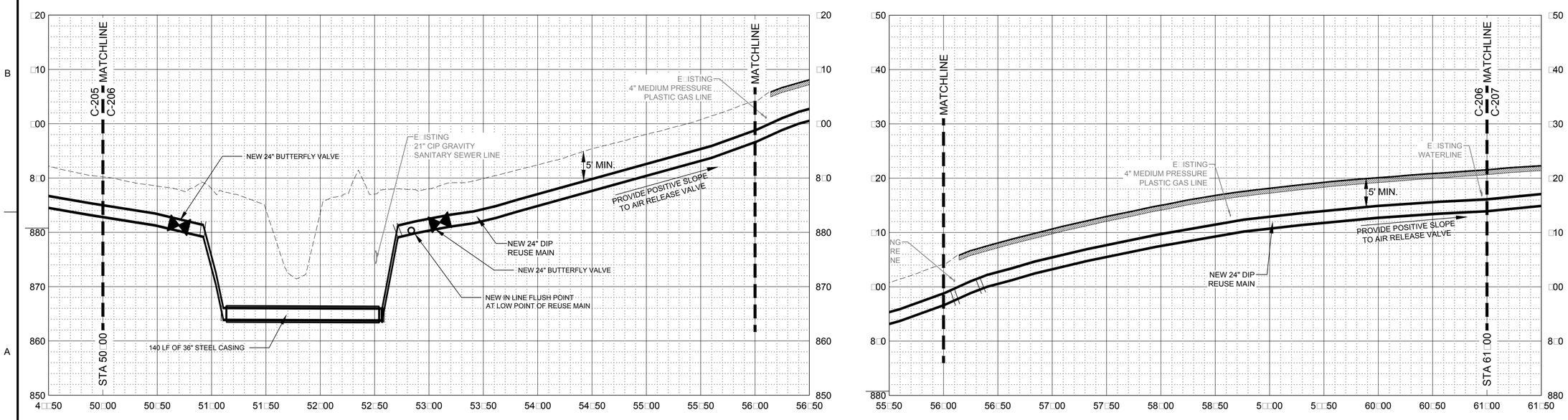
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

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Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
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LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
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FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-206

SHEET NUMBER
25 OF 77

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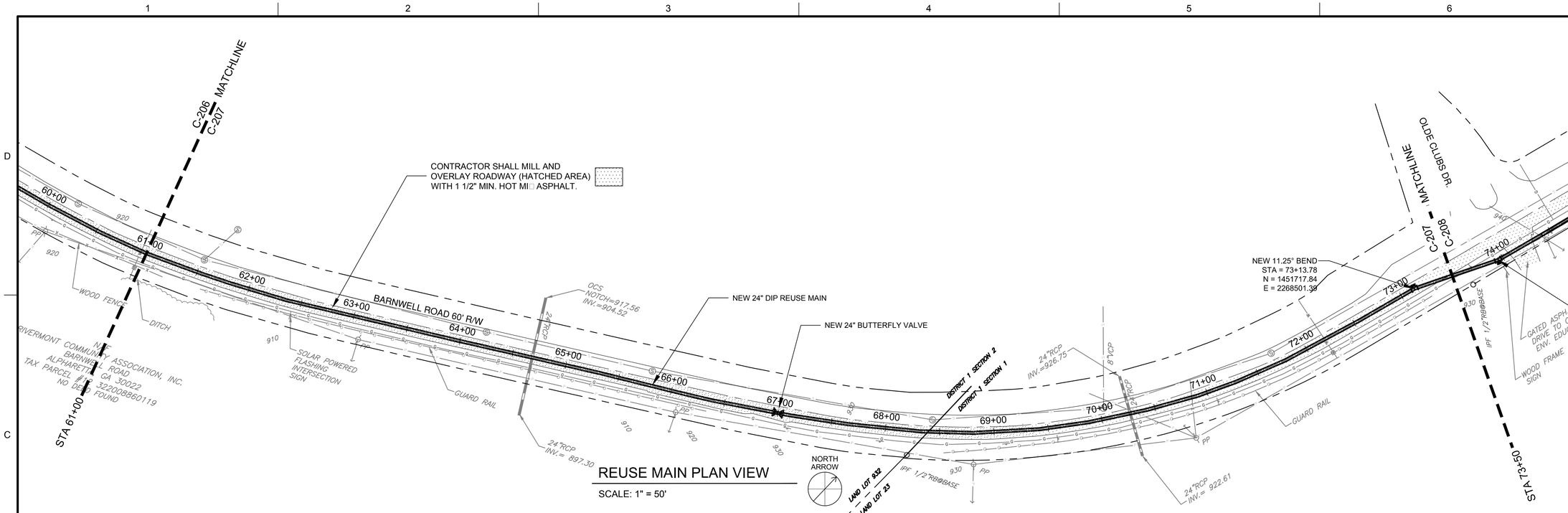
Fulton Logo w-na e g
CCOS FOD HLS



REUSE MAIN PLAN VIEW

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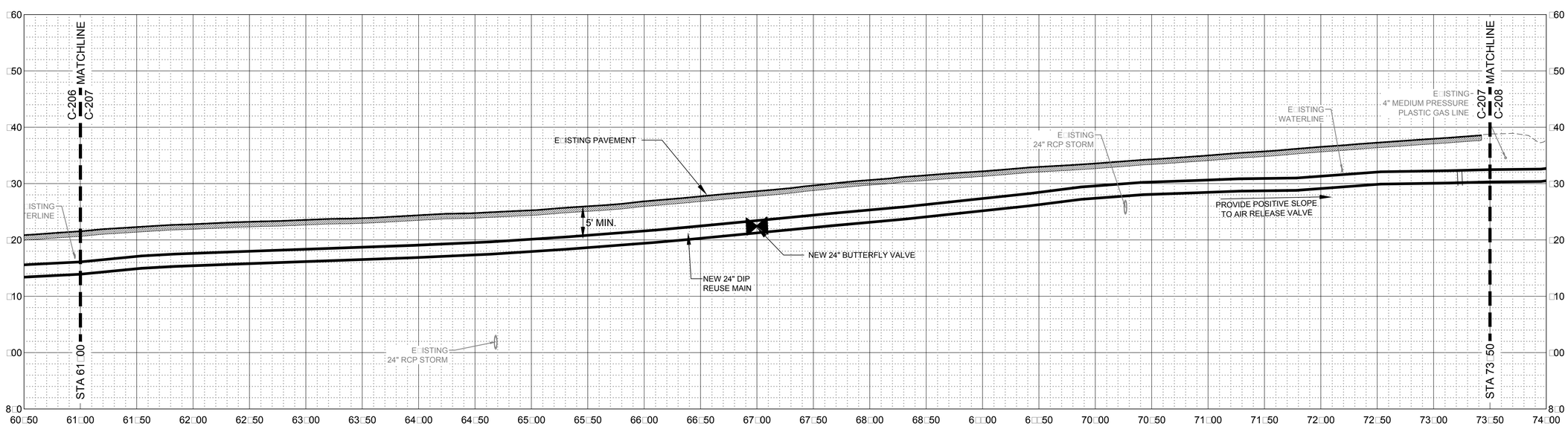
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

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Brown AND Caldwell
990 HAMMOND DRIVE
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ATLANTA, GEORGIA

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GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

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JOHNS CREEK
REUSE MAIN

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CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

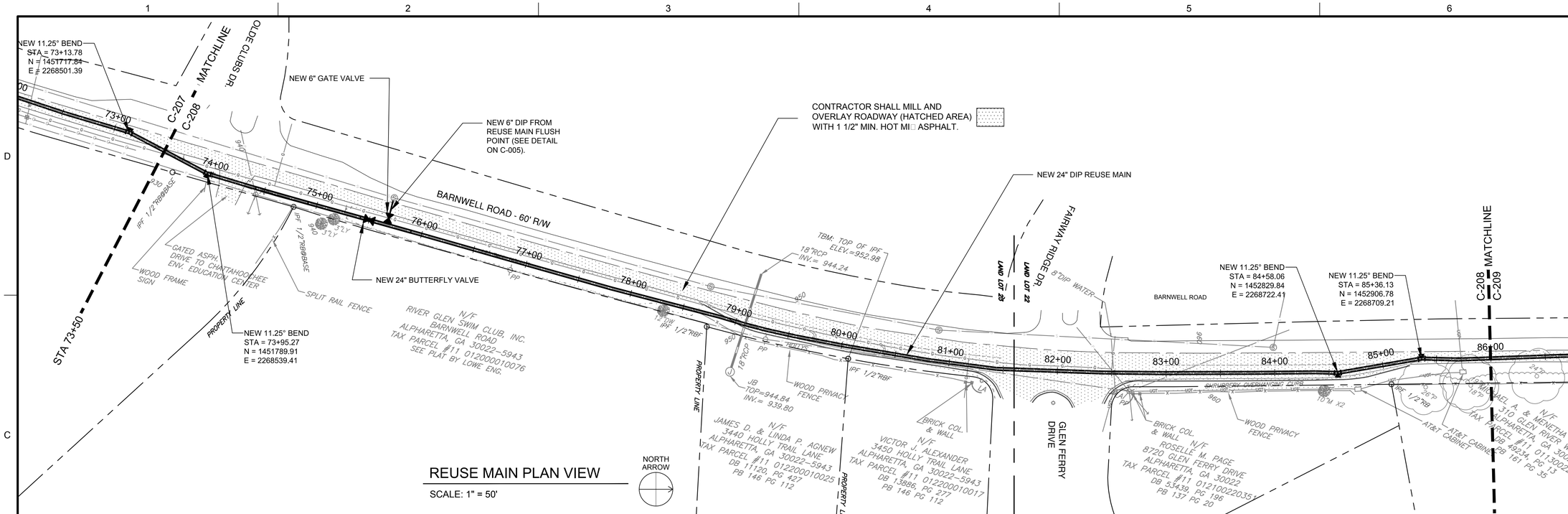
CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-207

SHEET NUMBER
26 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 2:23 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na - e - g
CCGS FOD.tif



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

1. MULTIPLE WATER SERVICE LINES, GAS SERVICE LINES AND OTHER UTILITIES ALONG THE ROUTE, ALL OF WHICH MAY NOT BE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING UTILITY SERVICES TO CUSTOMERS ALONG THE ROUTE, INCLUDING THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED SERVICES AS SOON AS POSSIBLE.
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3. DUCTILE IRON PIPE SHALL BE WRAPPED WITH POLYETHYLENE PIPE WRAP IN PHASE 1 FROM STA 1+16.50 TO EXISTING TIE-IN, IN PHASE 2 FROM STA. 6+00 TO STA. 37+00, AND WHERE WITHIN 10 FEET OF AN EXISTING STEEL GAS LINE.
4. THE TOP 60% OF THE NEW REUSE MAIN TO BE PAINTED PURPLE FOR THE ENTIRE LENGTH OF PIPE PER THE SPECIFICATIONS.

COLOR CODES FOR UTILITY LOCATING
RED — ELECTRIC
YELLOW — GAS-OIL
ORANGE — TELEPHONE/CATV
BLUE — WATER
GREEN — SEWER
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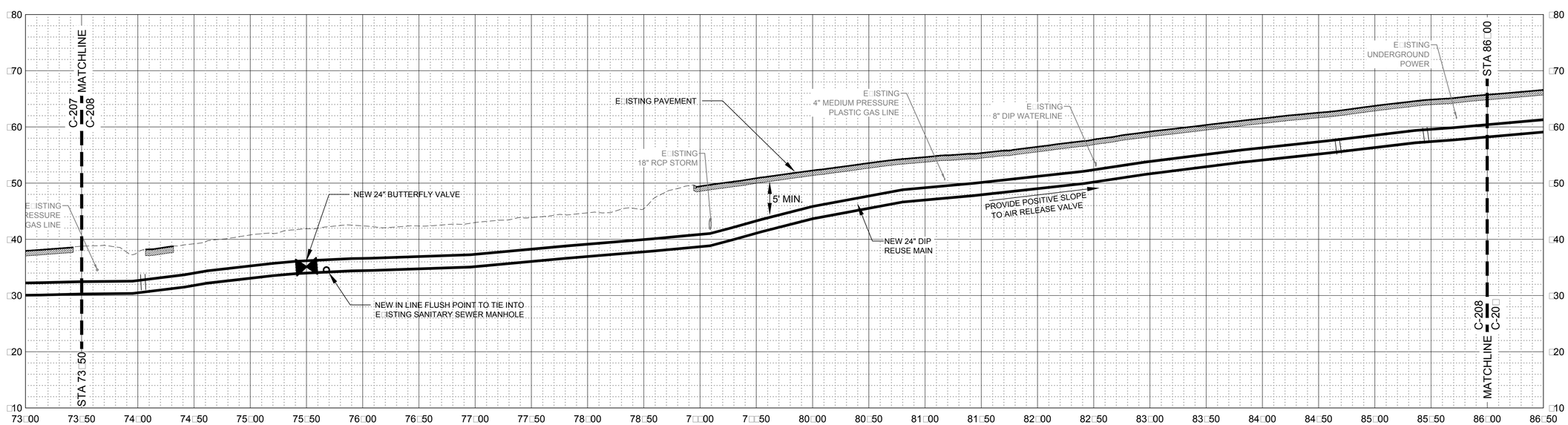
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

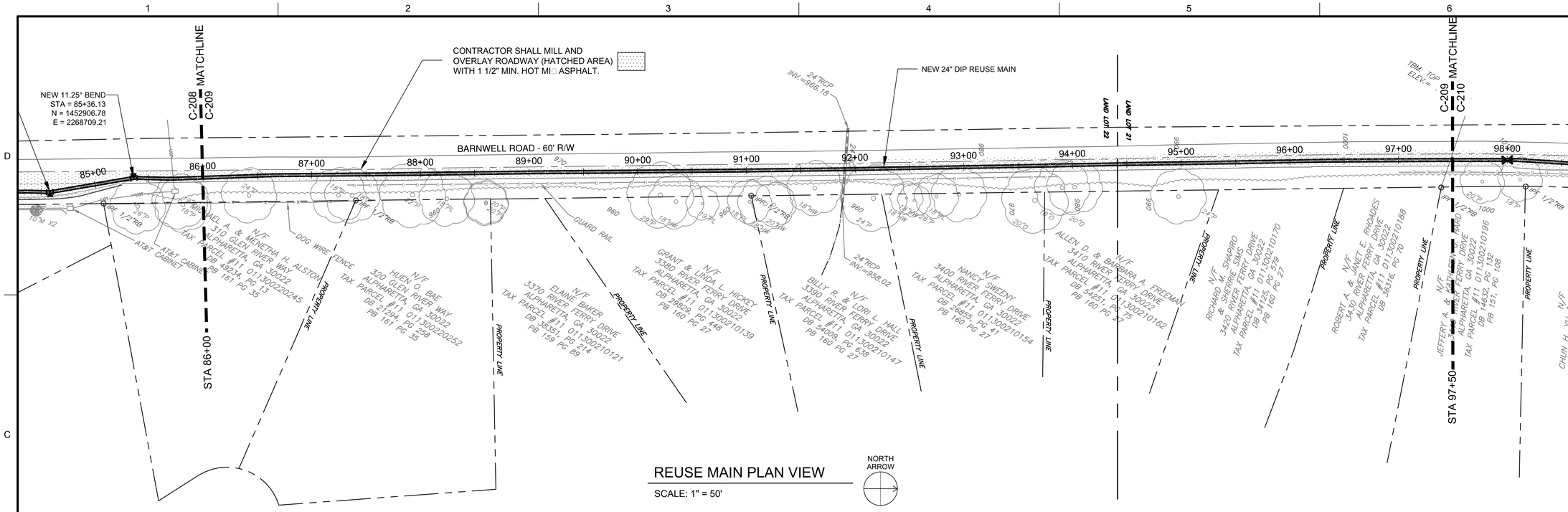
CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-208

SHEET NUMBER
27 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 2:24 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na - e - g
CCOS FOD Logo



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NORTH ARROW

NOTES:

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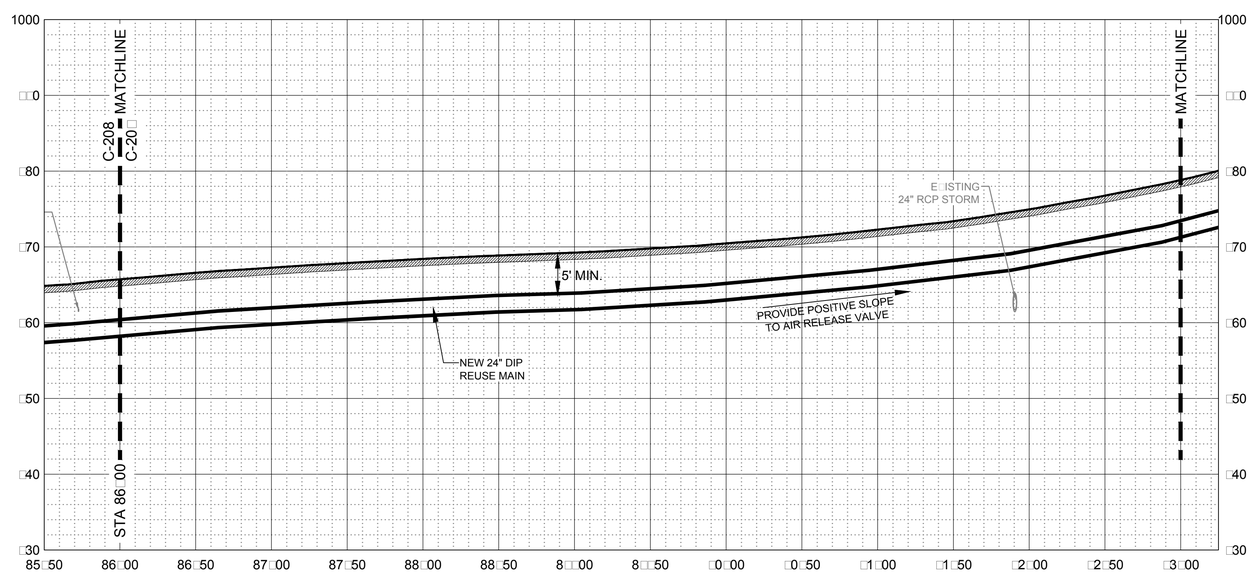
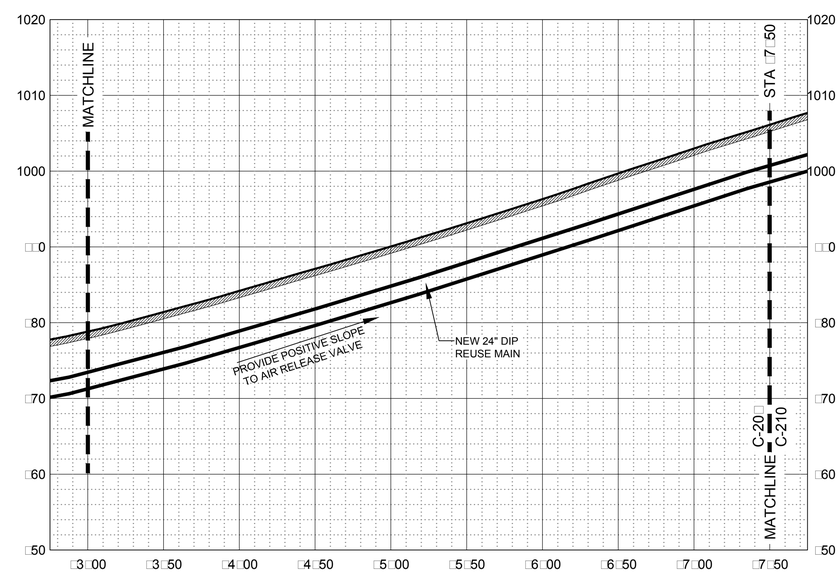
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10





REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

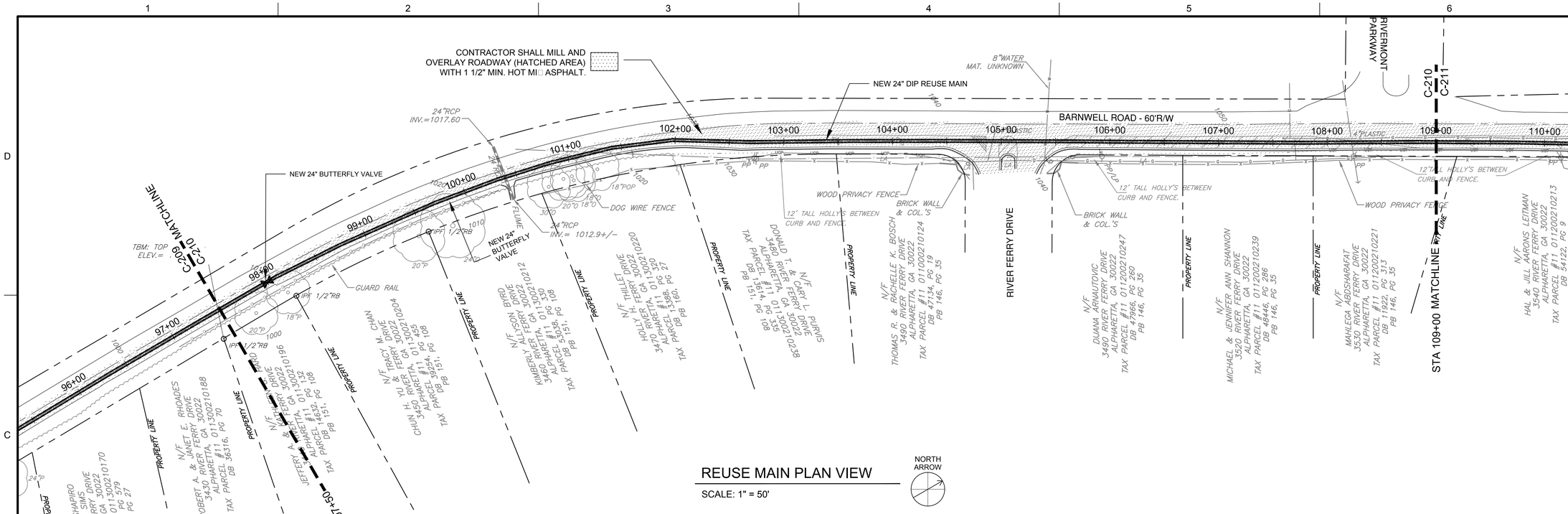
CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-20

SHEET NUMBER
28 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 2:26 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e_g
CCOS POD HLS
PROFILES.DWG



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

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YELLOW GAS-OIL
ORANGE TELEPHONE/CTV
BLUE WATER
GREEN SEWER
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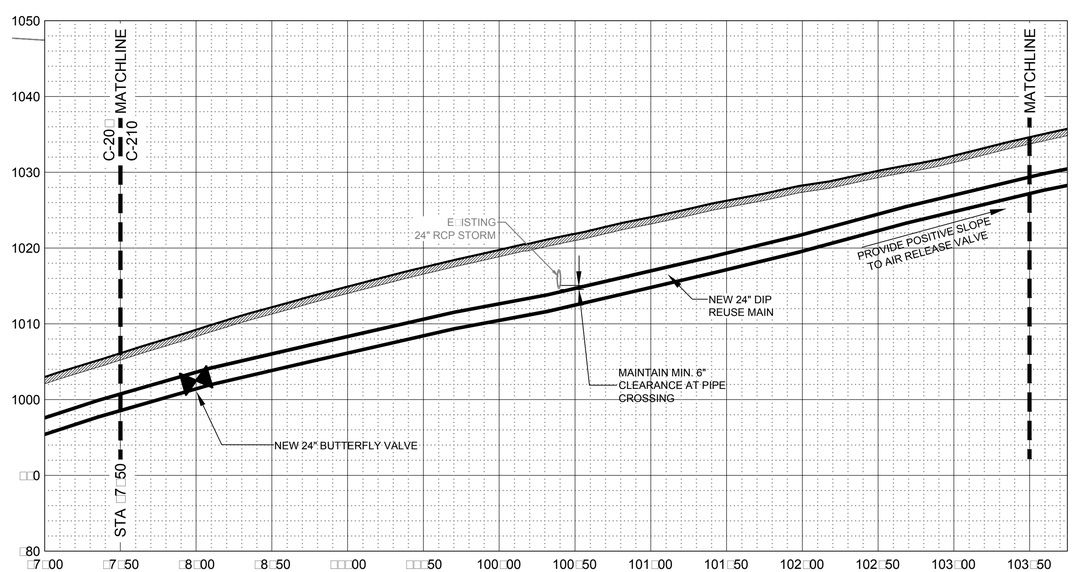
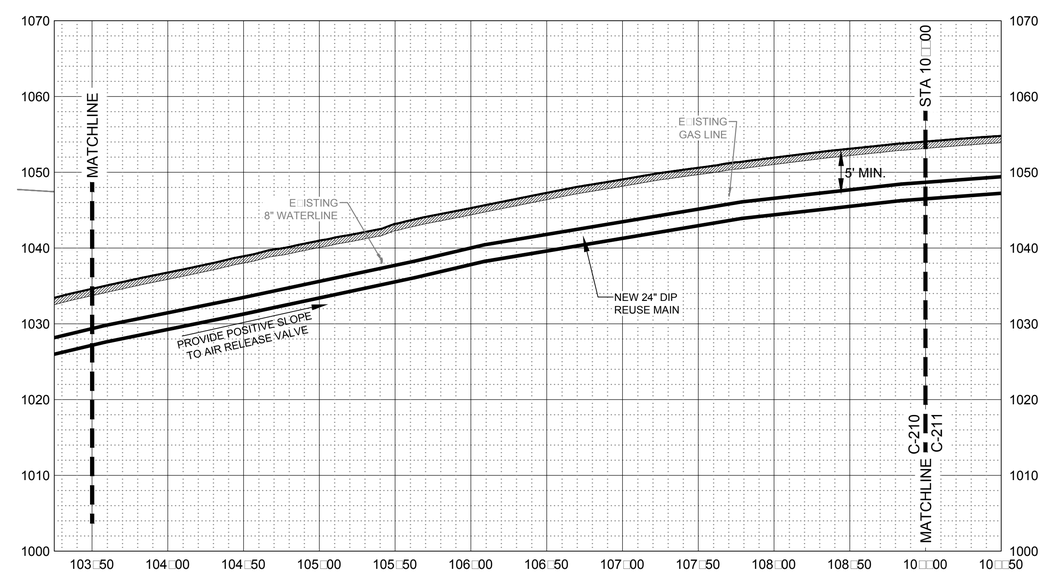
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI ONTAL SCALE 1:50
VERTICAL SCALE 1:10





REUSE MAIN PROFILE VIEW

HORI ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SI E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER 148787
CLIENT PROJECT NUMBER FCDWR PROJECT 15E-BC04

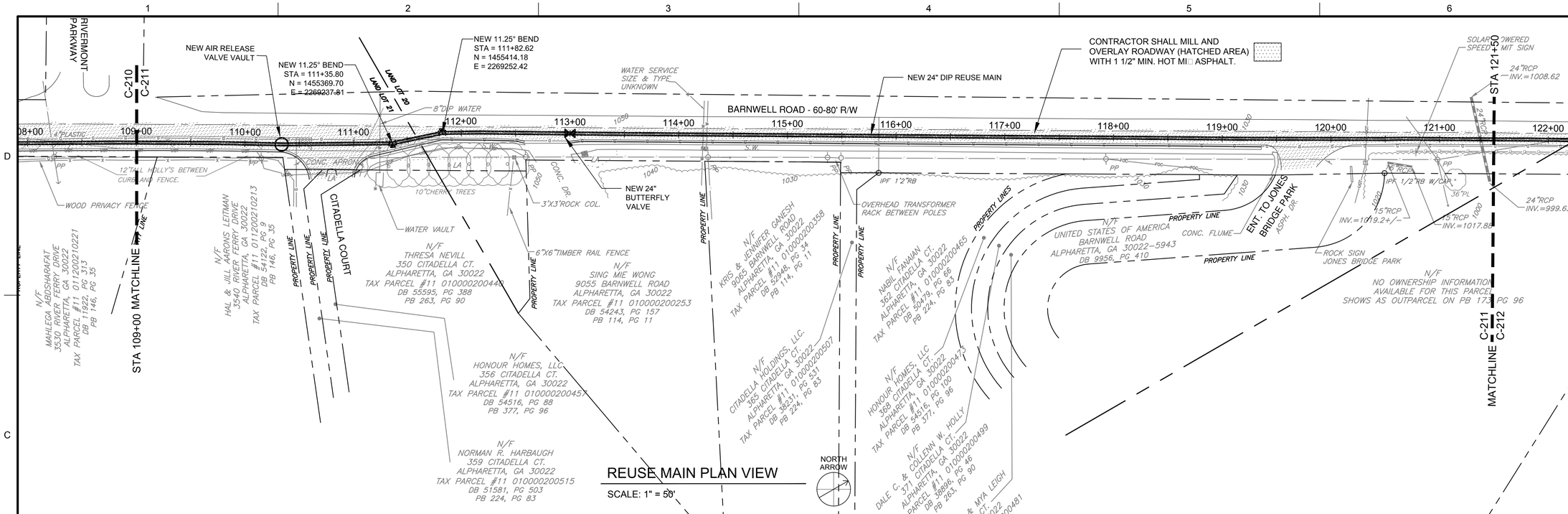
CIVIL

PHASE 2 REUSE MAIN PLAN / PROFILE

DRAWING NUMBER
C-210

SHEET NUMBER
2 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: 28/2016 2:28 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e g CCGS FOD H



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

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3. DUCTILE IRON PIPE SHALL BE WRAPPED WITH POLYETHYLENE PIPE WRAP IN PHASE 1 FROM STA 1[illegible]6[illegible]50 TO EXISTING TIE-IN, IN PHASE 2 FROM STA. 6[illegible]00 TO STA. 37[illegible]00, AND WHERE WITHIN 10 FEET OF AN EXISTING STEEL GAS LINE.
4. THE TOP 60[illegible] OF THE NEW REUSE MAIN TO BE PAINTED PURPLE FOR THE ENTIRE LENGTH OF PIPE PER THE SPECIFICATIONS.

COLOR CODES FOR UTILITY LOCATING
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YELLOW GAS-OIL
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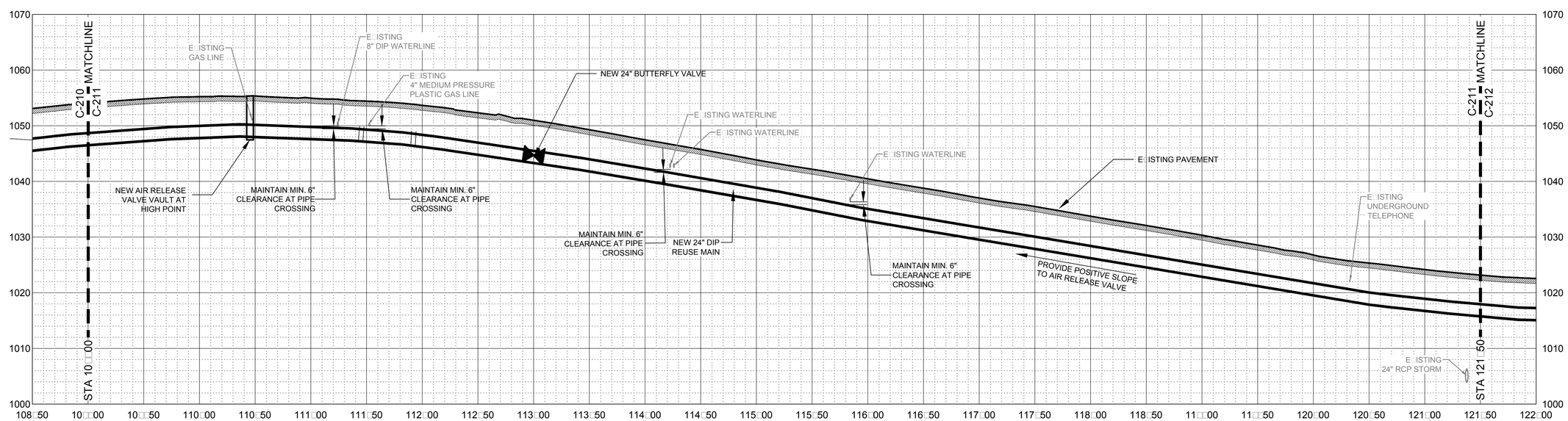
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER 148787
CLIENT PROJECT NUMBER FCDWR PROJECT [illegible]15E-BC04

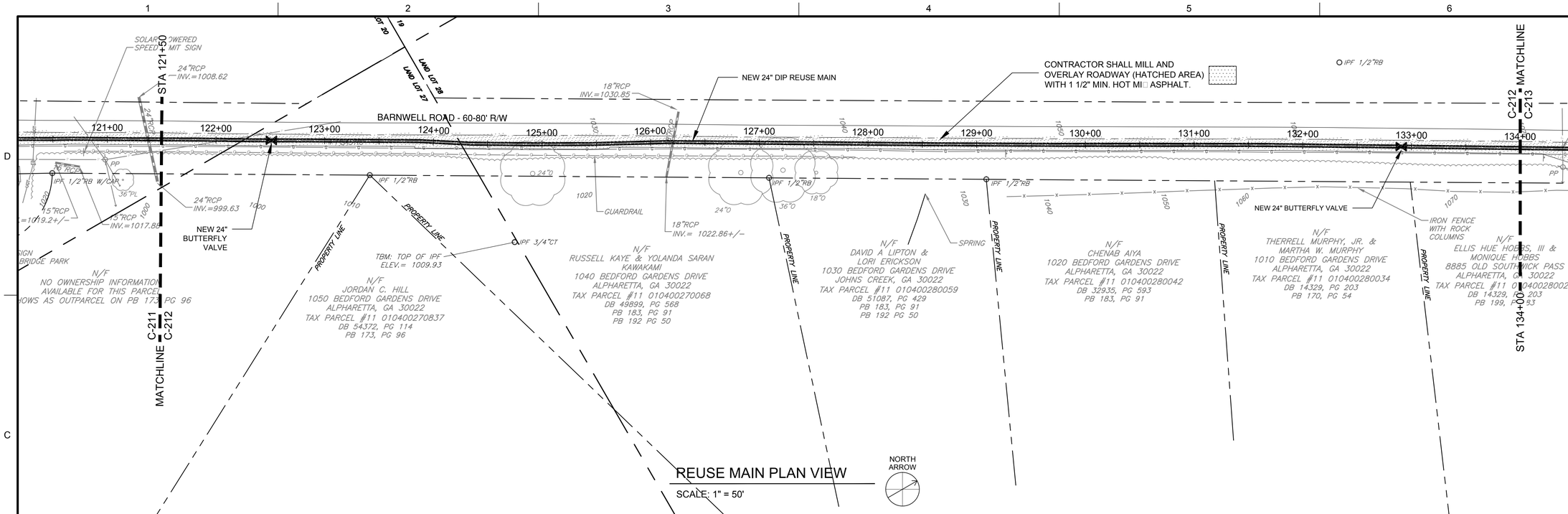
CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-211

SHEET NUMBER
30 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-RM PLAN-PROFILES.DWG PLOT DATE: [illegible]/28/2016 2:2[illegible] PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e[illegible]g CCOS POD HL[illegible]



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

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GREEN SEWER
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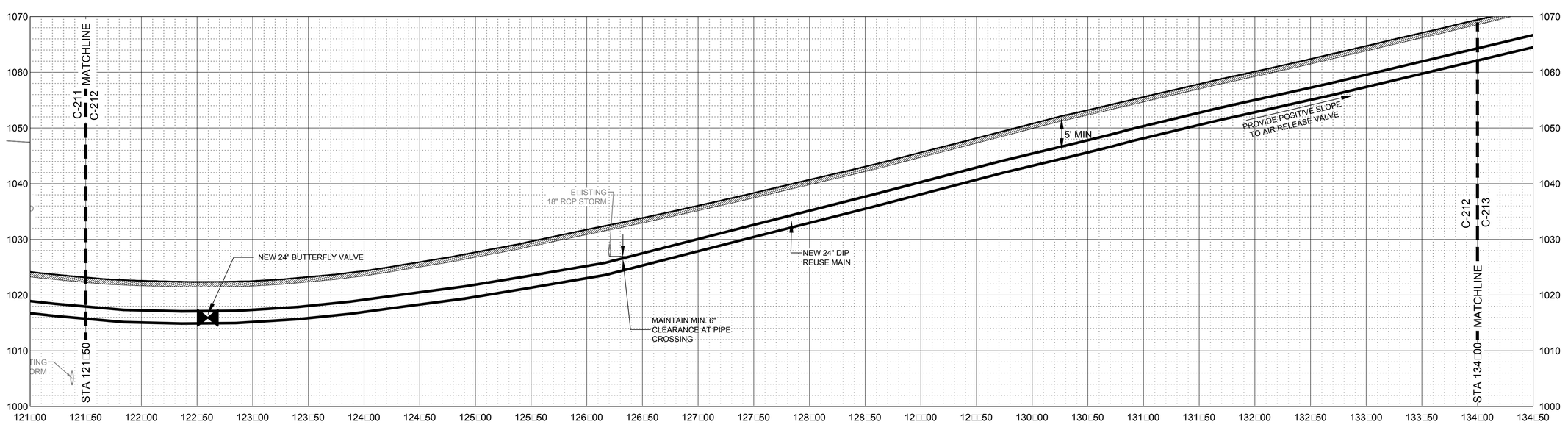
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORI ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE. 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION
----	----	----

LINE IS 2 INCHES AT FULL SI E

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 2
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-212

SHEET NUMBER
31 OF 77

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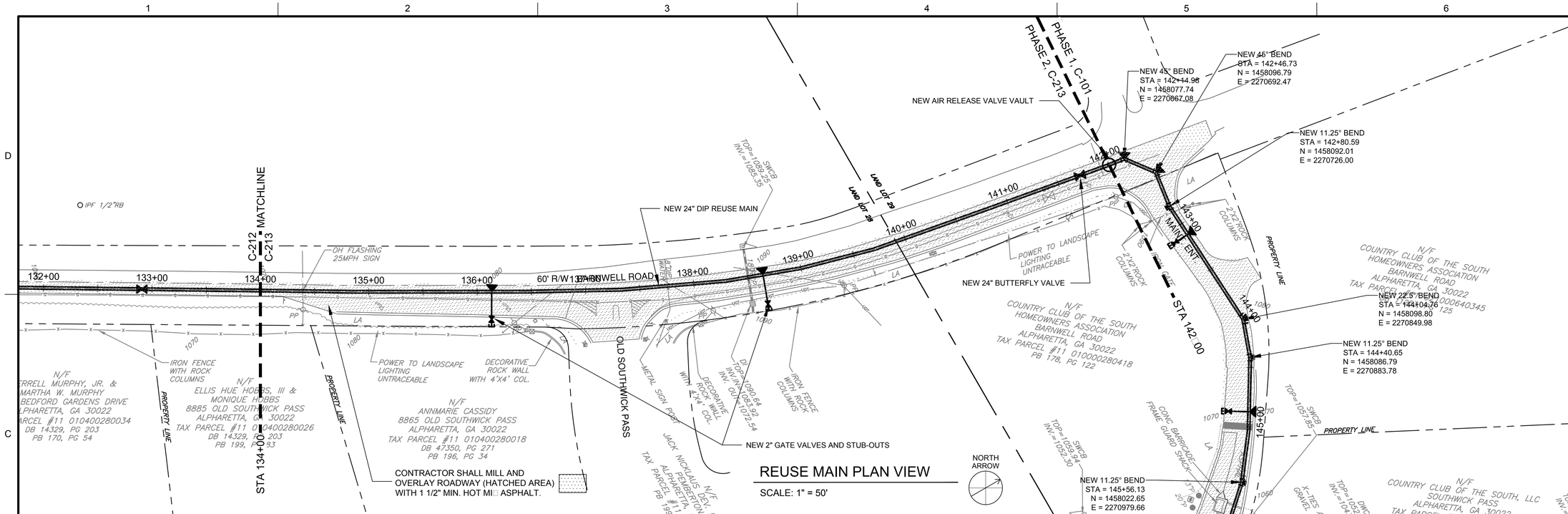
Fulton Logo w.na e g CCGS POD HL



REUSE MAIN PLAN VIEW

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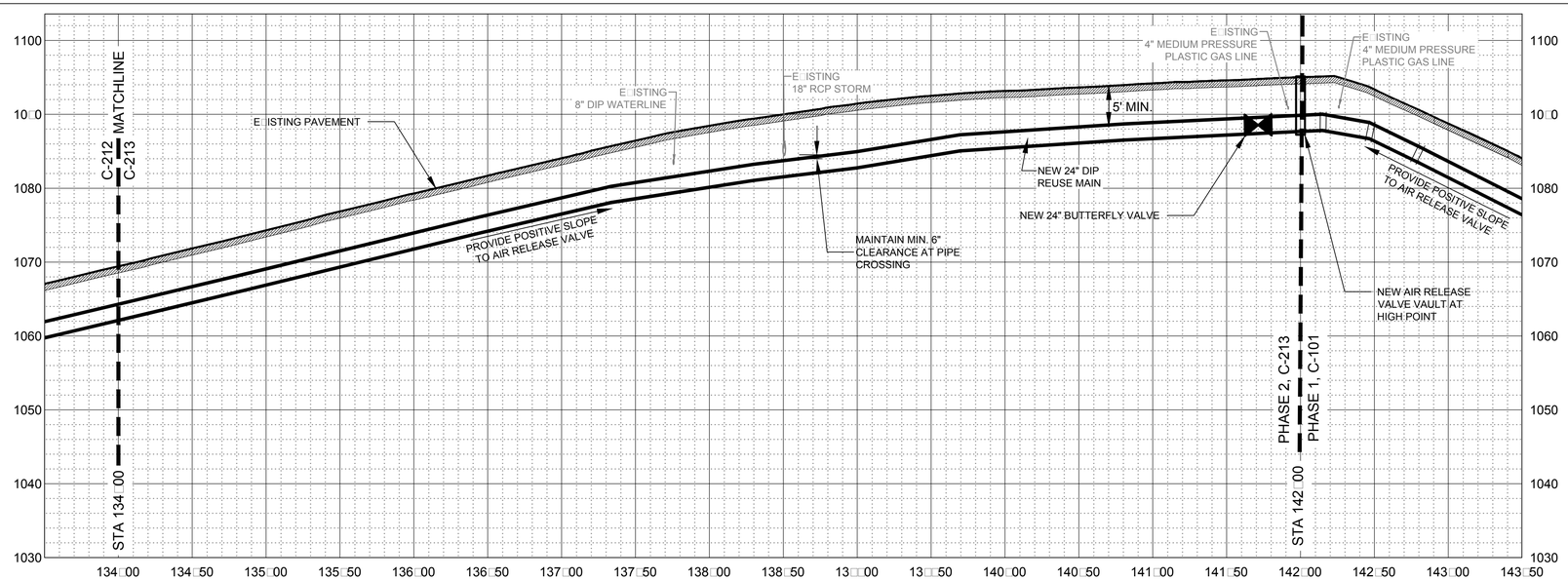
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	C. STANFIELD
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 2
REUSE MAIN
PLAN/PROFILE

DRAWING NUMBER
C-213

SHEET NUMBER
32 OF 77

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CCOS POD Hor

REUSE MAIN KEY MAP

SCALE: 1" = 200'

PLAN NORTH

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-BOLES RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 2:53 PM CAD USER: KATHRYNA CLARKE

Fulton Logo w-na e..g
20160808 12475 Unified..g
COMM PARK..g

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SI E

DESIGNED:	D. MURPHY
DRAWN:	K. CLARKE
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-BOLES RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

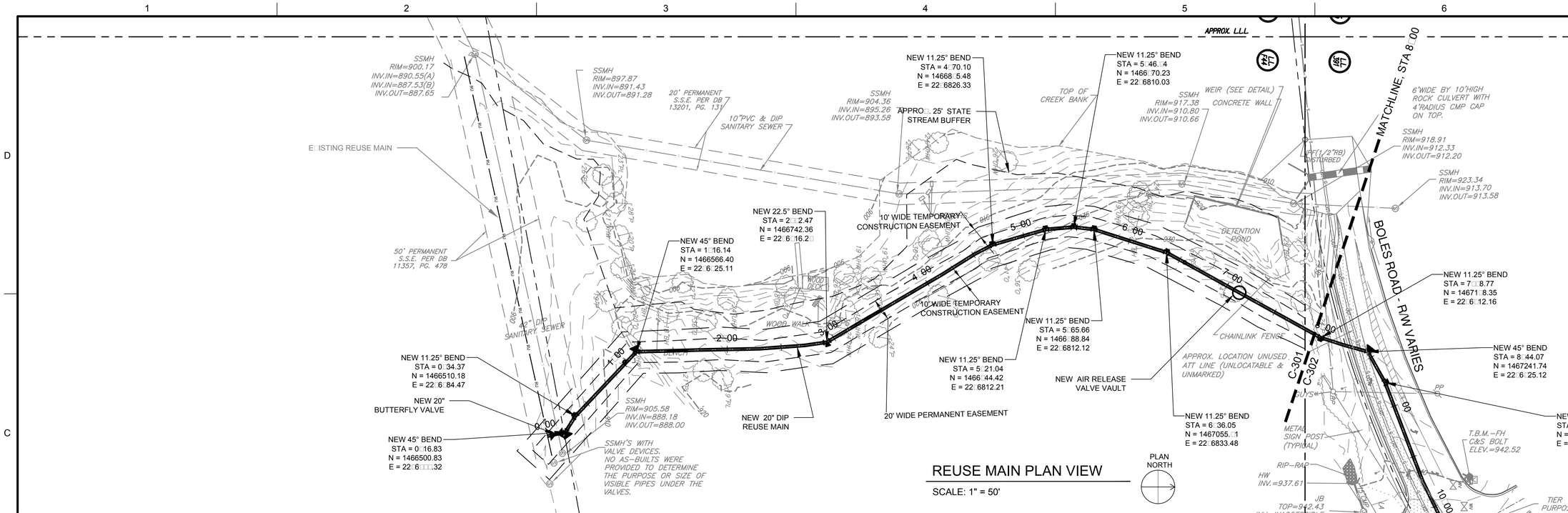
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

CIVIL

PHASE 3
KEY MAP

DRAWING NUMBER
C-300

SHEET NUMBER
33 OF 77



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

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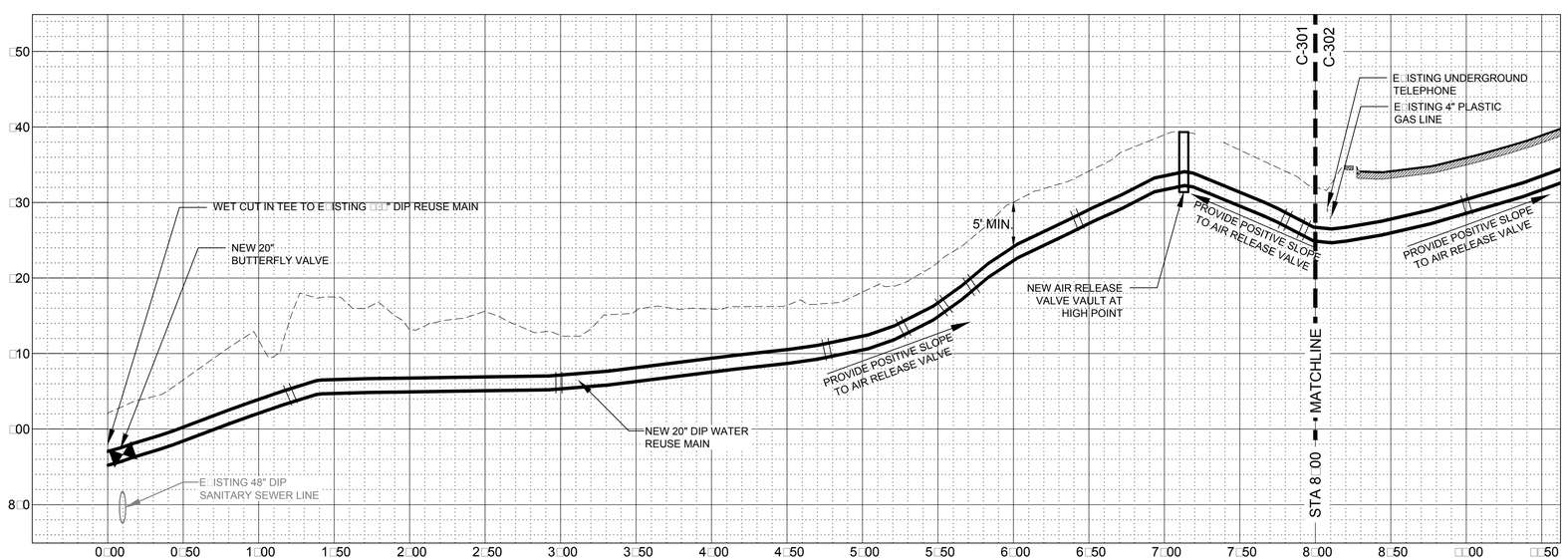
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORI□ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE. 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	K. CLARKE
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

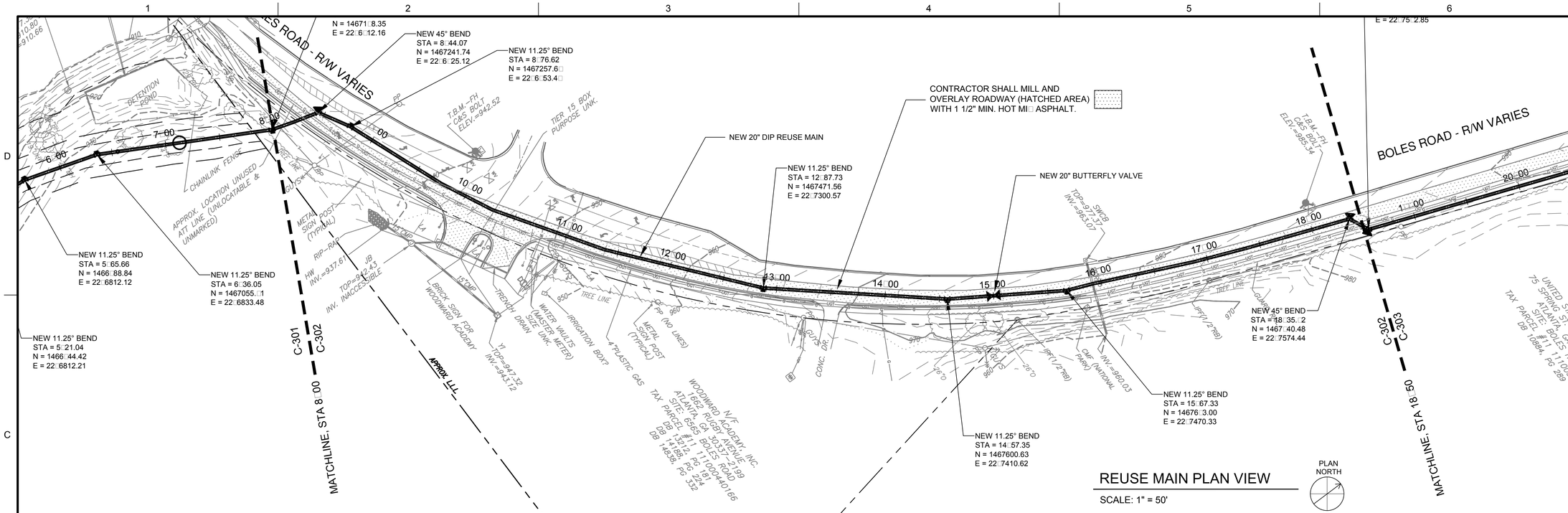
FILENAME
C-BOLES RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

PHASE 3
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-301
SHEET NUMBER
34 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-BOLES RM PLAN-PROFILES.DWG PLOT DATE: □/28/2016 2:52 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e□g 20160082425 Unified□g COMM PARK□g



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

NOTES:

1. MULTIPLE WATER SERVICE LINES, GAS SERVICE LINES AND OTHER UTILITIES CROSS THE ROAD ALONG THE ROUTE, ALL OF WHICH MAY NOT BE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING UTILITY SERVICES TO CUSTOMERS ALONG THE ROUTE, INCLUDING THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGED SERVICES AS SOON AS POSSIBLE.
2. EXISTING UTILITIES ARE SHOWN AS APPROXIMATE ON PLAN AND PROFILE VIEWS. CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES.
3. DUCTILE IRON PIPE SHALL BE WRAPPED WITH POLYETHYLENE PIPE WRAP WHEN WITHIN 10 FEET OF AN EXISTING STEEL GAS LINE.
4. THE TOP 60% OF THE NEW REUSE MAIN TO BE PAINTED PURPLE FOR THE ENTIRE LENGTH OF PIPE PER THE SPECIFICATIONS.

COLOR CODES FOR UTILITY LOCATING
RED — ELECTRIC
YELLOW — GAS-OIL
ORANGE — TELEPHONE/CATV
BLUE — WATER
GREEN — SEWER
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Utilities Protection Center,Inc.

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811
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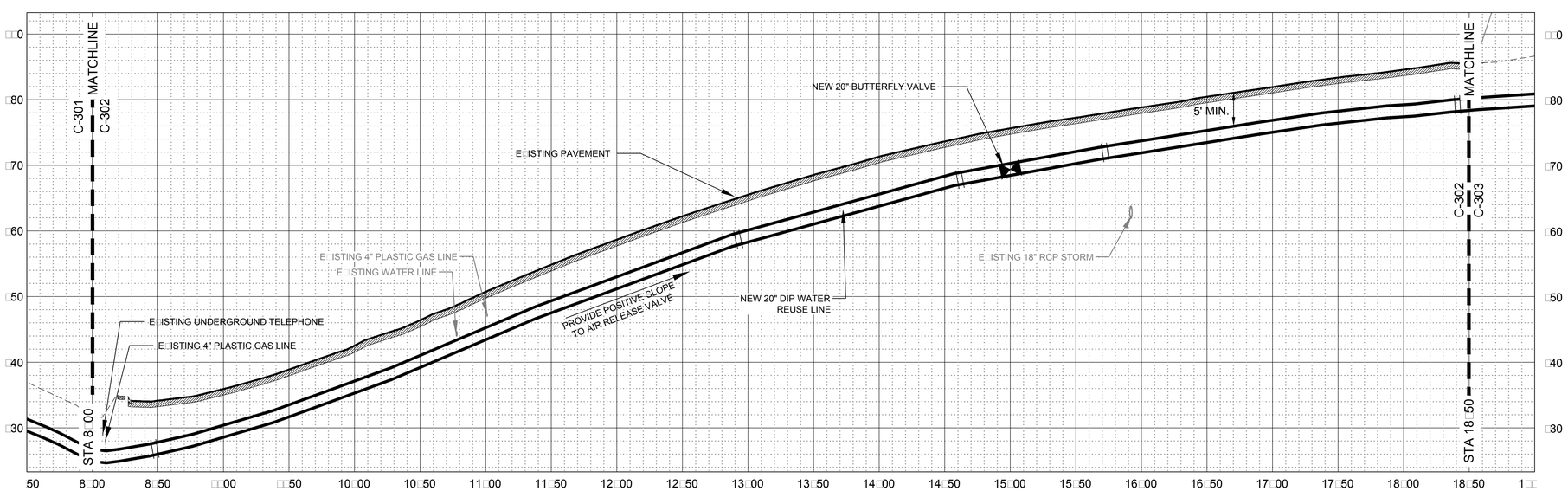
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	D. MURPHY
DRAWN:	K. CLARKE
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-BOLES RM PLAN-PROFILES.DWG
BC PROJECT NUMBER
148787
CLIENT PROJECT NUMBER
FCDWR PROJECT 15E-BC04

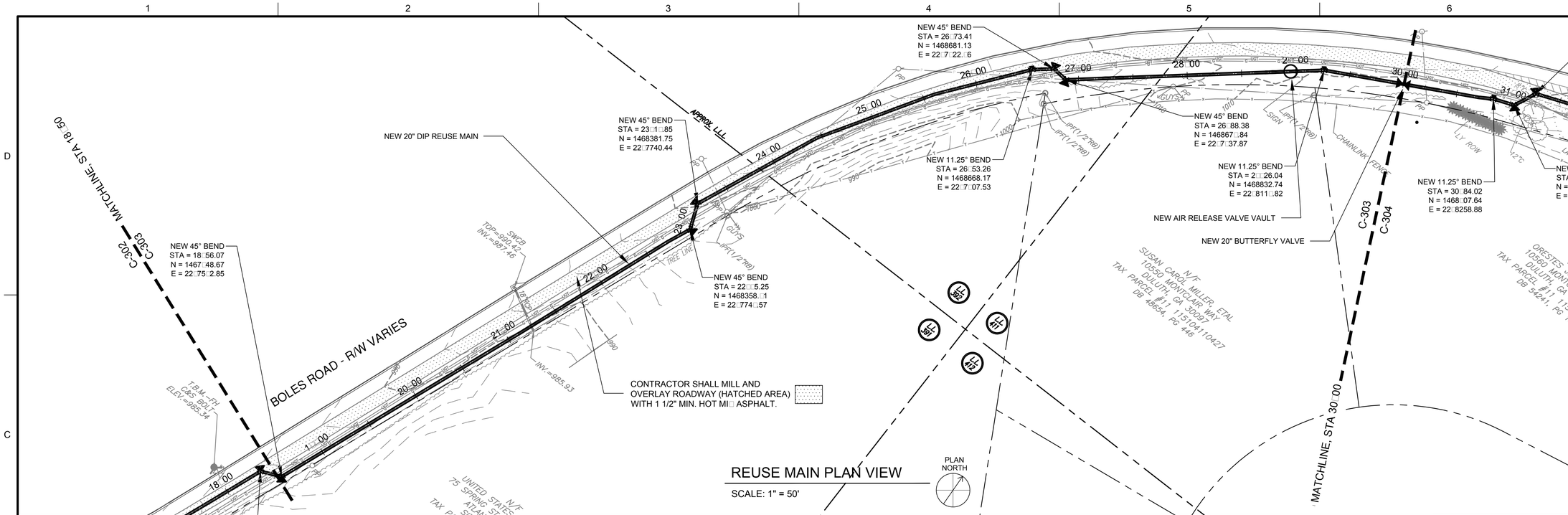
CIVIL

PHASE 3
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-302

SHEET NUMBER
35 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-BOLES RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 2:52 PM CAD USER: KATHRYNA CLARKE
Fulton Logo.wmf
20160682425 - Unified Land Development Ordinance
COMM PARK



REUSE MAIN PLAN VIEW

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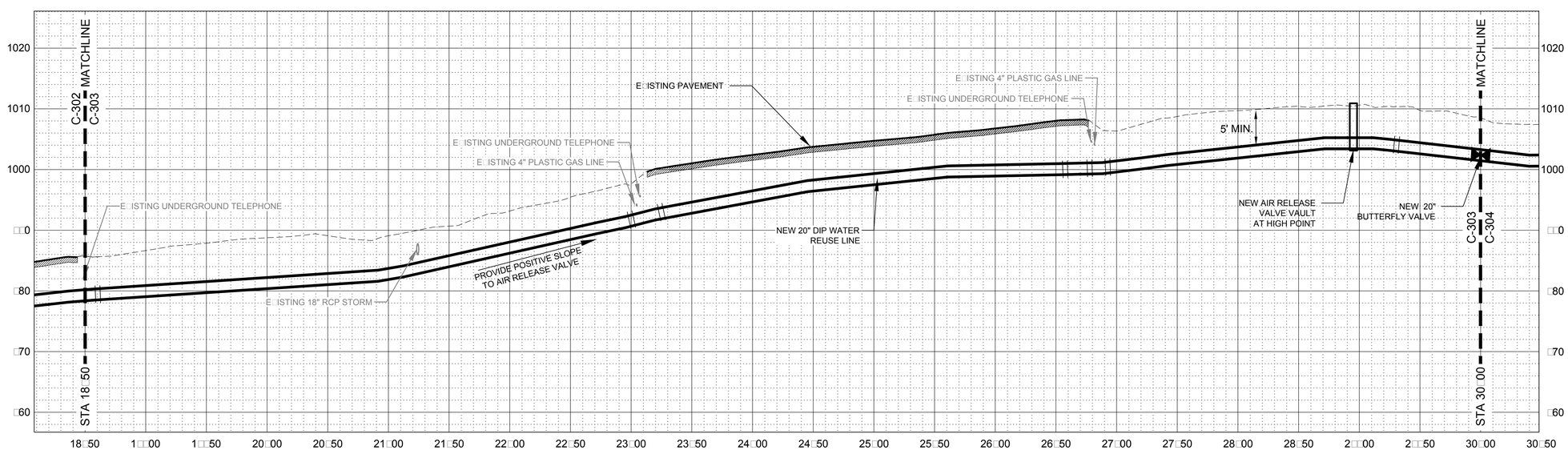
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10



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FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

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LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	K. CLARKE
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FILENAME
C-BOLES RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

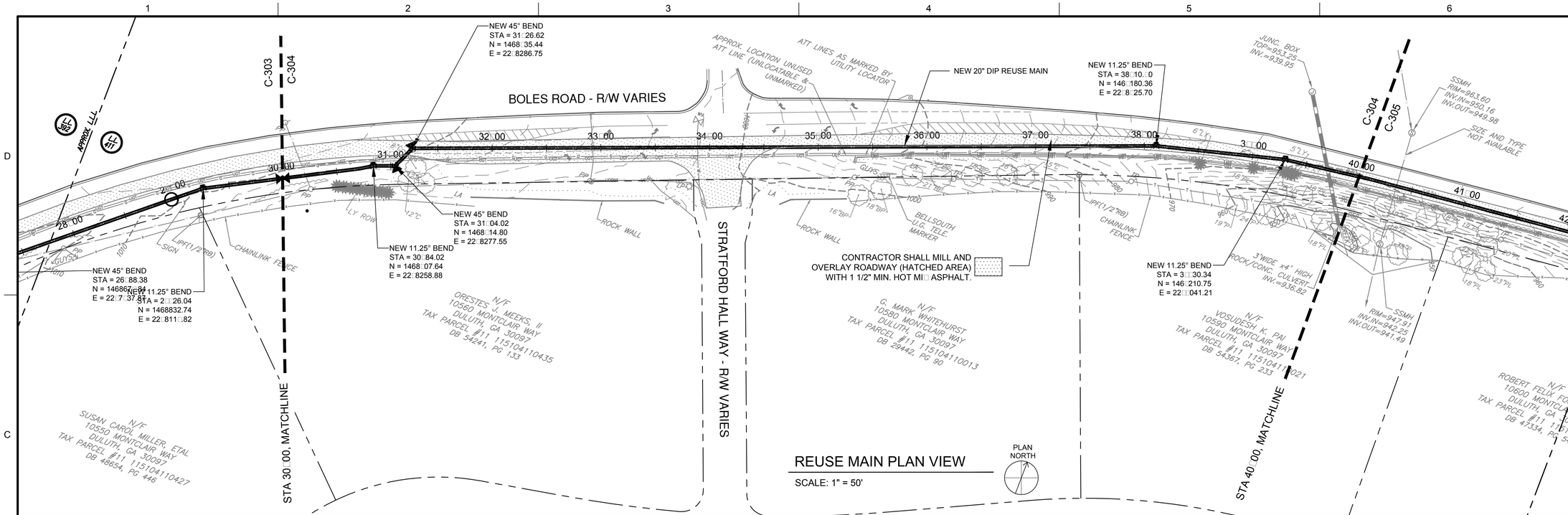
CIVIL

PHASE 3
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-303

SHEET NUMBER
36 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-BOLES RM PLAN-PROFILES.DWG PLOT DATE: □/28/2016 2:51 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e□g 20160682425 Unsiec□□g COMM PARK □g



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YELLOW GAS-OIL
ORANGE TELEPHONE/CATV
BLUE WATER
GREEN SEWER
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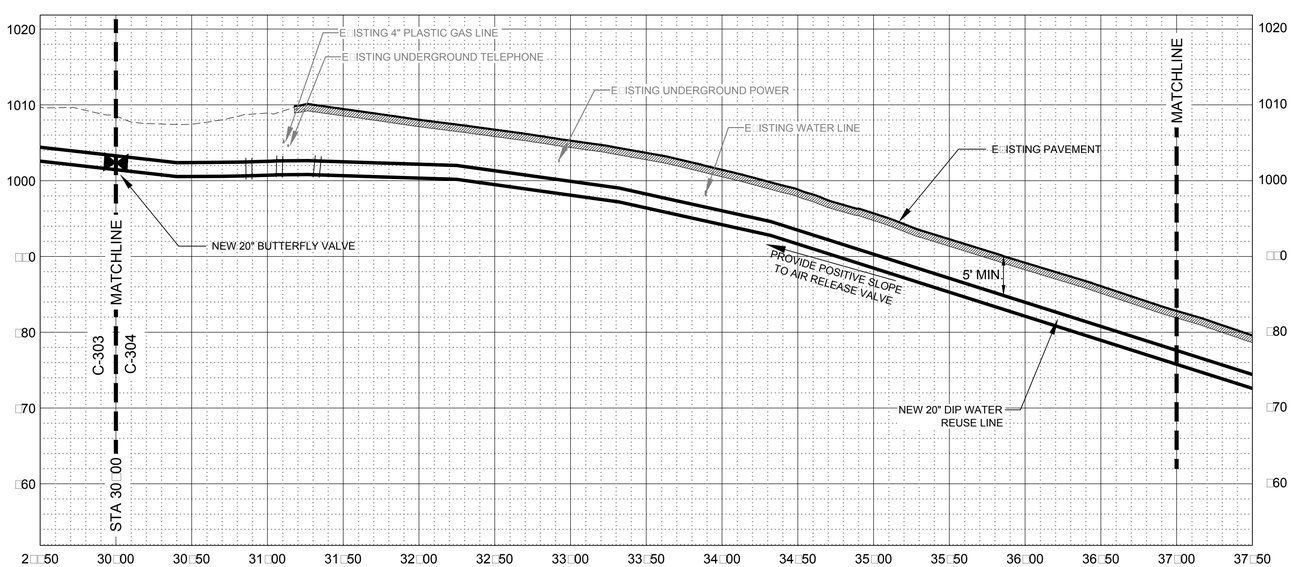
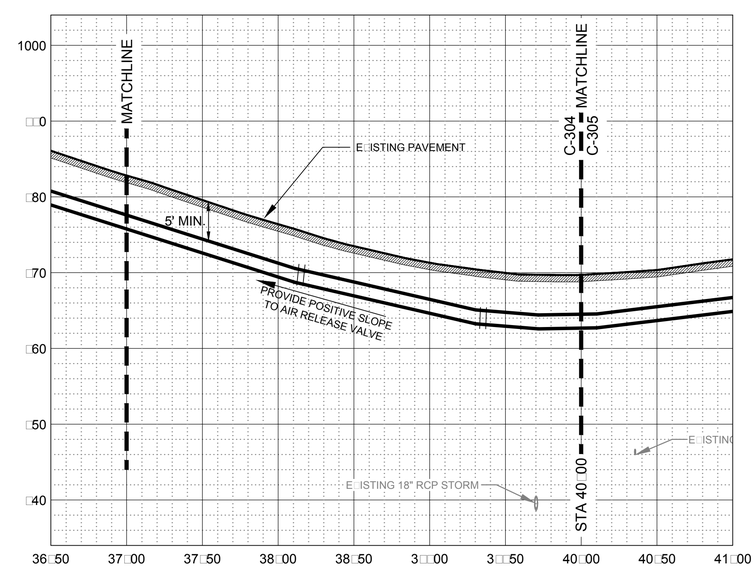
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI□ONTAL SCALE 1:50
VERTICAL SCALE 1:10





REUSE MAIN PROFILE VIEW

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VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE. 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SI□E

DESIGNED:	D. MURPHY
DRAWN:	K. CLARKE
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME
C-BOLES RM PLAN-PROFILES.DWG

BC PROJECT NUMBER
148787

CLIENT PROJECT NUMBER
FCDWR PROJECT □15E-BC04

CIVIL

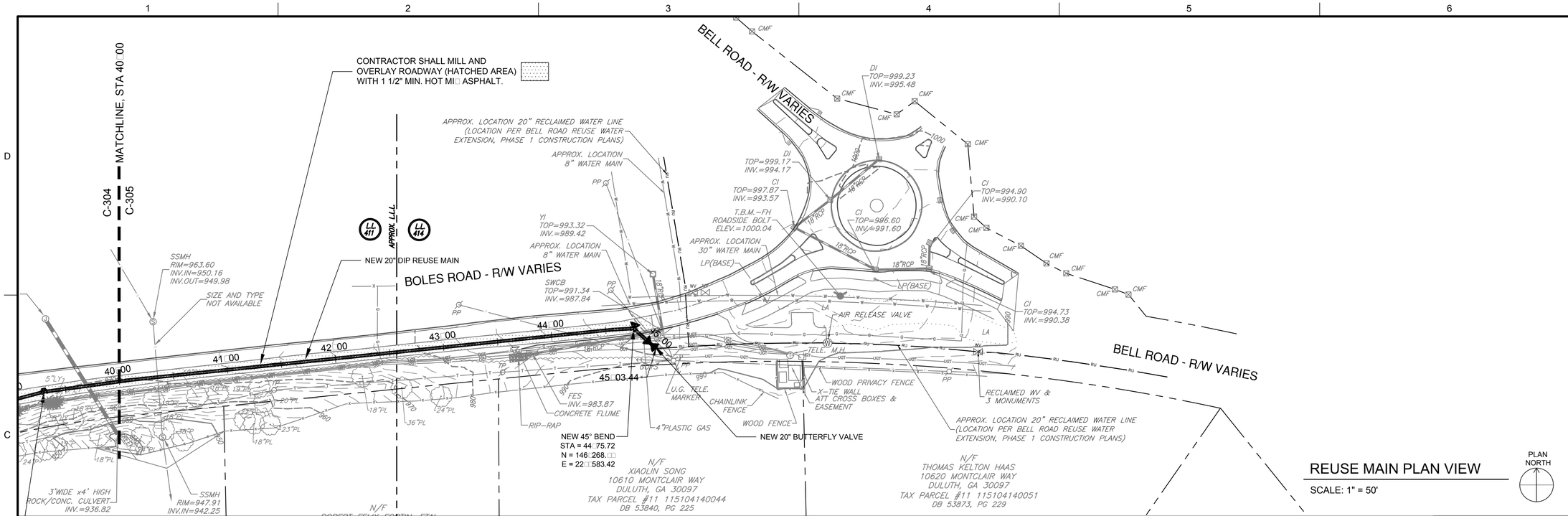
PHASE 3
REUSE MAIN
PLAN / PROFILE

DRAWING NUMBER
C-304

SHEET NUMBER
37 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-BOLES RM PLAN-PROFILES.DWG PLOT DATE: □/28/2016 2:50 PM CAD USER: KATHRYNA CLARKE

Fulton Logo w-na e□g
20160608124?5 □unified□□g
COMM PARK □g



REUSE MAIN PLAN VIEW

SCALE: 1" = 50'

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YELLOW GAS-OIL
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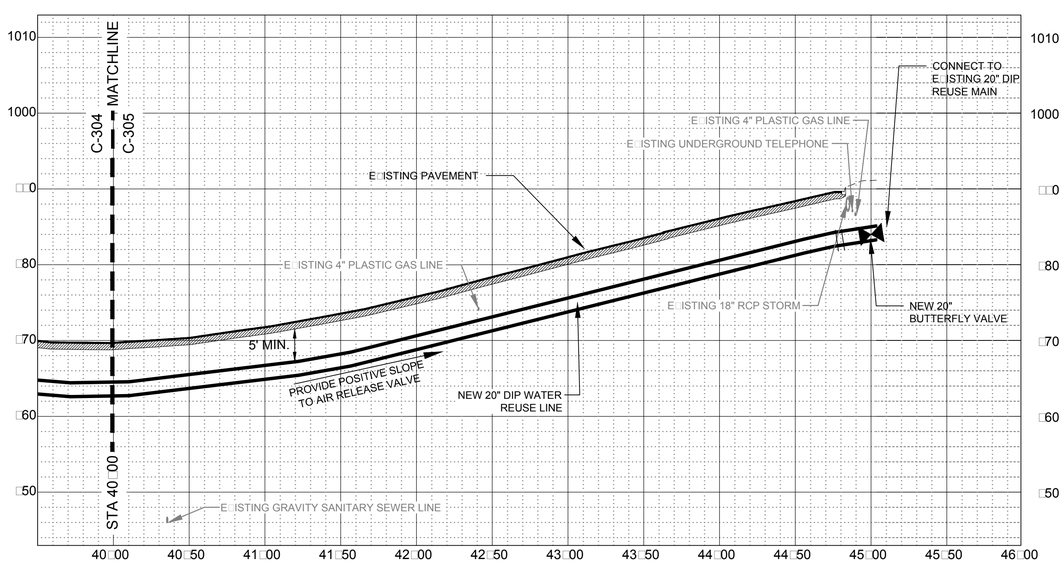
PLAN VIEW
0 50 100
SCALE IN FEET

PROFILE VIEW
HORI ONTAL SCALE 1:50
VERTICAL SCALE 1:10



REUSE MAIN PROFILE VIEW

HORI ONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

Brown AND Caldwell
990 HAMMOND DRIVE
SUITE 400
ATLANTA, GEORGIA

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PE 038551 PROFESSIONAL ENGINEER DANIEL L. MURPHY

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SI E

DESIGNED:	D. MURPHY
DRAWN:	----
CHECKED:	D. MURPHY
CHECKED:	S. ADAMS
APPROVED:	A. PANDYA

FILENAME C-BOLES RM PLAN-PROFILES.DWG
BC PROJECT NUMBER 148787
CLIENT PROJECT NUMBER FCDWR PROJECT 15E-BC04

CIVIL

PHASE 3 REUSE MAIN PLAN / PROFILE

DRAWING NUMBER
C-305

SHEET NUMBER
38 OF 77

Path: P:\FULTON\148787 - REUSE WATER LINE\ CAD\2-SHEETS\C-CIVIL FILENAME: C-BOLES RM PLAN-PROFILES.DWG PLOT DATE: 7/28/2016 2:48 PM CAD USER: KATHRYNA CLARKE
Fulton Logo w-na e g 20160682425 Unsiled g COMM PARK g

GENERAL ES&PC NOTES:

OWNER/DEVELOPER:

FULTON COUNTY
DEPARTMENT OF WATER RESOURCES
141 PRYOR STREET, SUITE 8001
ATLANTA, GA 30303
(404) 612–7556

24–HOUR EROSION CONTROL CONTACT

KHAFRA ENGINEERING CONSULTANTS
MERIDETH POOL, PE
(706) 250–3056

PROJECT ACREAGE: 7.78± AC
PHASE I: 2.010± AC
PHASE II: 4.006± AC
PHASE III: 1.765± AC

TOTAL DISTURBED ACREAGE: 7.78± AC
PHASE I: 2.010± AC
PHASE II: 4.006± AC
PHASE III: 1.765± AC

THERE ARE NO ON–SITE WETLANDS. THERE ARE STATE WATERS WITHIN 200' OF THIS PROJECT. THERE ARE AREAS OF IMPACT ON THE UNDISTURBED BUFFERS OF STATE WATERS. THE BUFFER IMPACTS FALL WITHIN THE CRITERIA FOR AND ARE CONSIDERED EXEMPT FROM REQUIRING A BUFFER VARIANCE.
THE RECEIVING WATERS FOR ALL THREE PHASES OF THIS PROJECT ARE UNNAMED TRIBUTARIES OF THE CHATTAHOOCHEE RIVER. THE SEGMENT OF THE CHATTAHOOCHEE RIVER RECEIVING RUNOFF IS NOT LISTED ON THE 305(b)/303(d) LIST FOR BIO F OR BIO M.

WATER FROM THIS PROJECT SITE FLOWS INTO EXISTING STORM PIPES AND ROADSIDE DITCHES. WATER IS DISCHARGED FROM THE STORM PIPES INTO DITCHES THAT LEAD TO UNNAMED TRIBUTARIES OF THE CHATTAHOOCHEE RIVER, WHICH SUPPORTS WARM WATER FISHERIES. THERE ARE NO ANTICIPATED IMPACTS TO ANY DOWNSTREAM OR NEIGHBORING AREAS AS A RESULT OF THIS DEVELOPMENT. THERE ARE NO ANTICIPATED STORM WATER POLLUTANTS EXPECTED AS A RESULT OF THE COMPLETED PROJECT AND THUS NO CONTROLS OF STORM WATER POLLUTANTS ARE NECESSARY.

THERE ARE NO CRITICAL AREAS FOR THIS PROJECT. THERE ARE SENSITIVE AREAS FOR THIS PROJECT. ALL THREE PHASES OF THE PROJECT ARE LOCATED WITHIN RESIDENTIAL AREAS AND THUS ARE CONSIDERED SENSITIVE AREAS.

THE PRE–CONSTRUCTION ESTIMATE OF THE RUNOFF COEFFICIENT FOR THIS SITE IS C=0.90. THE POST–CONSTRUCTION ESTIMATE OF THE RUNOFF COEFFICIENT FOR THIS SITE IS C=0.90.

THERE ARE OFFSITE DRAINAGE AREAS THAT CONTRIBUTE RUNOFF THROUGH THE PROJECT.

THIS PROJECT WILL NOT CREATE ANY NEW IMPERVIOUS SURFACES.

THE LIMITS OF DISTURBANCE SHOWN REMAINS THE SAME FOR ALL PHASES OF CONSTRUCTION.

SEDIMENT STORAGE IS PROVIDED USING THE SILT FENCE. ADDITIONAL SEDIMENT STORAGE IS IMPRACTICAL DUE TO THE LINEAR NATURE OF THE CONSTRUCTION ACTIVITY.

THE SOIL SERIES FOR THIS PROJECT ARE
PHASE I:
- UfC2 (URBAN LAND–CECIL COMPLEX)
- UgE (URBAN LAND–GROVER–MOUNTAIN PARK COMPLEX)
- UmC2 (URBAN LAND–MADISON–BETHLEHEM COMPLEX)
- UrE (URBAN LAND–RION COMPLEX)

PHASE II:
- CpA (CONGAREE SANDY LOAM)
- GaE (GROVER–MOUNTAIN PARK COMPLEX)
- GaF (GROVER–MOUNTAIN PARK COMPLEX)
- HbC (HIWASEE SANDY LOAM)
- MdC2 (MADISON–BETHLEHEM COMPLEX)
- ReD (RION SANDY LOAM)
- Ub (URBAN LAND)
- UfC2 (URBAN LAND–CECIL COMPLEX)
- UgE (URBAN LAND–GROVER–MOUNTAIN PARK COMPLEX)
- UmC2 (URBAN LAND–MADISON–BETHLEHEM COMPLEX)
- UrE (URBAN LAND–RION COMPLEX)

PHASE III:
- UfC2 (URBAN LAND–CECIL COMPLEX)
- UrE (URBAN LAND–RION COMPLEX)

PROJECT DESCRIPTION:
THE PROJECT CONSISTS OF THE FOLLOWING MAJOR CONSTRUCTION ELEMENTS:
PHASE I: APPROXIMATELY 6,850 LINEAR FEET OF 24 INCH DIAMETER DUCTILE IRON PIPE (D.I.P) WATER REUSE MAIN; TO BE INSTALLED WITHIN BARNWELL ROAD AND OLD ALABAMA ROAD RIGHTS–OF–WAY AND WITHIN PRIVATE ROADS OF THE COUNTRY CLUB OF THE SOUTH.
PHASE II: APPROXIMATELY 14,200 LINEAR FEET OF 24 INCH DIAMETER DUCTILE IRON PIPE (D.I.P) WATER REUSE MAIN; TO BE INSTALLED WITHIN THE RIGHTS–OF–WAY OF HOLCOMB BRIDGE ROAD (SR 140) AND BARNWELL ROAD.
PHASE III: APPROXIMATELY 4,500 LINEAR FEET OF 24 INCH DIAMETER DUCTILE IRON PIPE (D.I.P) WATER REUSE MAIN; TO BE INSTALLED WITHIN BOLES ROAD RIGHTS–OF–WAY, BETWEEN PARSONS ROAD (SR 120) AND BELL ROAD.

THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT 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 OR TEMPORARY SEEDING.

NON–EXEMPT ACTIVITIES SHALL NOT BE CONDUCTED WITHIN THE 25 OR 50–FOOT UNDISTURBED STREAM BUFFERS (AS MEASURED FROM THE POINT OF WRESTED VEGETATION) WITHOUT FIRST ACQUIRING THE NECESSARY VARIANCES AND PERMITS.

ANY AMENDMENTS OR REVISIONS TO THE APPROVED ES&PC PLAN WHICH HAVE SIGNIFICANT EFFECT ON BMPs WITH A HYDRAULIC COMPONENT MUST BE CERTIFIED BY THE DESIGN PROFESSIONAL. SUCH REVISIONS OR AMENDMENTS SHALL BE RESUBMITTED TO THE LOCAL ISSUING AUTHORITY FOR REVIEW.

WASTE DISPOSAL:
SOLID MATERIALS, INCLUDING BUILDING MATERIALS, WILL NOT BE DISCHARGED TO WATERS OF THE STATE, EXCEPT AS AUTHORIZED BY A SECTION 404 PERMIT.

SPILL PREVENTION CONTROL AND COUNTERMEASURES

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

SOIL DISTURBING ACTIVITIES INCLUDE:
- INSTALLING A STABILIZED CONSTRUCTION EXIT, PERIMETER AND OTHER EROSION AND SEDIMENT CONTROLS
- CLEARING AND GRUBBING
- EXCAVATION OF THE FOUNDATION
- GRADING AND EXCAVATION FOR UTILITIES
- PREPARATION FOR FINAL PLANTING AND SEEDING
- COMPLETION OF ON–SITE STABILIZATION

EROSION AND SEDIMENT CONTROLS

ALL PERIMETER SILT FENCES AND CONSTRUCTION EXITS SHALL BE IN PLACE PRIOR TO ANY LAND DISTURBING ACTIVITIES.

EXISTING VEGETATION SHALL BE LEFT IN PLACE UNTIL SUCH TIME THAT LAND DISTURBING ACTIVITIES ARE TO TAKE PLACE UPON THAT PORTION OF THE SITE. WHEN CONSTRUCTION ACTIVITIES HAVE CEASED IN AN AREA, THAT AREA SHALL BE STABILIZED WITHIN 14 DAYS. IF THE AREA IS NOT YET TO FINAL GRADE, IT SHALL BE MULCHED. IF THE AREA IS TO FINAL GRADE AND WILL EVENTUALLY CONTAIN SITE IMPROVEMENTS SUCH AS THE STRUCTURES OR SIDEWALKS, IT SHALL BE TEMPORARY SEEDED. AREAS BROUGHT TO FINAL GRADE THAT WILL REMAIN PERVIOUS ARE TO BE PERMANENTLY SEEDED. ALLOWABLE EXCEPTIONS FROM THE NPDES GENERAL PERMIT GAR 100002, ARE NOTED BELOW.

"(a). WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY OR PERMANENTLY CEASE IS PRECLUDED BY SNOW COVER OR OTHER ADVERSE WEATHER CONDITIONS, STABILIZATIO MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE."

"(b). WHERE CONSTRUCTION ACTIVITY WILL RESUME ON A PORTION OF THE SITE WITHIN 21 DAYS FROM WHEN ACTIVITIES CEASED, (E.G., THE TOTAL TIME PERIOD THAT CONSTRUCTION ACTIVITY IS TEMPORARILY CEASED IS LESS THAN 21 DAYS) THEN STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY CEASED."

GOOD HOUSEKEEPING

- QUANTITIES OF PRODUCTS STORE ONSITE WILL BE LIMITED TO THE AMOUNT NEEDED FOR THE JOB.
- PRODUCTS AND MATERIALS WILL BE STORED IN A NEAT, ORDERLY MANNER IN APPROPRIATE CONTAINERS PROTECTED FROM RAINFALL, WHERE POSSIBLE.
- PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH MANUFACTURER LABELS LEGIBLE AND VISIBLE.
- PRODUCT MIXING, DISPOSAL AND DISPOSAL OF PRODUCT CONTAINERS WILL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
- THE CONTRACTOR WILL INSPECT SUCH MATERIALS TO ENSURE PROPER USE, STORAGE AND DISPOSAL.

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 DAILY INSPECTIONS AND REGULAR PREVENTATIVE MAINTENANCE OF 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.

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 MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

CONCRETE TRUCK WASHING – NO CONCRETE TRUCKS WILL BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASH WATER ONSITE. THERE WILL BE NO WASHDOWN OF TOOLS, MIXER CUTES OR THE REAR OF VEHICLES.

FERTILIZER/HERBICIDES – THESE PRODUCTS 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 SEDIMENT CONTROL IN GEORGIA. ANY STORAGE OF THESE MATERIALS WILL BE UNDER ROOF IN SEALED CONTAINERS.

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

SOIL CLEANUP AND CONTROL PRACTICES

- LOCAL, STATE, AND MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND PROCEDURES WILL BE MADE AVAILABLE TO SITE PERSONNEL.
- MATERIAL 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 METAL WASTE CONTAINERS.
- SPILL PREVENTION PRACTICES AND PROCEDURES WILL BE REVIEWED AFTER A SPILL AND ADJUSTED AS NECESSARY TO PREVENT FUTURE SPILLS.
- ALL SPILLS WILL BE CLEANED UP IMMEDIATELY UPON DISCOVERY. ALL SPILLS WILL BE REPORTED AS REQUIRED BY LOCAL, STATE, AND FEDERAL REGULATIONS.
- **FOR SPILLS THAT IMPACT SURFACE WATER (LEAVE A SHEEN ON SURFACE WATER), THE NATIONAL RESPONSE CENTER (NRC) WILL BE CONTACTED WITHIN 24 HOURS AT 1–800–426–2675.**
- **FOR SPILLS OF AN UNKNOWN AMOUNT, THE NATIONAL CENTER (NRC) WILL BE CONTACTED WITHIN 24 HOURS AT 1–800–426–2675.**
- **FOR SPILLS GREATER THAN 25 GALLONS AND NO SURFACE WATER IMPACTS, THE GEORGIA EPD WILL BE CONTACTED WITHIN 24 HOURS.**
- **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.**
- THE CONTRACTOR SHALL NOTIFY THE LICENSED PROFESSIONAL WHO PREPARED THIS PLAN IF MORE THAN 1320 GALLONS OF PETROLEUM IS STORED ONSITE (THIS INCLUDES CAPACITIES OF EQUIPMENT) OR IF ANY ONE PIECE OF EQUIPMENT HAS A CAPACITY GREATER THAN 660 GALLONS. THE CONTRACTOR WILL NEED A SPILL PREVENTION CONTAINMENT AND COUNTERMEASURES PLAN PREPARED BY THAT LICENSED PROFESSIONAL.

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. 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.

DUST CONTROL NOTE:

LIMIT BLOWING DUST CAUSED BY CONSTRUCTION OPERATIONS BY APPLYING WATER OR EMPLOYING OTHER APPROPRIATE MEANS OR METHODS TO MAINTAIN DUST CONTROL, SUBJECT TO THE APPROVAL OF THE OWNER. AS A MINIMUM, THIS MAY REQUIRE THE USE OF A WATER WAGON TWICE A DAY TO SUPPRESS DUSTY CONDITIONS.

OFFSITE VEHICLE TRACKING:

A STABILIZED CONSTRUCTION EXIT HAS BEEN PROVIDED TO HELP REDUCE VEHICLE TRACKING OF SEDIMENT. SEE EROSION CONTROL DETAILS SHEET FOR CONSTRUCTION EXIT LOCATION AND DETAILS. THE PAVED STREET ADJACENT TO THE SITE EXIT WILL BE INSPECTED DAILY FOR TRACKING OF MUD, DIRT OR ROCK. DUMP TRUCKS HAULING MATERIAL FROM THE CONSTRUCTION SITE WILL BE COVERED WITH A TARPAULIN.

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 SHEETS 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 THIS ESPCP AND WILL TRAIN ALL PERSONNEL IN THE PROPER CLEANUP AND HANDLING OF SPILLED MATERIALS. NO SPILLED HAZARDOUS MATERIALS OR HAZARDOUS WASTES WILL BE ALLOWED TO COME IN CONTACT WITH STORMWATER DISCHARGES. IF SUCH CONTACT OCCURS, THE STORMWATER DISCHARGE WILL BE CONTAINED ON SITE UNTIL APPROPRIATE MEASURES IN COMPLIANCE WITH STATE AND FEDERAL REGULATIONS ARE TAKEN TO DISPOSE OF SUCH CONTAMINATED STORMWATER. 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 COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONE TIME PER WEEK BY A LICENSED PORTABLE FACILITY PROVIDER IN COMPLETE COMPLIANCE WITH LOCAL AND STATE REGULATIONS.

ALL SANITARY WASTE UNITS WILL BE LOCATED IN AN AREA WHERE THE LIKELIHOOD OF THE UNIT CONTRIBUTING TO STORM WATER DISCHARGE IS NEGLIGIBLE. 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 PLAN BY THE CONTRACTOR ONCE THE LOCATIONS HAVE BEEN IDENTIFIED.

SANITARY SEWER WILL BE PROVIDED BY FULTON COUNTY AT THE COMPLETION OF THIS PROJECT.

INSPECTION AND RECORD KEEPING REQUIREMENTS

A. 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 PERMITTES'S SITE WHERE PETROLEUM PRODUCTS ARE STORED, USED, OR HANDLED FOR SPILLS AND LEAKS FROM VEHICLES AND EQUIPMENT.

(b) ALL LOCATIONS AT THE PRIMARY PERMITTEE'S SITE WHERE VEHICLES ENTER OR EXIT THE SITE FOR EVIDENCE OF OFF–SITE SEDIMENT TRACKING.

(c) MEASURE RAINFALL ONCE EACH 24 HOUR PERIOD AT THE SITE.

THESE INSPECTIONS MUST BE CONDUCTED UNTIL A NOTICE OF TERMINATION IS SUBMITTED.

(2) 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 NONWORKING 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 THAT HAVE NOT UNDERGONE FINAL STABILIZATION.

(b) AREAS USED BY THE PRIMARY PERMITTEE FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION THAT HAVE NOT UNDERGONE FINAL STABILIZATION.

(c) STRUCTURAL CONTROL MEASURES. EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN APPLICABLE TO THE PRIMARY PERMITTEE'S SITE SHALL BE OBSERVED TO ENSURE TO 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, THE PERMITTEE MUST COMPLY WITH PART IV.D.4.a.(3). THESE INSPECTIONS MUST BE CONDUCTED UNTIL A NOTICE OF TERMINATION IS SUBMITTED.

(3) CERTIFIED PERSONNEL (PROVIDED BY THE PRIMARY PERMITTEE) SHALL INSPECT AT LEAST ONCE PER MONTH DURING THE TERM OF THIS PERMIT (i.e. UNTIL A NOTICE OF TERMINATION IS RECEIVED BY EPD) THE AREAS OF THE SITE THAT HAVE UNDERGONE FINAL STABILIZATION. 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).

INSPECTION AND RECORD KEEPING REQUIREMENTS (CONT.)

(4) BASED ON THE RESULT 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.

(5) A REPORT OF EACH INSPECTION THAT INCLUDES THE NAMES(S) OF PERSONNEL MAKING EACH INSPECTION, THE DATE(S) OF EACH INSPECTION, 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.(4). OF THE PERMIT SHALL BE MADE AND RETAINED AT THE SITE OR BE READILY AVAILABLE AT A DESIGNATED ALTERNATE LOCATION UNTIL THE ENTIRE SITE OF THAT PORTION OF A CONSTRUCTION PROJECT THAT HAS BEEN PHASED HAS UNDERGONE FINAL STABILIZATION AND A NOTICE OF TERMINATION 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 REPORT SHALL CONTAIN A CERTIFICATION THAT THE CONSTRUCTION SITE IS IN COMPLIANCE WITH THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN AND PERMIT. THE REPORT SHALL BE SIGNED IN ACCORDANCE WITH PART V.G. OF THIS PERMIT.

SAMPLING FREQUENCY AND REPORTING RESULTS

B. SAMPLING FREQUENCY.

(1) THE PRIMARY PERMITTEE MUST SAMPLE IN ACCORDANCE WITH THE PLAN AT LEAST ONCE FOR EACH RAINFALL EVENT DESCRIBED BELOW. FOR A QUALIFYING EVENT, SAMPLES MUST BE TAKEN WITHIN FORTY–FIVE (45) MINUTES OF:

(a) THE ACCUMULATION OF THE MINIMUM AMOUNT OF RAINFALL FOR THE QUALIFYING EVENT, IF THE STORM WATER DISCHARGE TO A MONITORED RECEIVING WATER OR FROM A MONITORED OUTFALL HAS BEGUN AT OR PRIOR TO THE ACCUMULATION, OR

(b) 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 FOR THE QUALIFYING EVENT.

(2) HOWEVER, WHERE MANUAL AND AUTOMATIC SAMPLING ARE IMPOSSIBLE (AS DEFINED IN THIS 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 EVENTS:

(a) FOR EACH AREA OF THE SITE THAT DISCHARGES TO A RECEIVING STREAM, THE FIRST RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH AND ALLOWS FOR MONITORING DURING NORMAL BUSINESS HOURS* (MONDAY THRU FRIDAY, 8:00 AM TO 5:00 PM AND SATURDAY 8:00 AM TO 5:00 PM, EXCLUDING ALL NON–WORKING FEDERAL HOLIDAYS, WHEN CONSTRUCTION ACTIVITY IS BEING CONDUCTED BY THE PRIMARY PERMITTEE) THAT OCCURS AFTER ALL CLEARING AND GRUBBING OPERATIONS HAVE BEEN COMPLETED IN THE DRAINAGE AREA OF THE LOCATION SELECTED AS THE REPRESENTATIVE SAMPLING LOCATION;

(b) IN ADDITION TO (A) ABOVE, FOR EACH AREA OF THE SITE THAT DISCHARGES TO A RECEIVING STREAM, THE FIRST RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH AND ALLOWS FOR MONITORING DURING NORMAL BUSINESS HOURS* THAT OCCURS EITHER 90 DAYS AFTER THE FIRST SAMPLING EVENT OR AFTER ALL MASS GRADING OPERATIONS HAVE BEEN COMPLETED IN THE DRAINAGE AREA OF THE LOCATION SELECTED AS THE REPRESENTATIVE SAMPLING LOCATION, WHICHEVER COMES FIRST;

(c) AT THE TIME OF SAMPLING PERFORMED PURSUANT TO (A) AND (B) 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 THAT DISCHARGES TO A RECEIVING STREAM 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; AND

(d) EXISTING CONSTRUCTION ACTIVITIES, I.E., THOSE THAT ARE OCCURRING ON OR BEFORE THE EFFECTIVE DATE OF THIS PERMIT, THAT HAVE MET THE SAMPLING REQUIRED BY (A) ABOVE SHALL SAMPLE IN ACCORDANCE WITH (B). THOSE EXISTING CONSTRUCTION ACTIVITIES THAT HAVE MET THE SAMPLING REQUIRED BY (B) ABOVE SHALL NOT BE REQUIRED TO CONDUCT ADDITIONAL SAMPLING OTHER THAN AS REQUIRED BY (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 MONITORING AT ANY TIME OF THE DAY OR WEEK.

C. REPORTING.

(1) THE APPLICABLE PERMITTEES ARE REQUIRED TO SUBMIT A SUMMARY OF THE MONITORING RESULTS TO THE EPD AT THE ADDRESS SHOWN IN PART II.C. 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 STORM WATER 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. THE SAMPLING REPORTS MUST BE SIGNED IN ACCORDANCE WITH PART V.G. SAMPLING REPORTS MUST BE SUBMITTED TO EPD UNTIL SUCH TIME AS A NOT IS SUBMITTED IN ACCORDANCE WITH PART VI.

(2) 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.

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525–2120
FAX (404) 522–7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 MERIDETH K. POOL 9/25/16
GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
EC-001.dwg
KHAFRA PROJECT NUMBER
15ATL05-C155
CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

EROSION & SEDIMENT CONTROL NOTES

DRAWING NUMBER
EC-001

SHEET NUMBER
39 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-001.DWG PLOT DATE: 9/28/2016 2:51 PM CAD USER: EDWARD BURTON
Fulton Logo w-name.jpg

SAMPLING FREQUENCY AND REPORTING RESULTS (CONT.)

(3) ALL MONITORING RESULTS SHALL INCLUDE THE FOLLOWING INFORMATION:
- (a) THE DATE, EXACT PLACE, AND TIME OF SAMPLING OR MEASUREMENTS;
- (b) THE NAME(S) OF THE INDIVIDUAL(S) 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 INDIVIDUAL(S) 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; AND
- (h) RESULTS WHICH EXCEED 1000 NTU SHALL BE REPORTED AS "EXCEEDS 1000 NTU."

RECORD RETENTION

D. RETENTION OF RECORDS

(1) THE PRIMARY PERMITTEE 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 NOT 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;
- (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 MONITORING 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.(1)(C) OF THIS PERMIT.

(2) COPIES OF ALL NOTICES OF INTENT, NOTICES OF TERMINATION, REPORTS, PLANS, MONITORING REPORTS, MONITORING INFORMATION, INCLUDING ALL CALIBRATION AND MAINTENANCE RECORDS AND ALL ORIGINAL STRIP CHART RECORDINGS FOR CONTINUOUS MONITORING INSTRUMENTATION, 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 THE NOT 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.

SAMPLE COLLECTION AND ANALYSIS

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; THE GUIDANCE DOCUMENT TITLED "NPDES STORM WATER SAMPLING GUIDANCE DOCUMENT, EPA 833-B-92-001" AND GUIDANCE DOCUMENTS THAT MAY BE PREPARED BY THE EPD.

APPENDIX B

Nephelometric Turbidity Unit (NTU) TABLES

Cold Water (Trout Stream)

		Surface Water Drainage Area, square miles							
		0-4.99	5-9.99	10-24.99	25-49.99	50-99.99	100-249.99	250-499.99	500+
Site Size, acres	1.00-10	25	50	75	150	300	500	500	500
	10.01-25	25	25	50	75	150	200	500	500
	25.01-50	25	25	25	50	75	100	300	500
	50.01-100	20	25	25	35	59	75	150	300
	100.01+	20	20	25	25	25	50	60	100

Warm Water (Supporting Warm Water Fisheries)

		Surface Water Drainage Area, square miles							
		0-4.99	5-9.99	10-24.99	25-49.99	50-99.99	100-249.99	250-499.99	500+
Site Size, acres	1.00-10	75	150	200	400	750	750	750	750
	10.01-25	50	100	100	200	300	500	750	750
	25.01-50	50	50	100	100	200	300	750	750
	50.01-100	50	50	50	100	100	150	300	600
	100.01+	50	50	50	50	50	100	200	100

To use these tables, select the size (acres) of the construction site. Then, select the surface water drainage area (square miles). The NTU matrix value arrived at from the above tables is the one to use in Part III.D.4.

APPENDIX B RATIONALE IS USED FOR ALL OF THE OUTFALL SAMPLING POINTS ON THIS PROJECT. THE NTU VALUE OF 750 CORRESPONDS TO A SURFACE DRAINAGE AREA OF 288± SQ MI AND A SITE SIZE OF 7.99± ACRES FOR WATERS SUPPORTING WARM WATER FISHERIES.

REPRESENTATIVE SAMPLING IS TO BE USED FOR THIS PROJECT DUE TO THE SHORT DURATION OF CONSTRUCTION ACTIVITIES IN ANY ONE LOCATION, THE LIMITED VOLUME OF EXPOSED SOIL, AND THE LINEAR NATURE OF THE CONSTRUCTION ACTIVITY.

CERTIFICATION

"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."

"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 STATE SOIL AND WATER CONSERVATION COMMISSION AS OF JANUARY 1 OF THE YEAR IN WHICH THE 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 PERMIT NO. GAR 100002."

"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 STEAMS 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 THE 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."

Merideth K. Pool — 9/25/16

SIGN — DATE

GSWCC — GEORGIA SOIL AND WATER CONSERVATION COMMISSION

Merideth K Pool

Level II Certified Design Professional

CERTIFICATION NUMBER 0000037897

ISSUED: 02/29/2016 EXPIRES: 02/28/2019

DESIGN PROFESSIONAL 7-DAY VISIT CERTIFICATION

THE PRIMARY PERMITTEE MUST RETAIN THE DESIGN PROFESSIONAL WHO PREPARED THE PLAN, OR AN ALTERNATIVE PROFESSIONAL APPROVED BY EPD IN WRITING, TO INSPECT THE INSTALLATION OF THE INTIAL SEDIMENT STORAGE REQUIREMENTS AND PERIMETER CONTROL BMPS WITHIN (7) DAYS AFTER INSTALLATION. ALTERNATIVELY, FOR LINEAR INFRASTRUCTURE PROJECTS, THE PRIMARY PERMITTEE MUST RETAIN THE DESIGN PROFESSIONAL WHO PREPARED THE PLAN, OR ALTERNATIVE DESIGN PROFESSIONAL APPROVED BY EPD IN WRITING TO INSPECT (A) THE INSTALLATION OF SEDIMENT STORAGE REQUIREMENTS AND PERIMETER CONTROL BMPS FOR THE "INITIAL SEGMENT" OF THE LINEAR INFRASTRUCTURE PROJECT AND (B) ALL SEDIMENT BASINS WITHIN THE ENTIRE LINEAR INFRASTRUCTURE PROJECT WITHIN (7) DAYS AFTER THE INSTALLATION. FOR THE PURPOSES OF THE SPECIFIC REQUIREMENTS IN PART IV.A.5., THE DISTURBED ACERAGE OF THE "INITIAL SEGMENT" OF A LINEAR INFRASTRUCTURE PROJECT MUST BE EQUAL TO OR GREATER THAN 10%%% OF THE TOTAL ESTIMATED DISTURBED ACREAGE FOR THE LINEAR INFRASTRUCTURE PROJECT BUT NOT LESS THAN ONE(1) ACRE. THE DESIGN PROFESSIONAL SHALL DETERMINE IF THESE BMPS HAVE BEEN INSTALLED AND ARE BEING MAINTAINED AS DESIGNED. THE DESIGN PROFESSIONAL SHALL REPORT THE RESULTS OF THE INSPECTION TO THE PRIMARY PERMITTEE WITHIN (7) DAYS AND THE PERMITTEE MUST CORRECT ALL DEFICIENCIES WITHIN (2) BUSINESS DAYS OF RECEIPT OF THE INSPECTION REPORT FROM THE DESIGN PROFESSIONAL UNLESS WEATHER RELATED SITE CONDITIONS ARE SUCH THAT ADDITIONAL TIME IS REQUIRED.

DATE OF INSPECTION: _____

I CERTIFY THAT THE SITE WAS IN SUBSTANTIAL COMPLIANCE WITH THE ES&PC PLAN ON THE DATE OF INSPECTION.

_____

GSWCC LEVEL II DESIGN PROFESSIONAL — CERTIFICATION #

INSPECTION REVEALED THE FOLLOWING DEFICIENCIES FROM THE ES&PC PLAN:

_____

_____

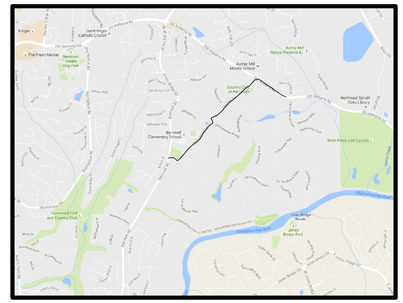
_____

_____

_____

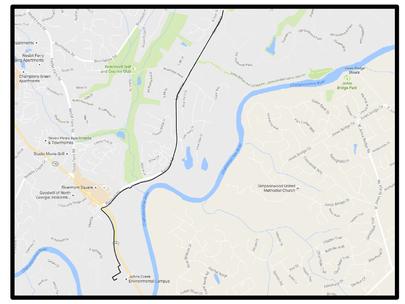
_____

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



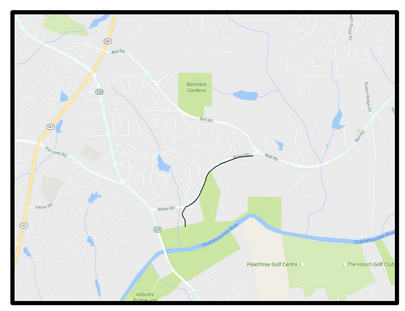
VICINITY MAP: PHASE I

SCALE: NTS



VICINITY MAP: PHASE II

SCALE: NTS



VICINITY MAP: PHASE III

SCALE: NTS

SLOPE STABILIZATION

APPLY THE APPROPRIATE GEORGIA DEPARTMENT OF TRANSPORTATION APPROVED EROSION CONTROL MATTING OR BLANKETS OR BONDED FIBER MATRIX TO ALL SLOPES STEEPER THAN 3:1.

SAMPLING LOCATIONS

REPRESENTATIVE SAMPL;ING IS USED TO MEET THE SAMPLING REQUIREMENTS DUE TO THE LINEAR NATURE OF THE CONSTRUCTION ACTIVITY.

CITY OF JOHNS CREEK EROSION CONTROL NOTES:

1. PRIOR TO ANY OTHER CONSTRUCTION, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AT EACH ENTRY TO OR EXIT FROM THE SITE.
2. THE CONSTRUCTION EXITS SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ON TO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH STONE, AS CONDITIONS DEMANDS, AND REPAIR AND/OR CLEAN-OUT OF ANY STRUCTURES USED TO TRAP SEDIMENT. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLE ONTO PUBLIC ROADWAY OR INTO STORM DRAIN MUST BE REMOVED.
3. PROVIDE GPS COORDINATES AT CONSTRUCTION EXIT AS REQUIRED ON THE NOTICE OF INTENT UNDER THE NPDES APPLICATION.
4. PRIOR TO COMMENCING LAND DISTURBANCE ACTIVITY, THE LIMITS OF LAND DISTURBANCE SHALL BE CLEARLY AND ACCURATELY DEMARCATED WITH STAKES, RIBBONS, OR OTHER APPROPRIATE MEANS. THE LOCATION AND EXTENT OF ALL AUTHORIZED LAND DISTURBANCE SHALL OCCUR WITHIN THE APPROVED LIMITS INDICATED ON THE APPROVED PLANS.
5. IMMEDIATELY AFTER THE ESTABLISHMENT OF CONSTRUCTION ENTRANCES/EXITS, ALL PERIMETER EROSION CONTROL DEVICES AND STORM WATER MANAGEMENT DEVICES SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION.
6. OWNER AGREES TO PROVIDE AND MAINTAIN OFF-STREET PARKING ON THE SUBJECT PROPERTY DURING THE ENTIRE CONSTRUCTION PERIOD.
7. THE CONTRACTOR SHALL FURNISH AND MAINTAIN ALL NECESSARY BARRICADES WHILE ROADWAY FRONTAGE IMPROVEMENTS ARE BEING MADE.
8. THE CONSTRUCTION OF THE SITE WILL INITIATE WITH THE INSTALLATION OF EROSION CONTROL MEASURES SUFFICIENT TO CONTROL SEDIMENT DEPOSITS AND EROSION. ALL SEDIMENT CONTROL WILL BE MAINTAINED UNTIL ALL UP STREAM GROUND WITHIN THE CONSTRUCTION AREA HAS BEEN COMPLETELY STABILIZED WITH PERMANENT VEGETATION AND ALL ROADS/DRIVEWAYS HAVE BEEN PAVED.
9. FAILURE TO INSTALL, OPERATE OR MAINTAIN ALL EROSION CONTROL MEASURES WILL RESULT IN ALL CONSTRUCTION BEING STOPPED ON THE JOB SITE UNTIL SUCH MEASURES ARE CORRECTED CONSISTENT WITH THE CITY OF JOHNS CREEK EROSION CONTROL ORDINANCE.
10. A COPY OF THE APPROVED LAND DISTURBANCE PLAN AND PERMIT SHALL BE PRESENT ON THE SITE WHENEVER LAND DISTURBANCE ACTIVITY IS IN PROGRESS.
11. ALL SEWER EASEMENTS DISTURBED MUST BE DRESSED AND GRASSED TO CONTROL EROSION.

CONSTRUCTION SCHEDULE - PHASE I

WEEK	1	2	3	4	5	6	7	8	9	10	11	12
INSTALL ES&PC	■											
MAINTAIN ES&PC		■	■	■	■	■	■	■	■	■	■	■
INSTALL WATER MAIN		■	■	■	■	■	■	■	■	■	■	
REPAIR ROADWAYS			■	■	■	■	■	■	■	■	■	
FINAL LANDSCAPING					■	■	■	■	■	■	■	■
REMOVE TEMPORARY ES&PC											■	■

CONSTRUCTION SCHEDULE - PHASE II

WEEK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
INSTALL ES&PC	■																							
MAINTAIN ES&PC		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
INSTALL WATER MAIN		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
REPAIR ROADWAYS			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
FINAL LANDSCAPING					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
REMOVE TEMPORARY ES&PC																							■	■

CONSTRUCTION SCHEDULE - PHASE III

WEEK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
INSTALL ES&PC	■																	
MAINTAIN ES&PC		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
INSTALL WATER MAIN		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
REPAIR ROADWAYS			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
FINAL LANDSCAPING					■	■	■	■	■	■	■	■	■	■	■	■	■	■
REMOVE TEMPORARY ES&PC																	■	■

KHAFRA

225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET

NOT FOR CONSTRUCTION

GEORGIA REGISTERED No. 33285 PROFESSIONAL ENGINEER MERIDETH K. POOL 9/25/16

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME EC-002.dwg

KHAFRA PROJECT NUMBER 15ATL05-C155

CLIENT PROJECT NUMBER FCDWR PROJECT # 15E-BC04

CIVIL

ES & PC NOTES

DRAWING NUMBER

EC-002

SHEET NUMBER 40 OF 77

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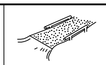
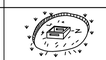
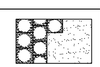
Fulton Logo w-name.jpg

GEORGIA
UNIFORM CODING SYSTEM
FOR SOIL EROSION AND SEDIMENT CONTROL PRACTICES
GEORGIA SOIL AND WATER CONSERVATION COMMISSION

STRUCTURAL PRACTICES

CODE	PRACTICE	DETAIL	MAP SYMBOL	DESCRIPTION
Co	CONSTRUCTION EXIT			A crushed stone pad located at the construction site exit to provide a place for removing mud from tires thereby protecting public streets.
Sd1	SEDIMENT BARRIER			A barrier to prevent sediment from leaving the construction site. It may be sandbags, bales of straw or hay, brush, logs and poles, gravel, or a silt fence.
Sd2	INLET SEDIMENT TRAP			An impounding area created by excavating around a storm drain drop inlet. The excavated area will be filled and stabilized on completion of construction activities.

VEGETATIVE PRACTICES

CODE	PRACTICE	DETAIL	MAP SYMBOL	DESCRIPTION
Ds1	DISTURBED AREA STABILIZATION (WITH MULCHING ONLY)		Ds1	Establishing temporary protection for disturbed areas where seedlings may not have a suitable growing season to produce an erosion retarding cover.
Ds2	DISTURBED AREA STABILIZATION (WITH TEMP SEEDING)		Ds2	Establishing a temporary vegetative cover with fast growing seedings on disturbed areas.
Ds3	DISTURBED AREA STABILIZATION (WITH PERM SEEDING)		Ds3	Establishing a permanent vegetative cover such as trees, shrubs, vines, grasses, or legumes on disturbed areas.
Ds4	DISTURBED AREA STABILIZATION (SODDING)		Ds4	A permanent vegetative cover using sods on highly erodable or critically eroded lands.
Ss	SLOPE STABILIZATION		Ss	A protective covering used to prevent erosion and establish temporary or permanent vegetation on steep slopes, shore lines, or channels.

GaSWCC (Amended – 2013)

NOTE:
SEE GEORGIA SOIL AND WATER CONSERVATION COMMISSION "MANUAL FOR EROSION AND SEDIMENT CONTROL IN GEORGIA (CURRENT EDITION)" FOR ADDITIONAL INFORMATION.

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GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

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DRAWN: E.L. BURTON
CHECKED: M.K. POOL
CHECKED: R.L. LINDSEY
APPROVED: M.C. LEUNG

FILENAME
EC-003.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

ES & PC LEGEND AND SCHEDULE

DRAWING NUMBER
EC-003

SHEET NUMBER
41 OF 77

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DISTURBED AREA STABILIZATION (WITH MULCHING ONLY) — DS1

USE DRY STRAW OR DRY HAY OF GOOD QUALITY AND FREE OF WEEDS SEEDS. DRY STRAW OR HAY SHALL BE APPLIED AT THE RATE OF 2.5 TONS PER ACRE. MULCHING SHALL BE USED MULCH WILL BE SPREAD UNIFORMLY WITHIN 24–HOURS AFTER SEEDING. MULCH SHALL BE USED DURING MONTHS THAT GRASSING SOULD NOT BE APPLIED BASED ON THE SCHEDULE BELOW.

DISTURBED AREA STABILIZATION (WITH MULCHING ONLY) — Ds1

NTS

DISTURBED AREA STABILIZATION (WITH TEMPORARY SEEDING) — DS2

TEMPORARY AND PERMANENT VEGETATION SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 OF "THE MANUAL FOR EROSION AND SEDIMENTATION CONTROL IN GEORGIA".

TEMPORARY GRASSES SHALL CONSIST OF SOWING A QUICK GRASS SUCH AS RYE, BROWN TOP MILLET, OR GRASS SUITABLE TO THE AREA AND SEASON. LIME AND FERTILIZER WILL BE OMITTED. MULCH IS NOT REQUIRED BUT SHOULD BE USED AS DICTATED BY SITE CONDITIONS. TEMPORARY GRASSING IS REQUIRED WHEN DISTURBED AREA IS LEFT EXPOSED MORE THAN 14 DAYS.

PLANTING DATES

SPECIES	RATE/ACRE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
RYE GRASS	*40 lbs*	■	■	■	■								
BROWN MILLET	*10–40 lbs**				■	■	■						
RYE	*1/2–3 bu.**								■	■	■	■	■
WEEPING LOVEGRASS	*2–4 lbs**			■	■	■	■						
ANNUAL LESPEDEZA	*10–40 lbs**			■	■	■							
SUDAN GRASS	*60 lbs*				■	■	■	■	■				
WHEAT	*1/2–3 bu.**									■	■	■	■

** MAX. AMOUNT TO BE USED EXCEPT WHEN MIXED WITH OTHER PERENNIALS.*

DISTURBED AREA STABILIZATION (WITH TEMPORARY SEEDING) — Ds2

NTS

DISTURBED AREA STABILIZATION (WITH PERMANENT SEEDING) — DS3

PERMANENT GRASSING SHALL CONSIST OF GROUND PREPARATION, LIMING, FERTILIZATION, MULCHING AND SEEDING. THE GROUND SHALL BE PREPARED BY PLOWING AND DISKING TO A DEPTH NOT LESS THAN 4". FERTILIZER AND LIME SHALL BE UNIFORMLY MIXED INTO THE GROUND, WITH FERTILIZER AT THE RATE OF 1500#/ACRE AND LIME AT THE RATE OF 2000#/ACRE. THE GROUND SHALL BE FINISHED OFF SMOOTH AND UNIFORM AND BE FREE OF ROCKS, CLODS, ROOTS AND WEEDS. FERTILIZER SHALL BE APPLIED PER THE TABLE BELOW. WEATHER PERMITTING, SEEDING SHALL BE DONE WITHIN 24 HOURS OF FERTILIZER APPLICATION. SEED SHALL BE UNIFORMLY SPREAD AT THE RATES SHOWN BELOW. MULCHING IS REQUIRED AND SHALL BE DONE IMMEDIATELY AFTER SEEDING. MULCH SHALL BE UNIFORMLY APPLIED OVER THE AREA LEAVING APPROXIMATELY 25% OF THE GROUND SURFACE EXPOSED. THE RATE OF APPLICATION SHALL BE DOUBLED ON SLOPES STEEPER THAN 4:1.

GRASSING RATES AND SCHEDULE

PLANTING DATES

SPECIES	RATE/ACRE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TALL FESCUE	*30–50 lbs**			■	■				■	■	■		
UNSCARIFIED SERICEA LESPEDEZA(a)	*75 lbs*	■	■	■	■	■	■	■	■	■	■	■	■
SCARIFIED SERICEA LESPEDEZA (b)	*60 lbs*			■	■	■	■						
WEEPING LOVE GRASS	*2–4 lbs**			■	■	■	■						
UNHULLED BERMUDA	*6–10 lbs**	■	■								■	■	■
HULLED BERMUDA	*6–10 lbs**			■	■	■	■						
PENSACOLA BAHIA	*30–60 lbs**	■	■	■	■	■	■	■	■	■	■	■	■

** MAX. AMOUNT TO BE USED EXCEPT WHEN MIXED WITH OTHER PERENNIALS.*

(a) MIX WITH TALL FESCUE OR WINTER ANNUALS.
(b) USE EITHER COMMON SERALA, OR INTERSTATE SERICEA LESPEDEZA.

LIMING RATES

Agricultural lime is required at the rate of 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.

FERTILIZER REQUIREMENTS

TYPES OF SPECIES	YEAR	ANALYSIS OR EQUIVALENT N-P-K	RATE	N TOP DRESSING RATE
1. Cool season grasses	First Second Maintenance	6-12-12 6-12-12 10-10-10	1500 lbs./ac. 1000 lbs./ac. 400 lbs./ac.	50-100 lbs./ac/ 1/2/ - 30
2. Cool season grasses and legumes	First Second Maintenance	6-12-12 0-10-10 0-10-10	1500 lbs./ac. 1000 lbs./ac. 400 lbs./ac.	0-50 lbs./ac. 1/ - -
3. Ground Covers	First Second Maintenance	10-10-10 10-10-10 10-10-10	1300 lbs./ac. 3/ 1300 lbx./ac. 3/ 1100 lbx./ac.	- - -
4. Shrub Lespedeza	First Maintenance	0-10-10 0-10-10	700 lbs./ac. 700 lbs./ac. 4/	-
5. Warm season grasses	First Second Maintenance	6-12-12 6-12-12 10-10-10	1500 lbs./ac. 800 lbs./ac. 400 lbs./ac.	50-100 lbs./ac. 2/ 6/ 50-100 lbs./ac. 2/ 30 lbs./ac.
6. Warm season grasses and legumes	First Second Maintenance	6-12-12 0-10-10 0-10-10	1500 lbs./ac. 1000 lbs./ac. 400 lbs./ac.	50 lbs./ac. 6/

DISTURBED AREA STABILIZATION (WITH PERMANENT VEGETATION) — Ds3

NTS

DISTURBED AREA STABILIZATION (WITH SODDING) — DS4

SOD PLANTING REQUIREMENTS REQUIREMENTS

GRASS	VARIETIES	RESOURCE AREAS	GROWING SEASON
BERMUDAGRASS	COMMON TIFWAY TIFGREEN TIFLAWN	M-L,P,C P,C P,C P,C	WARM WEATHER
BAHIAGRASS	PENSACOLA	P,C	WARM WEATHER
CENTIPEDE	.	P,C	WARM WEATHER
ST. AUGUSTINE	COMMON TIFWAY TIFGREEN	C	WARM WEATHER
ZOYSIA	EMERALD MYER	P,C	WARM WEATHER
TALL FESCUE	KENTUCKY	M-L,C	COOL WEATHER

FERTILIZER REQUIREMENTS FOR SOD

TYPES OF SPECIES	PLANTING YEAR	FERTILIZER (N-P-K)	NITROGEN TOP DRESSING RATE (lbs./acre)	NITROGEN TOP DRESSING RATE (lbs./acre)
COOL SEASON GRASS	FIRST SECOND MAINTENANCE	6-12-12 6-12-12 10-10-10	1500 1000 400	50-100 - 30
WARM SEASON GRASS	FIRST SECOND MAINTENANCE	6-12-12 6-12-12 10-10-10	1500 800 400	50-100 50-100 30

FERTILIZER REQUIREMENTS FOR SOIL SURFACE APPLICATION

FERTILIZER TYPE (lbs./acre)	FERTILIZER RATES (lbs./acre)	FERTILIZER RATES	SEASON
10-10-10	1000	.025	FALL

* AGRICULTURAL LIME SHOULD BE APPLIED BASED ON SOIL TESTS OR AT A RATE OF 1 TO 2 TONS PER ACRE.

DISTURBED AREA STABILIZATION (WITH SODDING) — Ds4

NTS

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225 PEACHTREE STREET, SUITE 1600
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NOT FOR CONSTRUCTION

GEORGIA REGISTERED No. 33285 PROFESSIONAL ENGINEER MERIDETH K. POOL 6/25/16

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

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CHECKED: M.K. POOL
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APPROVED: M.C. LEUNG

FILENAME EC-004.dwg
KHAFRA PROJECT NUMBER 15ATL05-C155
CLIENT PROJECT NUMBER FCDWR PROJECT # 15E-BC04

CIVIL

ES & PC DETAILS (VEGETATIVE)

DRAWING NUMBER
EC-004

SHEET NUMBER
42 OF 77

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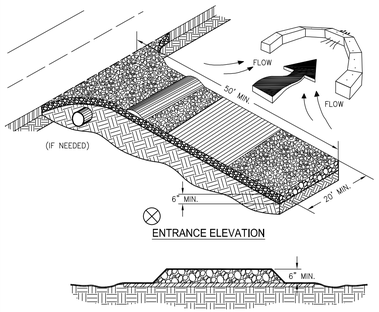
Fulton Logo w-name.jpg

CRUSHED STONE CONSTRUCTION EXIT

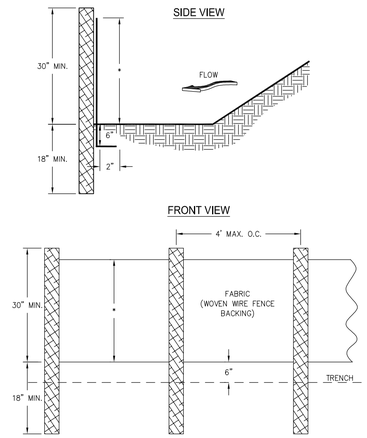
EXIT DIAGRAM



NOTES:
1. [redacted] 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 (1.5"-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 (DIVERT 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 CIRCUMSTANCE. IF NECESSARY, WASHRACK DESIGN MAY CONSIST OF ANY MATERIAL SUITABLE FOR TRUCK TRAFFIC THAT REMOVE 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 CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

CONSTRUCTION EXIT — Co
N.T.S.

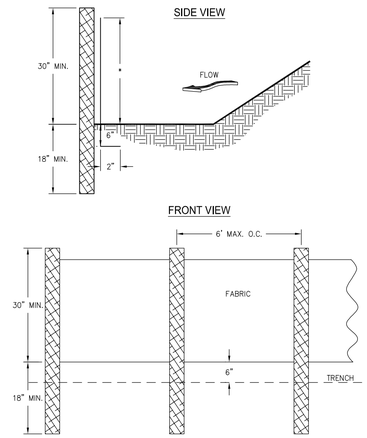
SILT FENCE - TYPE SENSITIVE



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.

SILT FENCE TYPE "S" — Sd1-S
N.T.S.

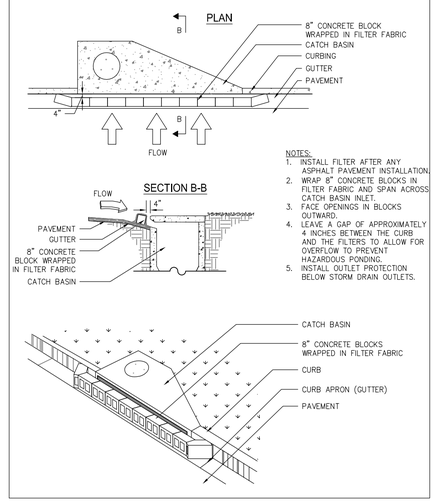
SILT FENCE - TYPE NON-SENSITIVE



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.

SILT FENCE TYPE "NS" — Sd1-NS
N.T.S.

CURB INLET FILTER "PIGS IN BLANKET"

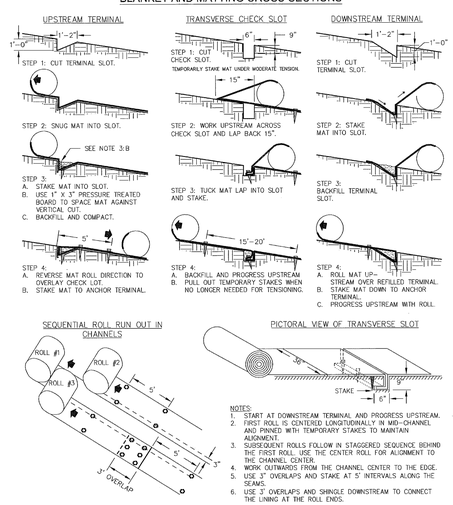


NOTES:
1. INSTALL FILTER AFTER ANY ASPHALT PAVEMENT INSTALLATION.
2. WRAP 8" CONCRETE BLOCKS IN FILTER FABRIC AND SPAN ACROSS CATCH BASIN INLET.
3. FACE OPENINGS IN BLOCKS OUTWARD.
4. LEAVE A GAP OF APPROXIMATELY 4 INCHES BETWEEN THE CURB AND THE FILTERS TO ALLOW FOR OVERFLOW TO PREVENT HAZARDOUS PONDING.
5. INSTALL OUTLET PROTECTION BELOW STORM DRAIN OUTLETS.

CURB INLET FILTER — Sd2-P
N.T.S.

TYPICAL INSTALLATION GUIDELINES FOR ROLLED EROSION CONTROL PRODUCTS (RECP)

BLANKET AND MATTING CROSS-SECTIONS



NOTES:
1. START AT DOWNSTREAM TERMINAL AND PROGRESS UPSTREAM.
2. FIRST ROLL IS CENTERED LONGITUDINALLY IN MID-CHANNEL AND PINNED WITH TEMPORARY STAKES TO MAINTAIN ALIGNMENT.
3. SUBSEQUENT ROLLS FOLLOW IN STAGGERED SEQUENCE BEHIND THE FIRST ROLL. USE THE CENTER ROLL FOR ALIGNMENT TO THE CHANNEL CENTER.
4. WORK OUTWARDS FROM THE CHANNEL CENTER TO THE EDGE.
5. USE 3" OVERLAPS AND STAKE AT 5' INTERVALS ALONG THE SEAMS.
6. USE 3" OVERLAPS AND SHINGLE DOWNSTREAM TO CONNECT THE LINING AT THE ROLL ENDS.

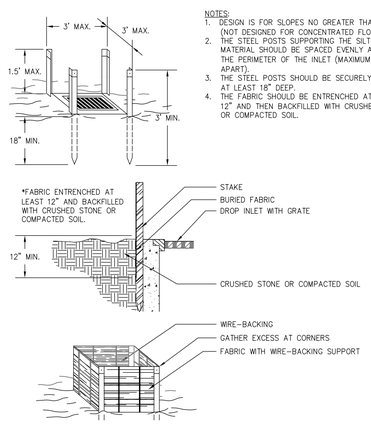
Figure 6-10.1 - Typical Installation Guidelines for Matting and Blankets

6-71 GSWCC 2016 Edition

SLOPE STABILIZATION — Ss
N.T.S.

FABRIC AND SUPPORTING FRAME FOR INLET PROTECTION

STEEL FRAME AND SILT FENCE INSTALLATION



NOTES:
1. DESIGN IS FOR SLOPES NO GREATER THAN 5% (NOT DESIGNED FOR CONCENTRATED FLOWS).
2. THE STEEL POSTS SUPPORTING THE SILT FENCE MATERIAL SHOULD BE SPACED EVENLY AROUND THE PERIMETER OF THE INLET (MAXIMUM OF 3' APART).
3. THE STEEL POSTS SHOULD BE SECURELY DRIVEN AT LEAST 18" DEEP.
4. THE FABRIC SHOULD BE ENTRENCHED AT LEAST 12" AND THEN BACKFILLED WITH CRUSHED STONE OR COMPACTED SOIL.

FILTER FABRIC WITH SUPPORTING FRAME — Sd2-F
N.T.S.

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GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: M.K. POOL
DRAWN: E.L. BURTON
CHECKED: M.K. POOL
CHECKED: R.L. LINDSEY
APPROVED: M.C. LEUNG

FILENAME EC-005.dwg
KHAFRA PROJECT NUMBER 15ATL05-C155
CLIENT PROJECT NUMBER FCDWR PROJECT # 15E-BC04

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ES & PC DETAILS (STRUCTURAL)

DRAWING NUMBER
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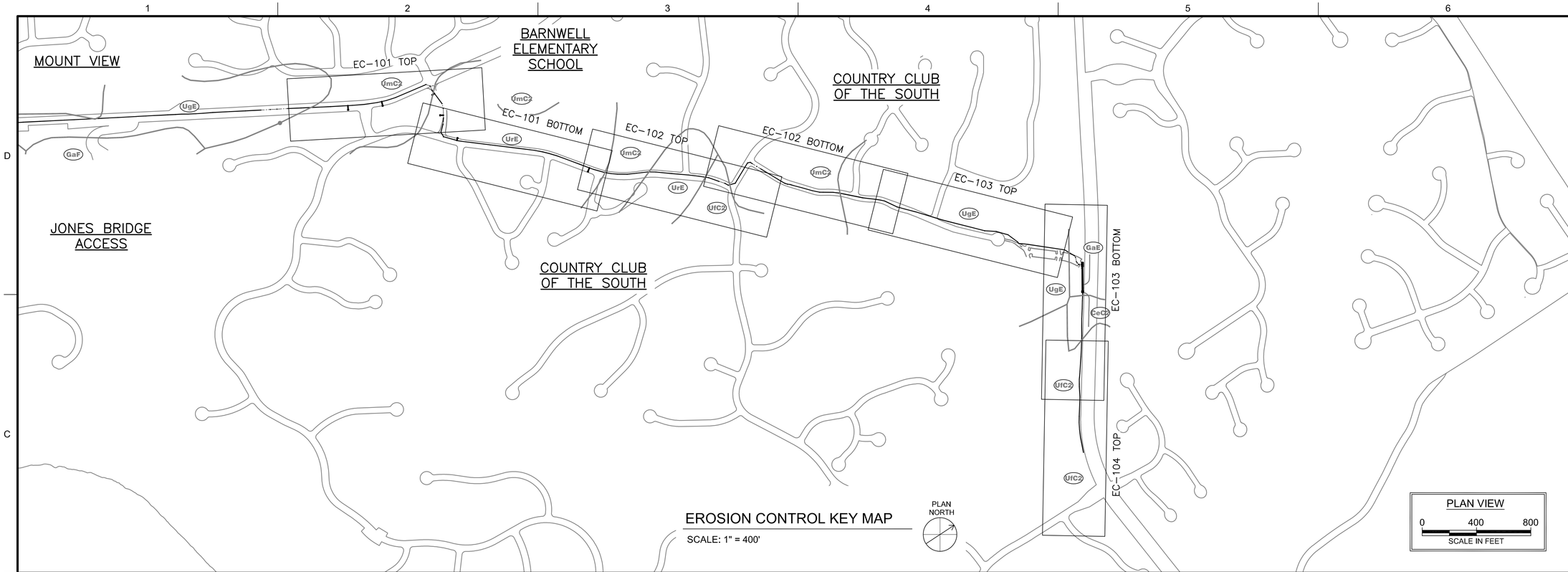

EROSION CONTROL KEY MAP

SCALE: 1" = 400'

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FILENAME
EC-100.dwg

KHAFRA PROJECT NUMBER
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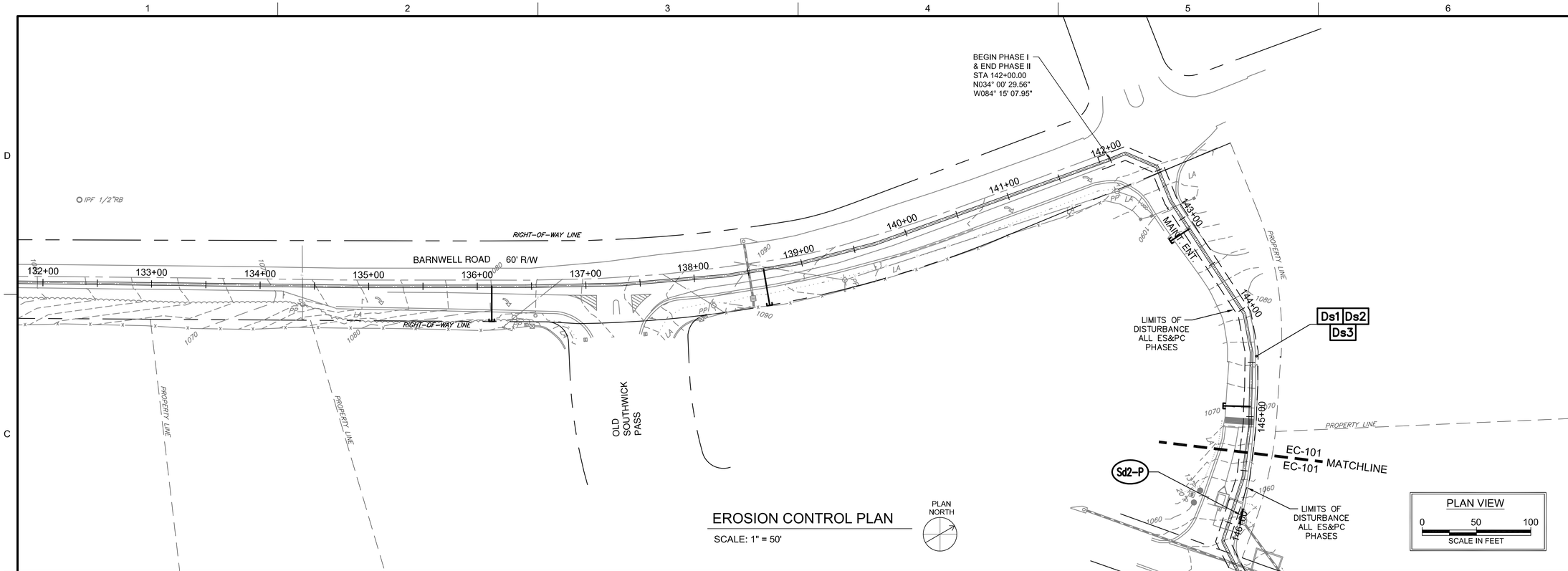
KEY PLAN
PHASE I

DRAWING NUMBER
EC-100

SHEET NUMBER
44 OF 77

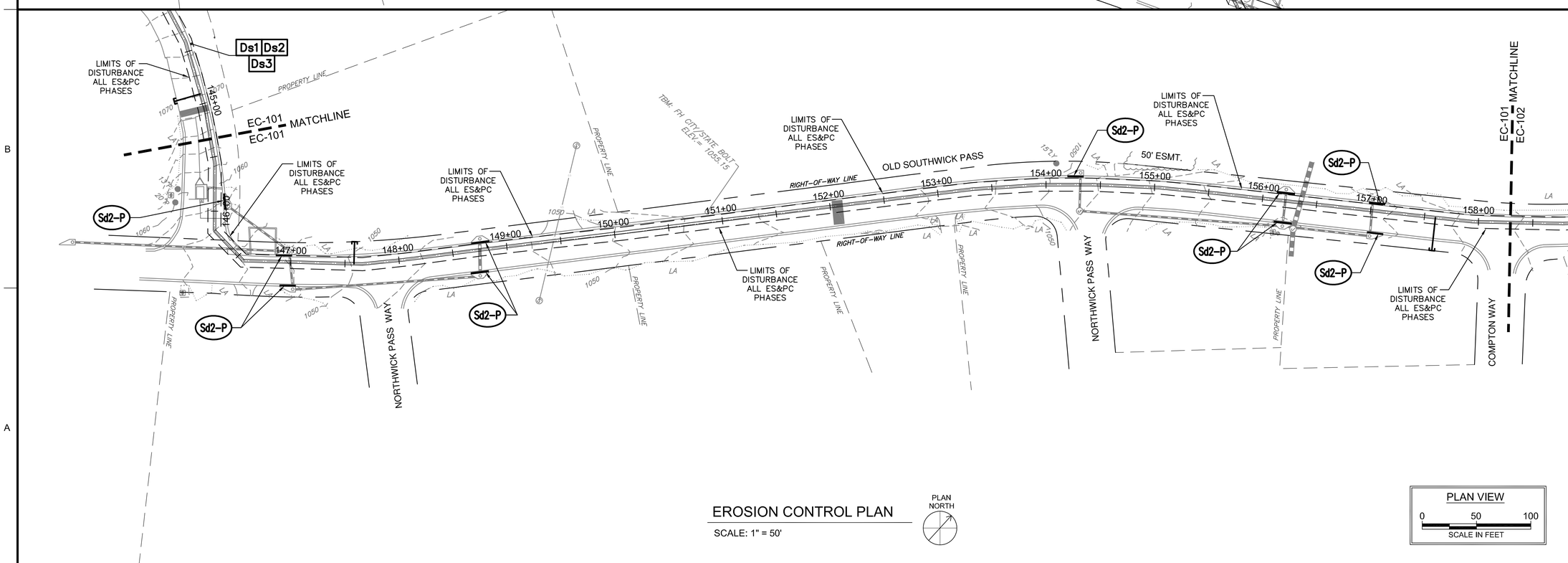
Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C-155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-100.DWG PLOT DATE: 9/28/2016 2:53 PM CAD USER: EDWARD BURTON

Fulton Logo w-name.jpg



EROSION CONTROL PLAN

SCALE: 1" = 50'



EROSION CONTROL PLAN

SCALE: 1" = 50'

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REUSE MAIN

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PHASE I
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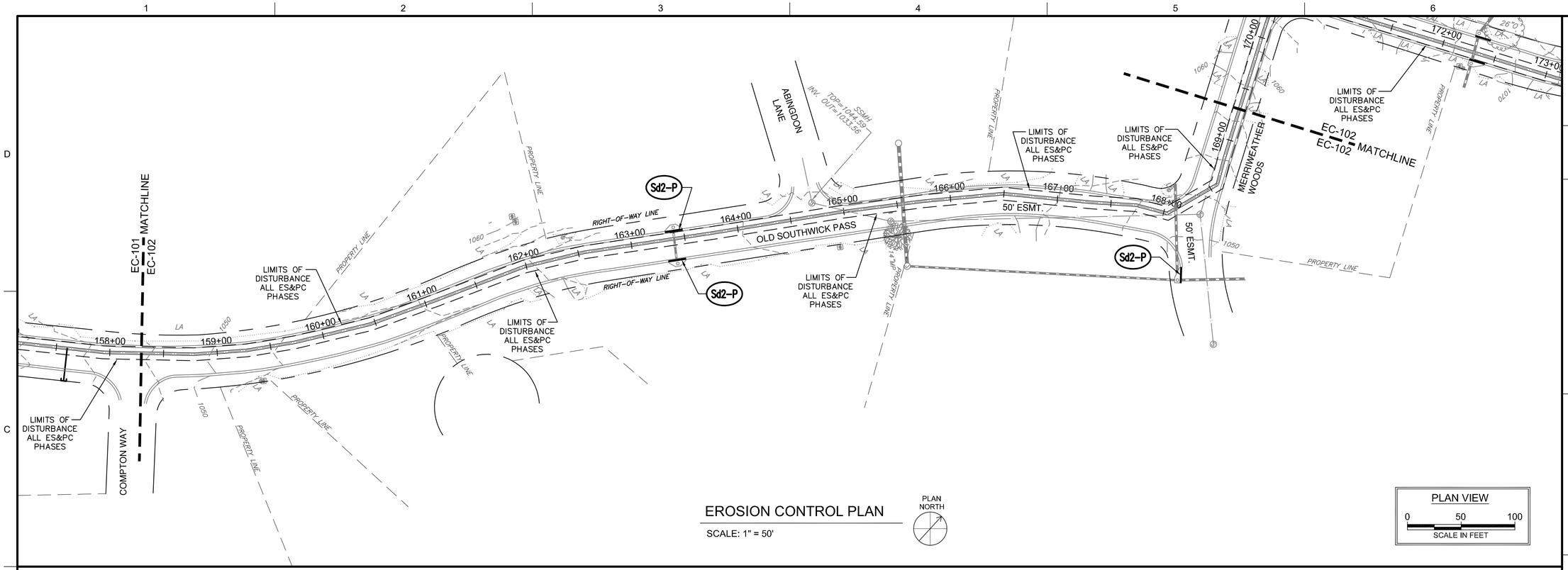


EROSION CONTROL PLAN

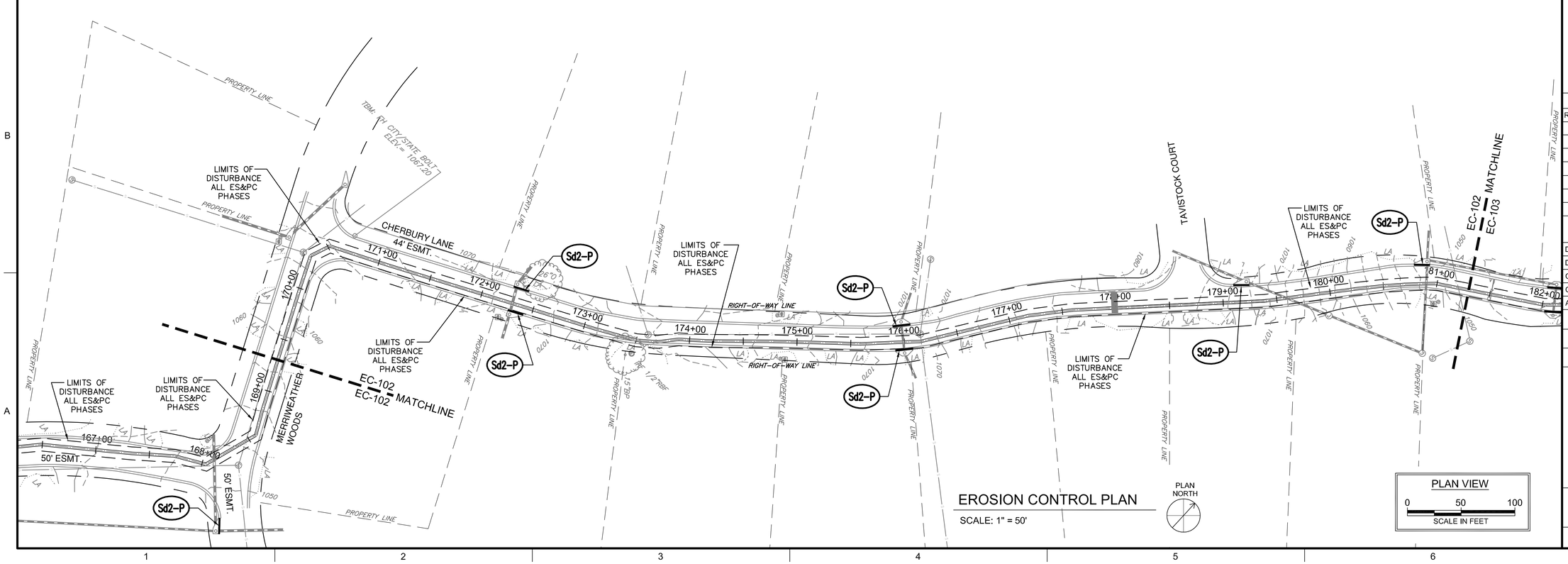
SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET



EROSION CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET

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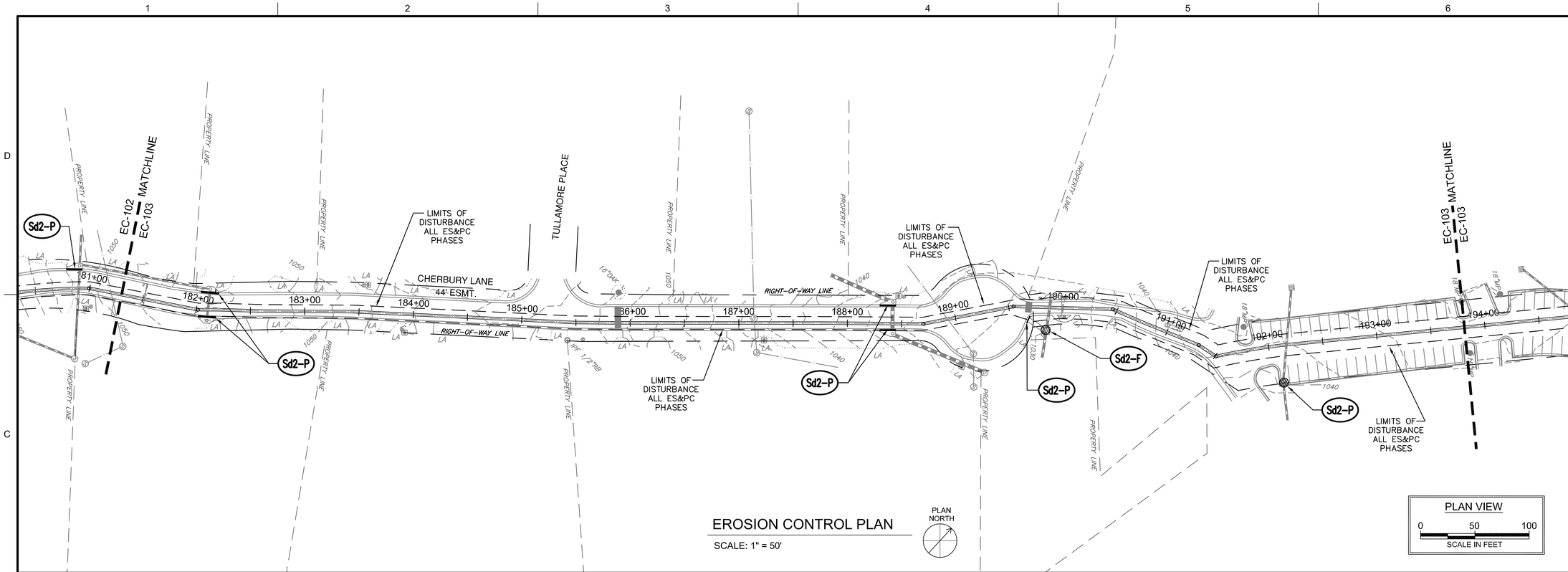


EROSION CONTROL PLAN

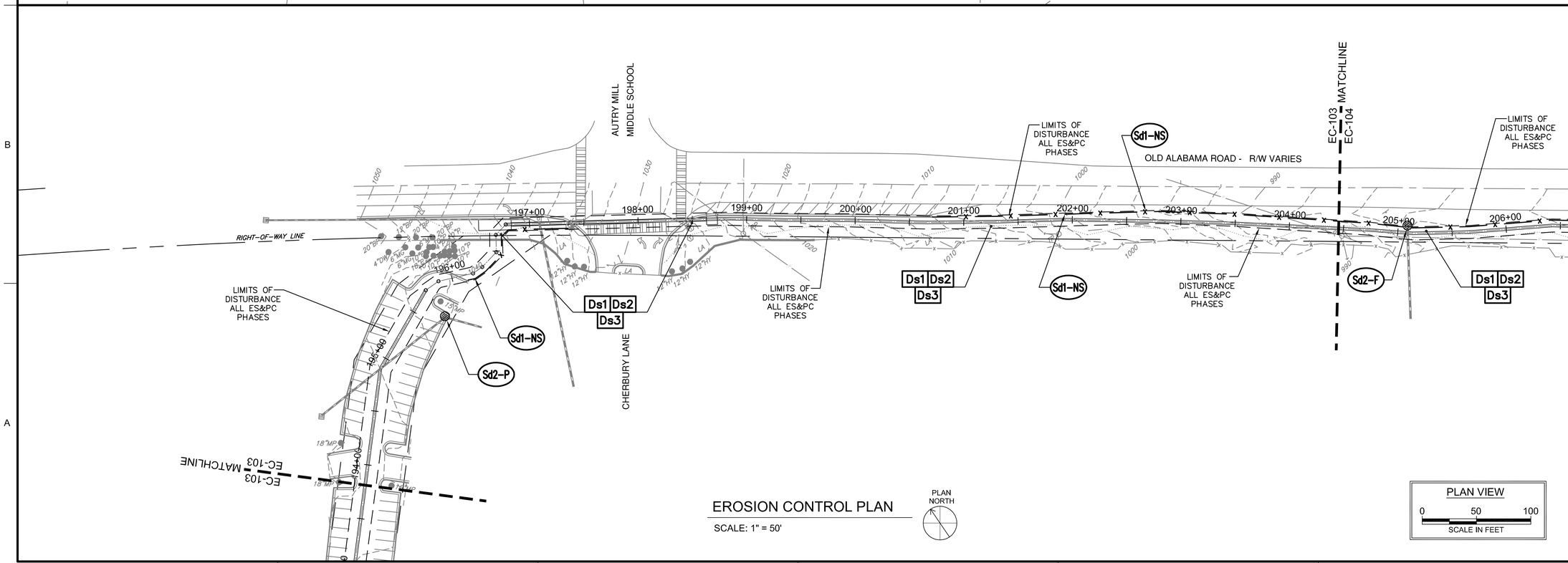
SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET



EROSION CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET

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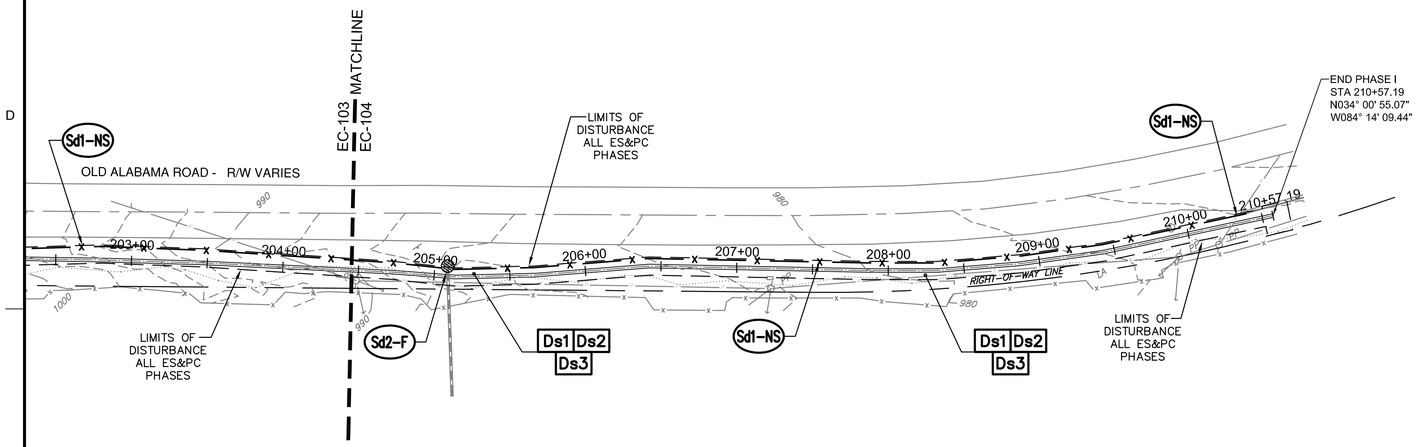

EROSION CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET

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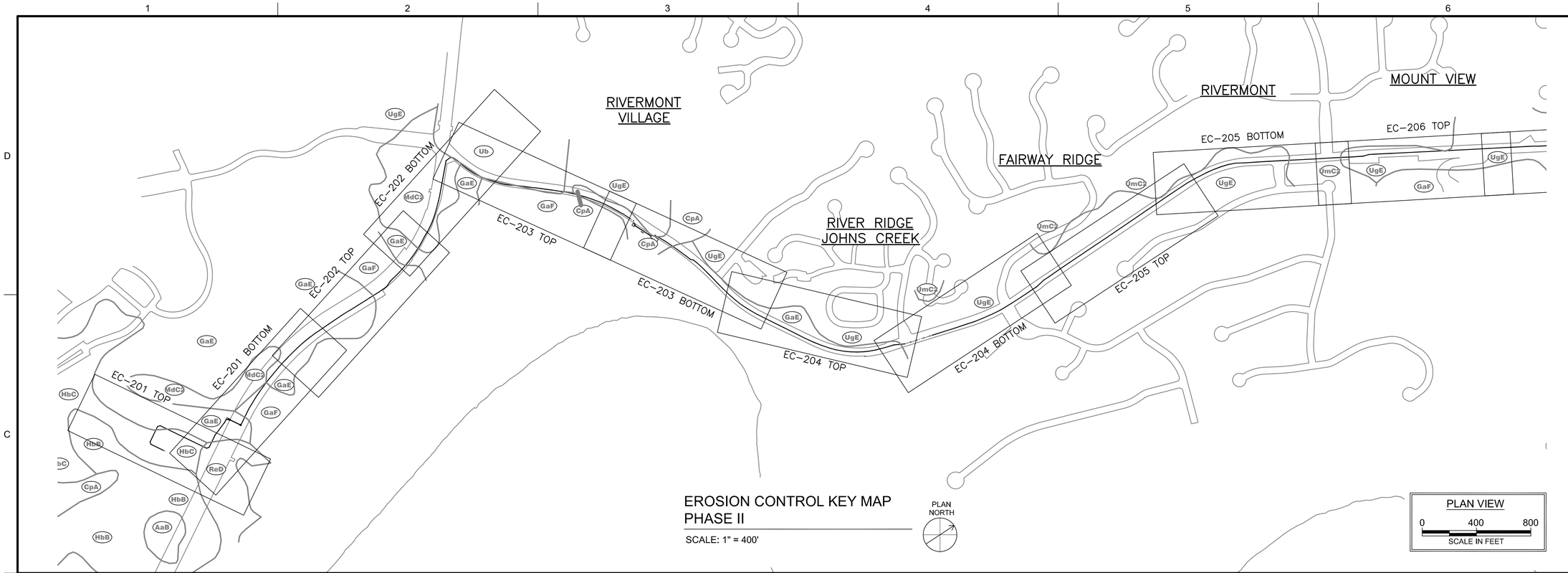
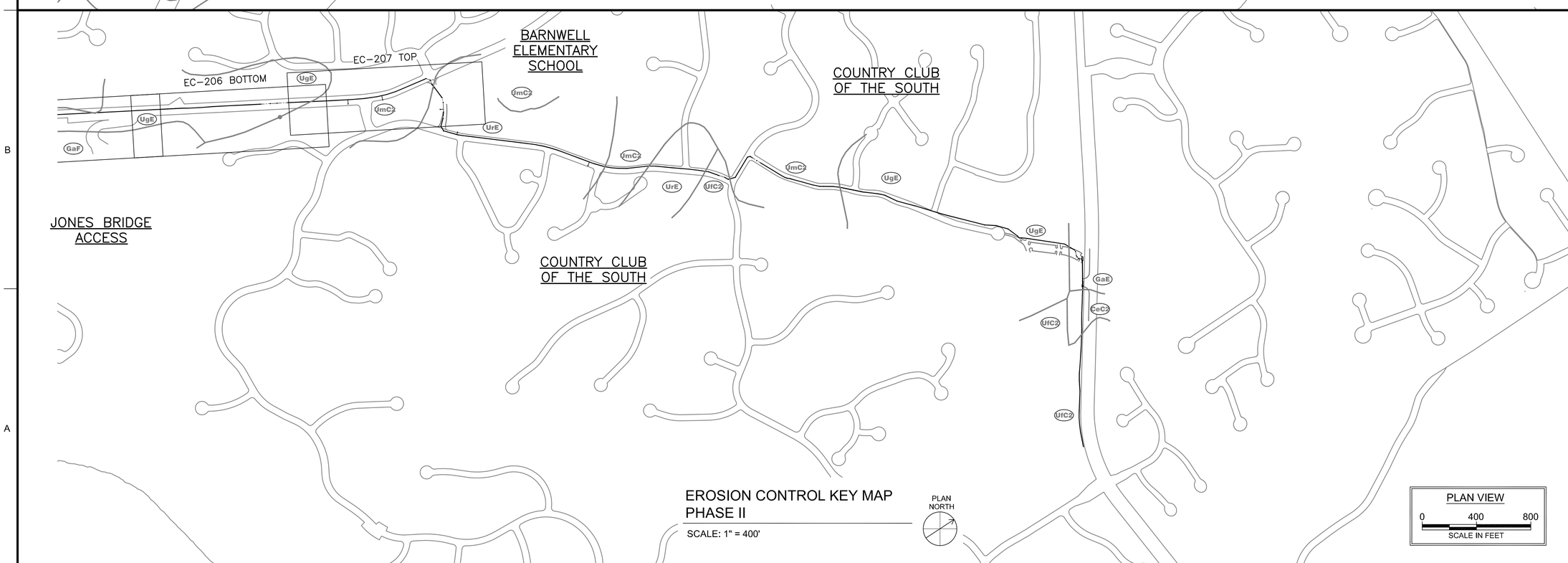


EROSION CONTROL KEY MAP
PHASE II

SCALE: 1" = 400'

PLAN NORTH

PLAN VIEW
0 400 800
SCALE IN FEET



EROSION CONTROL KEY MAP
PHASE II

SCALE: 1" = 400'

PLAN NORTH

PLAN VIEW
0 400 800
SCALE IN FEET

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FILENAME
EC-200.dwg

KHAFRA PROJECT NUMBER
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KEY PLAN
PHASE II

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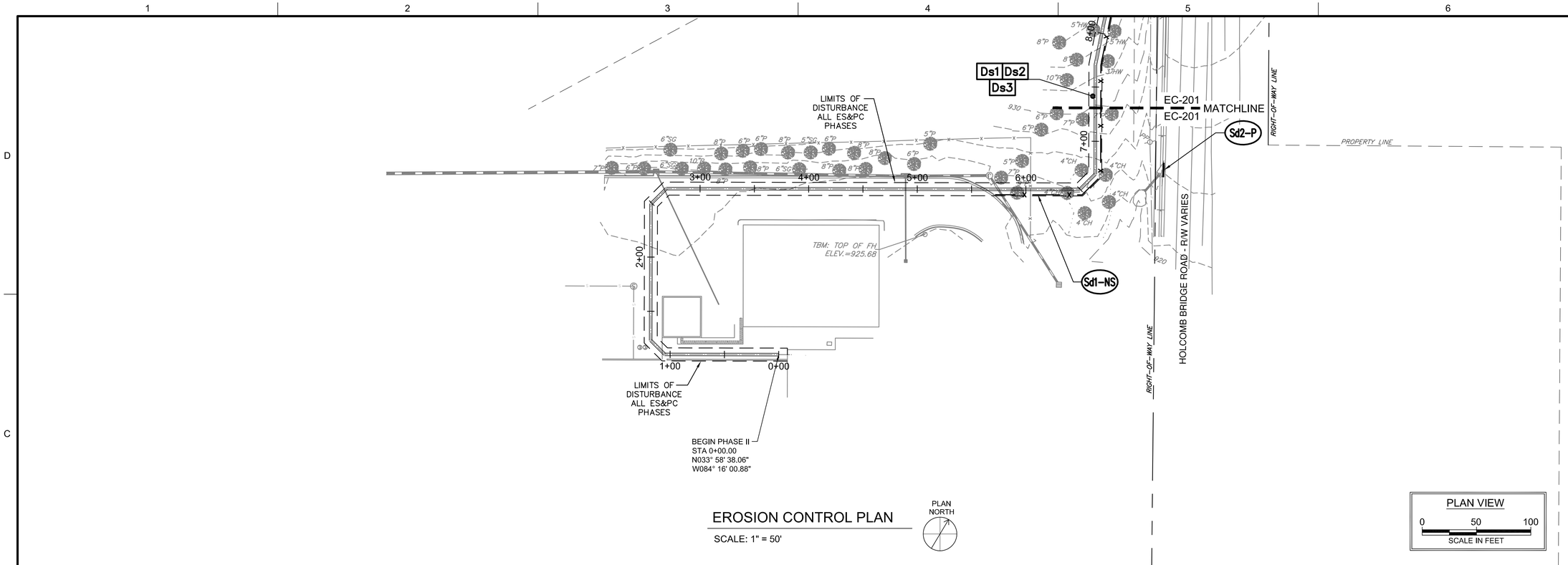

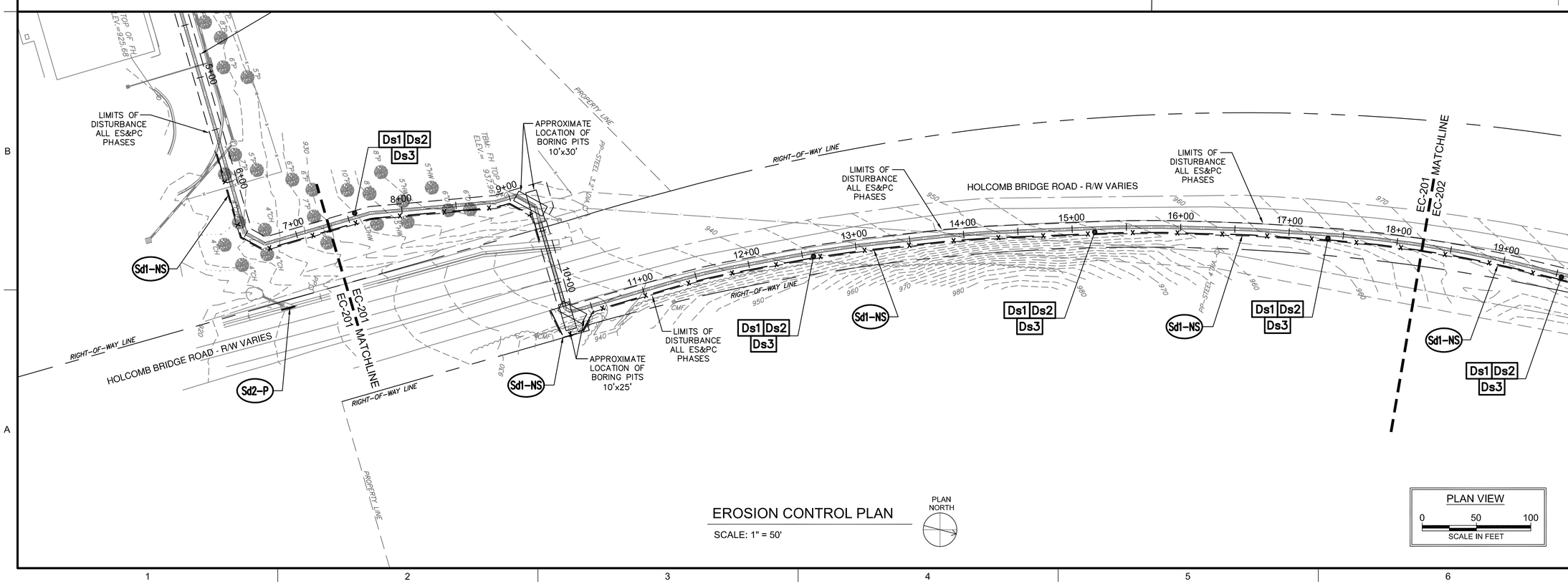

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GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

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DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
EC-201.dwg
KHAFRA PROJECT NUMBER
15ATL05-C155
CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
ES & PC PLAN

DRAWING NUMBER
EC-201

SHEET NUMBER
50 OF 77

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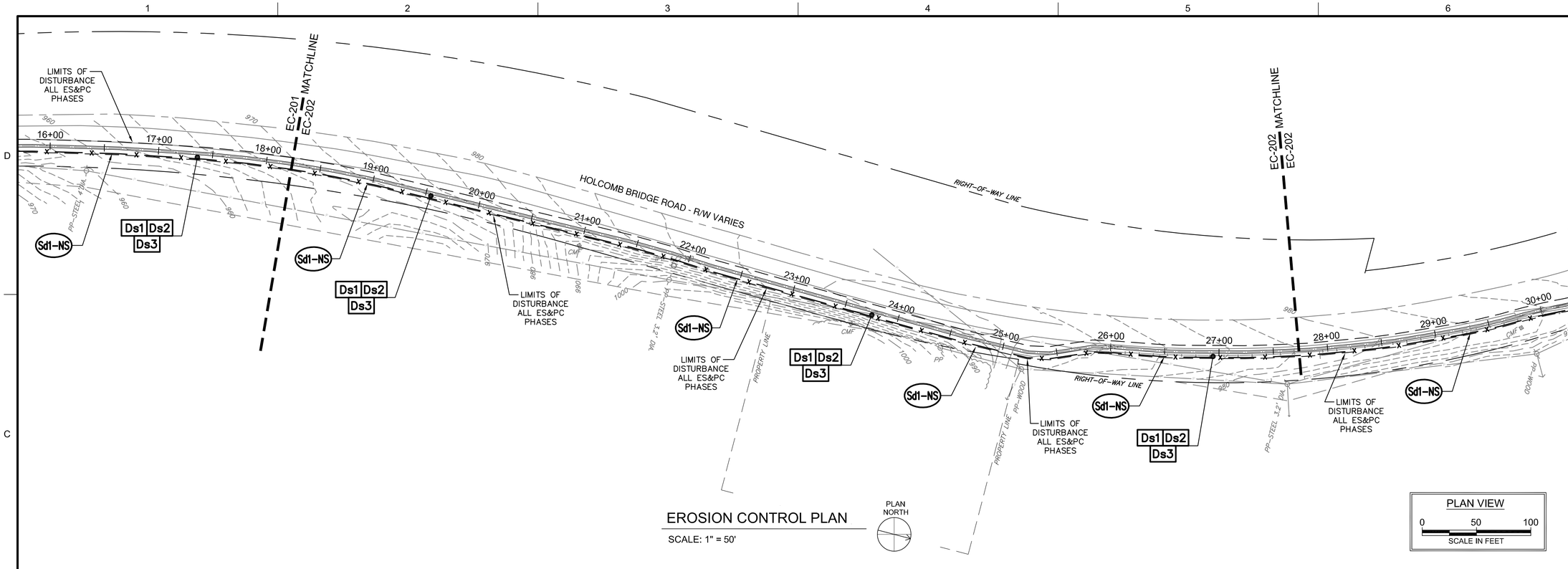


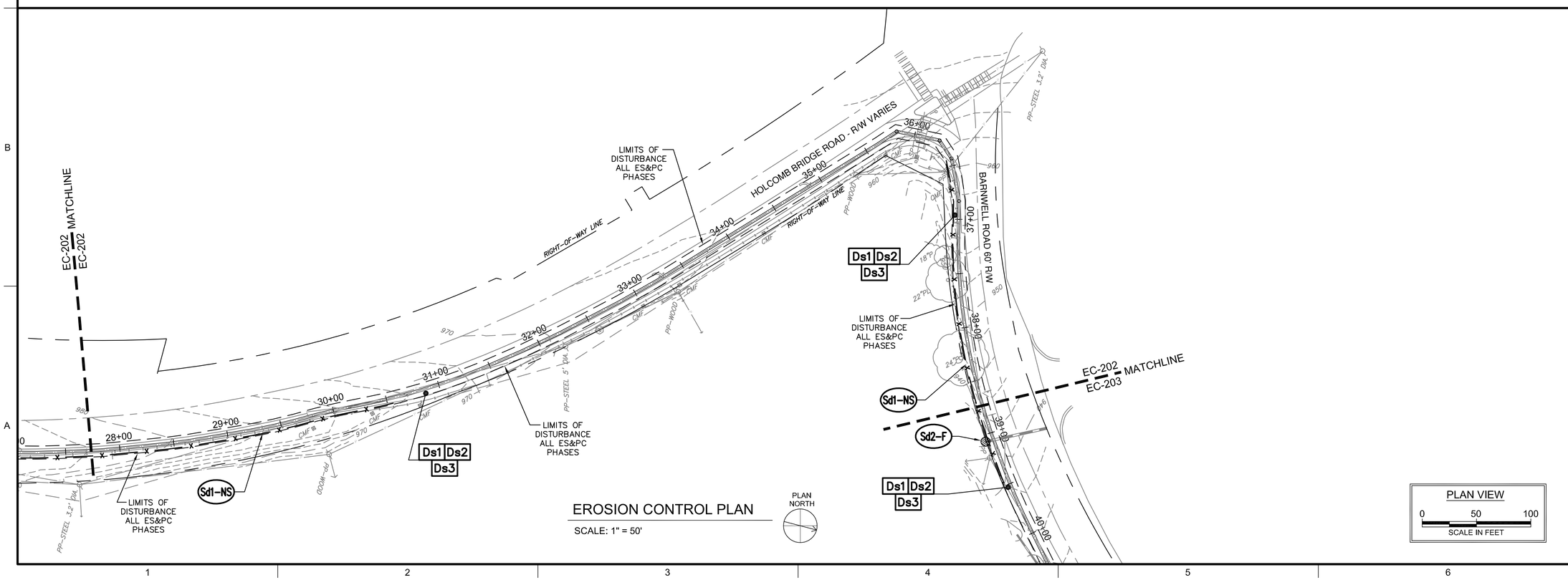
EROSION CONTROL PLAN

SCALE: 1" = 50'

PLAN VIEW

0 50 100

SCALE IN FEET



EROSION CONTROL PLAN

SCALE: 1" = 50'

PLAN VIEW

0 50 100

SCALE IN FEET

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FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

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DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	M.C. LEUNG
APPROVED:	M.C. LEUNG

FILENAME
EC-202.dwg

KHAFRA PROJECT NUMBER
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CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

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PHASE II
ES & PC PLAN

DRAWING NUMBER
EC-202

SHEET NUMBER
51 OF 77

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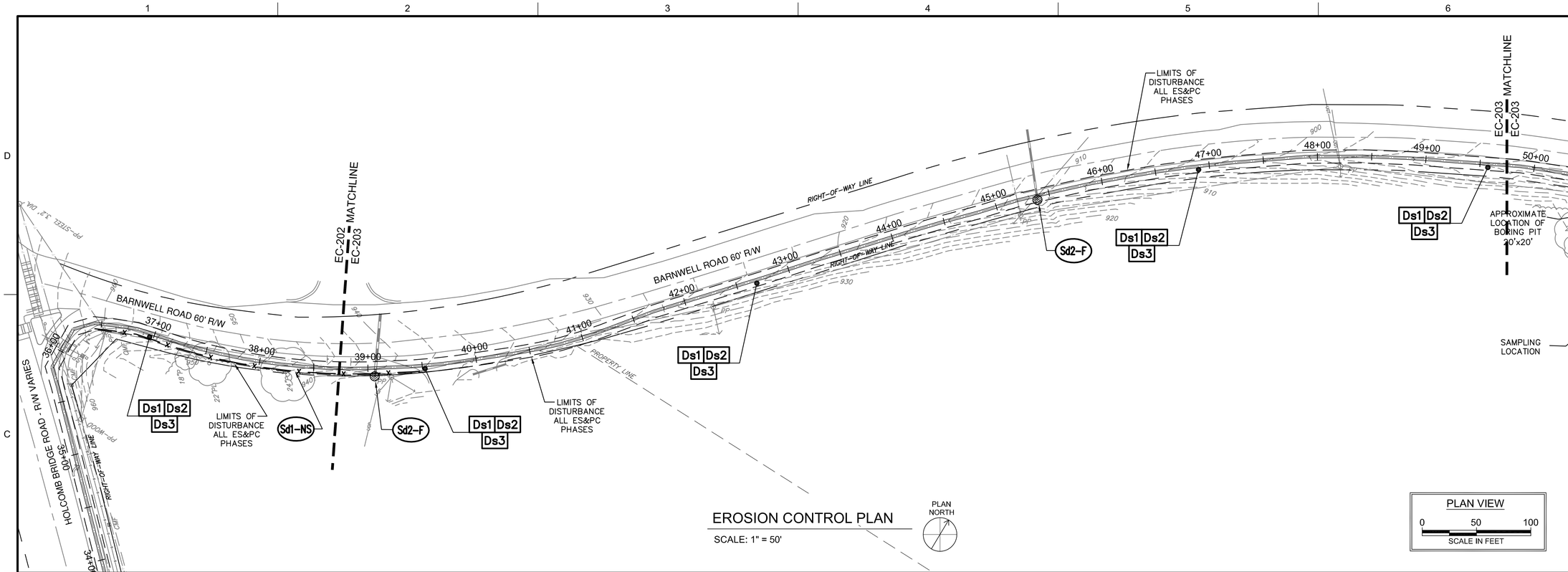
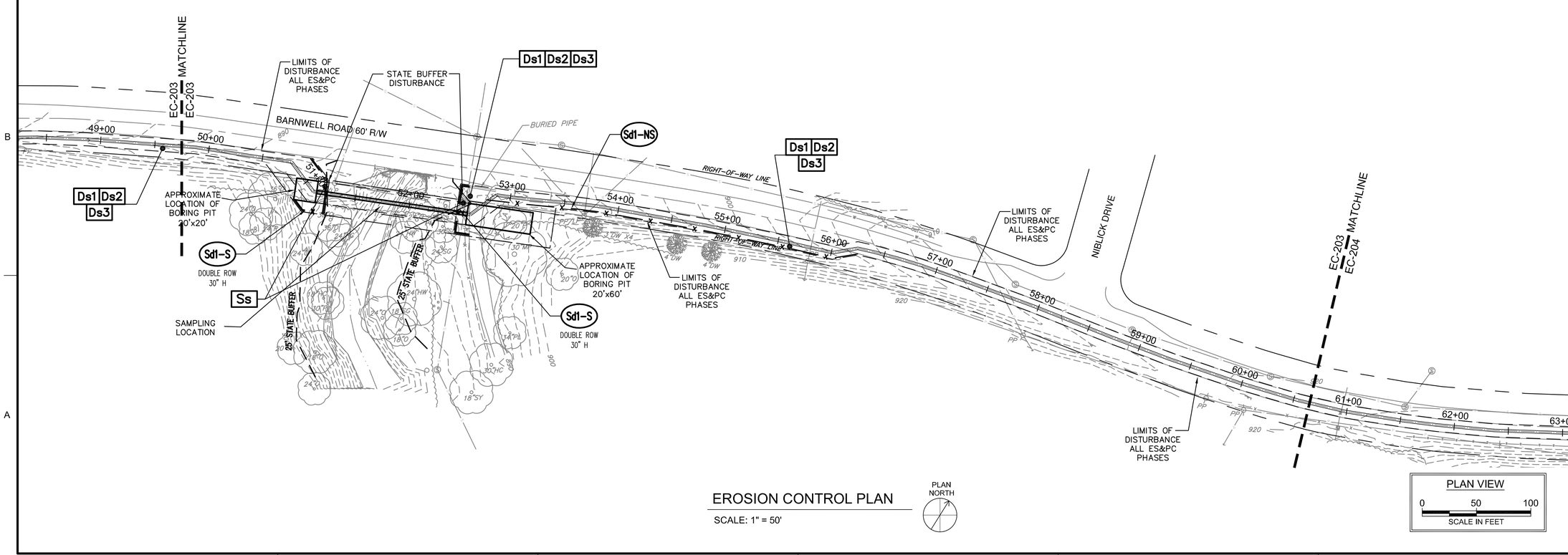


EROSION CONTROL PLAN

SCALE: 1" = 50'



EROSION CONTROL PLAN

SCALE: 1" = 50'

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ISSUE

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LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	M.C. LEUNG
APPROVED:	M.C. LEUNG

FILENAME
EC-203.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
ES & PC PLAN

DRAWING NUMBER
EC-203

SHEET NUMBER
52 OF 77

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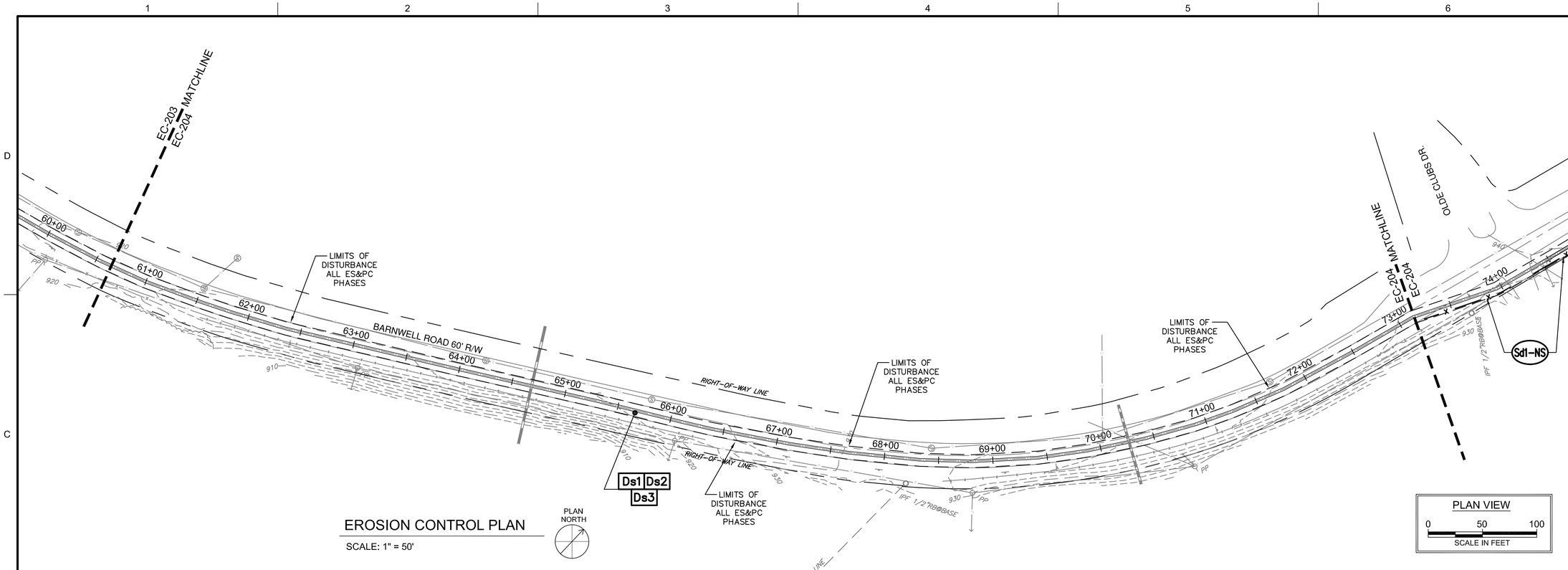
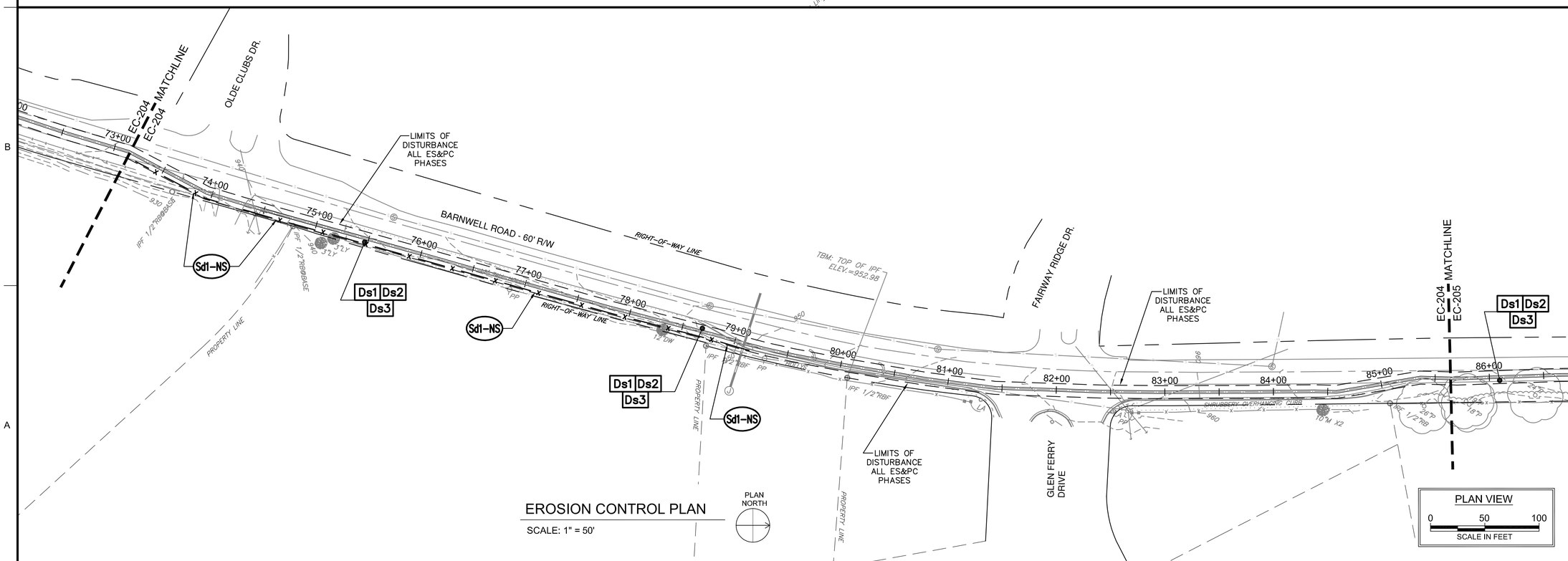


EROSION CONTROL PLAN

SCALE: 1" = 50'



EROSION CONTROL PLAN

SCALE: 1" = 50'

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
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GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 9/25/16 MERIDETH K. POOL

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: M.K. POOL
DRAWN: E.L. BURTON / M.K. POOL
CHECKED: M.K. POOL
CHECKED: R.L. LINDSEY
APPROVED: M.C. LEUNG

FILENAME
EC-204.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
ES & PC PLAN

DRAWING NUMBER
EC-204

SHEET NUMBER
53 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-204.DWG PLOT DATE: 9/28/2016 3:01 PM CAD USER: EDWARD BURTON

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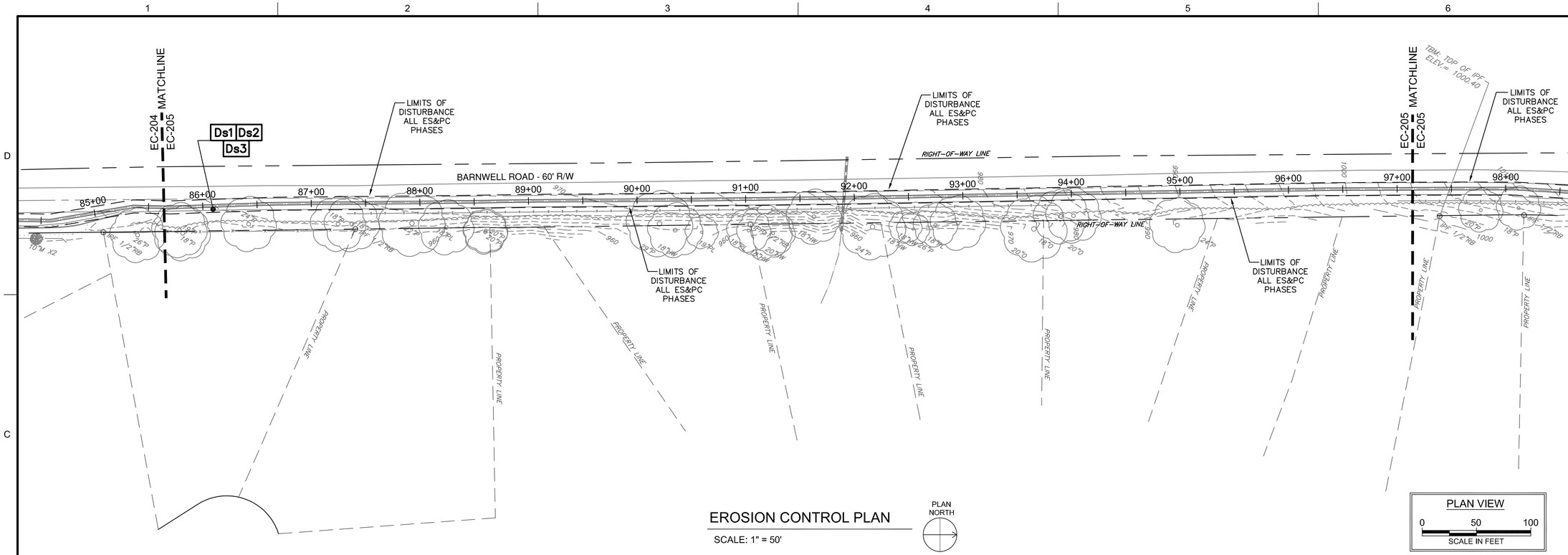


EROSION CONTROL PLAN

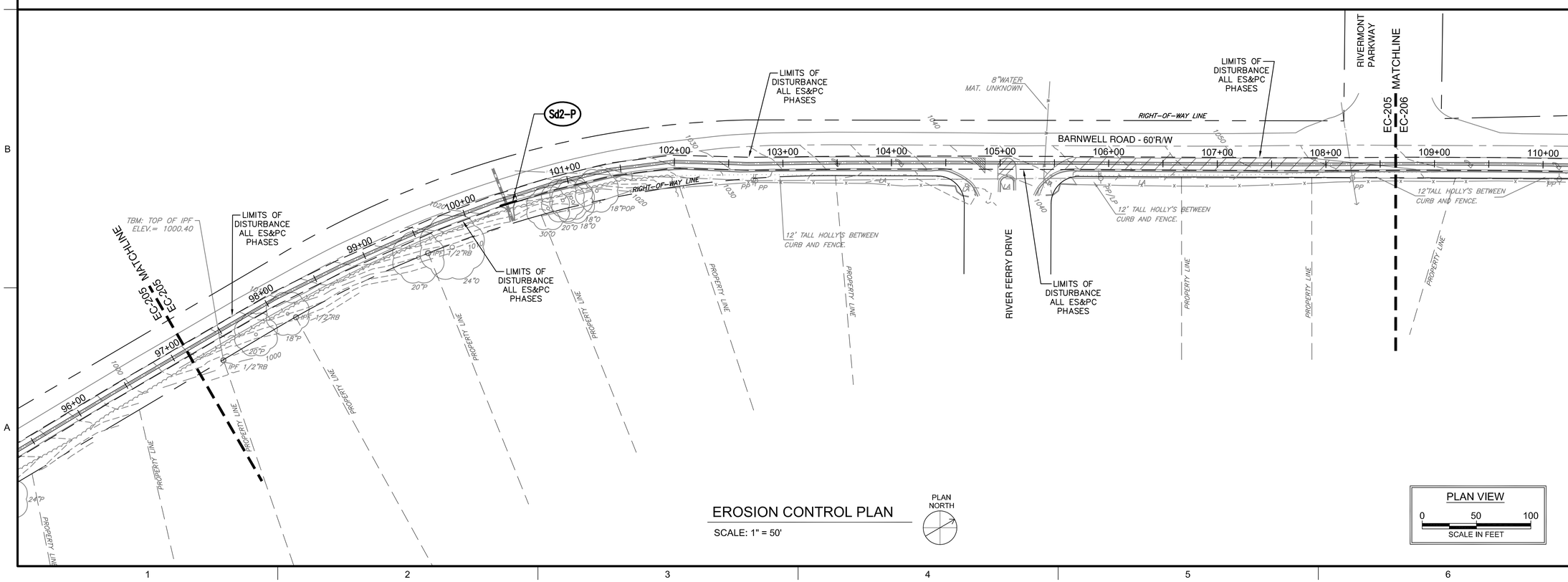
SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET



EROSION CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET

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225 PEACHTREE STREET, SUITE 1600
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GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
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CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
EC-205.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
ES & PC PLAN

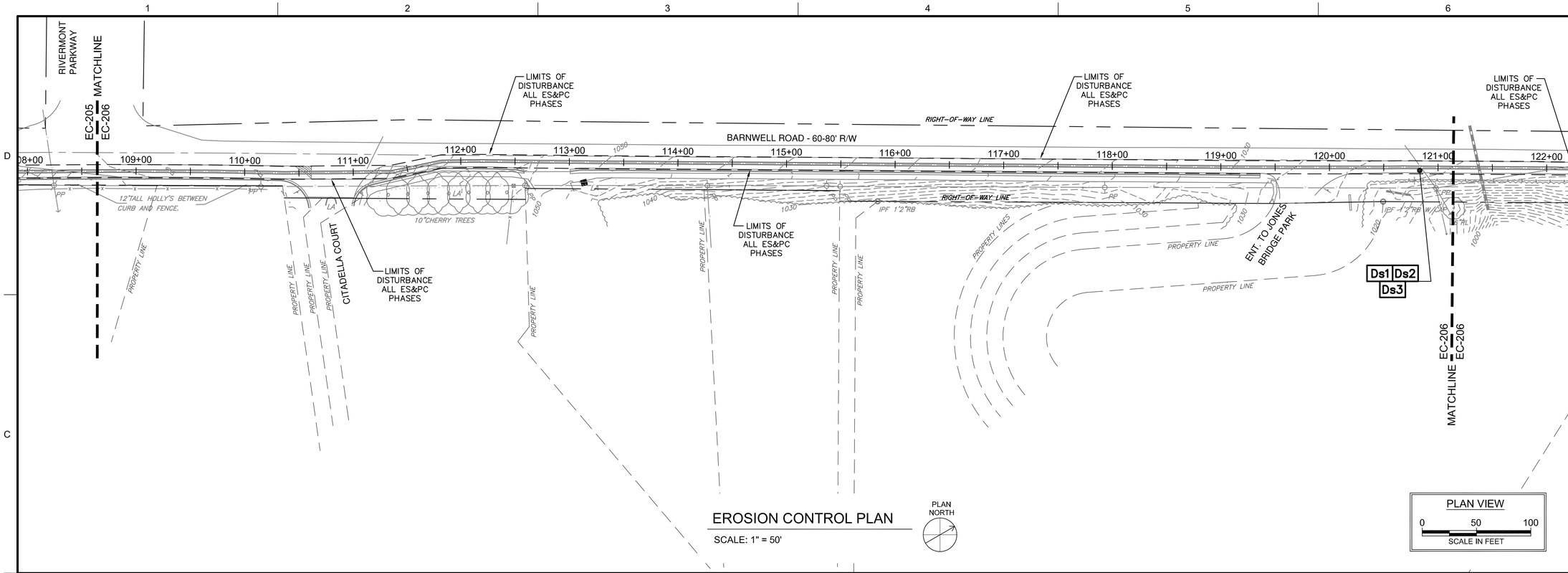
DRAWING NUMBER

EC-205

SHEET NUMBER
54 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-205.DWG PLOT DATE: 9/28/2016 3:02 PM CAD USER: EDWARD BURTON

Fulton Logo w-name.jpg



EROSION CONTROL PLAN

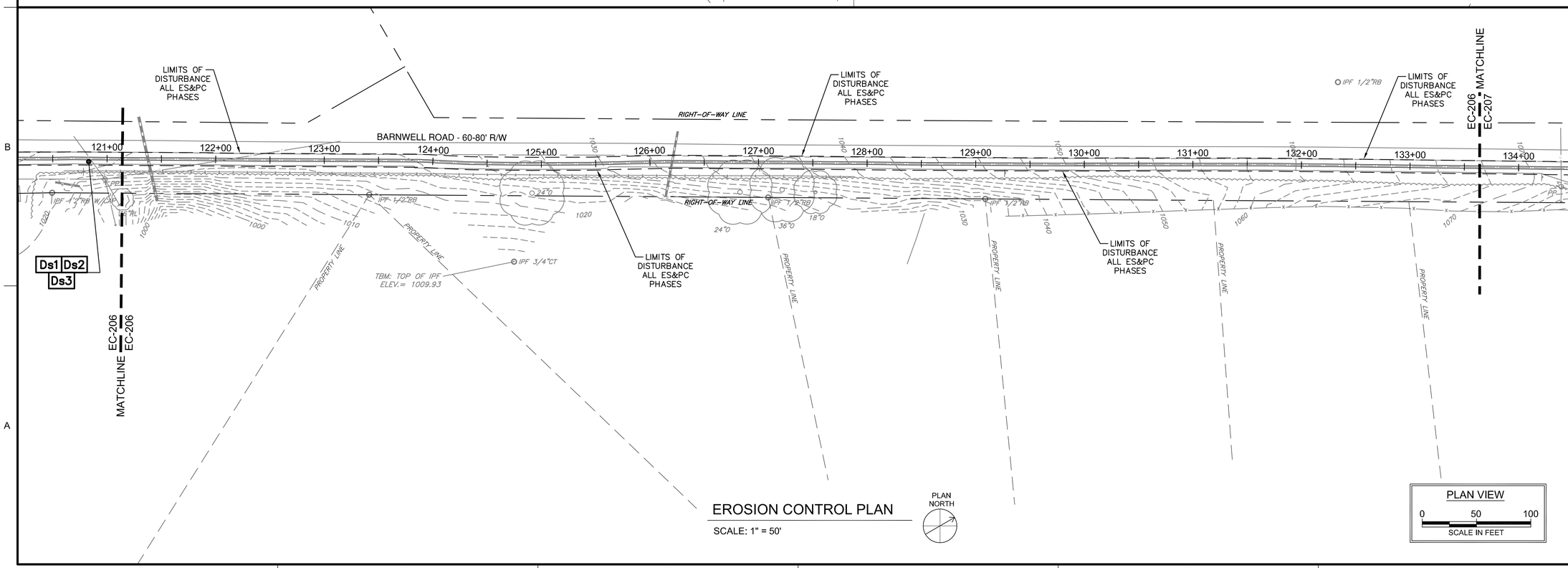
SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET



EROSION CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET

KHAFRA
225 PEACHTREE STREET, SUITE 1600
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GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
EC-206.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
ES & PC PLAN

DRAWING NUMBER
EC-206

SHEET NUMBER
55 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-206.DWG PLOT DATE: 9/28/2016 3:03 PM CAD USER: EDWARD BURTON
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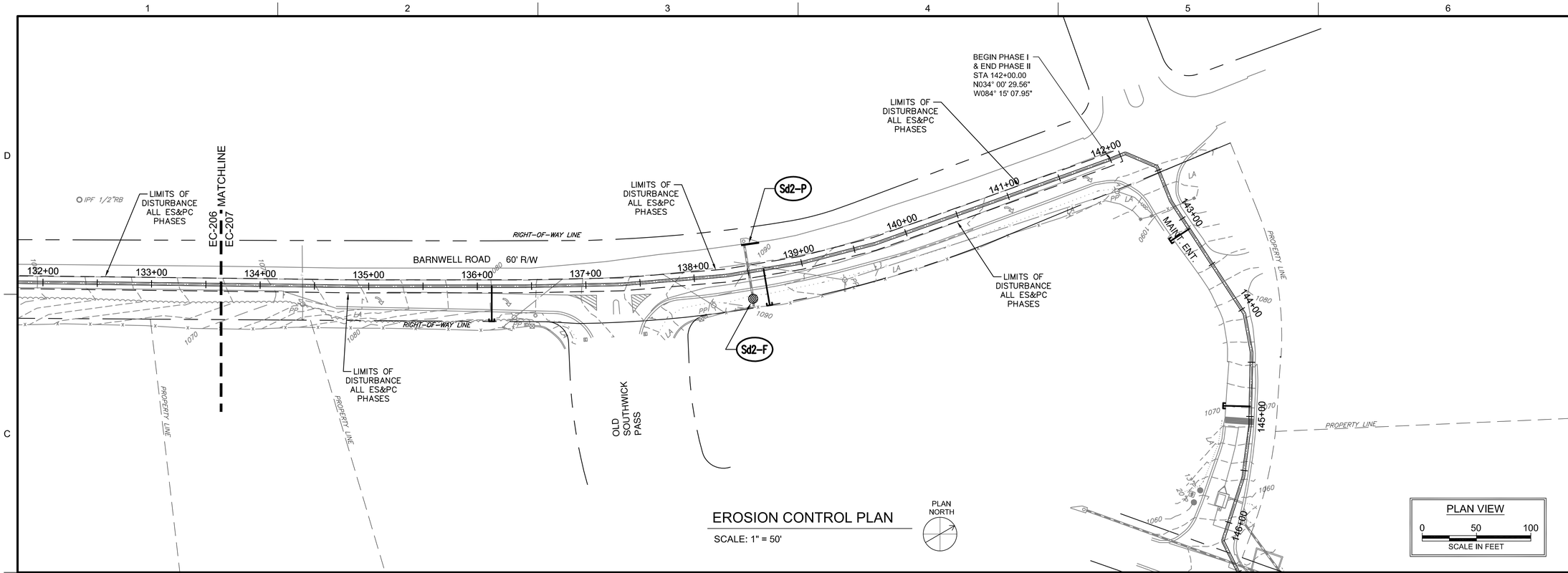

EROSION CONTROL PLAN

SCALE: 1" = 50'

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
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GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL
GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: M.K. POOL
DRAWN: E.L. BURTON / M.K. POOL
CHECKED: M.K. POOL
CHECKED: R.L. LINDSEY
APPROVED: M.C. LEUNG

FILENAME
EC-207.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
ES & PC PLAN

DRAWING NUMBER
EC-207

SHEET NUMBER
56 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C-155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA. FILENAME: EC-207.DWG PLOT DATE: 9/28/2016 3:04 PM CAD USER: EDWARD BURTON

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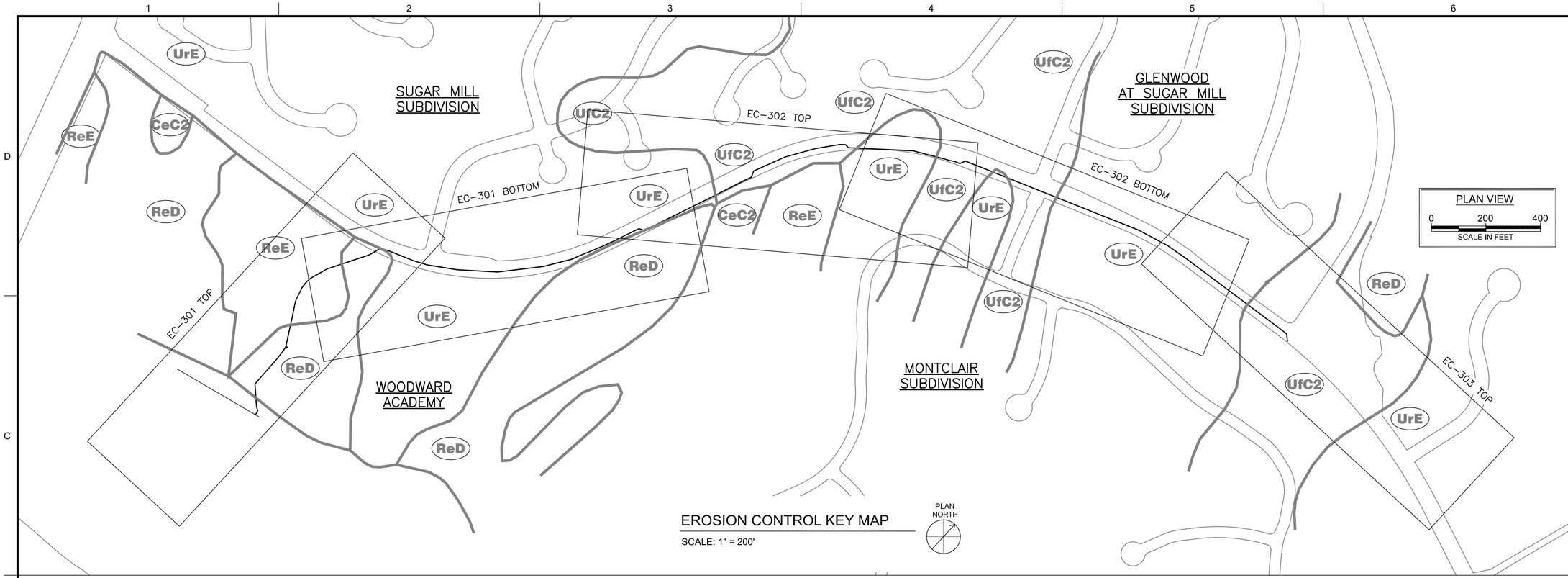

EROSION CONTROL KEY MAP

SCALE: 1" = 200'

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GSWCC NO. 37897

FULTON COUNTY

BOLES ROAD
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: M.K. POOL
DRAWN: E.L. BURTON / M.K. POOL
CHECKED: M.K. POOL
CHECKED: R.L. LINDSEY
APPROVED: M.C. LEUNG

FILENAME
EC-300.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

KEY PLAN
PHASE III

DRAWING NUMBER
EC-300

SHEET NUMBER
57 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-300.DWG PLOT DATE: 9/28/2016 3:05 PM CAD USER: EDWARD BURTON
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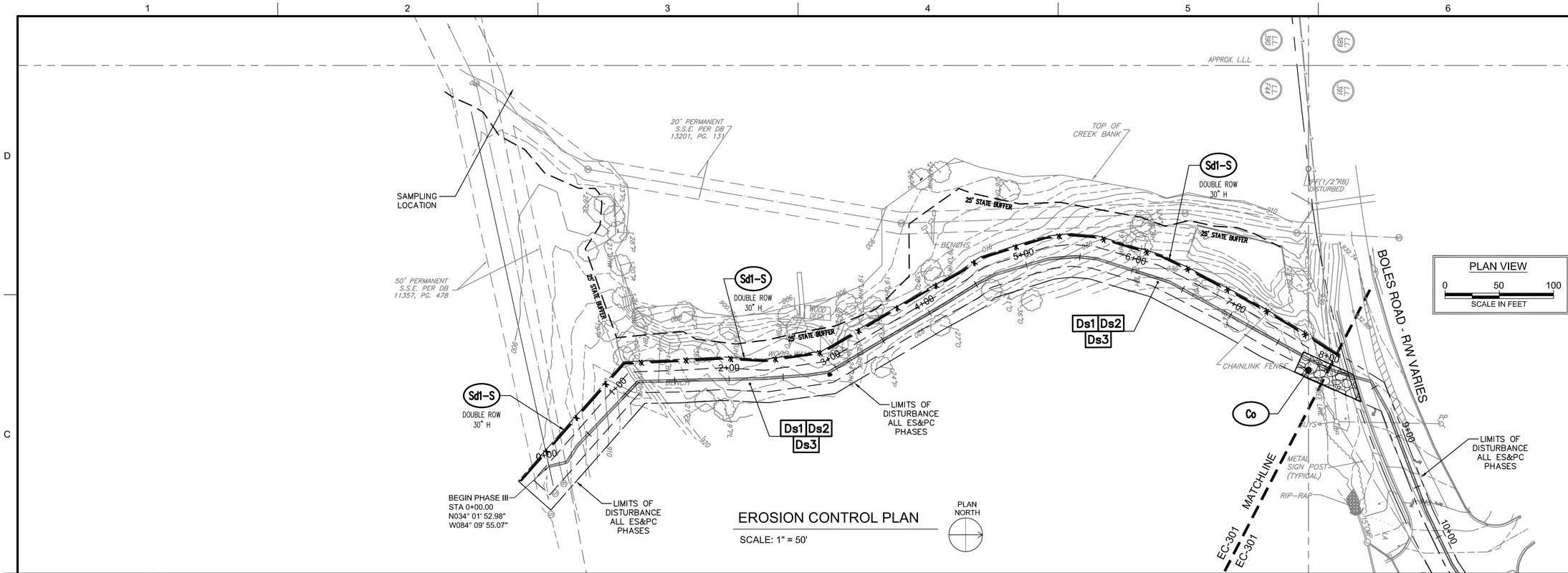
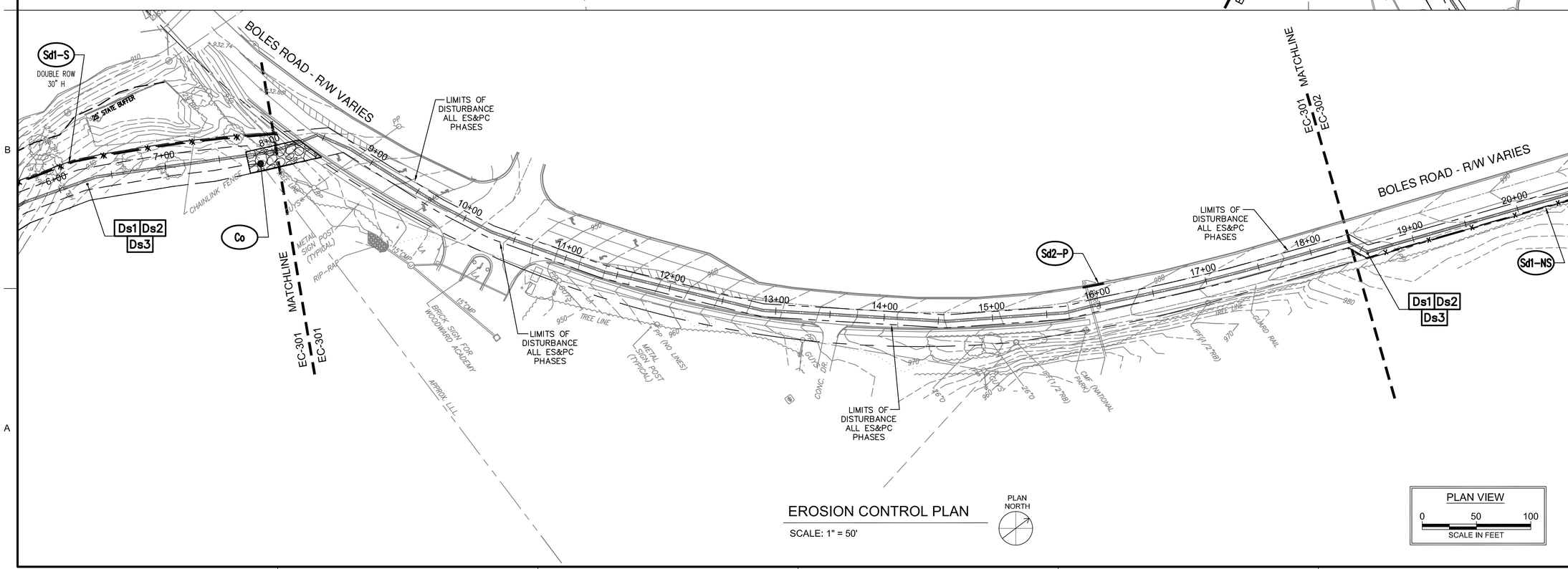


EROSION CONTROL PLAN

SCALE: 1" = 50'



EROSION CONTROL PLAN

SCALE: 1" = 50'

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GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL

GSWCC NO. 37897

FULTON COUNTY

BOLES ROAD REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
EC-301.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE III
ES & PC PLAN

DRAWING NUMBER
EC-301

SHEET NUMBER
58 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-301.DWG PLOT DATE: 9/28/2016 3:06 PM CAD USER: EDWARD BURTON

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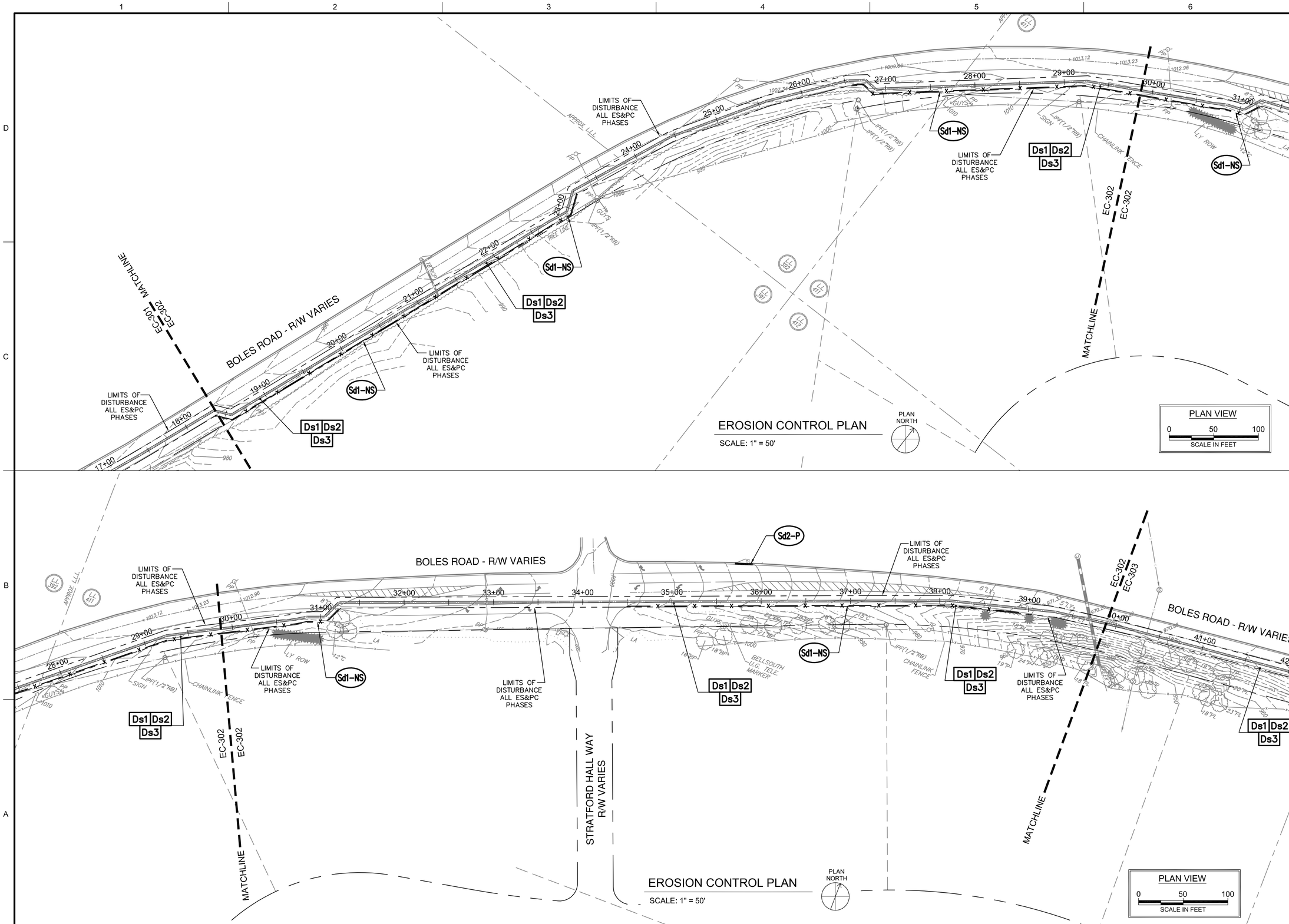

KHAFRA
225 PEACHTREE STREET, SUITE 1600
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GSWCC NO. 37897

FULTON COUNTY

BOLES ROAD
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
EC-302.dwg
KHAFRA PROJECT NUMBER
15ATL05-C155
CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE III
ES & PC PLAN

DRAWING NUMBER
EC-302

SHEET NUMBER
59 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-302.DWG PLOT DATE: 9/28/2016 3:06 PM CAD USER: EDWARD BURTON
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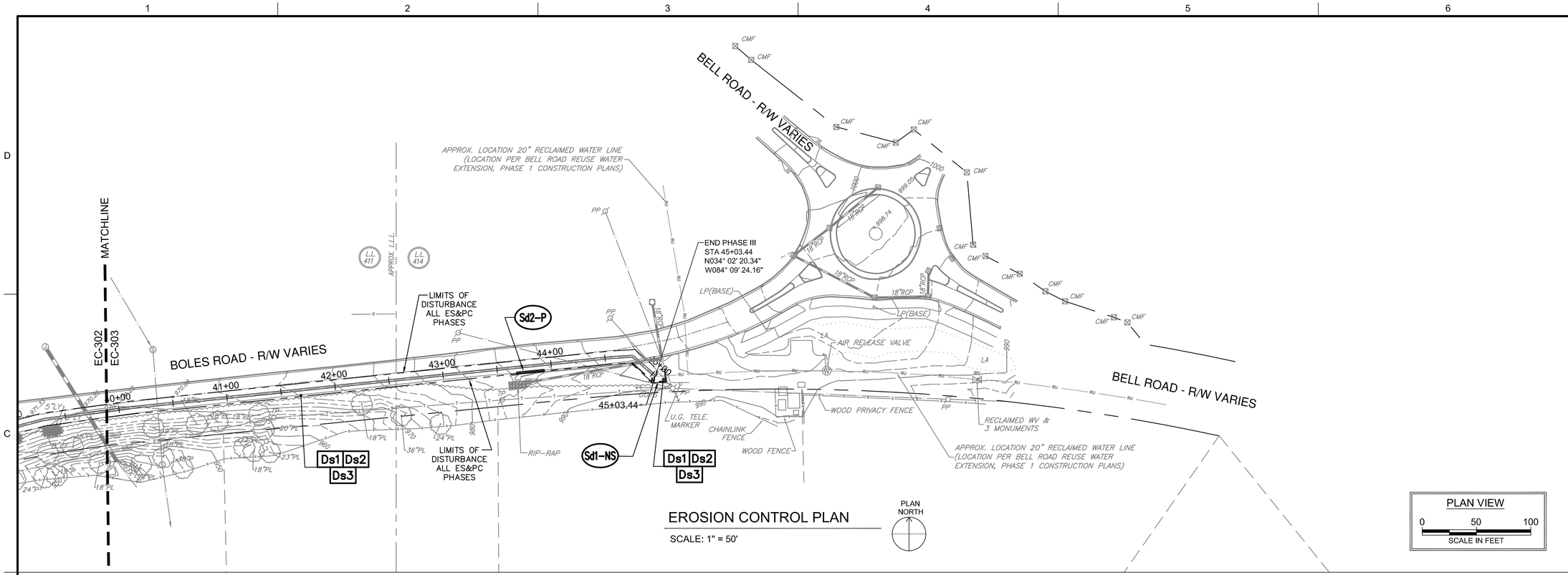

EROSION CONTROL PLAN

SCALE: 1" = 50'

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ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

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GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 MERIDETH K. POOL 9/25/16

GSWCC NO. 37897

FULTON COUNTY

BOLES ROAD
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: M.K. POOL
DRAWN: E.L. BURTON
CHECKED: M.K. POOL
CHECKED: R.L. LINDSEY
APPROVED: M.C. LEUNG

FILENAME
EC-303.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE III
ES & PC PLAN

DRAWING NUMBER
EC-303

SHEET NUMBER
60 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: EC-303.DWG PLOT DATE: 9/28/2016 3:07 PM CAD USER: EDWARD BURTON

Fulton Logo w-name.jpg

TRAFFIC NOTES:

1. ALL CONSTRUCTION IS TO BE PERFORMED WITHIN THE CURRENT APPLICABLE GEORGIA DEPARTMENT OF TRANSPORTATION STANDARDS, THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES – PART 6 – TEMPORARY TRAFFIC CONTROL, AND GDOT PLAN SPECIFICATIONS.
2. ALL TRAFFIC CONTROL DEVICES SHALL BE AS SHOWN, OR AS DIRECTED BY FULTON COUNTY. ADDITIONAL DEVICES MAY BE REQUIRED AS DIRECTED BY FULTON COUNTY.
3. PRECAST CONCRETE MEDIAN BARRIERS ARE TO BE PLACED WHERE SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. ANY STOCKPILED SLOPES EXCEEDING 4:1 ADJACENT TO TRAFFIC SHALL BE PROTECTED WITH PRECAST CONCRETE MEDIAN BARRIER.
4. ACCESS SHALL BE MAINTAINED AT ALL TIMES TO SIDE STREETS AND DRIVEWAYS.
5. THE CONTRACTOR SHALL MAINTAIN ADEQUATE POSITIVE DRAINAGE AT ALL LOCATIONS AT ALL TIMES.
6. ALL TRAFFIC CONTROL DEVICES SHALL BE MOUNTED A MINIMUM OF 1 FOOT ABOVE THE LEVEL OF PAVEMENT EDGE FOR DIRECTIONAL TRAFFIC OF TWO (2) LANES OR LESS AND A MINIMUM OF 7 FEET FOR DIRECTIONAL OF THREE (3) OR MORE LANES. ALL PORTABLE SIGNS AND SIGN MOUNTING DEVICES UTILIZED IN THE WORK SHALL BE NCHRP 350 COMPLIANT. PORTABLE SIGNS MAY BE USED WHEN THE DURATION OF THE WORK IS LESS THAN 3 DAYS.
7. WHEN THE CONSTRUCTION AREA HAS INTERSECTIONS, WORK WILL BE PERFORMED IN SUCH A MANNER TO PERMIT TRAFFIC TO OPERATE WITH THE LEAST AMOUNT OF INCONVENIENCE AS POSSIBLE. ADDITIONAL CHANNELIZATION AND SIGNING SHALL BE INSTALLED. AS REQUIRED, TO ALLOW TRAFFIC TO REMAIN AS OPERATIONAL AS POSSIBLE. WHEN ENTRANCE RAMPS/INTERSECTIONS ARE INOPERABLE, FLAGGERS WILL BE UTILIZED TO CONTROL AND PROHIBIT MOVEMENT INTO THE PROJECT AT THAT POINT UNTIL CONSTRUCTION HAS CLEARED THE RESTRICTION SUFFICIENT TO RETURN TO OPERATIONAL STATUS.
8. FOR NIGHT TIME OPERATIONS, DRUMS SHALL HAVE, FOR THE LENGTH OF THE TAPER ONLY, A SIX (6") INCH ORANGE REFLECTIZED TOP STRIPE ON EACH DRUM IN THE TAPER AS REQUIRED IN SECTION 150 OF GEORGIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, LATEST EDITION. SPACING OF DEVICES SHALL BE AS SHOWN. DURING DAYLIGHT HOURS, CONES (28" MIN.) MAY BE USED IN ADVANCE OF AND THROUGHOUT WORK AREA.
9. SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED TO MEET FIELD CONDITIONS BUT MUST BE WITHIN THE LIMITATIONS SET FORTH IN THE MUTCD.
10. WHEN NOT IN USE. PORTABLE SIGNS SHALL BE REMOVED FROM THE TRAVELWAY SO THAT THE MESSAGE IS NOT VISIBLE TO THE MOTORIST. INTERIM SIGNS THAT ARE PERMANENTLY MOUNTED SHALL BE COVERED WHEN NOT APPLICABLE.
11. ALL CROSSROADS, SIDE ROADS, OR OTHER ENTRANCES TO MAINLINE CONSTRUCTION SHALL REQUIRE W20–1 SIGNS LOCATED AS SHOWN IN THE PLANS, OR AS DIRECTED BY FULTON COUNTY.
12. MARKINGS AND/OR SIGNS IN CONFLICT WITH INTERIM TRAFFIC CONTROL SHALL BE REMOVED, RELOCATED OR COVERED; APPLICABLE EXISTING AND INTERIM MARKINGS AND/OR SIGNING SHALL BE MAINTAINED PER SECTION 150 OF GEORGIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, LATEST EDITION.
13. ANY CHANNELIZING DEVICES (DRUMS OR BARRICADES) IN CONFLICT WITH CONCRETE BARRIERS SHALL BE OMITTED.
14. EXISTING GUIDE SIGNS SHALL REMAIN IN PLACE SO LONG AS THEY DO NOT CONFLICT WITH THE CONSTRUCTION OF THIS PROJECT. WHEN IN CONFLICT, THEY SHALL BE RELOCATED ON TEMPORARY POSTS AT THE LOCATION AS DIRECTED BY THE ENGINEER. ANY DISTANCE SHOWN ON THE SIGN SHALL BE ADJUSTED ACCORDINGLY. IF THE SIGNS CANNOT BE RELOCATED, THEN THE SIGN SHALL BE REMOVED AND STORED AT A PLACE DESIGNATED BY THE ENGINEER. IF NEITHER OF THE ABOVE CAN BE DONE, THEN THE CONTRACTOR SHALL PROVIDE INTERIM GUIDE SIGNS AS COVERED IN SECTION 150 OF GEORGIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, LATEST EDITION.
15. WORK SPACE SHALL BE LIMITED TO THE SHORTEST DISTANCE PRACTICAL FOR THE DAY'S CONSTRUCTION ACTIVITIES. WORK AREA NOT TO EXCEED 400' UNLESS APPROVED BY FULTON COUNTY.
16. WORK SHALL BE LIMITED TO BETWEEN 9:00AM AND 3:00PM MONDAY TO FRIDAY OR AS DIRECTED BY FULTON COUNTY.
17. CONTRACTOR TO PROVIDE ELECTRONIC CHANGEABLE MESSAGE SIGNS WHERE INDICATED ON THE DRAWING OR WHERE DIRECTED BY FULTON COUNTY.
18. CONTRACTOR SHALL PROVIDE NIGHT WATCHMAN IF SIGNALS ARE PROVIDED AND PROVIDE FLAG CONTROL, IF REQUIRED.
19. CONTRACTOR TO COORDINATE WITH FULTON COUNTY TO POST CONSTRUCTION SCHEDULE AND TRAFFIC DETOUR RECOMMENDATIONS ON WEBSITES.
20. CONTRACTOR TO COORDINATE WITH FULTON COUNTY BOARD OF EDUCATION AND EMERGENCY RESPONSE.
21. WHERE FLAGGERS ARE PROVIDED CONTRACTOR SHALL MAINTAIN A MINIMUM OF TWO CERTIFIED FLAGGERS AT ALL TIMES.
22. ON NO OCCASION SHALL TRAFFIC BE DETOURED ONTO RESIDENTIAL SUBDIVISION STREETS.
23. TRAFFIC ALONG BARNWELL ROAD AND BOLES ROAD SHALL BE MAINTAINED IN BOTH DIRECTIONS DURING PEAK TRAFFIC HOURS.
24. THE TRAFFIC MANAGEMENT PLAN SHOWN HERE IS THE MINIMUM REQUIRED FOR EFFECTIVE TRAFFIC MANAGEMENT.
25. TRENCHES SHALL NOT BE LEFT OPEN OVERNIGHT.
26. SIDEWALKS AND ISLANDS MUST BE DESIGNED TO ACCEPT HANDICAP RAMPS AND LANDINGS THAT MEET ADA REQUIREMENTS.
27. ALL HANDICAP RAMP FORMS MUST BE APPROVED BY FULTON COUNTY LAND DISTURBANCE INSPECTOR PRIOR TO CONCRETE POUR.

TRAFFIC NOTES (CONTINUED):

28. ROADWAY PAVEMENT SPECIFICATIONS, AND CURB & GUTTER DETAIL MUST MEET FULTON COUNTY STANDARDS.
29. CONTRACTOR IS TO PROVIDE FULTON COUNTY ENCROACHMENT PERMIT FOR ALL WORK WITHIN THE R–O–W. ANY TRAFFIC SIGNAL OR UTILITY RELOCATIONS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
30. ALL UTILITY LOCATES AND RELOCATIONS AND/OR DAMAGE WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR MUST CONTACT FULTON COUNTY LOCATE PERSONNEL DIRECTLY FOR TRAFFIC SIGNAL UTILITY LOCATES. PHONE 404–612–7400..
31. CONTRACTOR TO MAINTAIN SIDEWALK CONTINUITY THROUGHOUT CONSTRUCTION ZONE. SIGNAGE TO BE PROVIDED THROUGH MUTCD PART VI.
32. CONTRACTOR TO PROVIDE DETAIL TRAFFIC CONTROL PLANS AT ALL INTERSECTIONS FOR APPROVAL BY FULTON COUNTY BEFORE ANY CONSTRUCTION ACTIVITY TAKES PLACE.
33. COMPACTION REPORTS AROUND ALL STRUCTURES, ESPECIALLY IN ROADWAY, WILL NEED TO BE APPROVED.
34. MILL AND RESURFACE ROADWAY GUTTER TO GUTTER.
35. CONTRACTOR IS RESPONSIBLE FOR REPLACEMENT OF ALL DAMAGED TRAFFIC SIGNAL LOOPS.
36. CONTRACTOR IS RESPONSIBLE FOR REPLACEMENT OF CURB AND GUTTER THAT IS DAMAGED DURING CONSTRUCTION WHICH WILL NEED TO BE REPLACED PRIOR TO FINAL PAVING.
37. REPAVING/REPAIR OF ROADWAY AT INTERSECTIONS TO GO TO END OF RADII ON ALL INTERSECTION WORK.
38. ALL STRIPING MUST BE REPLACED WITH THERMOPLASTIC STRIPING.

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PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED No. 33285 PROFESSIONAL ENGINEER MERIDETH K. POOL 9/25/16

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-001.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

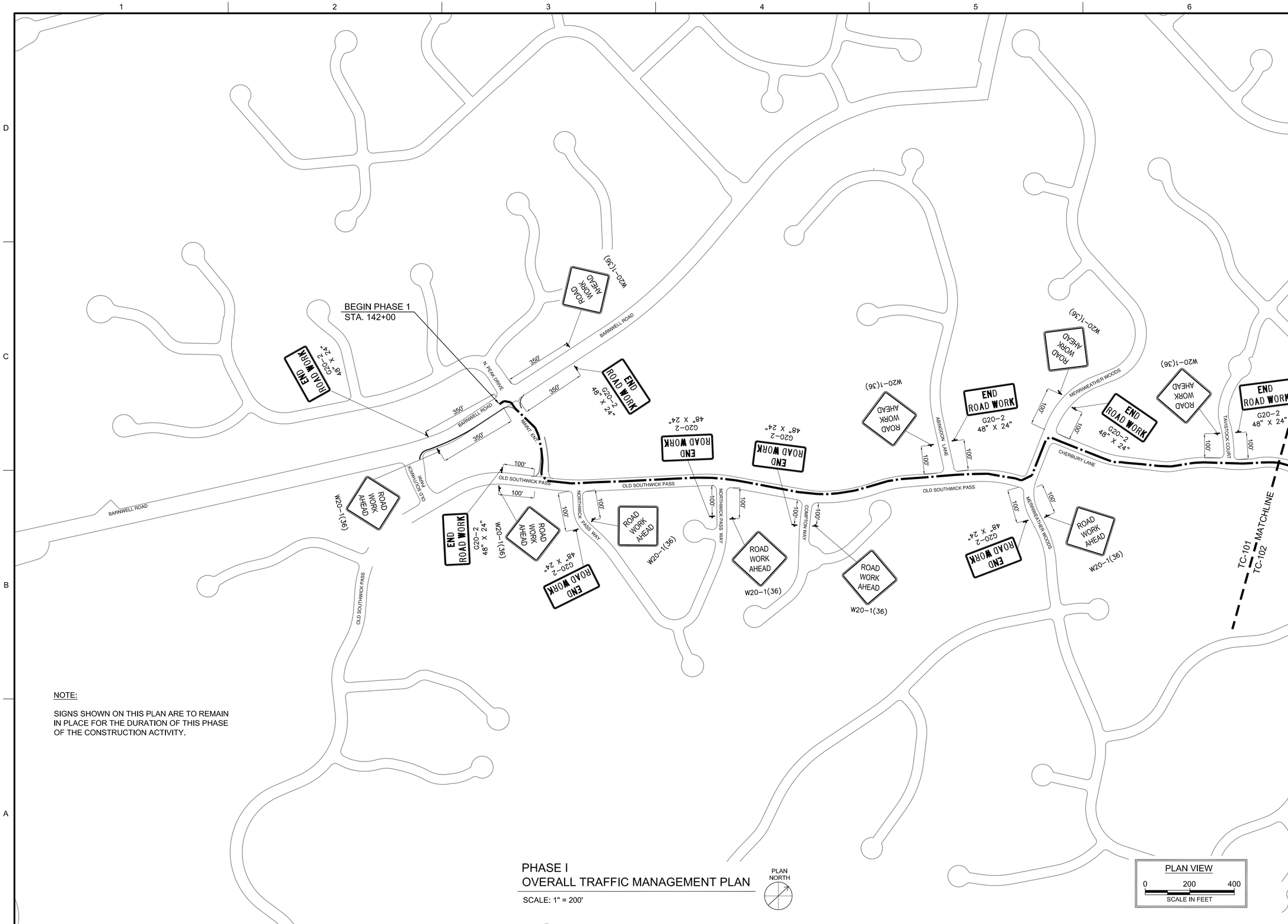
CIVIL

TRAFFIC NOTES

DRAWING NUMBER
TC-001

SHEET NUMBER
61 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: TC-001.DWG PLOT DATE: 9/28/2016 3:08 PM CAD USER: EDWARD BURTON
Fulton Logo w-name.jpg



NOTE:

SIGNS SHOWN ON THIS PLAN ARE TO REMAIN IN PLACE FOR THE DURATION OF THIS PHASE OF THE CONSTRUCTION ACTIVITY.

PHASE I
OVERALL TRAFFIC MANAGEMENT PLAN

SCALE: 1" = 200'

PLAN NORTH

PLAN VIEW
0 200 400
SCALE IN FEET

KHAFRA
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PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-101.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

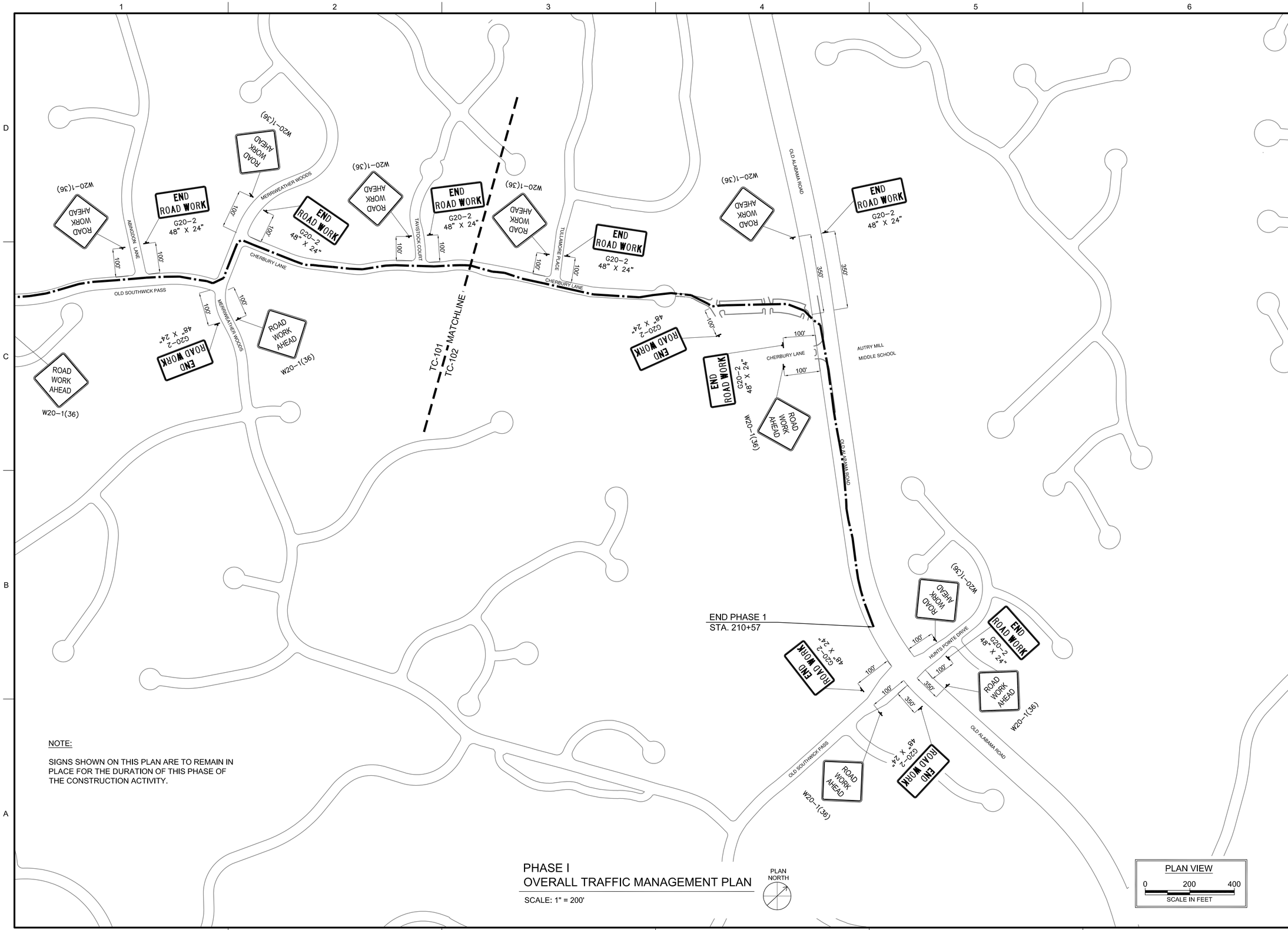
PHASE I OVERALL TRAFFIC MANAGEMENT PLAN
SHEET 1 OF 2

DRAWING NUMBER
TC-101

SHEET NUMBER
62 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: TC-101.DWG PLOT DATE: 9/28/2016 3:08 PM CAD USER: EDWARD BURTON

Fulton Logo w-name.jpg



NOTE:

SIGNS SHOWN ON THIS PLAN ARE TO REMAIN IN PLACE FOR THE DURATION OF THIS PHASE OF THE CONSTRUCTION ACTIVITY.

PHASE I
OVERALL TRAFFIC MANAGEMENT PLAN

SCALE: 1" = 200'

PLAN NORTH

PLAN VIEW
0 200 400
SCALE IN FEET

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 MERIDETH K. POOL 6/25/16

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-102.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE I OVERALL TRAFFIC MANAGEMENT PLAN SHEET 2 OF 2

DRAWING NUMBER
TC-102

SHEET NUMBER
63 OF 77

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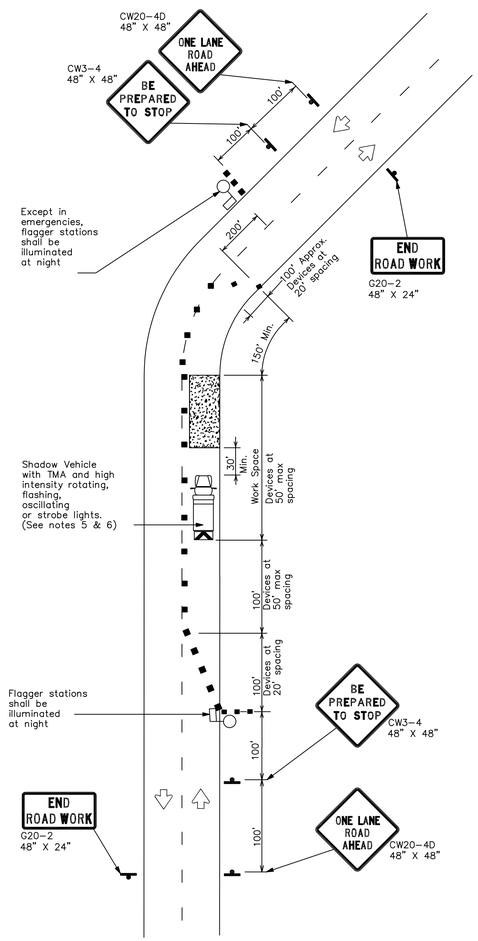


LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flagger		

Posted Speed *	Formula	Minimum Desirable Taper Lengths * *			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

GENERAL NOTES

1. FLAGS ATTACHED TO SIGNS WHERE SHOWN ARE REQUIRED.
2. ALL TRAFFIC CONTROL DEVICES ILLUSTRATED ARE REQUIRED, EXCEPT THOSE DENOTED WITH THE TRIANGLE SYMBOL MAY BE OMITTED WHEN STATED ELSEWHERE IN THE PLANS, OR FOR ROUTINE MAINTENANCE WORK, WHEN APPROVED BY THE ENGINEER.
3. THE CW3-4 "BE PREPARED TO STOP" SIGN MAY BE INSTALLED AFTER THE CW20-4D "ONE LANE ROAD AHEAD" SIGN, BUT PROPER SIGN SPACING SHALL BE MAINTAINED.
4. SIGN SPACING MAY BE INCREASED OR AN ADDITIONAL CW20-1D "ROAD WORK AHEAD" SIGN MAY BE USED IF ADVANCE WARNING AHEAD OF THE FLAGGER OR R1-2 "YIELD" SIGN IS LESS THAN 1500 FEET.
5. A SHADOW VEHICLE WITH A TMA SHOULD BE USED ANYTIME IT CAN BE POSITIONED 30 TO 100 FEET IN ADVANCE OF THE AREA OF CREW EXPOSURE WITHOUT ADVERSELY AFFECTING THE PERFORMANCE OR QUALITY OF THE WORK. IF WORKERS ARE NO LONGER PRESENT BUT ROAD OR WORK CONDITIONS REQUIRE THE TRAFFIC CONTROL TO REMAIN IN PLACE, TYPE 3 BARRICADES OR OTHER CHANNELIZING DEVICES MAY BE SUBSTITUTED FOR THE SHADOW VEHICLE AND TMA.
6. ADDITIONAL SHADOW VEHICLES WITH TMAS MAY BE POSITIONED OFF THE PAVED SURFACE, NEXT TO THOSE SHOWN IN ORDER TO PROTECT WIDER WORK SPACES.
7. FLAGGERS SHOULD USE TWO-WAY RADIOS OR OTHER METHODS OF COMMUNICATION TO CONTROL TRAFFIC.
8. LENGTH OF WORK SPACE SHOULD BE BASED ON THE ABILITY OF FLAGGERS TO COMMUNICATE.
9. IF THE WORK SPACE IS LOCATED NEAR A HORIZONTAL OR VERTICAL CURVE, THE BUFFER DISTANCES SHOULD BE INCREASED IN ORDER TO MAINTAIN ADEQUATE STOPPING SIGHT DISTANCE TO THE FLAGGER AND A QUEUE OF STOPPED VEHICLES (SEE TABLE ABOVE).
10. CHANNELIZING DEVICES ON THE CENTER-LINE MAY BE OMITTED WHEN A PILOT CAR IS LEADING TRAFFIC AND APPROVED BY THE ENGINEER.
11. FLAGGERS SHOULD USE 24" STOP/SLOW PADDLES TO CONTROL TRAFFIC.

TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

WITHIN COUNTRY CLUB OF THE SOUTH
(OLD SOUTHWICK PASS, MERRIWETHER WOODS
AND CHERBURY LANE):
STA. 146+00 TO STA. 189+50

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL
GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-103.dwg
KHAFRA PROJECT NUMBER
15ATL05-C155
CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

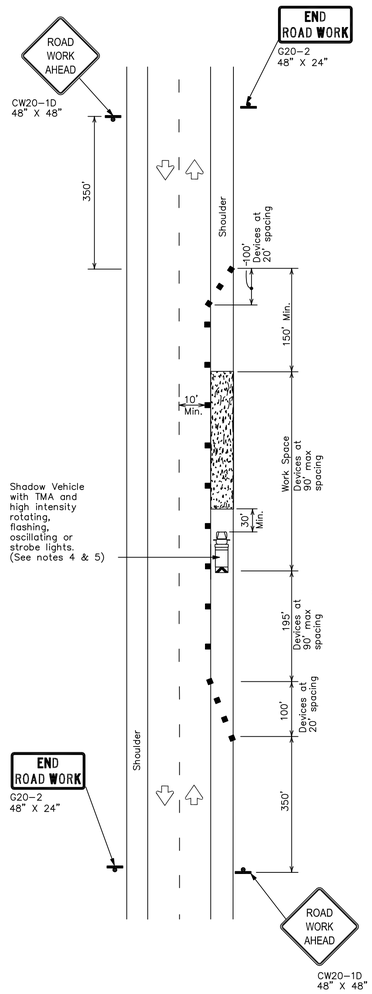
CIVIL

PHASE I TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 1 OF 2

DRAWING NUMBER
TC-103

SHEET NUMBER
64 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: TC-103.DWG PLOT DATE: 9/28/2016 3:09 PM CAD USER: EDWARD BURTON
Fulton Logo w-name.jpg



LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flagger		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
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75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

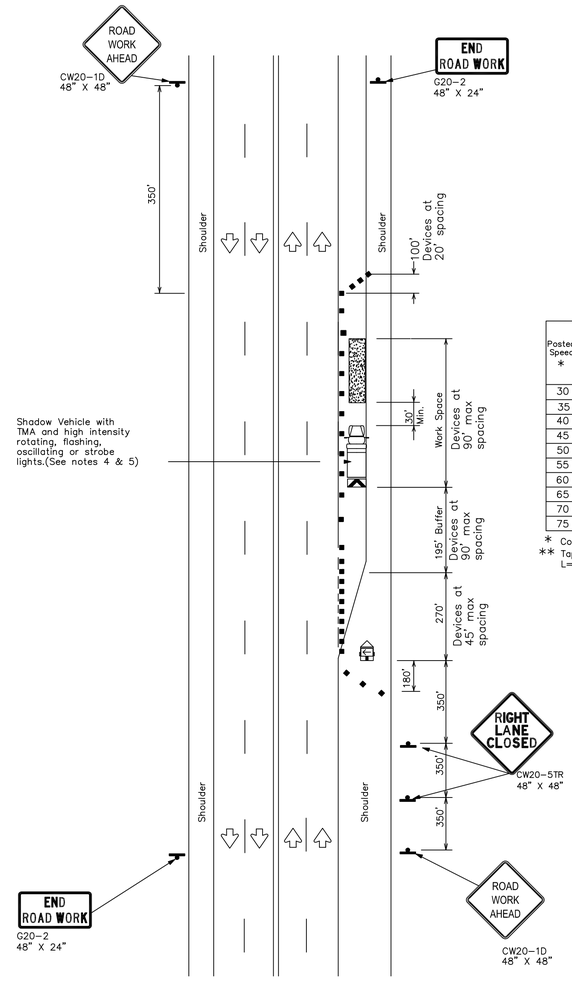
GENERAL NOTES

1. WORK SPACE SHALL BE LIMITED TO THE SHORTEST DISTANCE PRACTICAL FOR THE DAY'S CONSTRUCTION ACTIVITIES..
2. INACTIVE WORK VEHICLES OR OTHER EQUIPMENT SHOULD BE PARKED NEAR THE RIGHT-OF-WAY LINE AND NOT PARKED ON THE PAVED SHOULDER.
3. A SHADOW VEHICLE WITH A TMA SHOULD BE USED ANYTIME IT CAN BE POSITIONED 30 TO 100 FEET IN ADVANCE OF THE AREA OF CREW EXPOSURE WITHOUT ADVERSELY AFFECTING THE PERFORMANCE OR QUALITY OF THE WORK. IF WORKERS ARE NO LONGER PRESENT BUT ROAD OR WORK CONDITIONS REQUIRE THE TRAFFIC CONTROL TO REMAIN IN PLACE, TYPE 3 BARRICADES OR OTHER CHANNELIZING DEVICES MAY BE SUBSTITUTED FOR THE SHADOW VEHICLE AND TMA.
4. ADDITIONAL SHADOW VEHICLES WITH TMAS MAY BE POSITIONED OFF THE PAVED SURFACE, NEXT TO THOSE SHOWN IN ORDER TO PROTECT WIDER WORK SPACES.
5. CW21-5 "SHOULDER WORK" SIGNS MAY BE USED IN PLACE OF CW20-1D "ROAD WORK AHEAD" SIGNS FOR SHOULDER WORK ON CONVENTIONAL ROADWAYS.

TCP (1-1b)

WORK SPACE ON SHOULDER CONVENTIONAL ROADS

OLD ALABAMA ROAD: STA. 197+00 TO STA. 210+00



LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flagger		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
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L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TCP (1-4a)

TURN LANE CLOSED

OLD ALABAMA ROAD: STA. 210+00 TO STA. 210+57.33 (END)

GENERAL NOTES

1. ALL TRAFFIC CONTROL DEVICES ILLUSTRATED ARE REQUIRED, EXCEPT THOSE DENOTED WITH THE TRIANGLE SYMBOL MAY BE OMITTED WHEN STATED ELSEWHERE IN THE PLANS, OR FOR ROUTINE MAINTENANCE WORK, WHEN APPROVED BY THE ENGINEER.
2. THE CW20-1D "ROAD WORK AHEAD" SIGN MAY BE REPEATED IF THE VISIBILITY OF THE WORK ZONE IS LESS THAN 1500 FEET.
3. A SHADOW VEHICLE WITH A TMA SHOULD BE USED ANYTIME IT CAN BE POSITIONED 30 TO 100 FEET IN ADVANCE OF THE AREA OF CREW EXPOSURE WITHOUT ADVERSELY AFFECTING THE PERFORMANCE OR QUALITY OF THE WORK. IF WORKERS ARE NO LONGER PRESENT BUT ROAD OR WORK CONDITIONS REQUIRE THE TRAFFIC CONTROL TO REMAIN IN PLACE, TYPE 3 BARRICADES OR OTHER CHANNELIZING DEVICES MAY BE SUBSTITUTED FOR THE SHADOW VEHICLE AND TMA.
4. ADDITIONAL SHADOW VEHICLES WITH TMAS MAY BE POSITIONED OFF THE PAVED SURFACE, NEXT TO THOSE SHOWN IN ORDER TO PROTECT WIDER WORK SPACES.

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL
GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME TC-104.dwg
KHAFRA PROJECT NUMBER 15ATL05-C155
CLIENT PROJECT NUMBER FCDWR PROJECT # 15E-BC04

CIVIL

PHASE I TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 2 OF 2

DRAWING NUMBER
TC-104

SHEET NUMBER
65 OF 77

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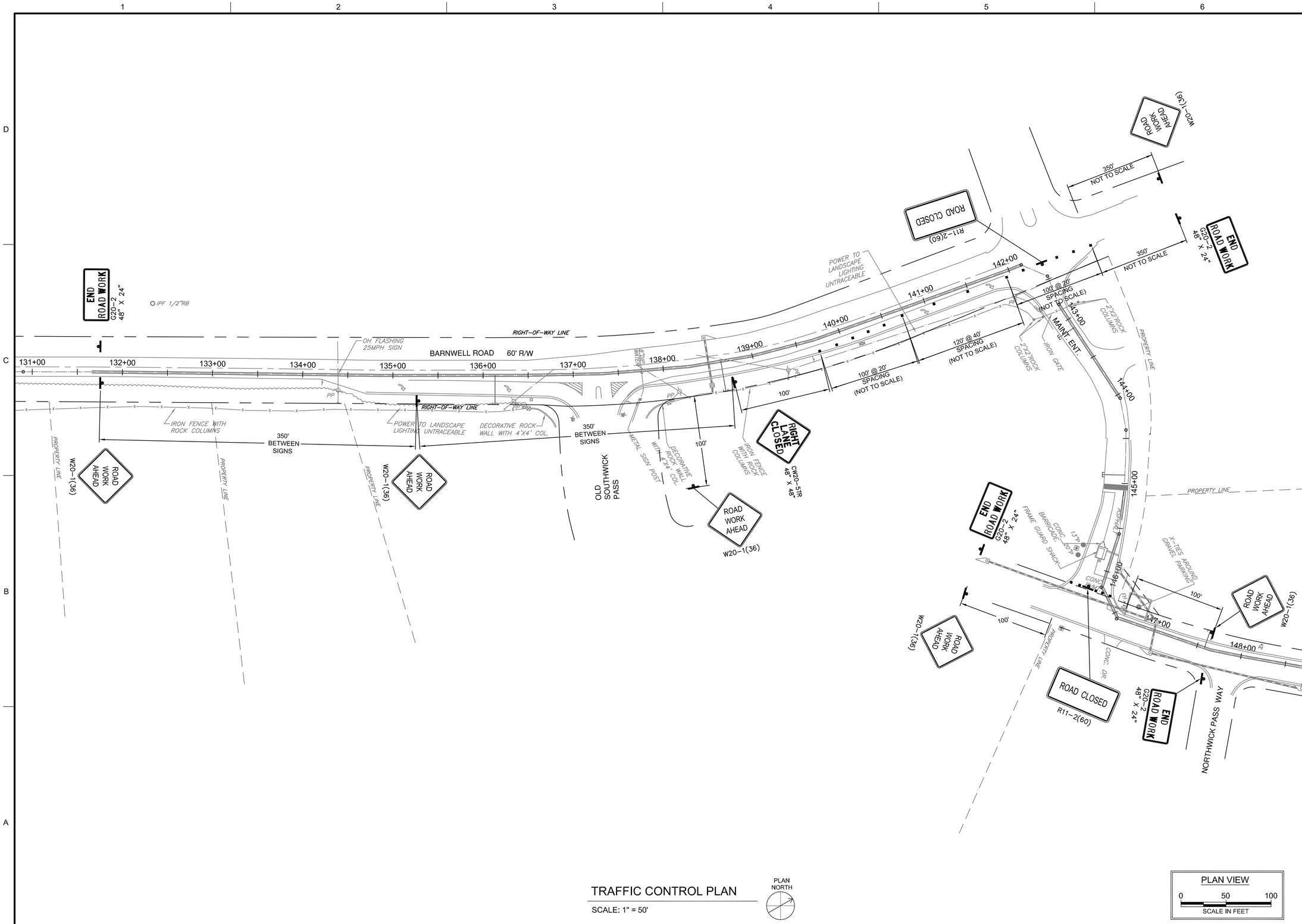
Fulton Logo w-name.jpg



TRAFFIC CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
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GEORGIA REGISTERED No. 33285 PROFESSIONAL ENGINEER MERIDETH K. POOL 6/25/16

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE		
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CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME TC-105.dwg

KHAFRA PROJECT NUMBER 15ATL05-C155

CLIENT PROJECT NUMBER FCDWR PROJECT # 15E-BC04

CIVIL

PHASE I TRAFFIC MANAGEMENT DETAIL STA. 142+00 TO STA. 146+00

DRAWING NUMBER

TC-105

SHEET NUMBER

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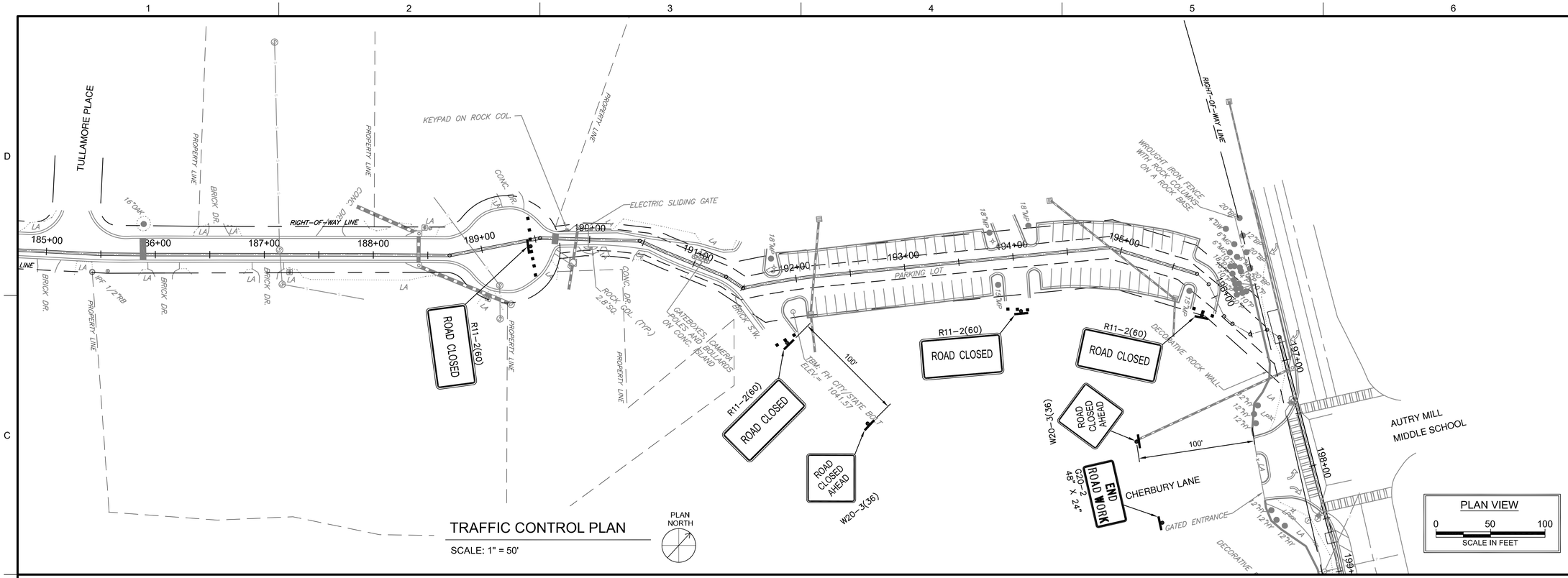

TRAFFIC CONTROL PLAN

SCALE: 1" = 50'

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
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FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

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CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-106.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE I TRAFFIC MANAGEMENT DETAIL STA. 189+50 TO STA. 197+00

DRAWING NUMBER
TC-106

SHEET NUMBER
67 OF 77

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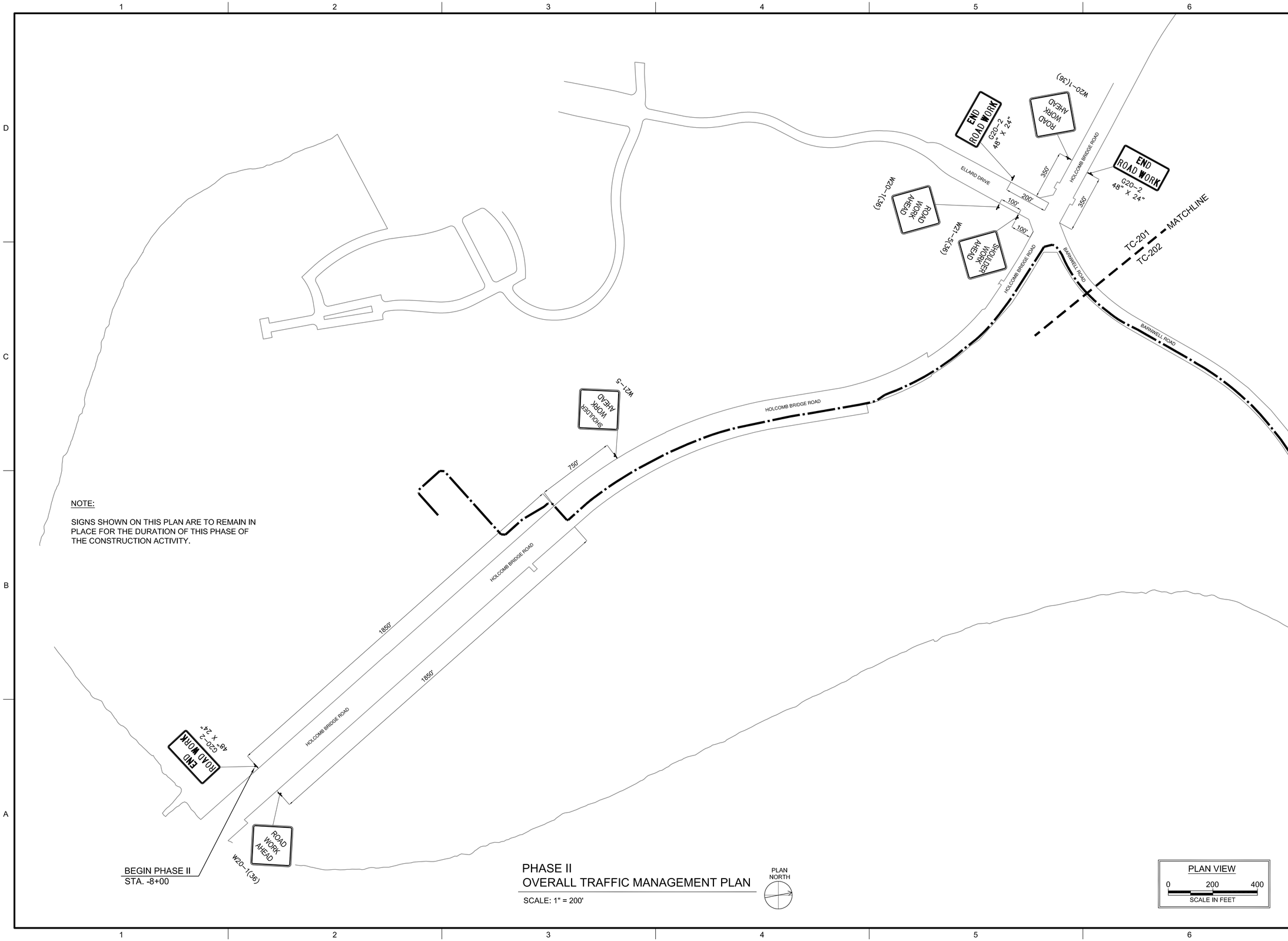

NOTE:

SIGNS SHOWN ON THIS PLAN ARE TO REMAIN IN PLACE FOR THE DURATION OF THIS PHASE OF THE CONSTRUCTION ACTIVITY.

PHASE II
OVERALL TRAFFIC MANAGEMENT PLAN

SCALE: 1" = 200'

PLAN NORTH

PLAN VIEW
0 200 400
SCALE IN FEET

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
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JOHNS CREEK
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APPROVED:	M.C. LEUNG

FILENAME
TC-201.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
OVERALLTRAFFIC
MANAGEMENT PLAN
SHEET 1 OF 3

DRAWING NUMBER
TC-201

SHEET NUMBER
68 OF 77

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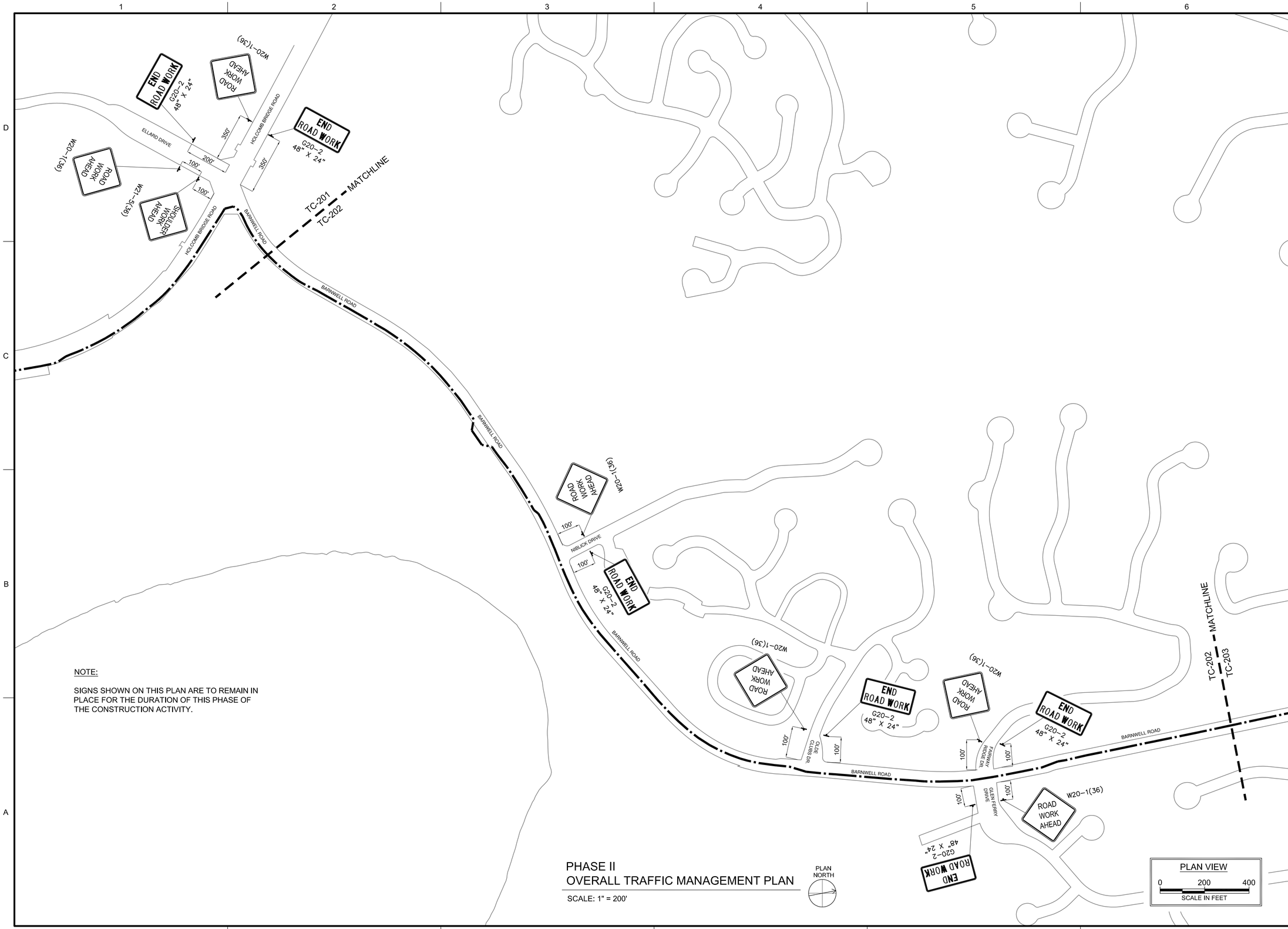
Fulton Logo w-name.jpg



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JOHNS CREEK
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CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-202.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

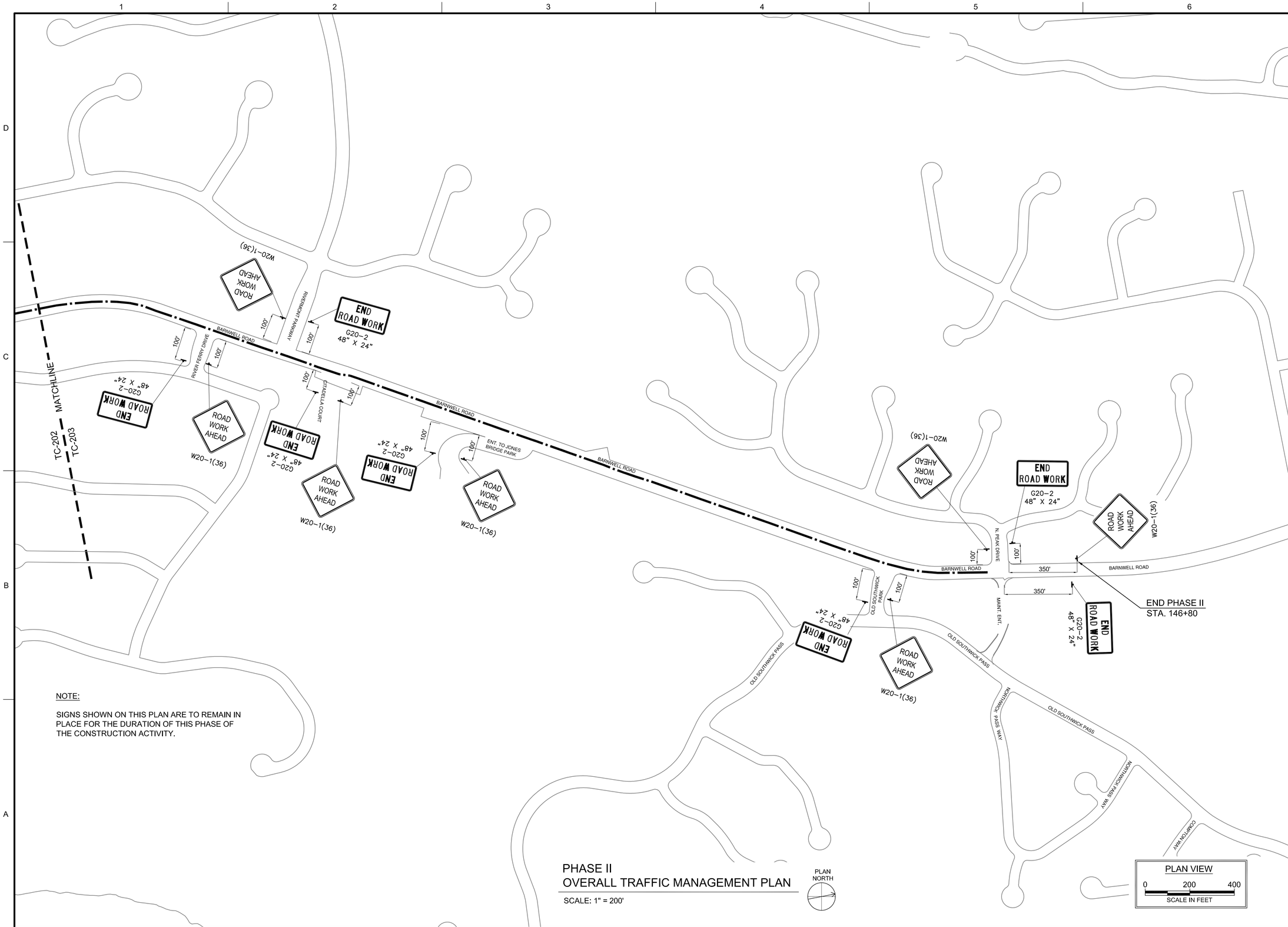
PHASE II
OVERALL TRAFFIC
MANAGEMENT PLAN
SHEET 2 OF 3

DRAWING NUMBER
TC-202

SHEET NUMBER
69 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: TC-202.DWG PLOT DATE: 9/28/2016 3:12 PM CAD USER: EDWARD BURTON

Fulton Logo w-name.jpg



NOTE:

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PHASE II
OVERALL TRAFFIC MANAGEMENT PLAN

SCALE: 1" = 200'

KHAFRA
225 PEACHTREE STREET, SUITE 1600
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JOHNS CREEK
REUSE MAIN

ISSUE		
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CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-203.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II
OVERALL TRAFFIC
MANAGEMENT PLAN
SHEET 3 OF 3

DRAWING NUMBER
TC-203

SHEET NUMBER
70 OF 77

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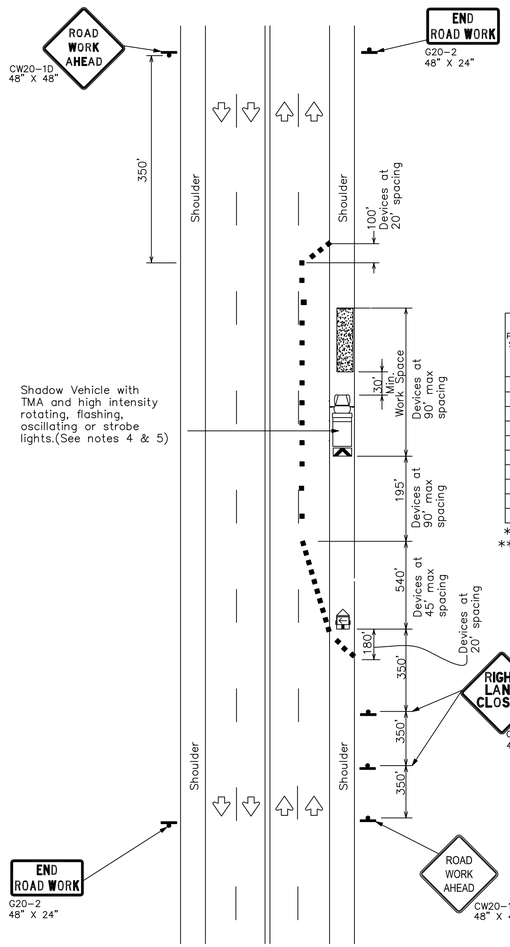
Fulton Logo w-name.jpg



LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flagger		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

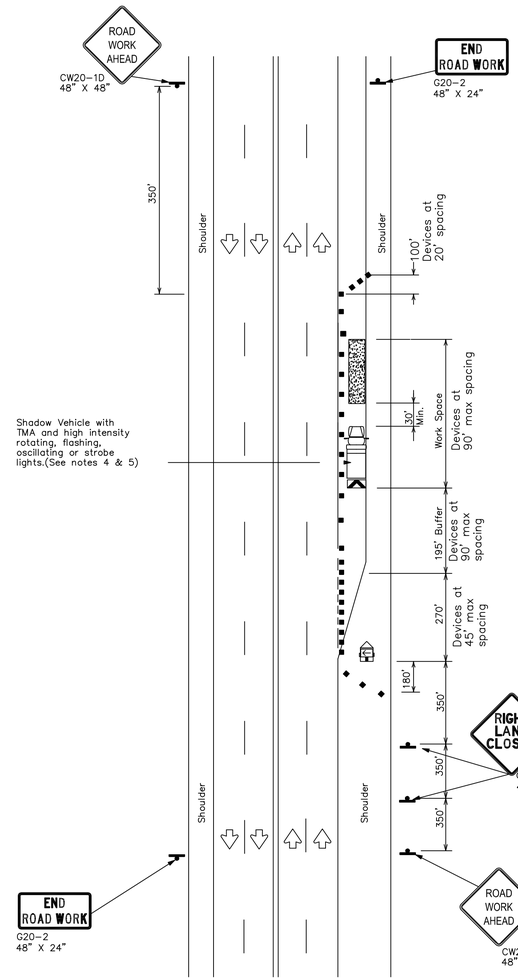
TCP (1-4a)

ONE LANE CLOSED

HOLCOMB BRIDGE ROAD:
STA. 10+50 TO STA. 30+00

GENERAL NOTES

1. ALL TRAFFIC CONTROL DEVICES ILLUSTRATED ARE REQUIRED, EXCEPT THOSE DENOTED WITH THE TRIANGLE SYMBOL MAY BE OMITTED WHEN STATED ELSEWHERE IN THE PLANS, OR FOR ROUTINE MAINTENANCE WORK, WHEN APPROVED BY THE ENGINEER.
2. THE CW20-1D "ROAD WORK AHEAD" SIGN MAY BE REPEATED IF THE VISIBILITY OF THE WORK ZONE IS LESS THAN 1500 FEET.
3. A SHADOW VEHICLE WITH A TMA SHOULD BE USED ANYTIME IT CAN BE POSITIONED 30 TO 100 FEET IN ADVANCE OF THE AREA OF CREW EXPOSURE WITHOUT ADVERSELY AFFECTING THE PERFORMANCE OR QUALITY OF THE WORK. IF WORKERS ARE NO LONGER PRESENT BUT ROAD OR WORK CONDITIONS REQUIRE THE TRAFFIC CONTROL TO REMAIN IN PLACE, TYPE 3 BARRICADES OR OTHER CHANNELIZING DEVICES MAY BE SUBSTITUTED FOR THE SHADOW VEHICLE AND TMA.
4. ADDITIONAL SHADOW VEHICLES WITH TMAS MAY BE POSITIONED OFF THE PAVED SURFACE, NEXT TO THOSE SHOWN IN ORDER TO PROTECT WIDER WORK SPACES.



LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flagger		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TCP (1-4a)

TURN LANE CLOSED

HOLCOMB BRIDGE ROAD:
STA. 30+00 TO STA. 32+00

GENERAL NOTES

1. ALL TRAFFIC CONTROL DEVICES ILLUSTRATED ARE REQUIRED, EXCEPT THOSE DENOTED WITH THE TRIANGLE SYMBOL MAY BE OMITTED WHEN STATED ELSEWHERE IN THE PLANS, OR FOR ROUTINE MAINTENANCE WORK, WHEN APPROVED BY THE ENGINEER.
2. THE CW20-1D "ROAD WORK AHEAD" SIGN MAY BE REPEATED IF THE VISIBILITY OF THE WORK ZONE IS LESS THAN 1500 FEET.
3. A SHADOW VEHICLE WITH A TMA SHOULD BE USED ANYTIME IT CAN BE POSITIONED 30 TO 100 FEET IN ADVANCE OF THE AREA OF CREW EXPOSURE WITHOUT ADVERSELY AFFECTING THE PERFORMANCE OR QUALITY OF THE WORK. IF WORKERS ARE NO LONGER PRESENT BUT ROAD OR WORK CONDITIONS REQUIRE THE TRAFFIC CONTROL TO REMAIN IN PLACE, TYPE 3 BARRICADES OR OTHER CHANNELIZING DEVICES MAY BE SUBSTITUTED FOR THE SHADOW VEHICLE AND TMA.
4. ADDITIONAL SHADOW VEHICLES WITH TMAS MAY BE POSITIONED OFF THE PAVED SURFACE, NEXT TO THOSE SHOWN IN ORDER TO PROTECT WIDER WORK SPACES.

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED No. 33285 PROFESSIONAL ENGINEER MERIDETH K. POOL 6/25/16
GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	M.K. POOL / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-204.dwg
KHAFRA PROJECT NUMBER
15ATL05-C155
CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

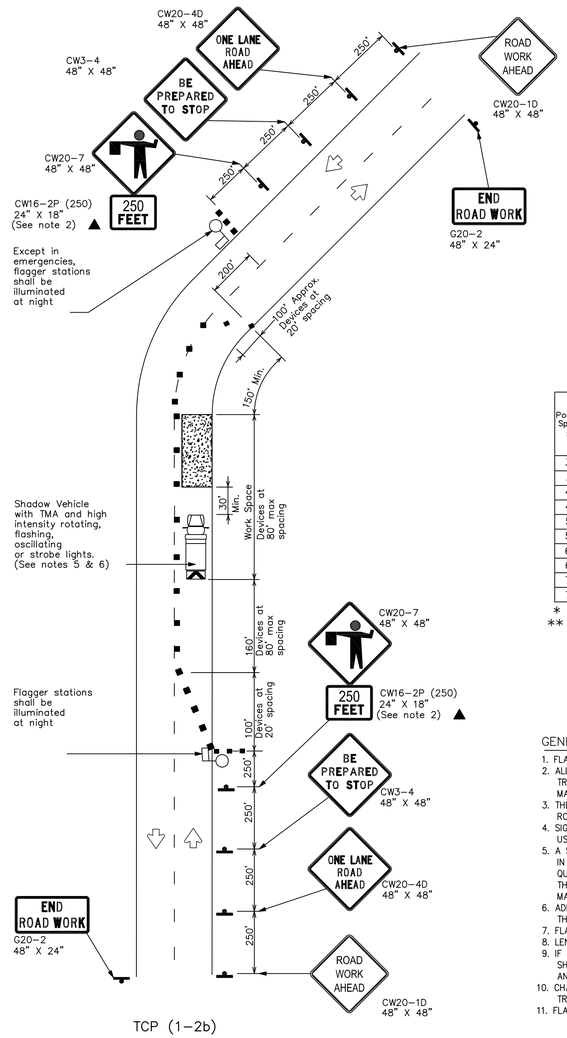
CIVIL

PHASE II TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 1 OF 3

DRAWING NUMBER
TC-204

SHEET NUMBER
71 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: TC-204.DWG PLOT DATE: 9/28/2016 3:13 PM CAD USER: EDWARD BURTON
Fulton Logo w-name.jpg



TCP (1-2b)

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flagger		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

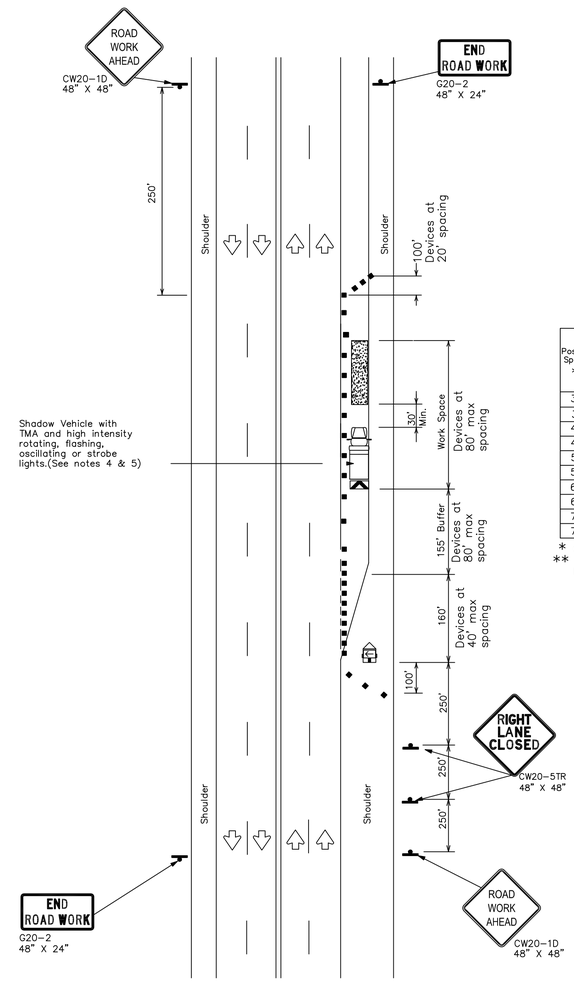
* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

GENERAL NOTES

1. FLAGS ATTACHED TO SIGNS WHERE SHOWN ARE REQUIRED.
2. ALL TRAFFIC CONTROL DEVICES ILLUSTRATED ARE REQUIRED, EXCEPT THOSE DENOTED WITH THE TRIANGLE SYMBOL MAY BE OMITTED WHEN STATED ELSEWHERE IN THE PLANS, OR FOR ROUTINE MAINTENANCE WORK, WHEN APPROVED BY THE ENGINEER.
3. THE CW3-4 "BE PREPARED TO STOP" SIGN MAY BE INSTALLED AFTER THE CW20-4D "ONE LANE ROAD AHEAD" SIGN, BUT PROPER SIGN SPACING SHALL BE MAINTAINED.
4. SIGN SPACING MAY BE INCREASED OR AN ADDITIONAL CW20-1D "ROAD WORK AHEAD" SIGN MAY BE USED IF ADVANCE WARNING AHEAD OF THE FLAGGER OR R1-2 "YIELD" SIGN IS LESS THAN 1500 FEET.
5. A SHADOW VEHICLE WITH A TMA SHOULD BE USED ANYTIME IT CAN BE POSITIONED 30 TO 100 FEET IN ADVANCE OF THE AREA OF CREW EXPOSURE WITHOUT ADVERSELY AFFECTING THE PERFORMANCE OR QUALITY OF THE WORK. IF WORKERS ARE NO LONGER PRESENT BUT ROAD OR WORK CONDITIONS REQUIRE THE TRAFFIC CONTROL TO REMAIN IN PLACE, TYPE 3 BARRICADES OR OTHER CHANNELIZING DEVICES MAY BE SUBSTITUTED FOR THE SHADOW VEHICLE AND TMA.
6. ADDITIONAL SHADOW VEHICLES WITH TMAS MAY BE POSITIONED OFF THE PAVED SURFACE, NEXT TO THOSE SHOWN IN ORDER TO PROTECT WIDER WORK SPACES.
7. FLAGGERS SHOULD USE TWO-WAY RADIOS OR OTHER METHODS OF COMMUNICATION TO CONTROL TRAFFIC.
8. LENGTH OF WORK SPACE SHOULD BE BASED ON THE ABILITY OF FLAGGERS TO COMMUNICATE.
9. IF THE WORK SPACE IS LOCATED NEAR A HORIZONTAL OR VERTICAL CURVE, THE BUFFER DISTANCES SHOULD BE INCREASED IN ORDER TO MAINTAIN ADEQUATE STOPPING SIGHT DISTANCE TO THE FLAGGER AND A QUEUE OF STOPPED VEHICLES (SEE TABLE ABOVE).
10. CHANNELIZING DEVICES ON THE CENTER-LINE MAY BE OMITTED WHEN A PILOT CAR IS LEADING TRAFFIC AND APPROVED BY THE ENGINEER.
11. FLAGGERS SHOULD USE 24" STOP/SLOW PADDLES TO CONTROL TRAFFIC.

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

BARNWELL ROAD:
STA. 36+50 TO STA. 79+00
STA. 85+00 TO STA. 102+00
STA. 111+50 TO STA. 142+00



TCP (1-4a)

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flagger		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

GENERAL NOTES

1. ALL TRAFFIC CONTROL DEVICES ILLUSTRATED ARE REQUIRED, EXCEPT THOSE DENOTED WITH THE TRIANGLE SYMBOL MAY BE OMITTED WHEN STATED ELSEWHERE IN THE PLANS, OR FOR ROUTINE MAINTENANCE WORK, WHEN APPROVED BY THE ENGINEER.
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4. ADDITIONAL SHADOW VEHICLES WITH TMAS MAY BE POSITIONED OFF THE PAVED SURFACE, NEXT TO THOSE SHOWN IN ORDER TO PROTECT WIDER WORK SPACES.

TURN LANE CLOSED

BARNWELL ROAD:
STA. 79+00 TO STA. 85+00
STA. 102+00 TO STA. 111+50

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL
GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-205.dwg
KHAFRA PROJECT NUMBER
15ATL05-C155
CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II TRAFFIC MANAGEMENT TYPICAL DETAILS SHEET 2 OF 3

DRAWING NUMBER
TC-205

SHEET NUMBER
72 OF 77

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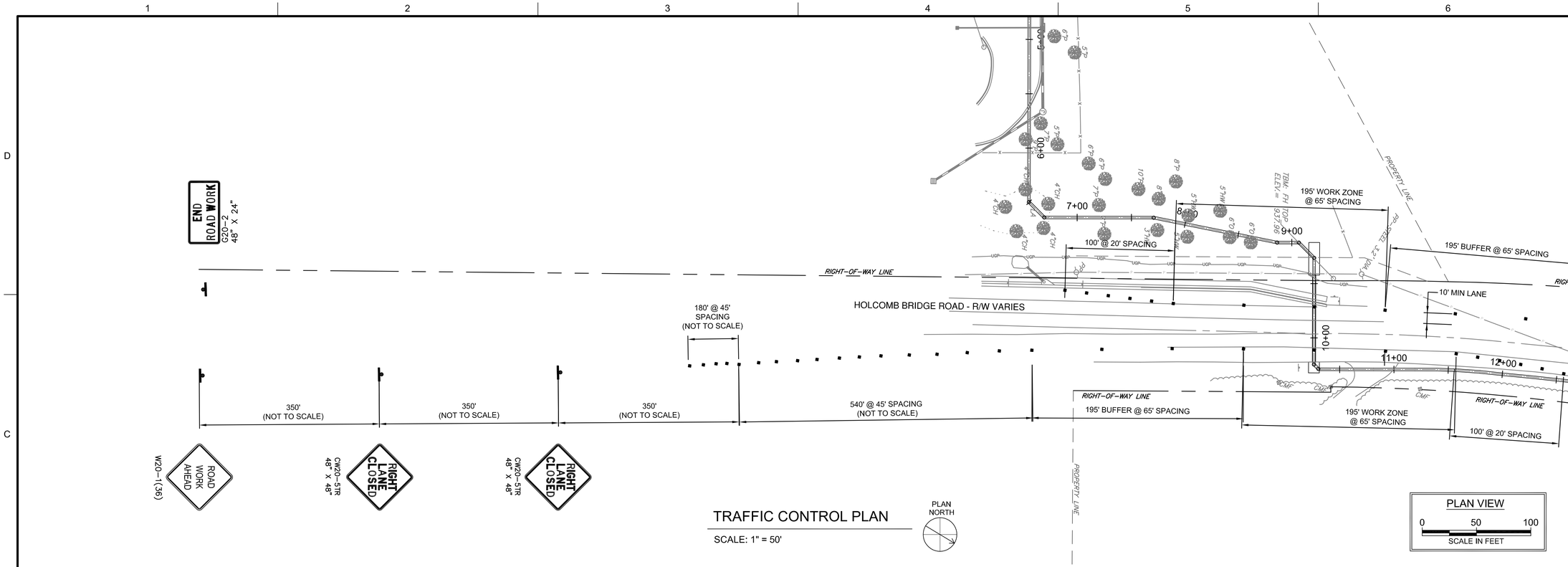
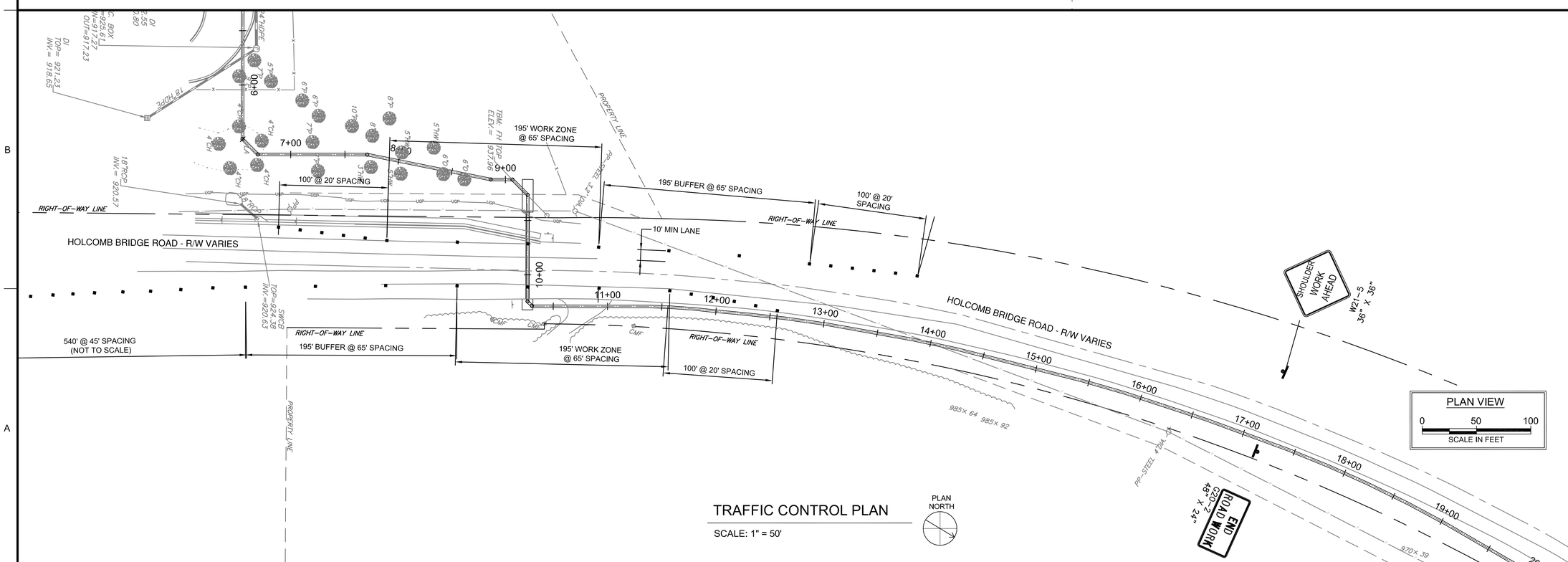


TRAFFIC CONTROL PLAN

SCALE: 1" = 50'



TRAFFIC CONTROL PLAN

SCALE: 1" = 50'

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED No. 33285 PROFESSIONAL ENGINEER MERIDETH K. POOL 9/25/16

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME TC-206.dwg

KHAFRA PROJECT NUMBER 15ATL05-C155

CLIENT PROJECT NUMBER FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II TRAFFIC MANAGEMENT DETAIL STA. 8+50 TO STA. 11+00

DRAWING NUMBER

TC-206

SHEET NUMBER

73 OF 77

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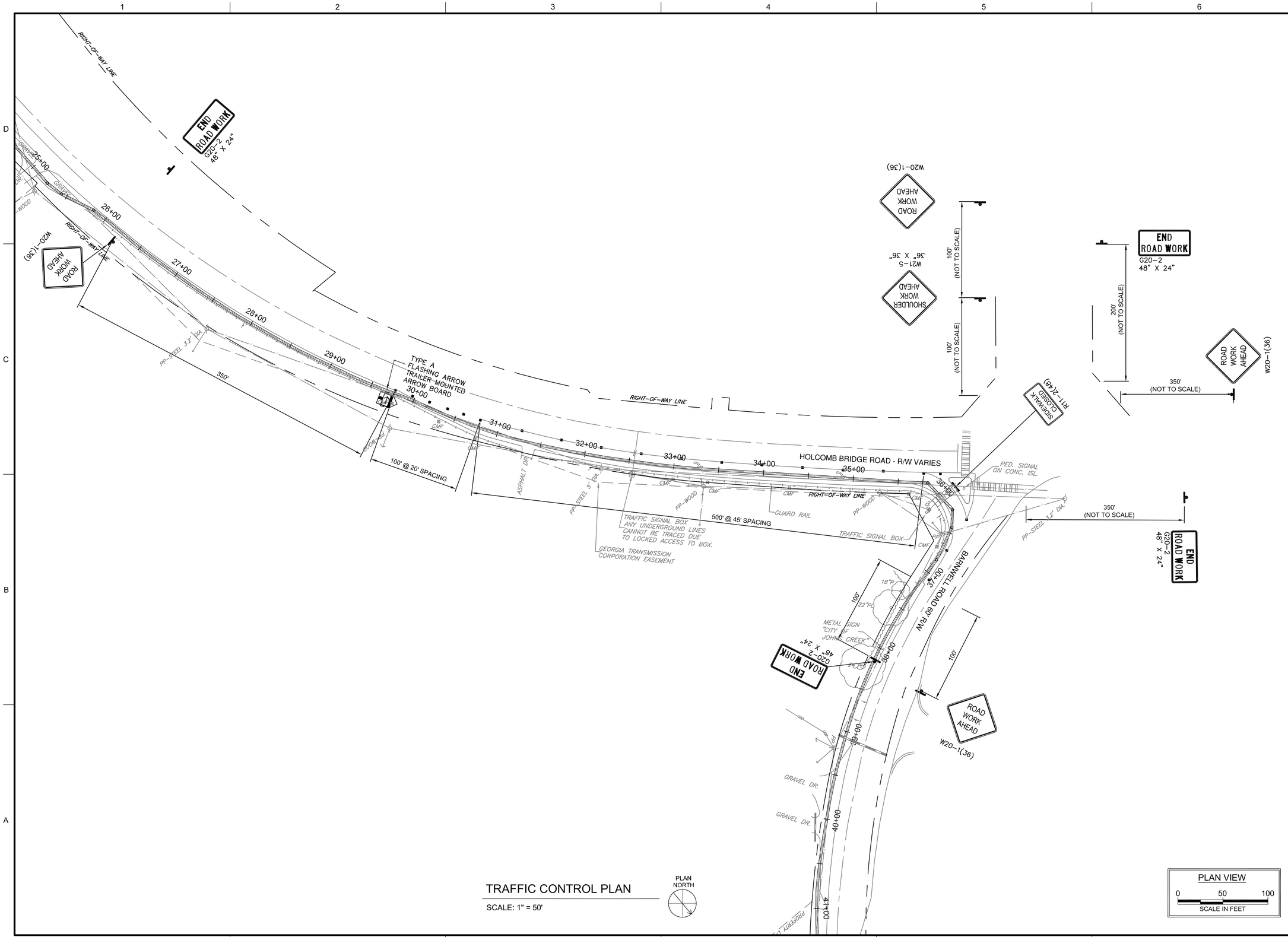

TRAFFIC CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW
0 50 100
SCALE IN FEET

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME TC-207.dwg

KHAFRA PROJECT NUMBER 15ATL05-C155

CLIENT PROJECT NUMBER FCDWR PROJECT # 15E-BC04

CIVIL

PHASE II TRAFFIC MANAGEMENT DETAIL STA. 32+00 TO STA. 36+50

DRAWING NUMBER

TC-207

SHEET NUMBER 74 OF 77

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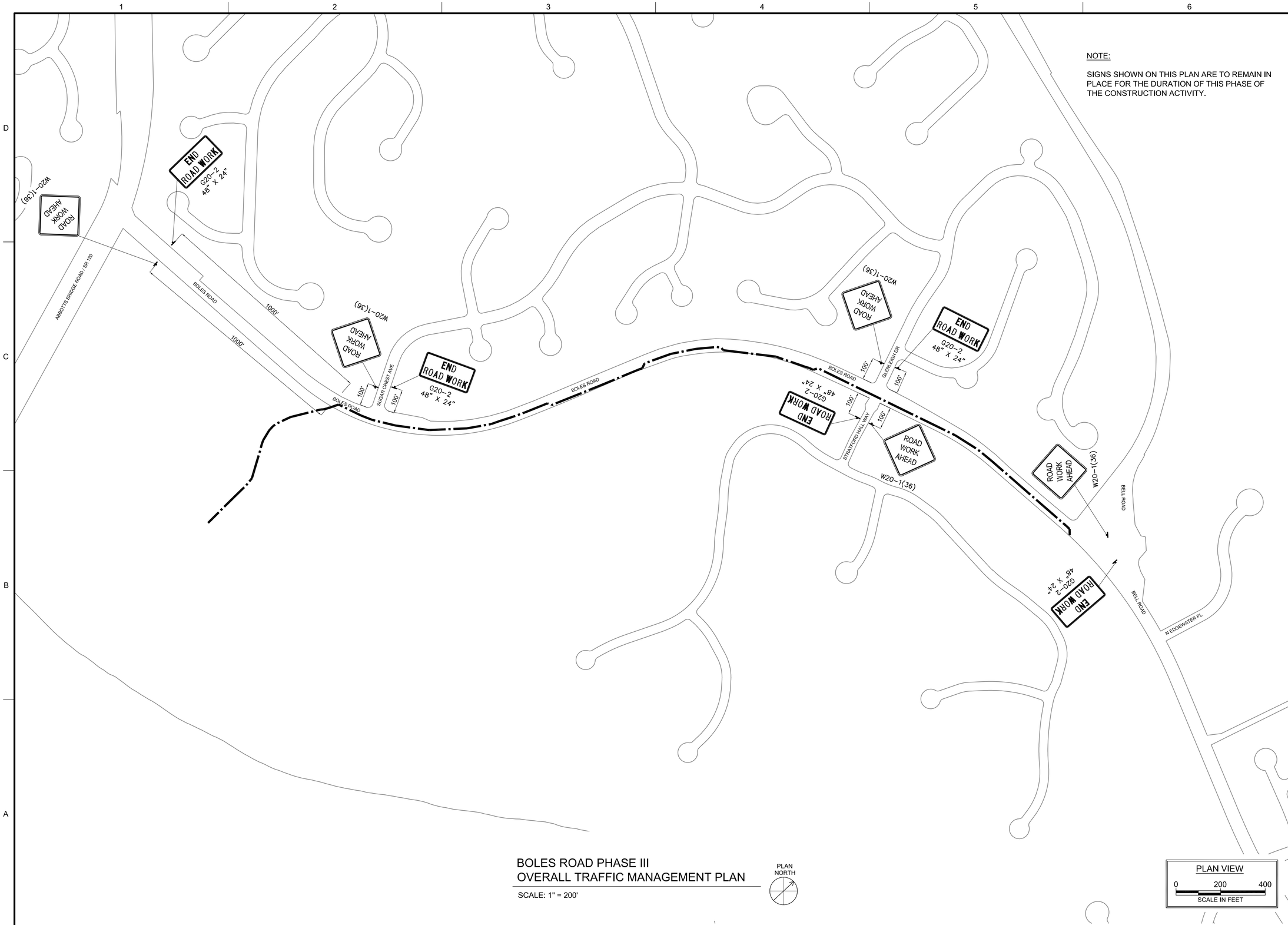
Fulton Logo w-name.jpg

NOTE:

SIGNS SHOWN ON THIS PLAN ARE TO REMAIN IN PLACE FOR THE DURATION OF THIS PHASE OF THE CONSTRUCTION ACTIVITY.



BOLES ROAD PHASE III
OVERALL TRAFFIC MANAGEMENT PLAN

SCALE: 1" = 200'

PLAN NORTH

PLAN VIEW

0 200 400

SCALE IN FEET

KHAFRA

225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET

NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL

GSWCC NO. 37897

FULTON COUNTY

JOHNS CREEK
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: M.K. POOL

DRAWN: E.L. BURTON / M.K. POOL

CHECKED: M.K. POOL

CHECKED: R.L. LINDSEY

APPROVED: M.C. LEUNG

FILENAME
TC-301.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE III
OVERALL TRAFFIC
MANAGEMENT PLAN

DRAWING NUMBER

TC-301

SHEET NUMBER
75 OF 77

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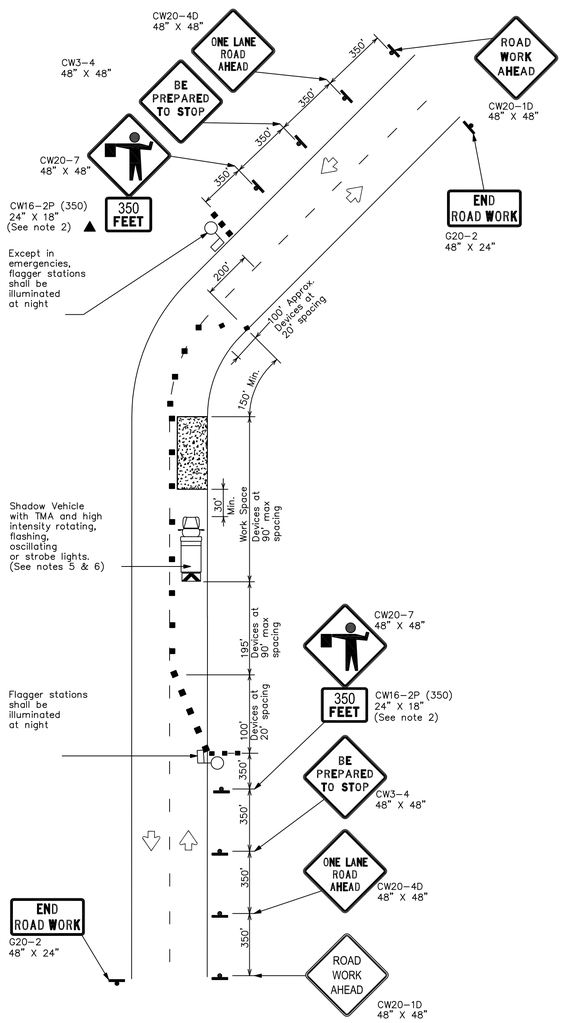
Fulton Logo w-name.jpg



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

BOLES ROAD:
STATION 8+00 TO 33+00
AND
STATION 37+00 TO 44+89.22 (END)

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL
GSWCC NO. 37897

FULTON COUNTY

BOLES ROAD
REUSE MAIN

ISSUE

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-302.dwg
KHAFRA PROJECT NUMBER
15ATL05-C155
CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE III TRAFFIC MANAGEMENT TYPICAL DETAILS

DRAWING NUMBER
TC-302

SHEET NUMBER
76 OF 77

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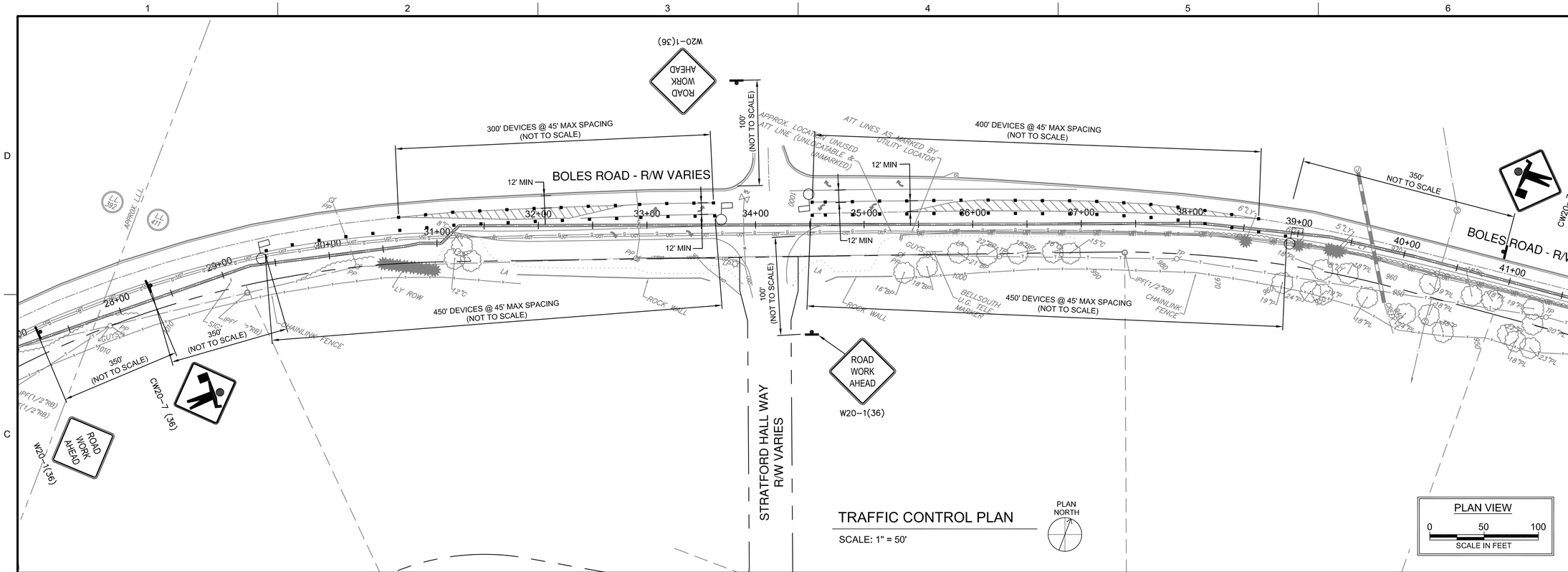
Fulton Logo w-name.jpg



TRAFFIC CONTROL PLAN

SCALE: 1" = 50'

PLAN NORTH

PLAN VIEW

0 50 100

SCALE IN FEET

KHAFRA
225 PEACHTREE STREET, SUITE 1600
ATLANTA, GEORGIA 30303
PHONE (404) 525-2120
FAX (404) 522-7941

PERMIT SET
NOT FOR CONSTRUCTION

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 33285 6/25/16 MERIDETH K. POOL

GSWCC NO. 37897

FULTON COUNTY

BOLES ROAD
REUSE MAIN

ISSUE		
REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	M.K. POOL
DRAWN:	E.L. BURTON / M.K. POOL
CHECKED:	M.K. POOL
CHECKED:	R.L. LINDSEY
APPROVED:	M.C. LEUNG

FILENAME
TC-303.dwg

KHAFRA PROJECT NUMBER
15ATL05-C155

CLIENT PROJECT NUMBER
FCDWR PROJECT # 15E-BC04

CIVIL

PHASE III TRAFFIC MANAGEMENT DETAIL STA. 33+00 TO STA. 37+00

DRAWING NUMBER

TC-303

SHEET NUMBER
77 OF 77

Path: S:\ENGINEER\15ATL05 STANBY ENG SERV FOR FULTON CNTY\TASK C155 - JOHNS CREEK REUSE WATER MAIN DESIGN\DRA FILENAME: TC-303.DWG PLOT DATE: 9/28/2016 3:17 PM CAD USER: EDWARD BURTON
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SECTION 11

APPENDICES

Appendix 1: Subsurface Exploration and Geotechnical Engineering Evaluation

SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION

Johns Creek Reuse Line and Boles Road Reuse Line
Fulton County, Georgia
October 26, 2016

Submitted to:
Brown and Caldwell
990 Hammond Drive, Suite 400
Atlanta, GA 30328

Submitted by:
Willmer Engineering Inc.
Project No. 71.4152

October 26, 2016

VIA EMAIL

Mr. Alok Pandya, PE, PMP
Project Manager
Brown and Caldwell
990 Hammond Drive, Suite 400
Atlanta, GA 30328

SUBJECT: Subsurface Exploration and Geotechnical Engineering Evaluation
Johns Creek Reuse Line and Boles Road Reuse Line
Fulton County, Georgia
Willmer Project No. 71.4152

Dear Mr. Pandya:

Willmer Engineering (Willmer) is pleased to provide this report of subsurface exploration and geotechnical engineering evaluation for the proposed Johns Creek Reuse Line and Boles Road Reuse Line in Fulton County, Georgia. This work was performed for Brown and Caldwell in general accordance with our contract dated September 1, 2016.

This report presents our understanding of the project, methods of exploration, site and subsurface conditions, and our conclusions and recommendations related to the design and construction of the proposed reuse lines.

1.0 Project Description

Fulton County is proposing to construct approximately 25,000 feet of 20-inch to 24-inch diameter reuse water lines in Fulton County, Georgia. The proposed Johns Creek Reuse Line alignment begins at Johns Creek Environmental Campus at station 0+00 and runs northwest on Holcomb Bridge Road for about 3,200 feet, continues north/northeast on Barnwell Road for about 10,750 feet, continues northeast on Old Southwick Pass for about 2,500 feet, continues northwest on Merriweather Woods for about 250 feet, continues northeast on Cherbury Lane for about 2,650 feet, and continues on Old Alabama Road for about 1,350 feet and terminates near the golf course located in Country Club of the South at station 210+42. A second alignment, of approximately 4,500 feet (Stations 0+00 to 45+23), runs along Boles Road approximately 5 miles to the northeast. Figure 1 shows the two project locations. It is our understanding that the proposed reuse line will be constructed within the existing right-of-way of the roads or easments along the proposed alignment using open excavation for installation of the reuse line. At three locations, jack and bore methods will be used for installation of the reuse line; the jack and bore locations are at the crossing of Holcomb Bridge Road at approximate station 9+00, at a location where Barnwell Road crosses a creek at approximate station 51+00, and at a location where the reuse line crosses Cherbury Lane at approximate station 197+00.

2.0 Scope of Work

Our field exploration consisted of drilling 42 Standard Penetration Test (SPT) borings and 2 hand-auger borings at an approximate spacing of 300 to 500 feet. At the direction of Brown and Caldwell, no borings were performed along Old Southwick Pass or Merriweather Woods, as these are privately maintained by the Country Club of the South. Detailed descriptions of the SPT borings are provided below.

3.0 Standard Penetration Test Borings

As indicated earlier, 42 SPT borings (B-2 through B-33, B-30b, and B-35 through B-43) were drilled at an approximately 300 to 500 feet spacing along the proposed alignment (see Figure 2). The borings were drilled to a depth below the proposed invert elevation and the boring depths ranged from 10-25 feet. At possible locations where Jack and Bore installation of the reuse line is anticipated, borings were extended to depths of 10 to 25 feet deep.

Drilling of the soil test borings was accomplished using a truck-mounted CME 55 rotary drill rig to advance continuous hollow-stem augers. The SPT borings were performed in general accordance with ASTM Standard D1586. In this process, a 2-foot long, 2-inch outside-diameter split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The blows required for the first 6 inches of penetration are allowed for seating the sampler into any loose cuttings, and the sum of the blows required for penetration of the second and third 6-inch increments constitutes the penetration resistance or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample.

The N-value has been empirically correlated with various soil properties including consistency, relative density, strength, compressibility and potential for difficult excavation. Correlations between the N-value and the relative density of cohesionless soils (sands) and consistency of cohesive soils (clays/silts) are included in Appendix I.

Groundwater observations at each boring location were noted immediately upon completion of borings and the borings were then immediately backfilled with soil cuttings. Classification of the soil samples collected was performed in general accordance with the Unified Soil Classification System (USCS) using visual/manual methods. Detailed descriptions of the materials encountered in each soil test boring, along with graphic representations of the standard penetration test blow counts (N-values), are presented on the Soil Boring Logs included in Appendix I.

4.0 Soil Sampling

Soil samples (split-spoon) obtained during the field exploration program were classified by our geotechnical engineer. The split-spoon samples were obtained from each boring and placed in glass jars. The samples were transported to a laboratory for further classification and characterization.

5.0 Rock Coring

Rock coring was performed at two boring locations (B-11, and B-12) where rock was encountered above proposed pipe invert elevation to obtain samples for determination of the type and characteristics of the rock. The depth of rock coring, percent recovery (REC) of rock core, and the Rock Quality Designation (RQD) are presented on the boring logs in Appendix I and photos of the rock cores are presented in Appendix II. Percent recovery is defined as the length of rock core recovered divided by the total length of the core run. RQD is defined as the fraction of core run with rock core pieces equal to or longer than 4 inches; it is computed by summing the length of intact rock core pieces 4 inches or longer (ignoring mechanical breaks) and dividing the sum by the total length of the core run. Percent REC and RQD provide an indication of the continuity, fracturing, and degree of weathering of the rock.

6.0 Hand Auger Borings

Due to access limitations, two boring locations along Boles road could not be accessed with a drill rig, and hand auger borings (B-34 and B-34b) were performed at these locations. Borings B-34 and B-34b were extended to a depth of 6 and 7 feet below the existing ground surface and approximately to the pipe invert elevation.

7.0 Area Geology

Based on the USGS Database for the 'Geologic Units of Georgia', the project site is located within the Piedmont Physiographic Province of Georgia and is underlain by Mica Schist, Biotite Gneiss, Quartzite, Aluminous Schist**,** and Amphibolite. The Piedmont is composed of metamorphic rocks with localized igneous intrusions. The residual overburden soils encountered in the Piedmont are the product of in-situ chemical and physical weathering of the underlying parent rock. Typically, weathering is most advanced near the surface and decreases with depth. Below the residual soils, partially weathered rock is usually encountered as a transition zone to the underlying bedrock. Partially weathered rock (PWR) is locally defined as a material with a Standard Penetration Resistance in excess of 50 blows per 6 inches of penetration.

An important aspect of the Piedmont subsurface profile is that highly variable conditions may exist over relatively short horizontal distances. This is caused by variation in mineral composition of the parent rock and the intensity of fractures and joints within the rock. Zones of partially weathered rock may be encountered within residual soils, and lenses of soil may occur in the rock mass. The subsurface profile may be altered by excavating or filling, or by effects of water through the process of erosion or alluvial deposition.

8.0 Subsurface Conditions

The subsurface profile encountered generally consisted of fill soils, alluvial soils, residual soils, partially weathered rock (PWR), and parent bedrock. All of these soil/rock types were not encountered at all boring locations. Alluvial soils are defined as materials that have been eroded, reshaped by water, and redeposited. Residual soils are defined as materials derived from the in-place weathering of the parent rock. PWR is characterized for engineering purposes as residual soils exhibiting N-values in excess of 50 blows for 6 inches of penetration. Auger refusal is generally indicative of the top of parent bedrock. A summary of the subsurface conditions is included in Table 1.

Fill soils were encountered in 12 borings and generally consisted of silty sand, sandy clay, and clayey sand with rock fragments. Alluvial soils (B-8 through B-10) consisted of very soft to very stiff sandy clay and very loose silty sand, and the residual soils consisted of very loose to very dense silty/clayey sand, soft to very hard sandy silt, and firm to hard sandy clay. PWR was encountered in borings B-11 through B-13, B-15, B-20, B-23, B-25, B-26, B-28, B-29, and B-36 at depths up to 14 feet above the proposed invert elevation. PWR generally consisted of very dense silty sand.

Auger refusal material was encountered in borings B-11 and B-12 (Station 51+65 and 53+00) at depths of 10 and 13 feet, respectively. Rock coring was performed at borings B-11, and B-12. The rock type encountered consisted of moderately hard Gneiss.

Groundwater was not encountered in the borings at the time of boring completion. Because the borings were drilled from the roadway, borings had to be backfilled immediately after boring completion. It should be noted that groundwater elevations are expected to vary due to seasonal and climatic changes, and there is a possibility that in borings where groundwater was not encountered within the boring depths during our field exploration, groundwater may be encountered at the time of construction.

9.0 Conclusions and Recommendations

The geotechnical engineering evaluations and recommendations presented herein are based on the boring data gathered during this investigation, our understanding of the proposed design, and our experience with similar site and subsurface conditions. These recommendations were prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of the Brown and Caldwell, Fulton County, and their designated consultants for the design of the proposed pipelines. No other warranty, expressed or implied, is made.

We request that we be advised of any significant changes in the proposed alignment from that described in this report so that we may amend our recommendations accordingly. In addition, we request the opportunity to review the portions of the project specifications that relate to geotechnical engineering to ensure that our recommendations are properly incorporated.

9.1 Excavation Methods

It is our understanding that open excavation will be used to install the reuse lines. Based on the results of the soil test borings, we anticipate that a variety of soils will be encountered during excavation. The soils expected to be encountered include existing fill soils, very loose to loose alluvial soils, loose to dense residual soils, PWR, and rock.

We anticipate that the fill, alluvial, and residual soils can generally be excavated using conventional equipment such as backhoes and excavators.

PWR and was encountered in borings B-11, B-12, B-13, B-15, B-20, B-23, B-25, B-26, B-28, B-29, and B-36 at depths up to 14 feet above the proposed invert elevation. PWR and fractured/weathered rock would likely be rippable with a CAT 330 or equivalent trackhoe. Material that cannot be removed with such equipment may have to be removed with a hydraulic jackhammer attached to a trackhoe.

Auger refusal material (indicative of top of bedrock) was encountered in borings B-11, and B-12 at depths of 10 and 13 feet above the proposed invert elevation, respectively. Microtunneling through rock will be required at this location to cross under an existing creek, as described in the following section, blasting of rock may be required to excavate the landing and receiving pits for the microtunnel.

9.2 Jack and Bore Pipe Installation

It is our understanding that jack and bore installation method is planned to be used to install the reuse line at three locations. The jack and bore locations are at the crossing of Holcomb Bridge Road at approximate station 9+00 at a location where Barnwell Road crosses a creek at approximate station 51+00, and at a location where the reuse line crosses Cherbury Lane at approximate station 197+00.

At the Holcomb Bridge Road Crossing, the jack and bore installation will be through residual soils consisting of stiff sandy silt and medium dense silty sand (borings B-2 and B-3). Groundwater was not encountered in our borings at this location, but groundwater levels can fluctuate seasonally and with changes in climate, and may be encountered during pipe installation.

At the creek crossing at approximate station 51+00 (borings B-11 and B-12), the proposed pipe installation will be through rock consisting of moderately hard Gneiss with a rock core recovery of 97 to 98 percent. Microtunneling through rock will likely be required for installation of the proposed reuse line at this location. Also, since the pipe installation will be under the creek, we anticipate that groundwater will be encountered during pipe installation.

At the Cherbury Lane crossing (Borings B-30 and B-30b), the jack and bore installation will likely be through fill and residual soils. The fill consisted of firm to stiff sandy clay, and the residual soils consist of medium dense to dense silty sand and or firm sandy clay. Groundwater was not encountered at B-30 or B-30b, but groundwater levels can fluctuate seasonally and with changes in climate, and may be encountered during pipe installation.

9.3 Effects of Construction Methods on Adjacent Properties

Several aspects of construction at the site could adversely affect the adjacent street, utilities, and nearby facilities. Excavation with heavy equipment, jackhammering, rock blasting, and other construction activities can generate vibrations. These vibrations can cause damage to adjacent utilities or structures if not properly controlled. Care must also be taken to prevent damage to newly placed structures, especially fresh concrete. Therefore, proper design and special care during construction will be needed to protect the adjoining properties.

9.4 Excavation Slope/Support

Temporary construction slopes should be designed in compliance with the most recent local, state, and federal governing regulations, including OSHA (29 CFR Part 1926) trench excavation safety standards. Temporary slopes should be cut to a stable slope or be temporarily braced, depending upon the excavation depth and encountered subsurface conditions. A trench box may also be used for shallow excavation support. Stockpiles should be placed well away from the edge of the excavation and their height should be controlled so they do not surcharge the sides of the excavation. The responsibility for excavation safety and stability of temporary construction slopes should lie solely with the contractor.

9.5 Drainage and Groundwater Management

The proposed construction areas must be provided with adequate drainage measures to maintain the integrity of the subgrade soils, especially during wet-weather conditions. When free water is allowed to stand on a stable subgrade, the soils can absorb water, soften, swell and experience a reduction in their support capability. Without adequate drainage provisions, site preparation activities during wet-weather periods may result in subgrade conditions that will necessitate undercutting or other subgrade stabilization measures.

Groundwater was not encountered above the proposed invert elevations at the time of our borings. Although groundwater was not encountered at boring B-11 and B-12 at the time of boring completion, based on the nearby creek, groundwater is very likely to be encountered at these locations during construction. It should also be noted that groundwater elevations are expected to vary due to seasonal and climatic changes. Therefore, there is a possibility that groundwater may be encountered at locations where no groundwater was encountered during our field work. Any required dewatering can be accomplished by pumping from sumps installed within the excavation or a system of well points installed along the perimeter of the excavation.

9.6 Pipe Bedding

In areas where open excavation is used to install the pipeline, the pipe invert will rest on materials ranging from soil to PWR to rock, and uneven support conditions will develop in the transition zones (soil to PWR, soil to rock, PWR to rock). To provide a uniform bearing surface for the pipe, we recommend that any rock encountered at the pipe bearing elevation be over-excavated a minimum of 12-inches and replaced with No. 57 stone. Any soft soils encountered below and around the pipe should be over-excavated under the observation of a geotechnical engineer and replaced with compacted suitable soil or No. 57 stone.

9.7 Fill Material and Placement

All fill used for trench backfill should consist of a clean (free of organics and debris), low plasticity soil (Plasticity Index less than 30). The proposed fill should have a maximum dry density of at least 90 pounds per cubic foot as determined by a Standard Proctor compaction test (ASTM D 698). All fill should be placed in loose lifts not exceeding eight inches in thickness and compacted to a minimum of 95 percent of its Standard Proctor maximum dry density. We recommend that field density tests, including one-point Proctor verification tests, be performed on the fill as it is being placed at a frequency determined by an experienced Geotechnical Engineer to verify the compaction criteria.

Based on the results of the soil test borings performed and our experience with similar type materials, the soils observed in the borings (except the alluvial clay encountered in boring B-8 and B-9) appear to be suitable for use as trench backfill. Excavated rock should not be used as fill backfill. We recommend that Proctor compaction tests be performed to confirm the suitability of excavated soils for use as backfill.

10.0 Closing Remarks

We greatly appreciate the opportunity to be of service to you on this project. Please contact us if you have any questions concerning this report or require further assistance.

Sincerely,
WILLMER ENGINEERING INC.

Daniel C. Pitts, PE
Staff Geotechnical Engineer

Sujit K. Bhowmik, PhD, PE
Chief Engineer

James L. Willmer, PE
Executive Vice President/Principal Consultant

This original document was signed and sealed by James L. Willmer, PE, Registration No. 10780 on October 26, 2016.
THIS REPRODUCTION IS NOT A CERTIFIED DOCUMENT

Attachments: **Table**
Table 1 – Summary of Soil Borings and Subsurface Conditions

Figures
Figure 1 – Project Location Map
Figure 2 – Boring Location Plan (Sheets 1 through 24)

Appendix I
Boring Record Legend
Unified Soil Classification System Reference Sheet
Engineering Description of Rock Hardness
Boring Logs

Appendix II
Rock Core Photographs

DCP/SKB/JLW
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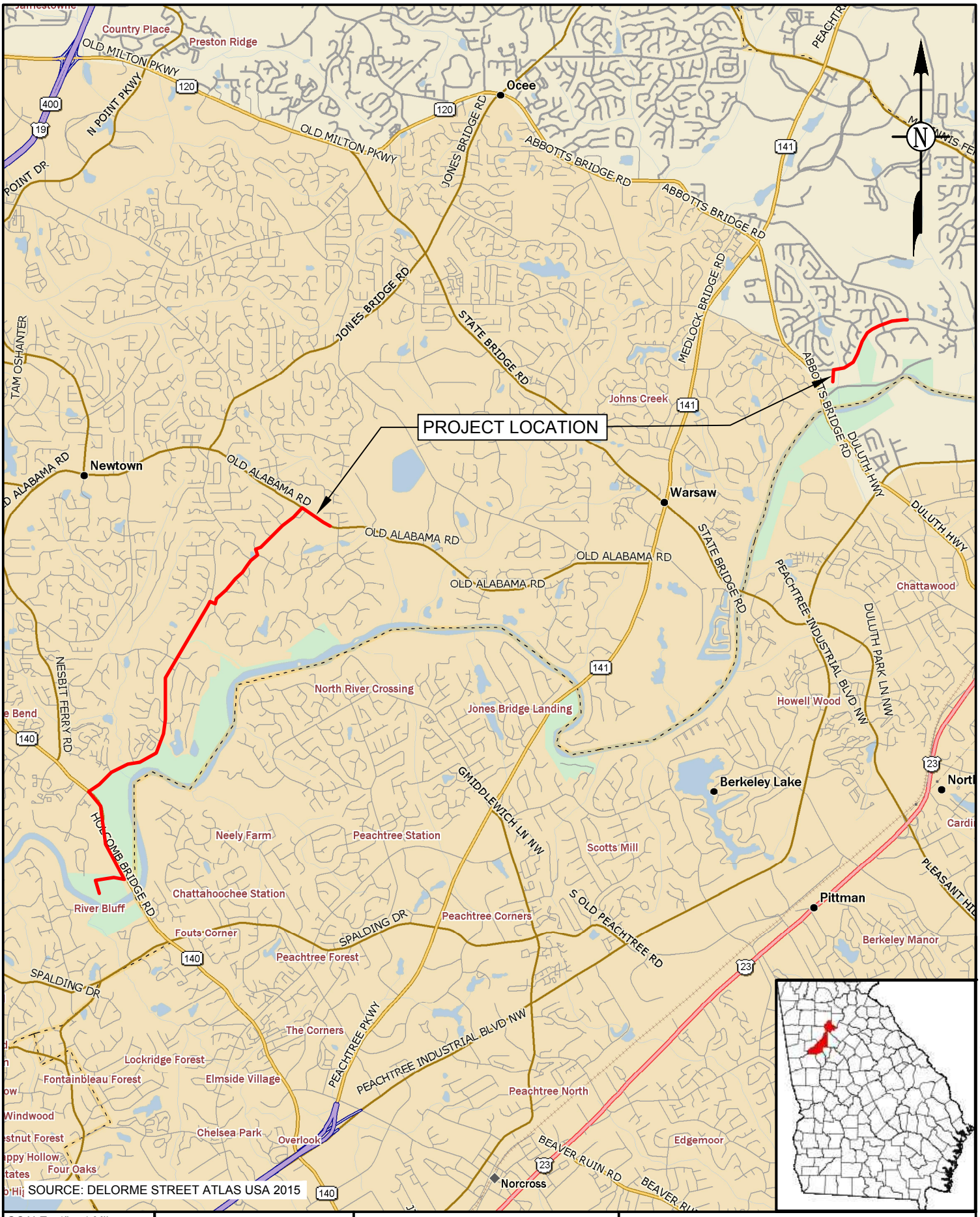
TABLE

Table 1
Summary of Soil Test Borings
Subsurface Exploration and Geotechnical Engineering Evaluation
Johns Creek Reuse Line and Boles Road Reuse Line Design
Johns Creek, Fulton County, Georgia
Willmer Engineering Project No. 71.4152

Boring No.	Station	Approximate Surface Elevation[1] (feet)	Approximate Pipe invert Elevation (feet)	Top of PWR Elevation (feet)	Top of Rock Elevation (feet)	Boring Termination Type	Boring Termination Depth (feet)	Boring Termination Elevation (feet)	Groundwater Elevation at TOB (feet)
Holcomb Bridge Road									
B-2	9+20	940	922	NE	NE	BT	25	915	NE
B-3	10+18	933	922	NE	NE	BT	25	908	NE
B-4	14+65	952	944.8	NE	NE	BT	10	942	NE
B-5	19+50	976	968	NE	NE	BT	10	966	NE
B-6	23+50	990	982	NE	NE	BT	10	980	NE
B-7	28+00	981	974.8	NE	NE	BT	10	971	NE
B-8	33+50	969	961.5	NE	NE	BT	10	959	NE
Barnwell Road									
B-9	39+50	939	931.8	NE	NE	BT	10	929	NE
B-10	45+00	914	904.6	NE	NE	BT	10	904	NE
B-11	51+65	888	865	879	878	CT	15	873	NE
B-12	53+00	887	864.5	878	874	CT	18	869	NE
B-13	57+50	913	906	908	NE	BT	10	903	NE
B-14	63+00	924	917	NE	NE	BT	10	914	NE
B-15	68+25	931	924.5	931	NE	BT	10	921	NE
B-16	73+25	938	929.5	NE	NE	BT	10	928	NE
B-17	78+65	948	940.5	NE	NE	BT	10	938	NE
B-18	84+00	961	953.4	NE	NE	BT	10	951	NE
B-19	89+00	969	962.8	NE	NE	BT	10	959	NE
B-20	94+25	985	978.2	979	NE	BT	10	975	NE
B-21	99+50	1017	1009.5	NE	NE	BT	10	1007	NE
B-22	104+75	1037	1030.8	NE	NE	BT	10	1027	NE
B-23	109+98	1056	1048	1050	NE	BT	10	1046	NE
B-24	114+75	1046	1037.2	NE	NE	BT	10	1036	NE
B-25	119+50	1029	1022.8	1029	NE	BT	10	1019	NE
B-26	125+75	1030	1022.8	1024	NE	BT	10	1020	NE
B-27	131+00	1055	1048.5	NE	NE	BT	10	1045	NE
B-28	136+25	1080	1072	1071	NE	BT	10	1070	NE
B-29	141+50	1095	1087	1086	NE	BT	10	1085	NE
Country Club of The South									
No Borings									
Old Alabama Road									
B-30	196+70	1039	1029	NE	NE	BT	10	1029	NE
B-30b	198+60	1025	1017	NE	NE	BT	10	1015	NE
B-31	201+27	1004	997.2	NE	NE	BT	10	994	NE
B-32	205+70	983	976.5	NE	NE	BT	10	973	NE
B-33	210+00	975	970.4	NE	NE	BT	10	965	NE
Boles Road									
B-34	2+00	913	907	NE	NE	BT	6	907	NE
B-34b	6+00	929	922	NE	NE	BT	7	922	NE
B-35	8+50	934	927	NE	NE	BT	10	924	NE
B-36	12+50	962	954.4	953	NE	BT	10	952	NE
B-37	16+50	980	973.5	NE	NE	BT	10	970	NE
B-38	21+00	993	982.2	NE	NE	BT	15	978	NE
B-39	25+25	1005	998.2	NE	NE	BT	10	995	NE
B-40	28+96	1011	1003.5	NE	NE	BT	10	1001	NE
B-41	33+75	1003	996.5	NE	NE	BT	10	993	NE
B-42	39+50	970	963.5	NE	NE	BT	10	960	NE
B-43	44+75	989	982	NE	NE	BT	10	979	NE

Notes:
1. Ground surface elvations were estimated from topographic maps provided by Brown And Caldwell.
Abbreviations:
PWR = Partially Weathered Rock
AR = Auger Refusal (indicative of top of bedrock)
BT = Boring Terminated
CT = Coring Terminated
NE = Not Encountered
TOB = Time of Boring Completion

FIGURES



SCALE: 1" = 1 Mile	WILLMER Engineering	GEOTECHNICAL ENGINEERING CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 1 PROJECT LOCATION MAP JOHNS CREEK REUSE LINE AND BOLES ROAD REUSE LINE DESIGN FULTON COUNTY, GEORGIA WILLMER PROJECT No. 71.4152
DATE: 10/20/2016			
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REVIEWED BY: DP			

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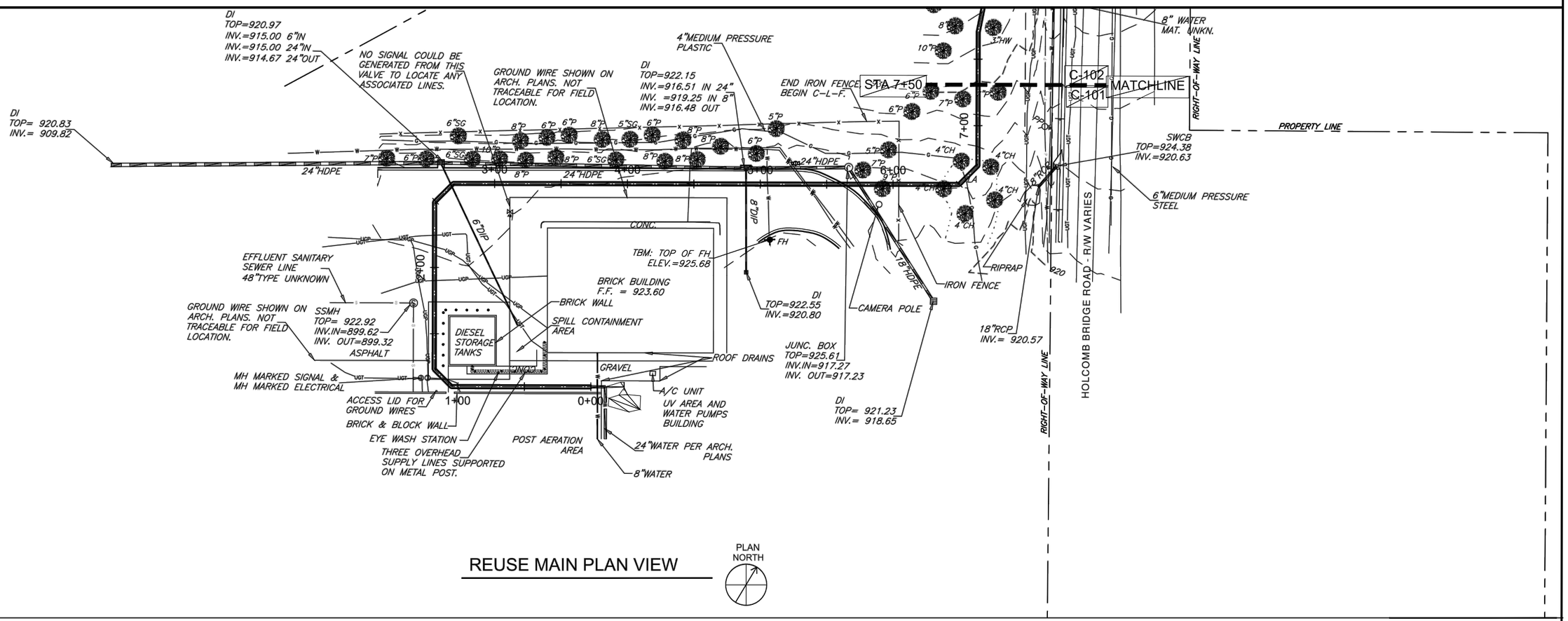

REUSE MAIN PLAN VIEW

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

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DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 1 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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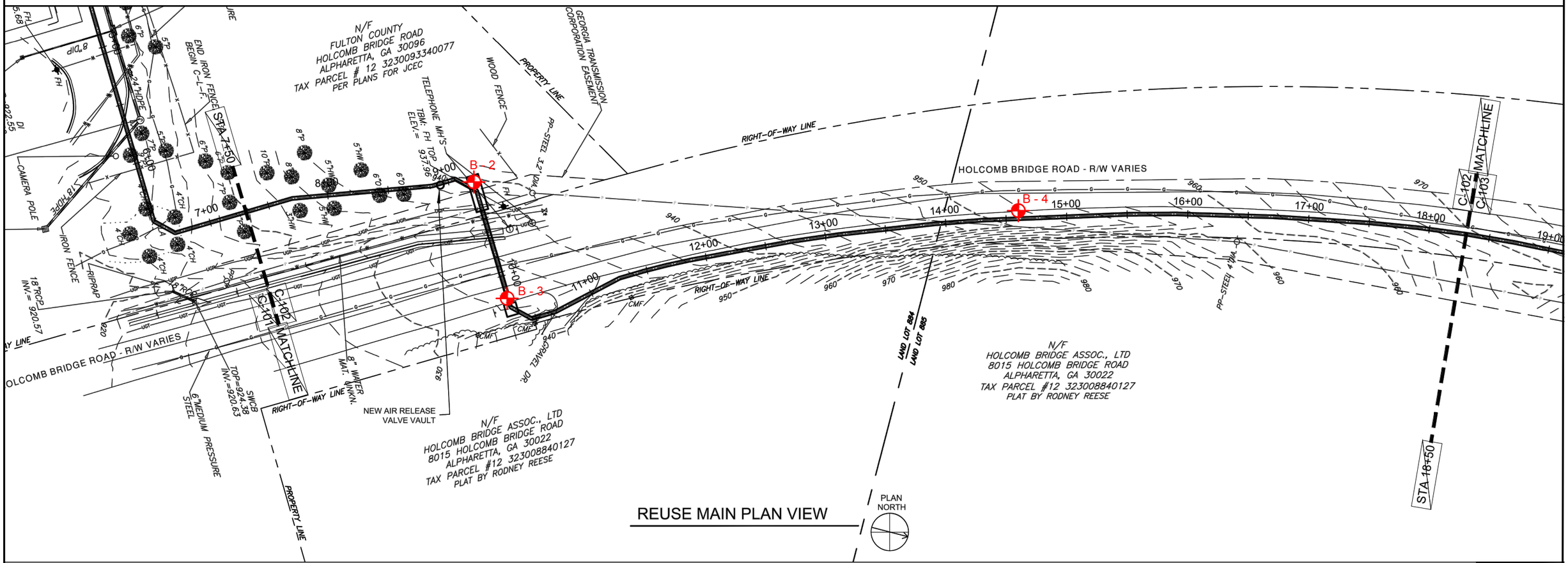

REUSE MAIN PLAN VIEW

LEGEND:

B - 2 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 2 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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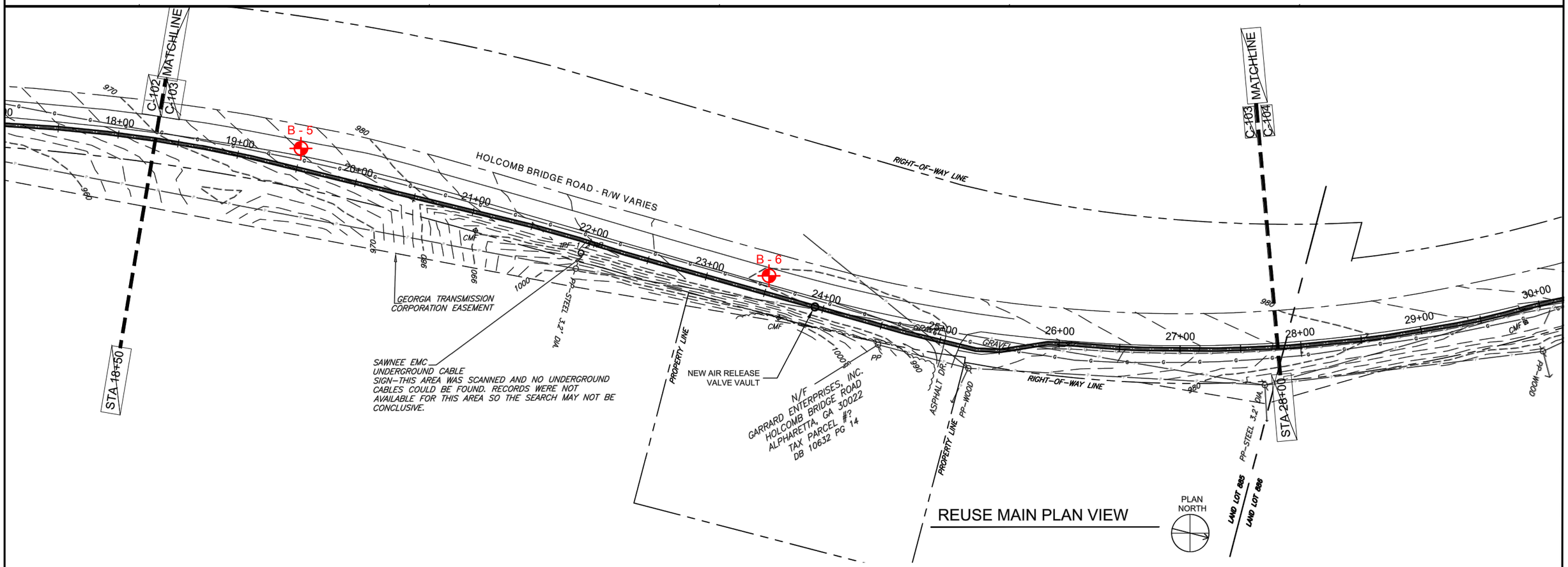

REUSE MAIN PLAN VIEW

LEGEND:

B - 2 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 2 (PAGE 3 OF 24) BORING LOCATION PLAN JOHNS CREEK REUSE LINE AND BOLES ROAD REUSE LINE DESIGN FULTON COUNTY, GEORGIA WILLMER PROJECT No. 71.4152

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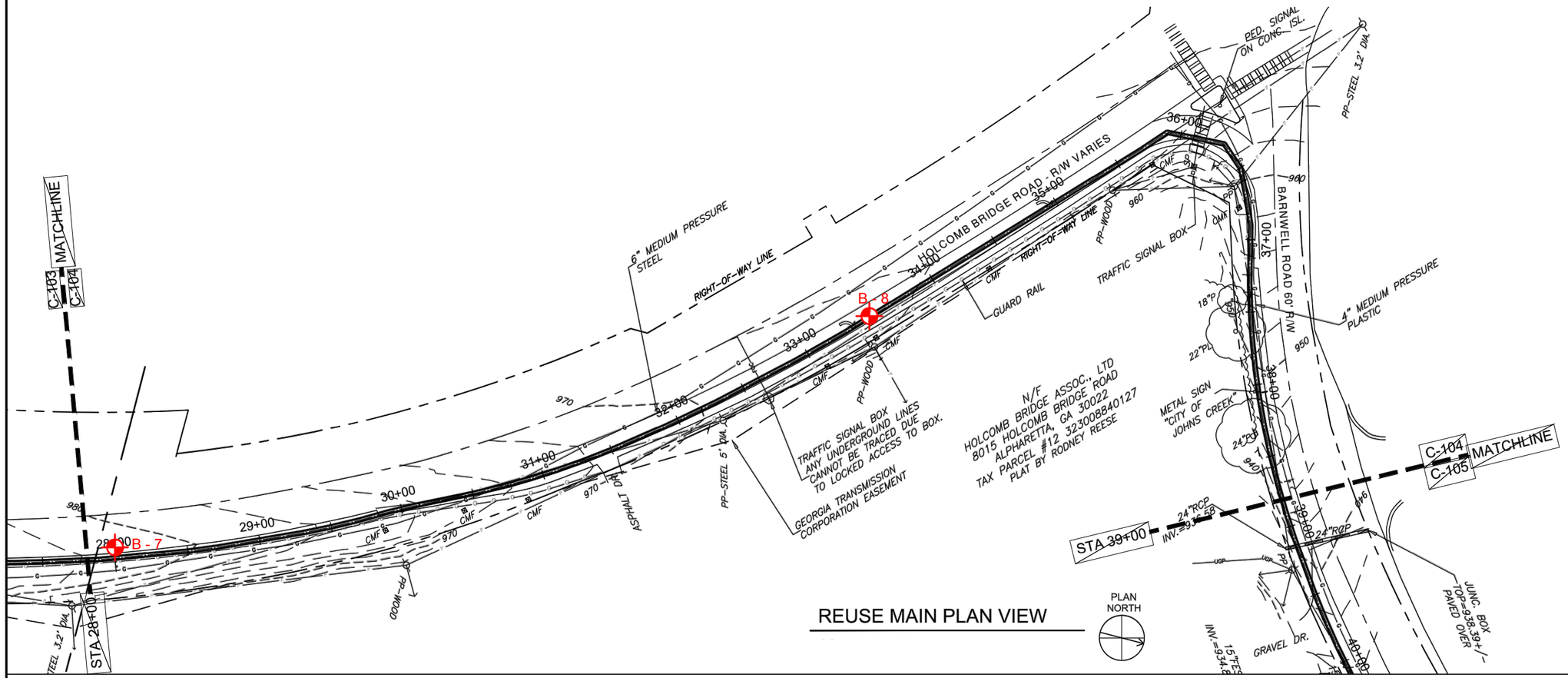

REUSE MAIN PLAN VIEW

LEGEND:

B - 2 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 2 (PAGE 4 OF 24) BORING LOCATION PLAN JOHNS CREEK REUSE LINE AND BOLES ROAD REUSE LINE DESIGN FULTON COUNTY, GEORGIA WILLMER PROJECT No. 71.4152

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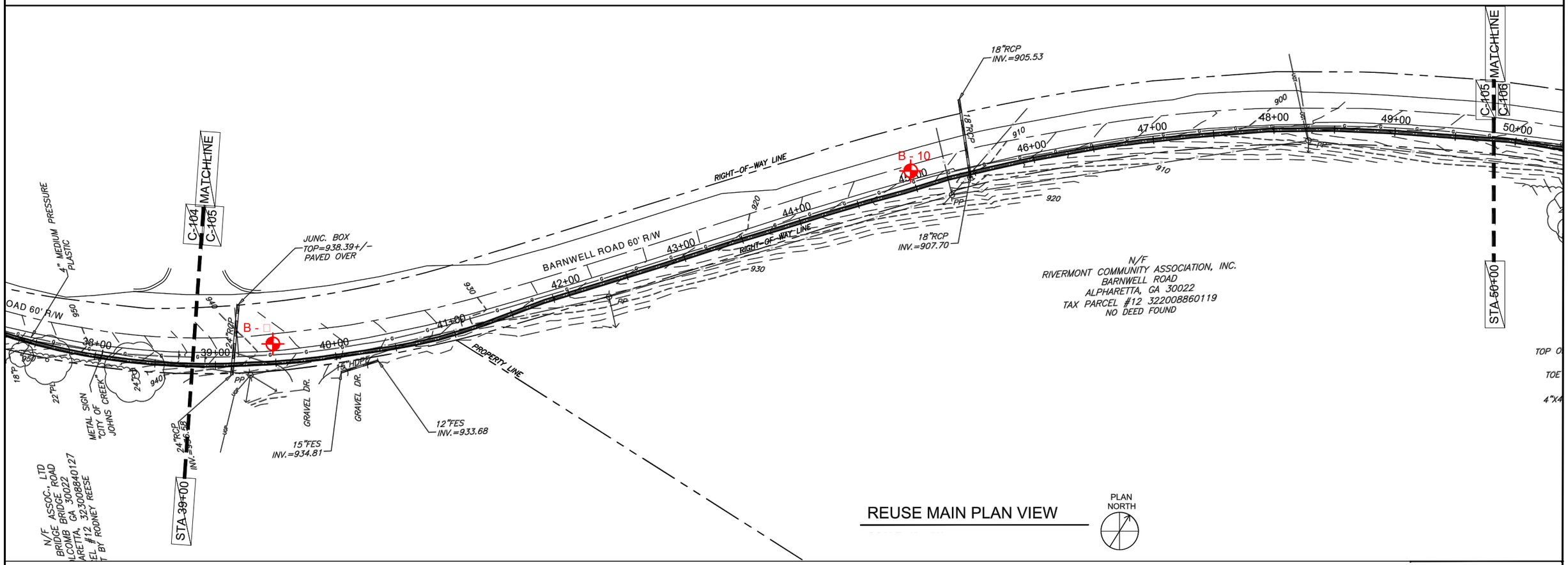

REUSE MAIN PLAN VIEW

PLAN NORTH

LEGEND:

B - 2 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
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REVIEWED BY: DP		

FIGURE 2 (PAGE 5 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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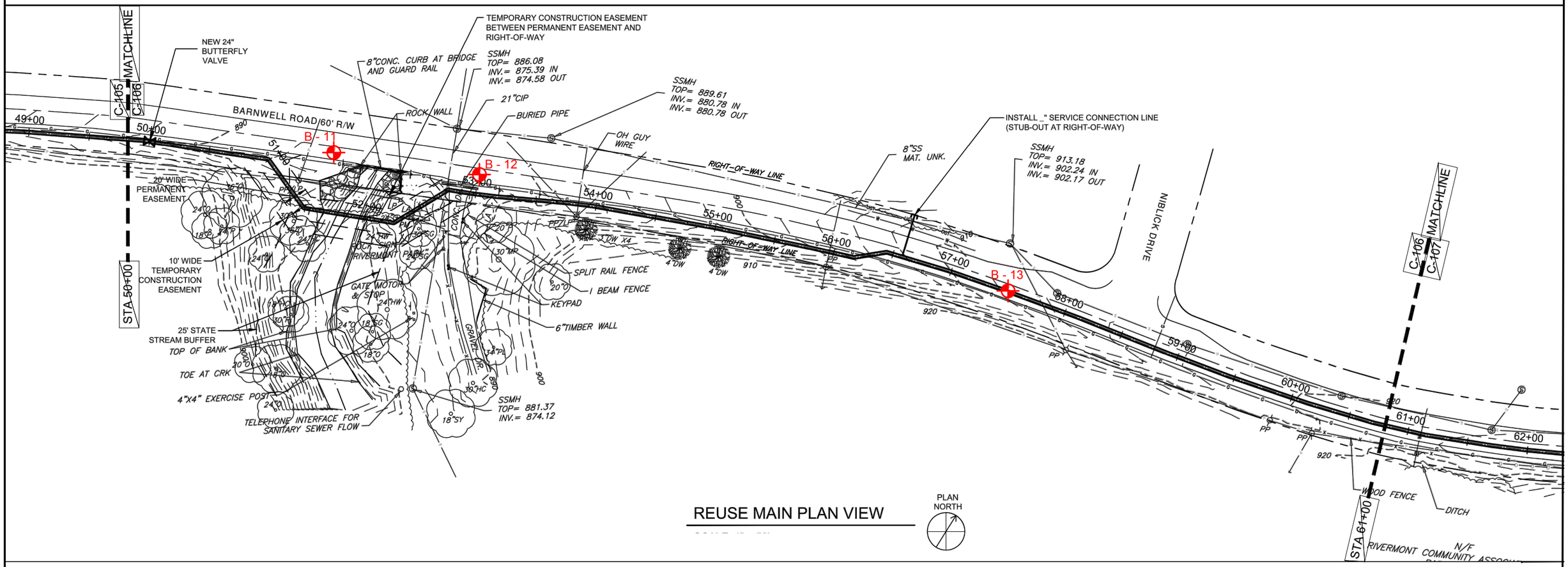

REUSE MAIN PLAN VIEW

PLAN NORTH

LEGEND:

B - 2 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 6 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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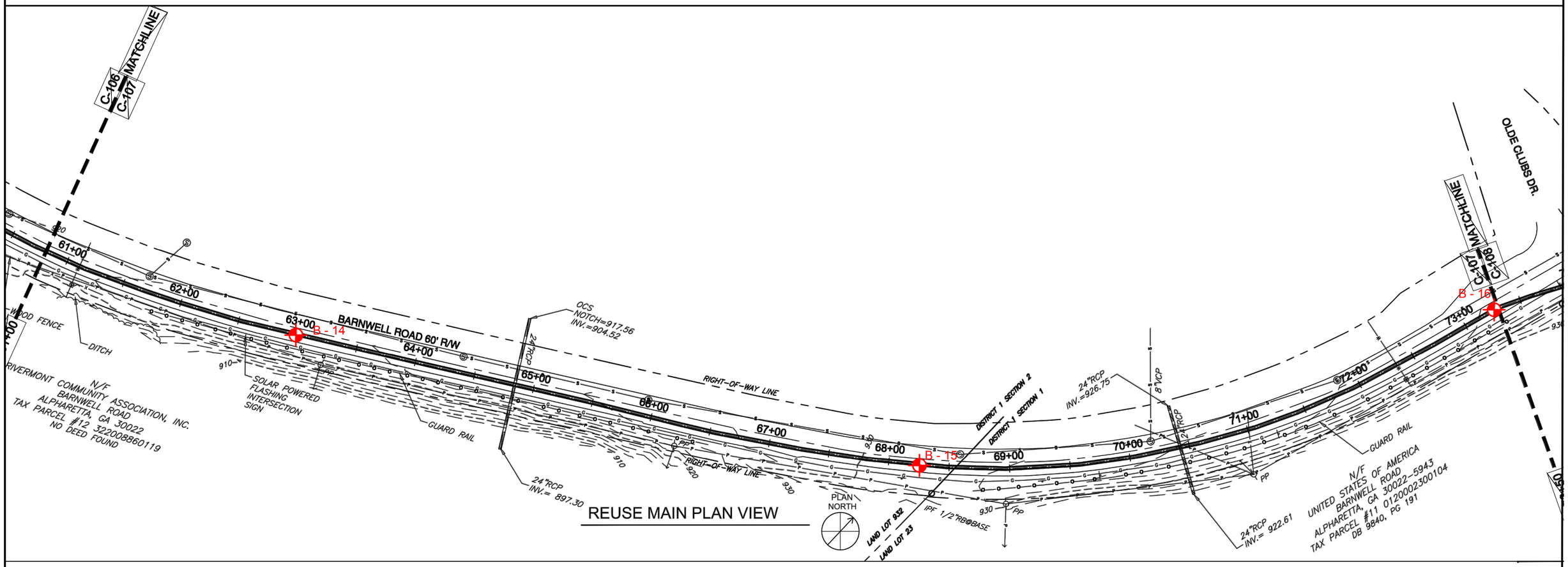

REUSE MAIN PLAN VIEW

LEGEND:

B - 2 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 7 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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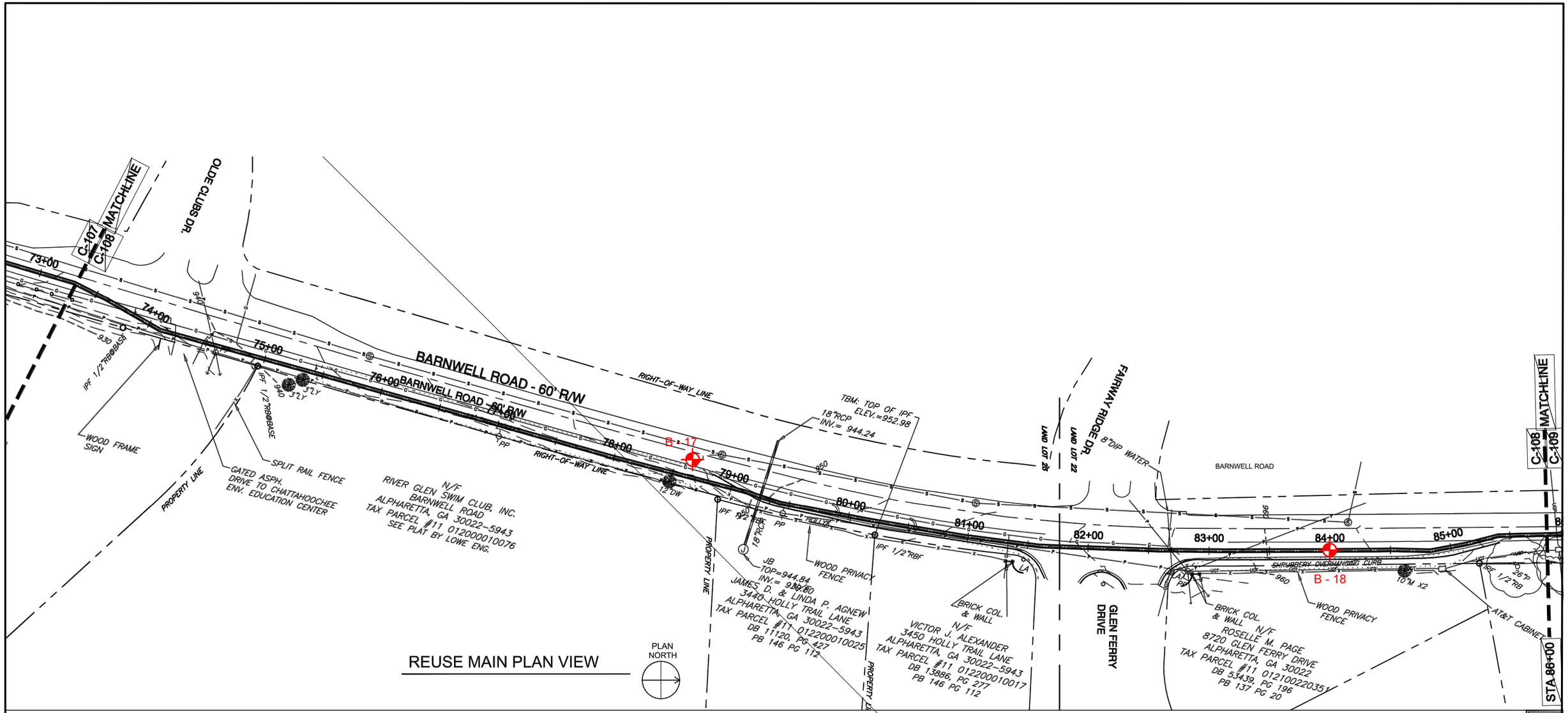

REUSE MAIN PLAN VIEW

PLAN NORTH

LEGEND:

B - 2 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 8 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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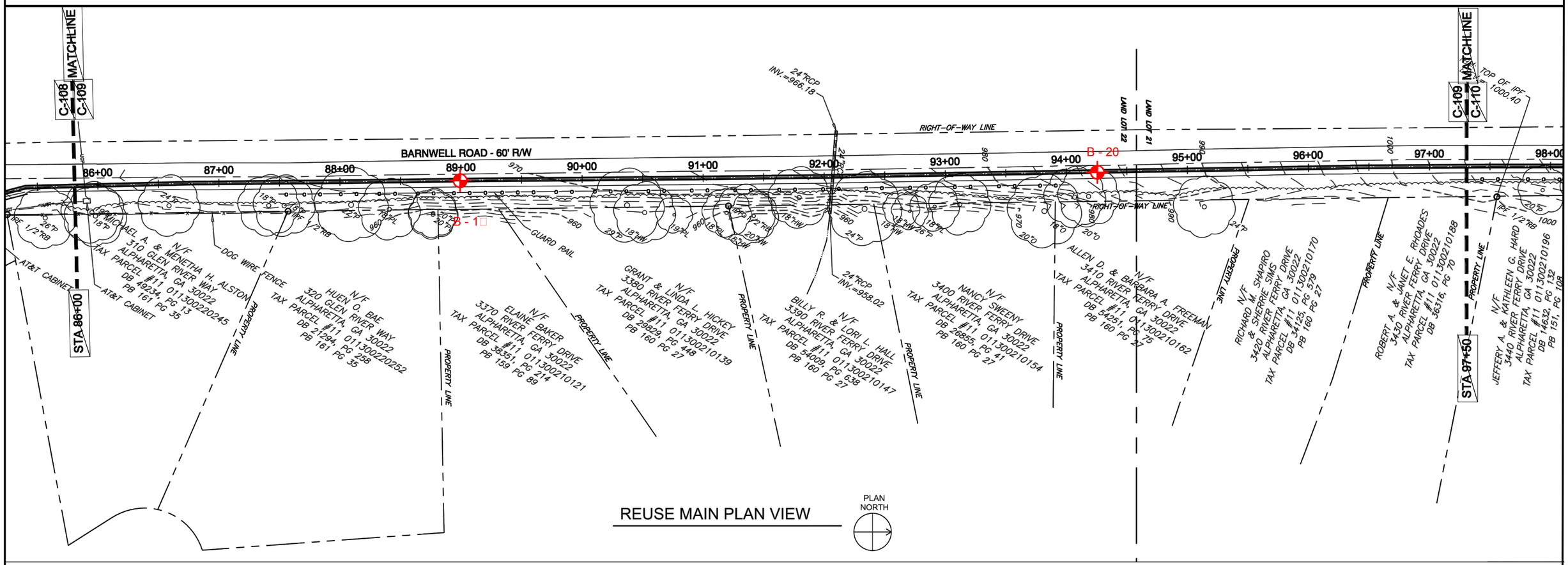

REUSE MAIN PLAN VIEW

PLAN NORTH

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	
DATE: 10/20/2016	
DRAWN BY: GH	
REVIEWED BY: DP	

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ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2 (PAGE OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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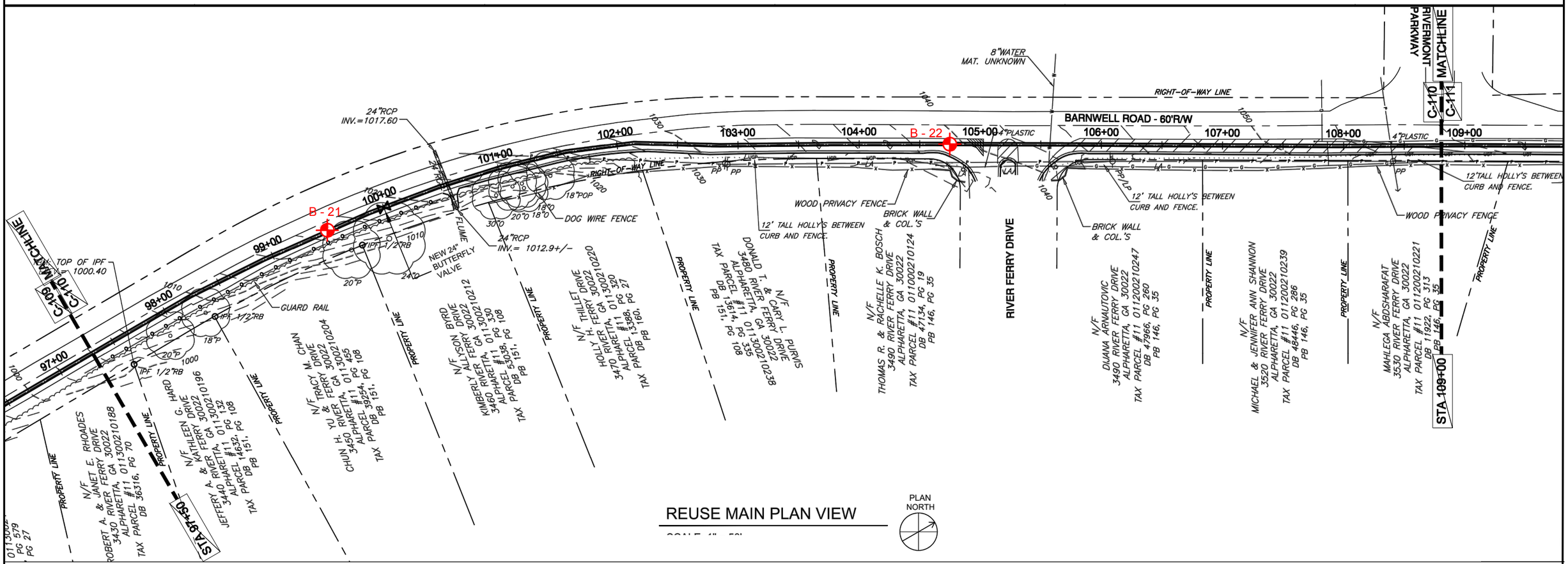

REUSE MAIN PLAN VIEW

PLAN NORTH

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	
DATE: 10/20/2016	
DRAWN BY: GH	
REVIEWED BY: DP	

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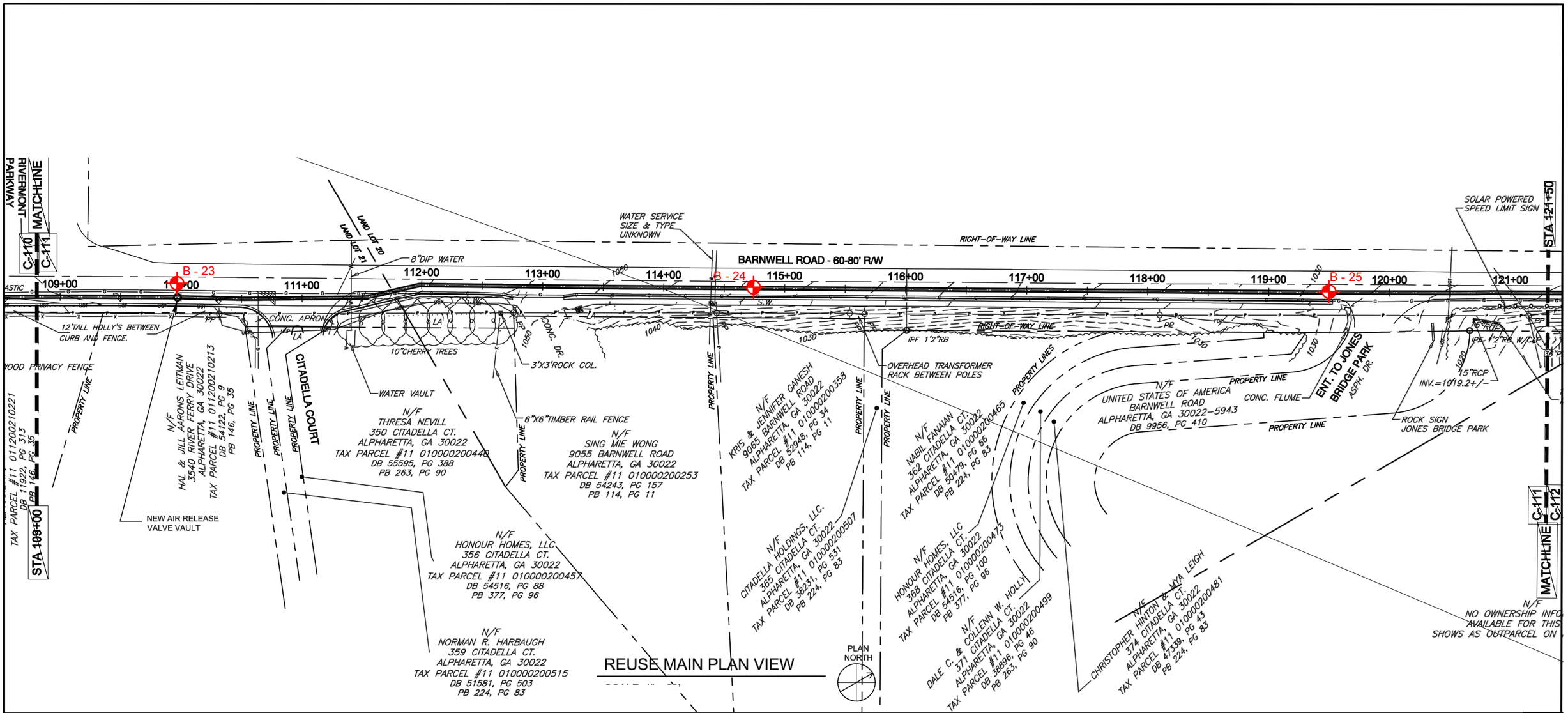
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 10 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



LEGEND:

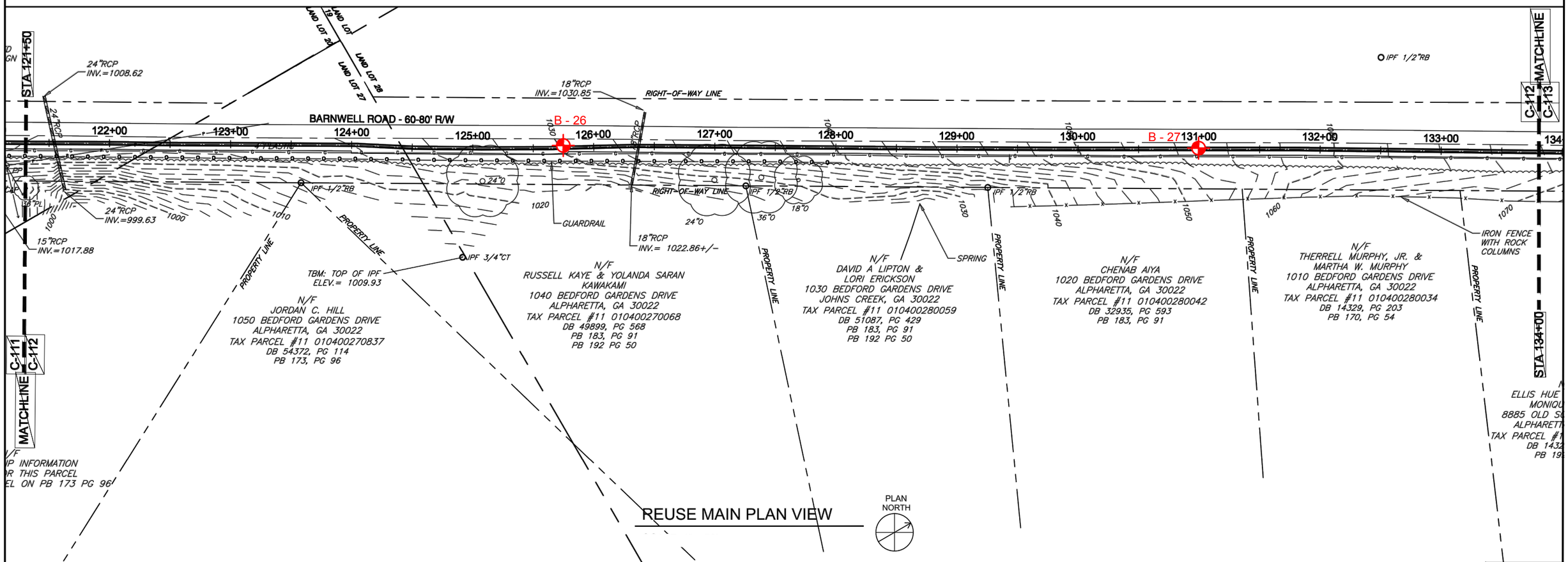
B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 11 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



REUSE MAIN PLAN VIEW

LEGEND:

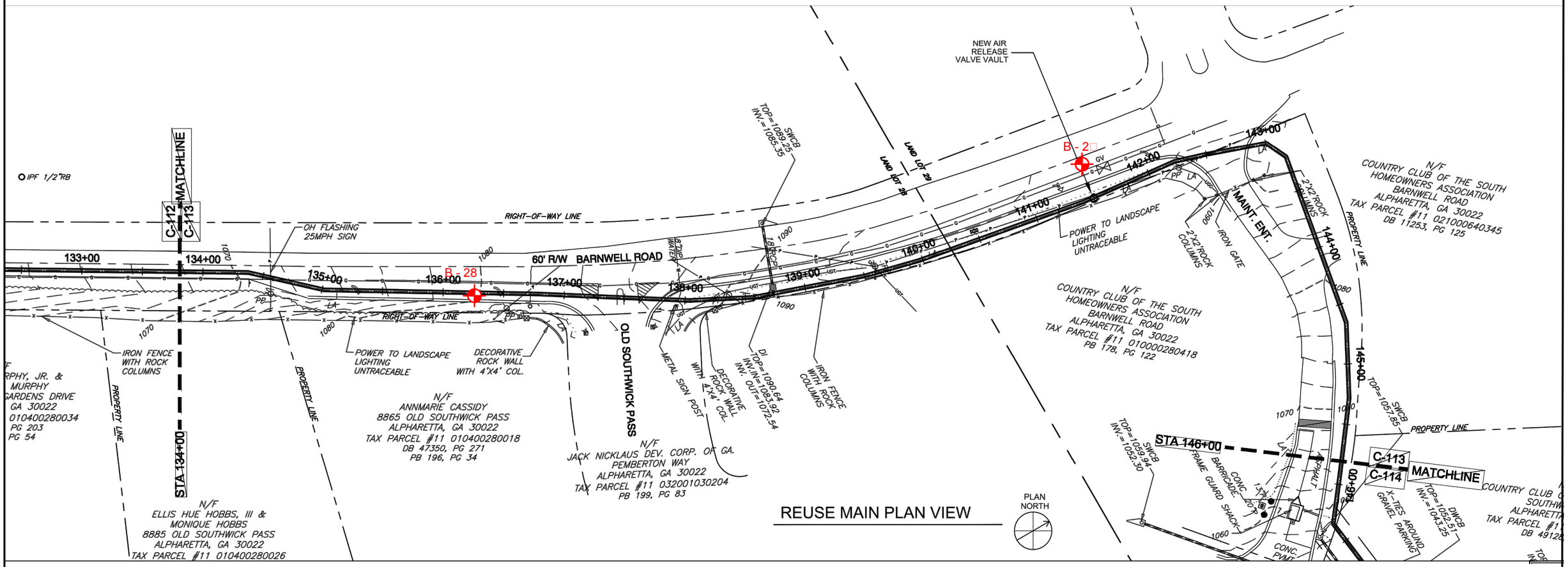
B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 12 OF 24)
BORING LOCATION PLAN
JOHN'S CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



REUSE MAIN PLAN VIEW

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	
DATE: 10/21/2016	
DRAWN BY: GH	
REVIEWED BY: DP	

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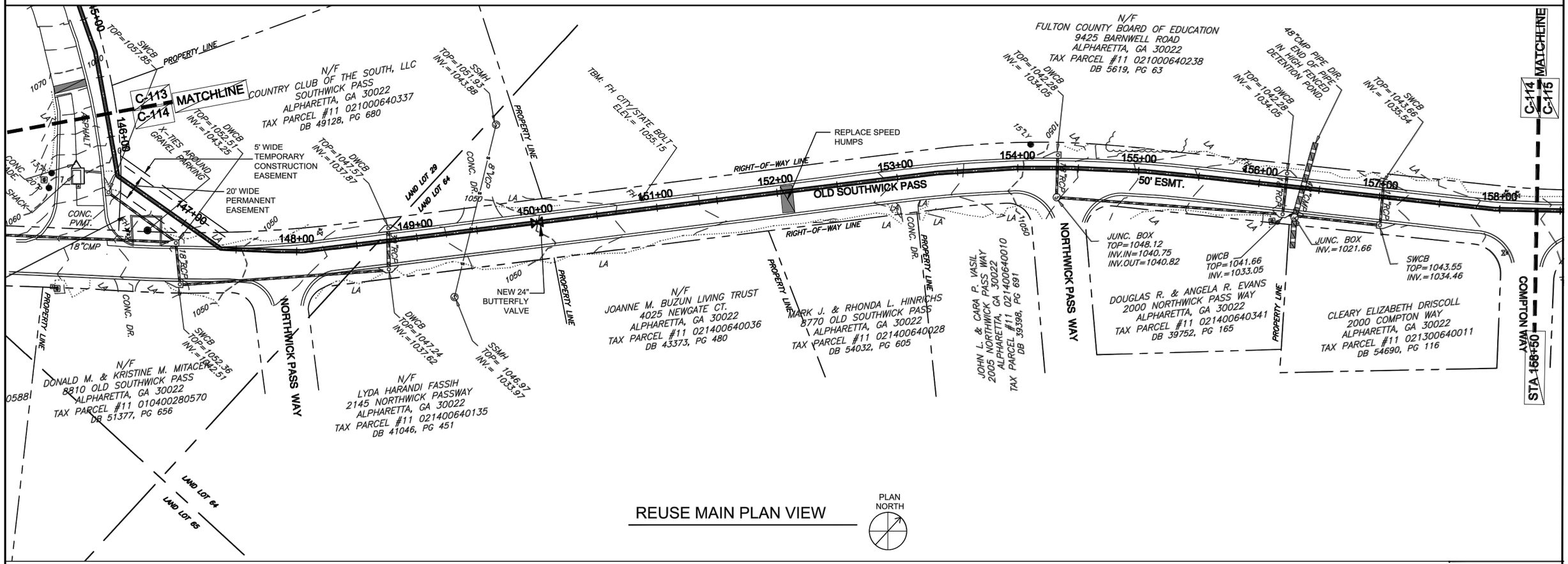
GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 13 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



REUSE MAIN PLAN VIEW

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 14 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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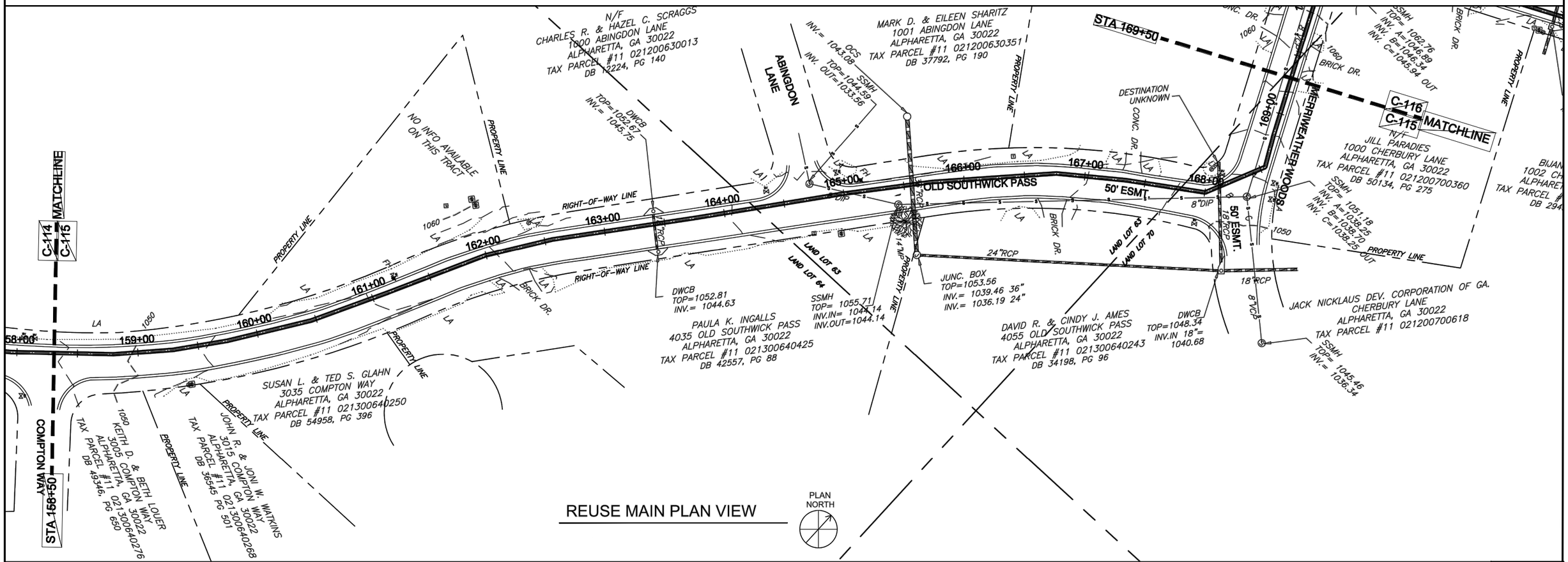


LEGEND:

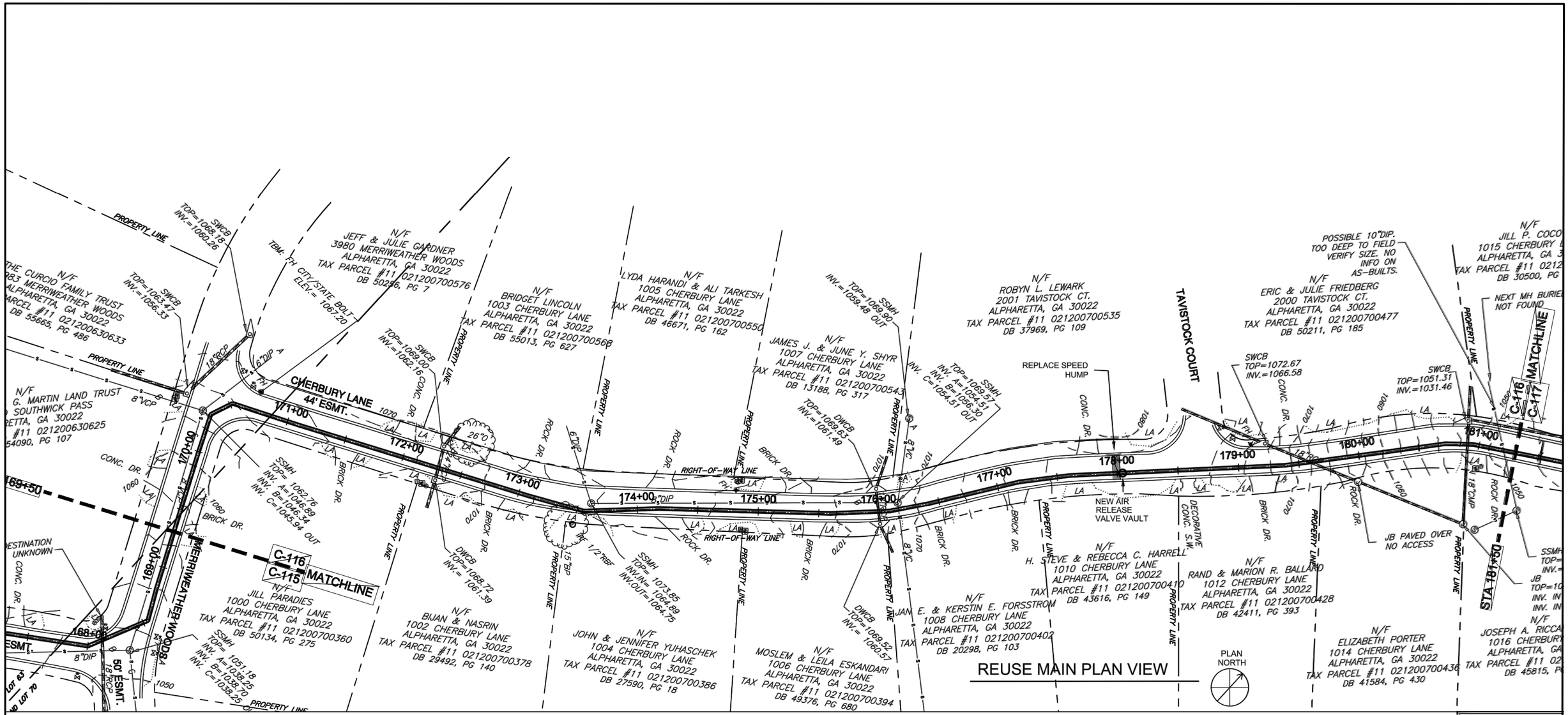
B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 15 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



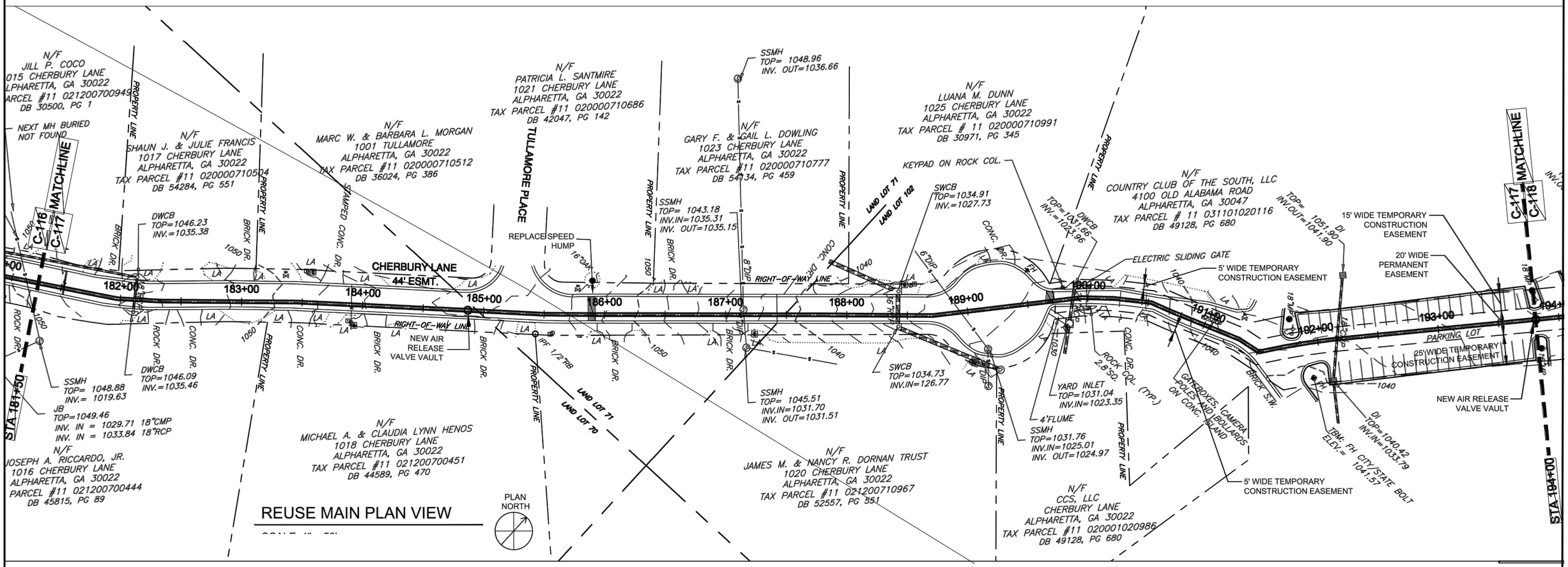
LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 2 (PAGE 16 OF 24) BORING LOCATION PLAN JOHNS CREEK REUSE LINE AND BOLES ROAD REUSE LINE DESIGN FULTON COUNTY, GEORGIA WILLMER PROJECT No. 71.4152
DATE: 10/20/2016			
DRAWN BY: GH			
REVIEWED BY: DP			

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



REUSE MAIN PLAN VIEW

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	
DATE: 10/20/2016	
DRAWN BY: GH	
REVIEWED BY: DP	

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GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 17 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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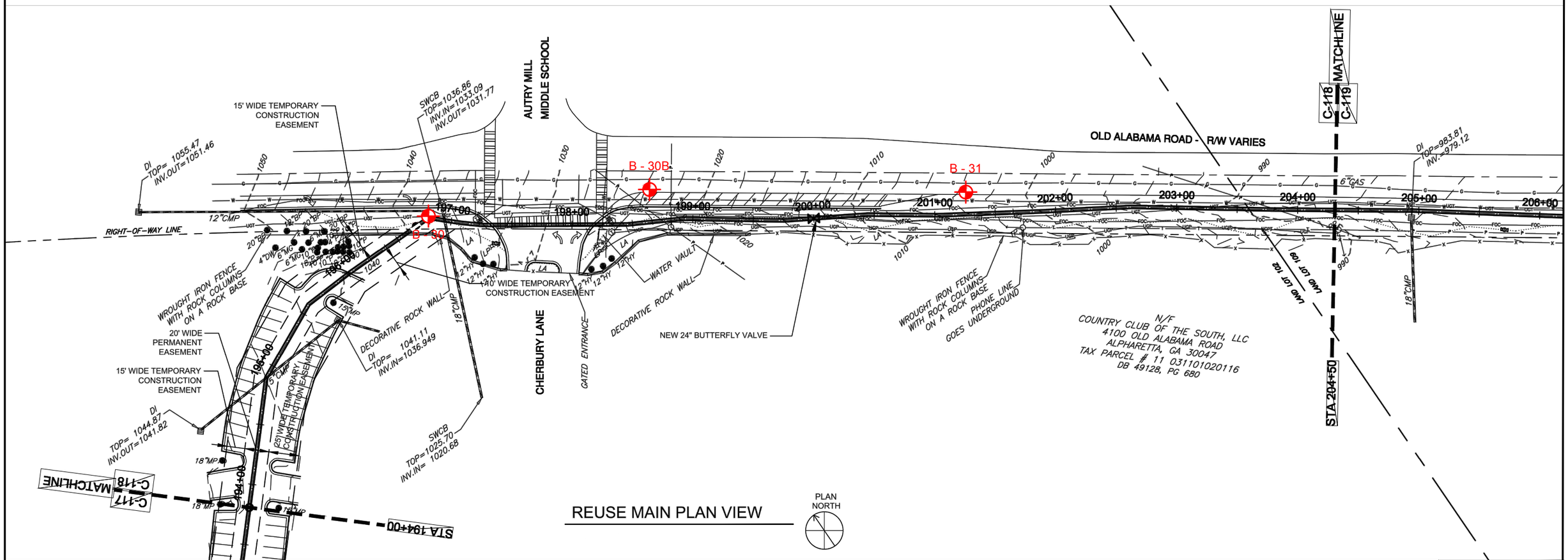

REUSE MAIN PLAN VIEW

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 18 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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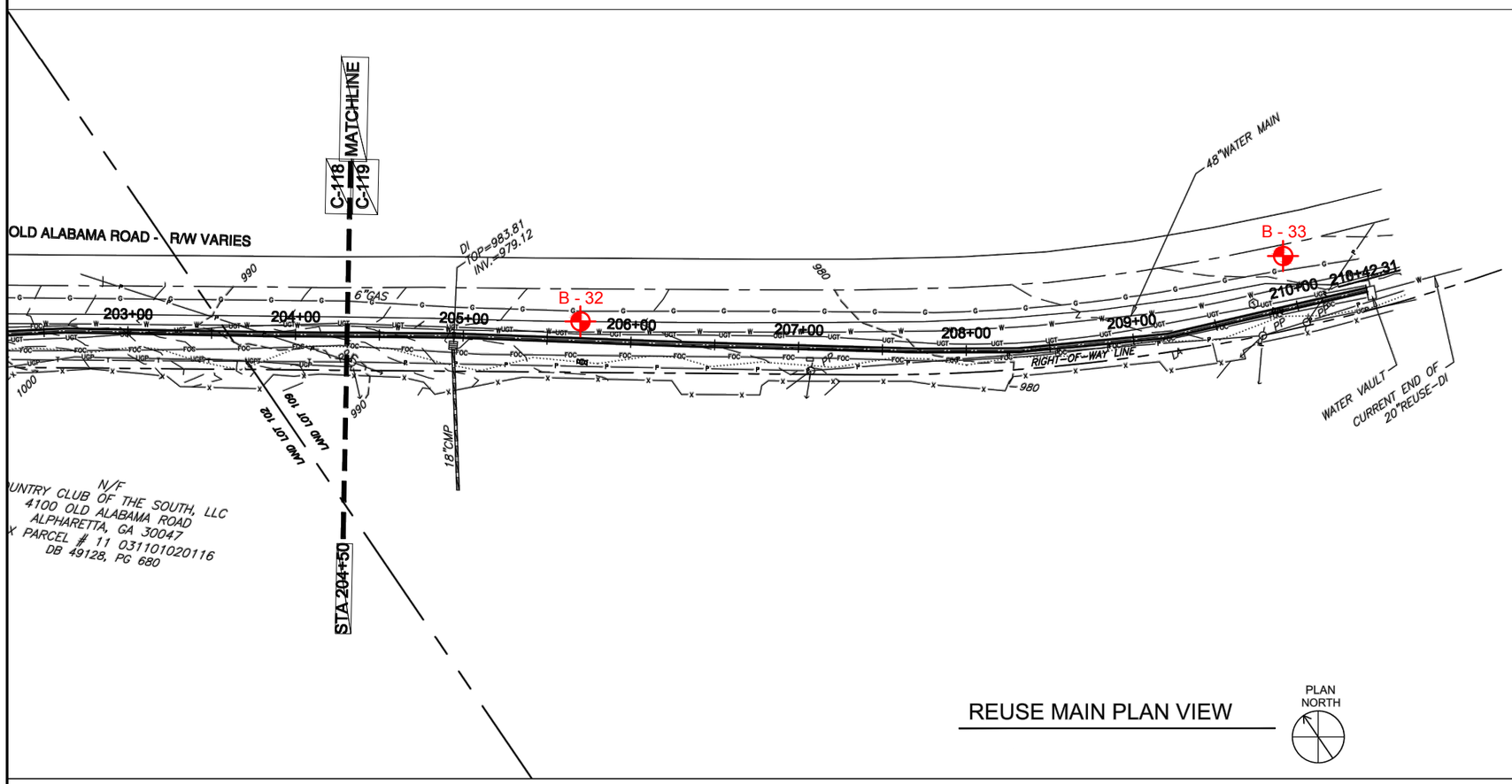


REUSE MAIN PLAN VIEW

PLAN NORTH

LEGEND:

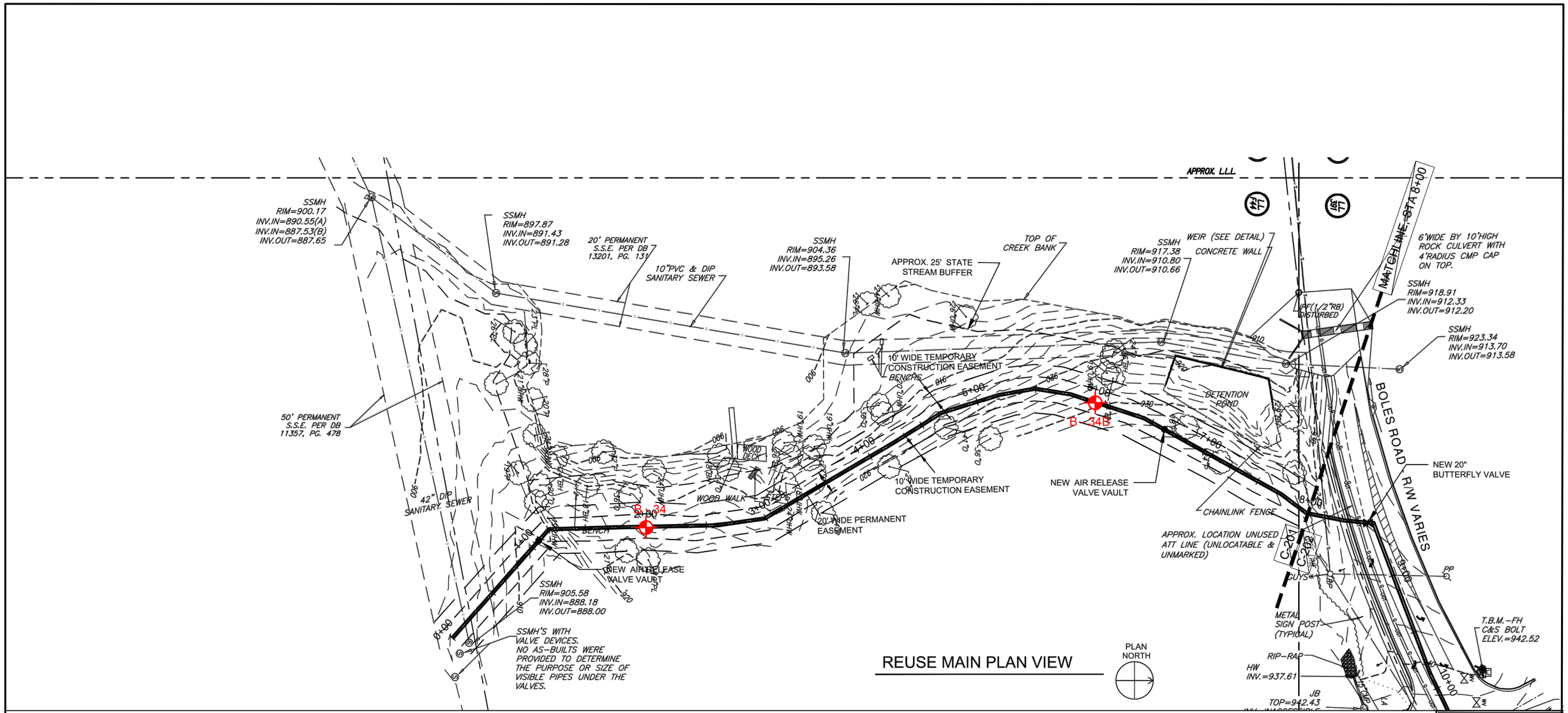
B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 1 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



REUSE MAIN PLAN VIEW

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 20 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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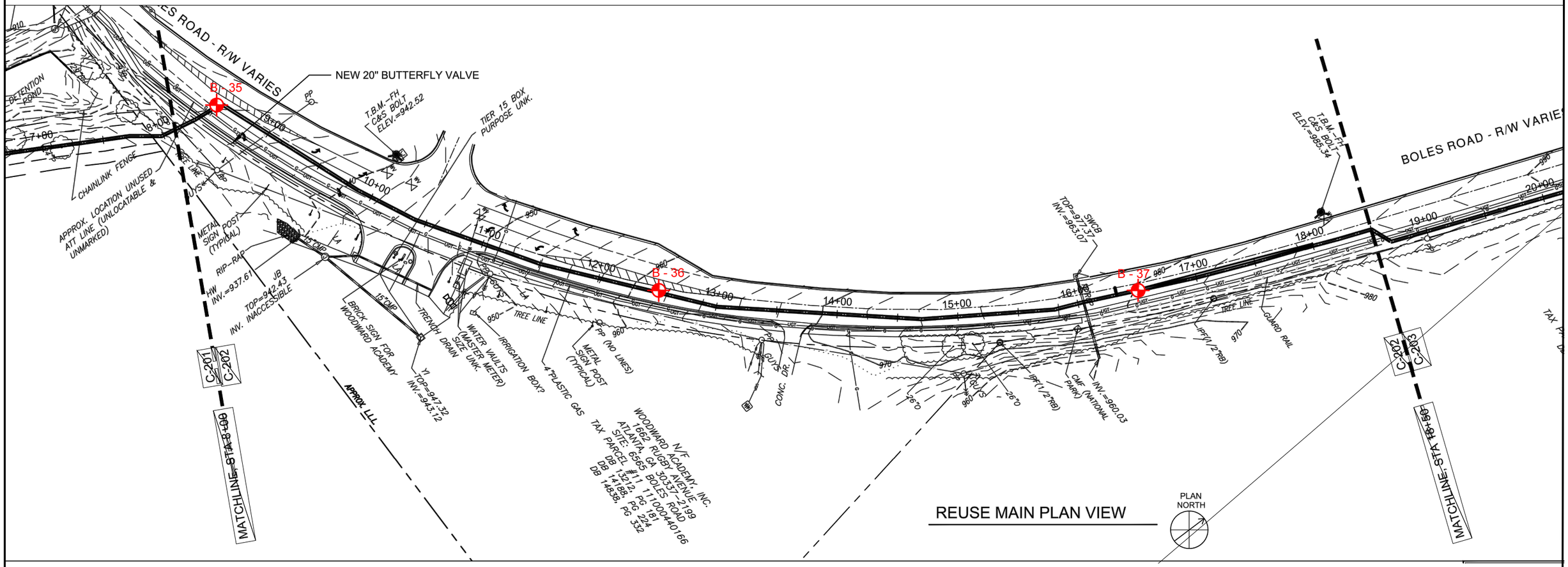

REUSE MAIN PLAN VIEW

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 21 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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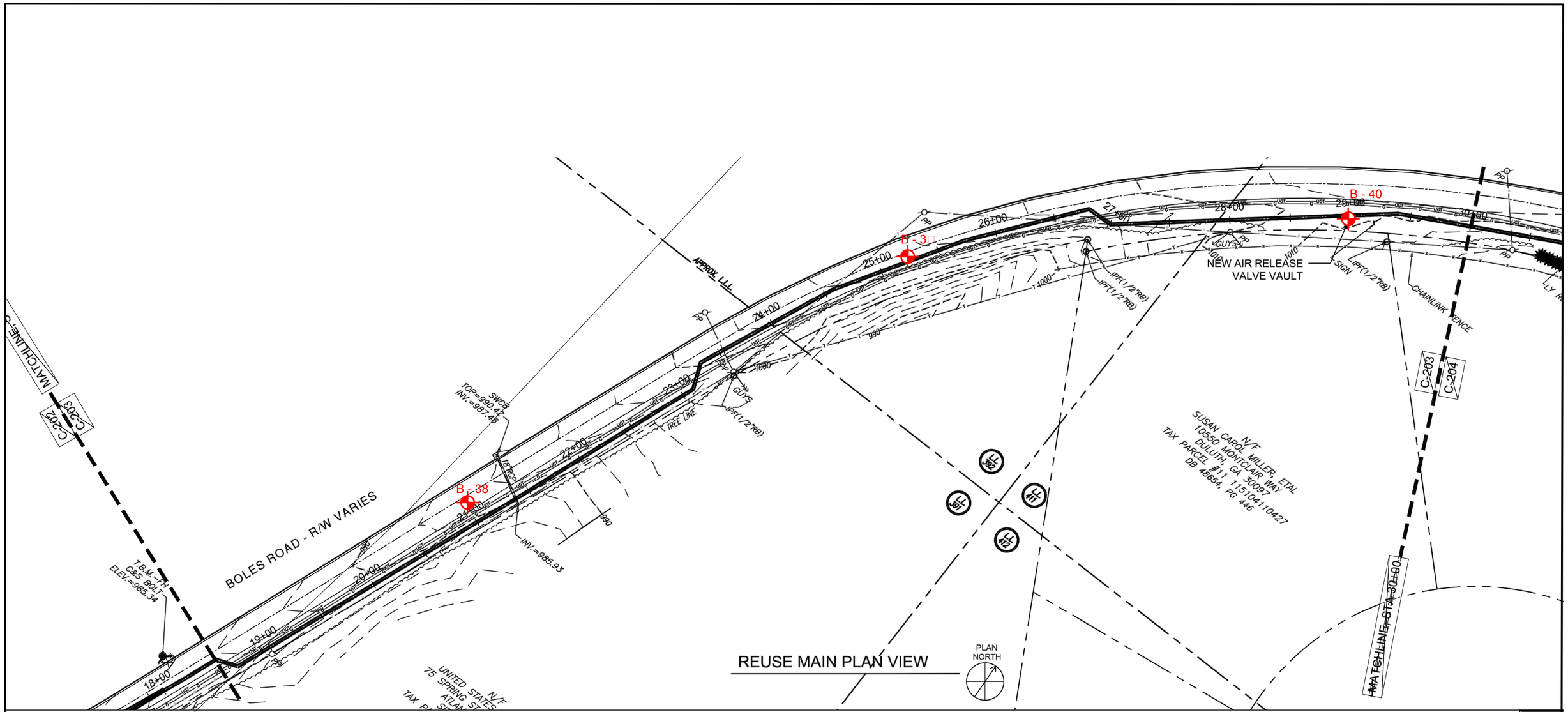

LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80' DATE: 10/20/2016 DRAWN BY: GH REVIEWED BY: DP	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 2 (PAGE 22 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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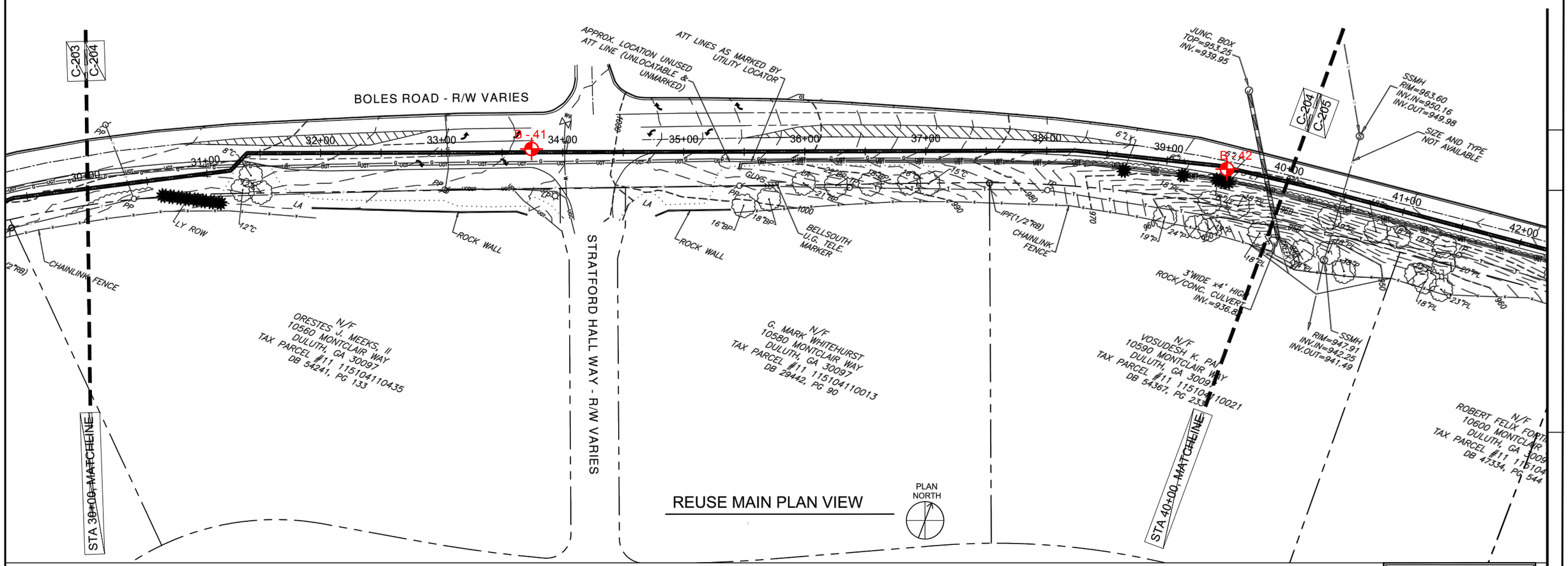


REUSE MAIN PLAN VIEW

LEGEND:

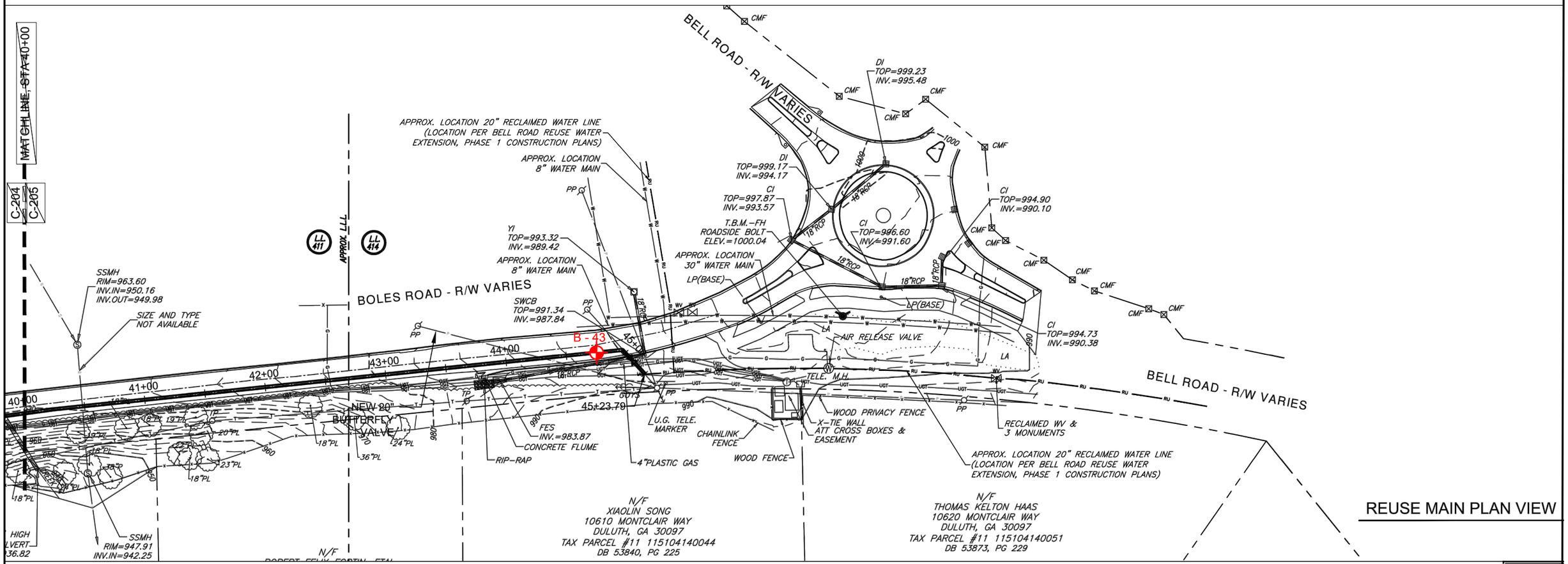
B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 23 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

P:\4152 Johns Creek Reuse Water Line Route\CADD\Boring Location Plan.dwg



LEGEND:

B - 1 BORING LOCATION

BASE DRAWING PROVIDED BY BROWN AND CALDWELL

SCALE: 1" = 80'	WILLMER Engineering	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/20/2016		
DRAWN BY: GH		
REVIEWED BY: DP		

FIGURE 2 (PAGE 24 OF 24)
BORING LOCATION PLAN
JOHNS CREEK REUSE LINE AND BOLES ROAD
REUSE LINE DESIGN
FULTON COUNTY, GEORGIA
WILLMER PROJECT No. 71.4152

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APPENDIX I

BORING RECORD LEGEND

SM, CL, etc: - GROUP SYMBOL based on Unified Soil Classification System.
(Refer to ASTM D-2488 and Table 1 of D-2487)

N-VALUE: BLOWS PER FOOT- Standard Penetration Resistance (SPT) blow count ,
the sum of the second and third 6-inch increments of the SPT test.
(Refer to ASTM D-1586)

CONSISTENCY / RELATIVE DENSITY Correlated with SPT Blow Count, N:

SILTS AND CLAYS

N (blows per foot)	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
> 50	Very Hard

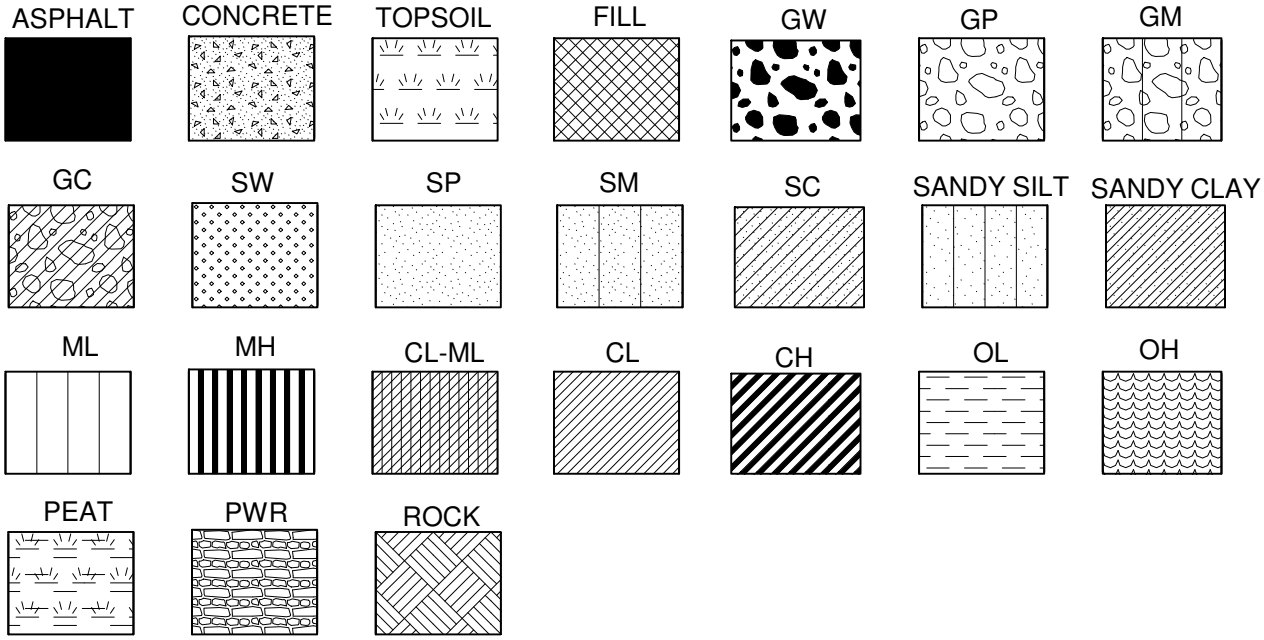
SANDS

N (blows per foot)	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

NOTES:

Groundwater Measurements:

- Water level at time of backfilling
- Water level at time of boring
- Caved level at 24 hours



Willmer Engineering Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED #4 SIEVE	CLEAN GRAVELS LITTLE OR NO FINES	**(GW)**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			(GP)	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES APPRECIABLE AMOUNT OF FINES	**(GM)**	SILTY GRAVELS and GRAVEL-SAND-SILT MIXTURES
			(GC)	CLAYEY GRAVELS and GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING #4 SIEVE	CLEAN SAND LITTLE OR NO FINES	**(SW)**	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			(SP)	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES APPRECIABLE AMOUNT OF FINES	**(SM)**	SILTY SANDS and SAND-SILT MIXTURES
			(SC)	CLAYEY SANDS and SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		**(ML)**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR VERY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			(CL)	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			(OL)	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		**(MH)**	INORGANIC ELASTIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
			(CH)	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			(OH)	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			**(PT)**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

Willmer Engineering, Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

ENGINEERING DESCRIPTION OF ROCK HARDNESS

Hardness	Description
Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.
Partially Weathered Rock	For engineering purposes, partially weathered rock (PWR) is locally defined as residual soils exhibiting Standard Penetration Test N-values in excess of 50 blows for 6 inches of penetration.

WILLMER Engineering

Project:	**Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-2**	
Location:	**Fulton County, Georgia**	Sheet 1 of 1	
Project Number:	**71.4152**	Location:	**SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **940.00** Station: **9+20**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **7** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **25.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					FILL: Firm to stiff orange and brown medium to fine sandy **CLAY**	CL	940.0		
		SS							8
		SS					935		10
5					RESIDUUM: Stiff to very stiff red and brown medium to fine sandy **SILT** (micaceous)	ML			
		SS							10
		SS					930		13
10									
		SS					925		15
15									
		SS					920		10
20									
		SS					915		18
25					Boring was terminated at 25 feet below the existing ground surface.				
					Groundwater was not encountered at the time of boring completion.				
30							910		
35							905		
40							900		
45							895		
50							890		
55							885		

STANDARD PENETRATION TEST DATA (blows/foot): 5, 10, 20, 40, 60, 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-2**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project:	Johns Creek Reuse Line and Boles Road Reuse Line	**HOLE No. B-3**	
Location:	Fulton County, Georgia	Sheet 1 of 1	
Project Number:	71.4152	Location:	SEE FIGURE 2

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 933.00 Station: 10+18

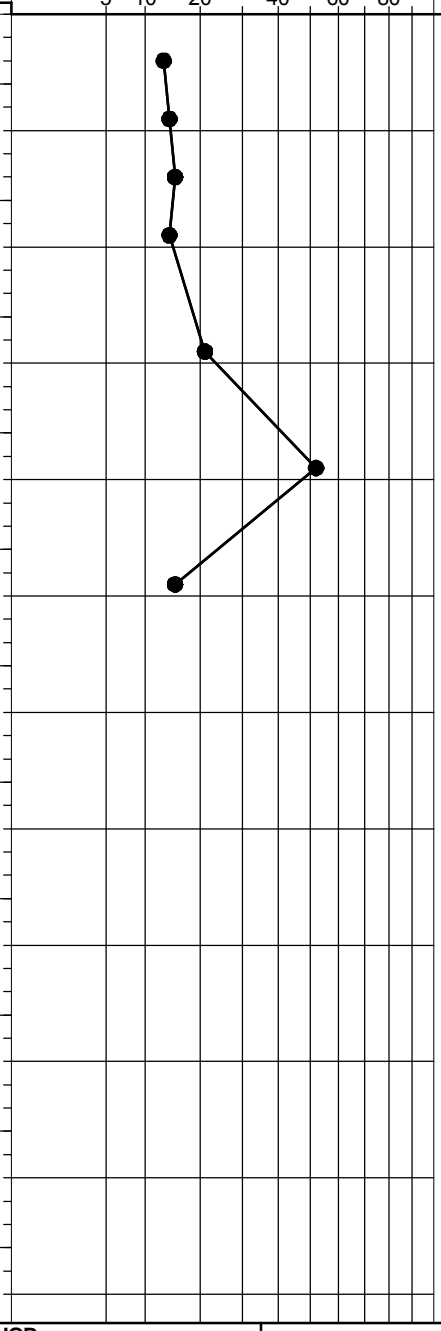
Drilling Equipment: TRUCK-MOUNTED CME 45 Drilling Method: HSA - AUTOMATIC HAMMER

Core Boxes: N/A Samples: 7 Overburden (ft): N/A Rock (ft): N/A Total Depth (ft): 25.0

Logged By: NR Date Drilled: 10/3/16

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			RESIDUUM: Medium dense and very dense pink and brown silty medium to fine **SAND** (micaceous) **SM**	933.0	
		SS				930	13
5		SS					14
		SS				925	15
10		SS					14
						920	
15		SS					21
						915	
20		SS					52
						910	
25		SS					15
					Boring was terminated at 25 feet below the existing ground surface.	905	
30					Groundwater was not encountered at the time of boring completion.		
						900	
35							
						895	
40							
						890	
45							
						885	
50							
						880	
55							

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-3**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-4**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **952.00** Station: **14+65**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 7"	952.0		
					GRADED AGGREGATE BASE = 10" GAB			
		SS			RESIDUUM: Firm pink and brown medium to fine sandy **SILT** (micaceous) ML	950		8
5		SS						8
		SS				945		8
10		SS						8
					Boring was terminated at 10 feet below the existing ground surface.	940		
15					Groundwater was not encountered at the time of boring completion.			
						935		
20						930		
25						925		
30						920		
35						915		
40						910		
45						905		
50						900		
55								

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-4**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-5**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

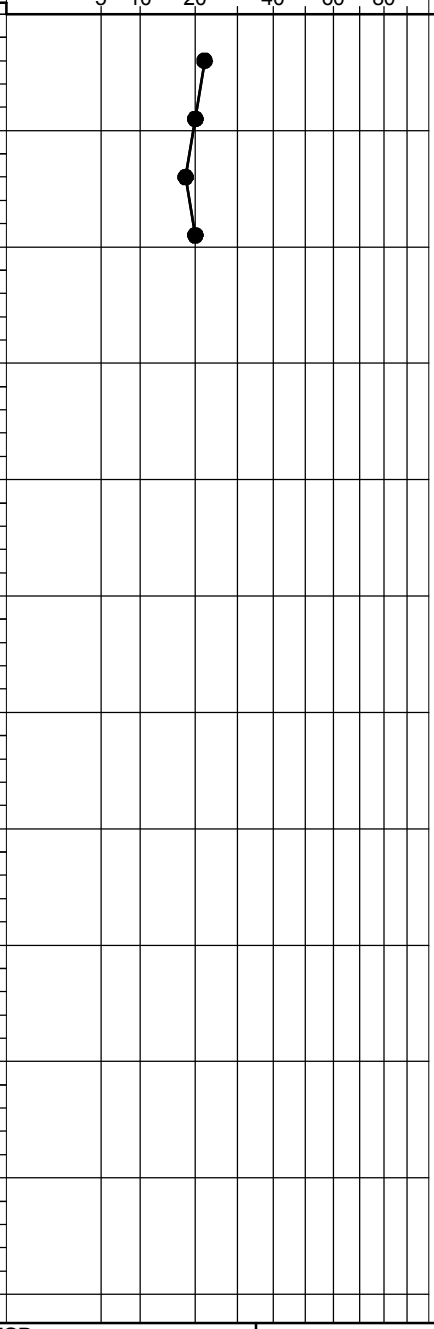
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **976.00** Station: **19+50**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					RESIDUUM: Medium dense orange and brown silty medium to fine **SAND** (very micaceous) **SM**	976.0		
		SS				975		22
5		SS						20
		SS				970		18
10		SS						20
					Boring was terminated at 10 feet below the existing ground surface.	965		
15					Groundwater was not encountered at the time of boring completion.	960		
20						955		
25						950		
30						945		
35						940		
40						935		
45						930		
50						925		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-5**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-6**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **990.00** Station: **23+50**

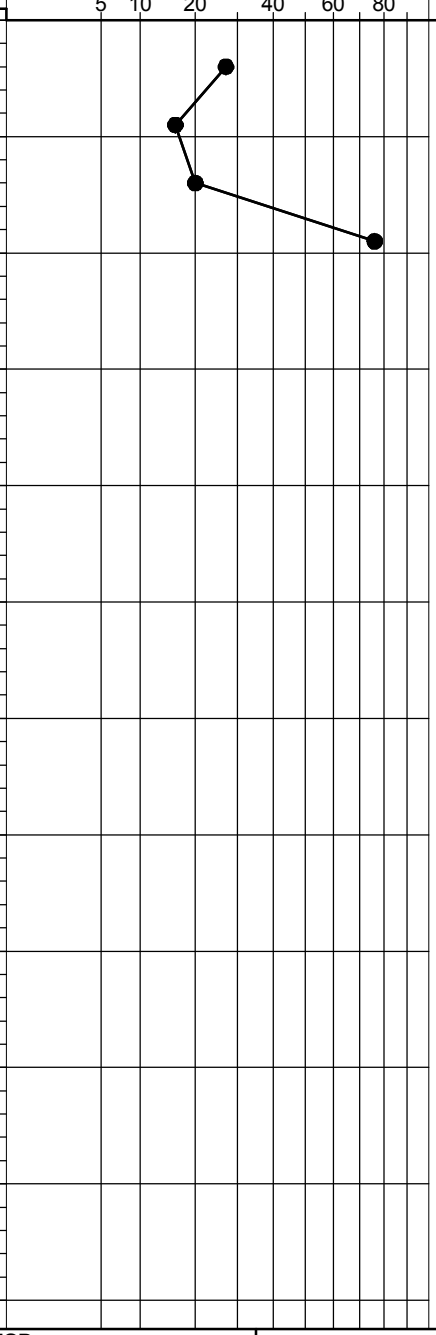
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					ASPHALT = 8"	990.0	
		SS			GRADED AGGREGATE BASE = 2" (GAB)		27
		SS			RESIDUUM: Very stiff to very hard pink and brown medium to fine sandy **SILT** (micaceous) (ML)	985	16
5		SS					20
		SS				980	76
10					Boring was terminated at 10 feet below the existing ground surface.		
					Groundwater was not encountered at the time of boring completion.		
15						975	
20						970	
25						965	
30						960	
35						955	
40						950	
45						945	
50						940	
55						935	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-6**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-7**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

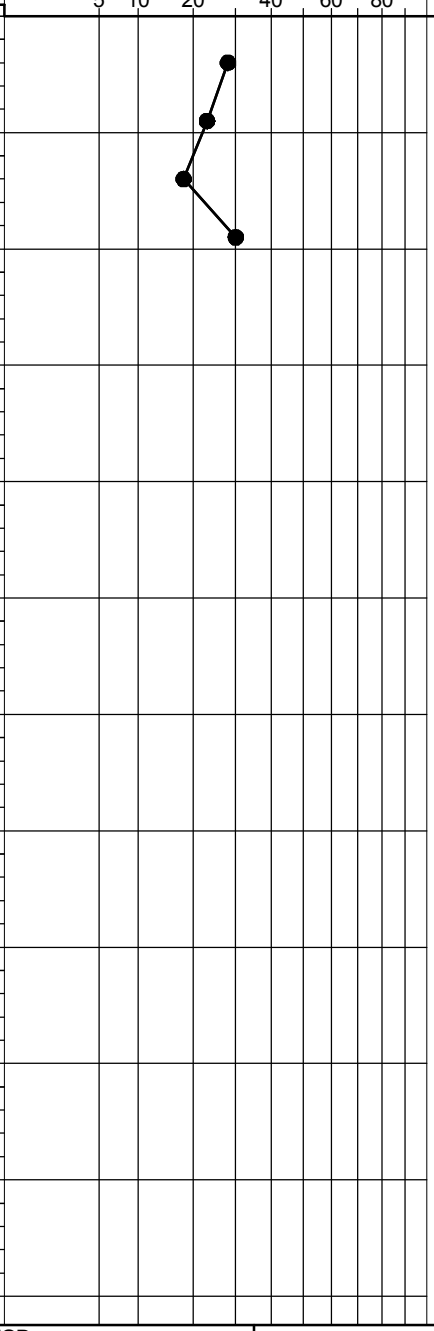
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **981.00** Station: **28+00**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 7"	981.0		
					GRADED AGGREGATE BASE = 2" GAB SM	980		
		SS			RESIDUUM: Medium dense red and brown silty medium to fine **SAND** (micaceous)			28
5		SS				975		23
		SS						18
10		SS						30
					Boring was terminated at 10 feet below the existing ground surface.	970		
15					Groundwater was not encountered at the time of boring completion.	965		
20						960		
25						955		
30						950		
35						945		
40						940		
45						935		
50						930		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-7**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-8**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **969.00** Station: **33+50**

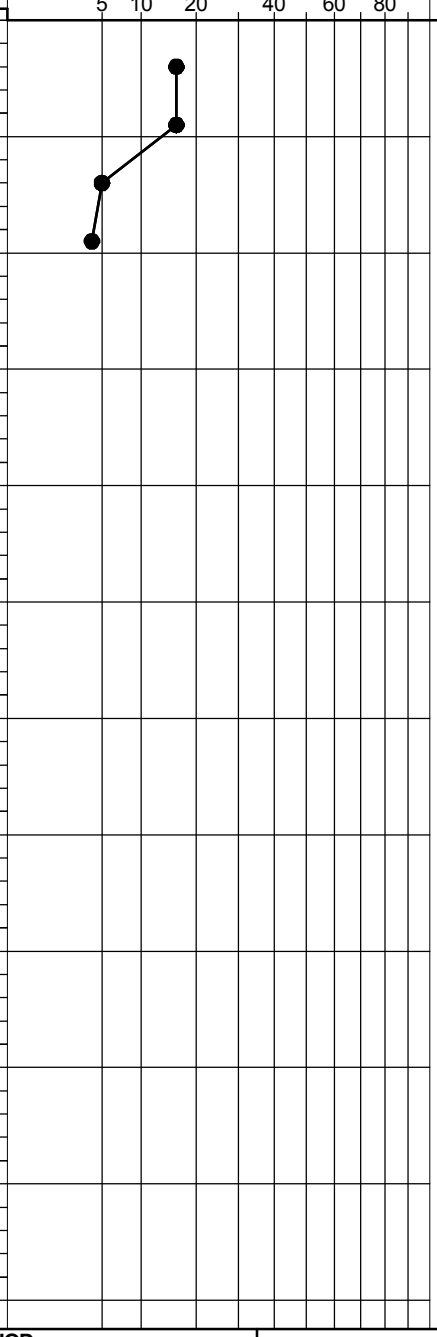
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 6"	GAB	969.0	
		SS			GRADED AGGREGATE BASE = 4"	SM		16
					FILL: Medium dense orange and brown silty medium to fine **SAND**	CL	965	16
5		SS						
		SS			ALLUVIUM: Very stiff to soft red and brown medium to fine sandy **CLAY**			5
		SS					960	4
10					Boring was terminated at 10 feet below the existing ground surface.			
					Groundwater was not encountered at the time of boring completion.		955	
15								
							950	
20								
							945	
25								
							940	
30								
							935	
35								
							930	
40								
							925	
45								
							920	
50								
							915	
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-8**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-9**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **939.00** Station: **39+50**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 3"	CL	939.0		
		SS			FILL: Firm gray and brown medium to fine sandy **CLAY** with organics (slightly micaceous)				8
5		SS					935		6
					ALLUVIUM: Very soft gray and brown medium to fine sandy **CLAY**	CL			
		SS							1
10		SS					930		1
					Boring was terminated at 10 feet below the existing ground surface.				
15					Groundwater was not encountered at the time of boring completion.		925		
20							920		
25							915		
30							910		
35							905		
40							900		
45							895		
50							890		
55							885		

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-9**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-10**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

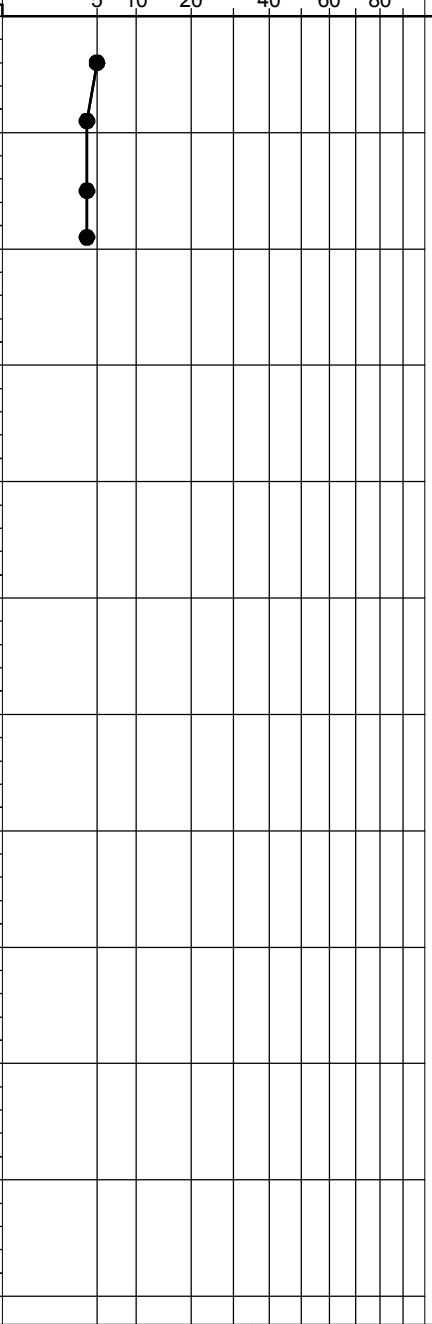
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **914.00** Station: **45+00**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 6"	CL	914.0		
		SS			FILL: Firm red and brown medium to fine sandy **CLAY** (slightly micaceous)	SC			5
5		SS			Very loose red clayey medium to fine **SAND** (slightly micaceous)	SM	910		4
		SS			ALLUVIUM: Very loose gray and brown silty medium to fine **SAND**				4
10		SS			Boring was terminated at 10 feet below the existing ground surface.		905		4
15					Groundwater was not encountered at the time of boring completion.		900		
20							895		
25							890		
30							885		
35							880		
40							875		
45							870		
50							865		
55							860		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-10**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-11**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **888.00** Station: **51+65**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **1** Samples: **4** Overburden (ft): **10** Rock (ft): **5** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **9/28/16**

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
				ASPHALT = 5"	SM	888.0	
	SS			FILL: Loose red and gray silty medium to fine **SAND** with rock fragments		885	7
5	SS						5
	SS			RESIDUUM: Very dense tan and brown (mottled black) silty medium to fine **SAND** with rock fragments	SM	880	55
	SS			PARTIALLY WEATHERED ROCK: Sampled as very dense tan and white (mottled black) silty medium to fine **SAND**	PWR		50/6"
10	NQ	97	72			875	
15				ROCK: Moderately hard medium to course grained light gray and black **GNEISS**		870	
20				Auger refusal was encountered at 10 feet below the existing ground surface. Coring was terminated at 15 feet below the existing ground surface.		865	
25				Groundwater was not encountered at the time of boring completion.		860	
30						855	
35						850	
40						845	
45						840	
50						835	
55							

STANDARD PENETRATION TEST DATA (blows/foot): 5, 10, 20, 40, 60, 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-11**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-12**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **886.50** Station: **53+00**

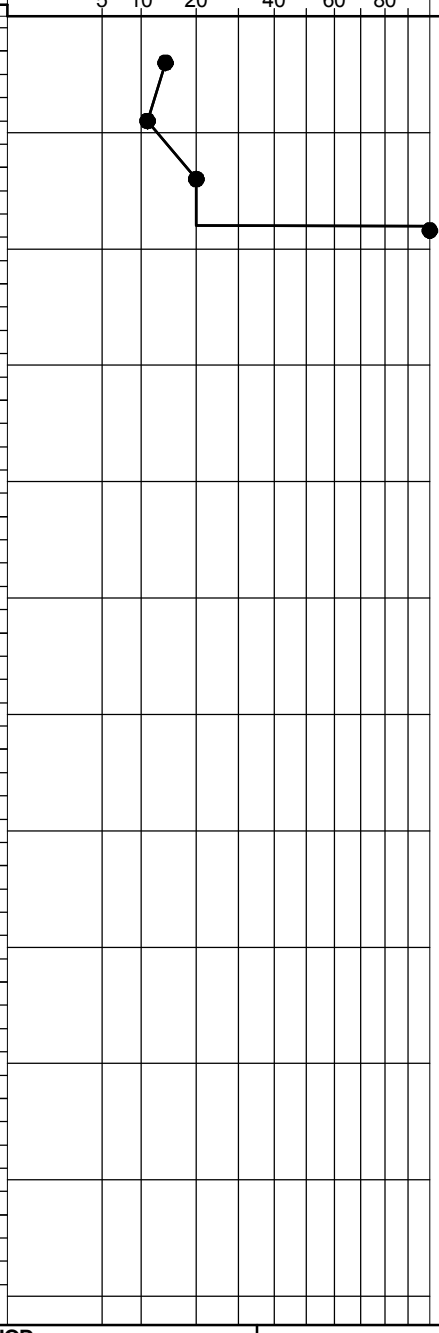
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **1** Samples: **4** Overburden (ft): **13** Rock (ft): **5** Total Depth (ft): **18.0**

Logged By: **ER** Date Drilled: **9/28/16**

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
				ASPHALT = 6"	SC	886.5	
	SS			RESIDUUM: Medium dense brown and red clayey medium to fine **SAND**		885	14
5	SS			- lens of white and tan sand			11
	SS					880	20
	SS			Medium dense tan and brown (mottled black) silty medium to fine **SAND** (slightly micaceous)	SM		50/5"
10				PARTIALLY WEATHERED ROCK: Sampled as very dense tan, gray, and white silty medium to fine **SAND** with rock fragments	PWR	875	
15	NQ	98	65	ROCK: Moderately hard medium to fine grained light gray and black **GNEISS**		870	
20				Auger refusal was encountered at 13 feet below the existing ground surface. Coring was terminated at 18 feet below the existing ground surface.		865	
25				Groundwater was not encountered at the time of boring completion.		860	
30						855	
35						850	
40						845	
45						840	
50						835	
55							

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-12**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-13**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **913.00** Station: **57+50**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/29/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 8"		913.0		
		SS			GRADED AGGREGATE BASE = 1"	GAB			77
					RESIDUUM: Very dense tan and white silty medium to fine **SAND** (slightly micaceous)	SM	910		
5		SS				PWR			50/5"
		SS			PARTIALLY WEATHERED ROCK: Sampled as very dense tan, white, and brown silty medium to fine **SAND** (micaceous)	SM	905		26
10		SS							54
					RESIDUUM: Medium dense to very dense tan, white, and brown silty medium to fine **SAND**		900		
15									
					Boring was terminated at 10 feet below the existing ground surface.		895		
20					Groundwater was not encountered at the time of boring completion.				
							890		
25									
							885		
30									
							880		
35									
							875		
40									
							870		
45									
							865		
50									
							860		
55									

Standard penetration test data scale: 5, 10, 20, 40, 60, 80 blows/foot.

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-13**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-14**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

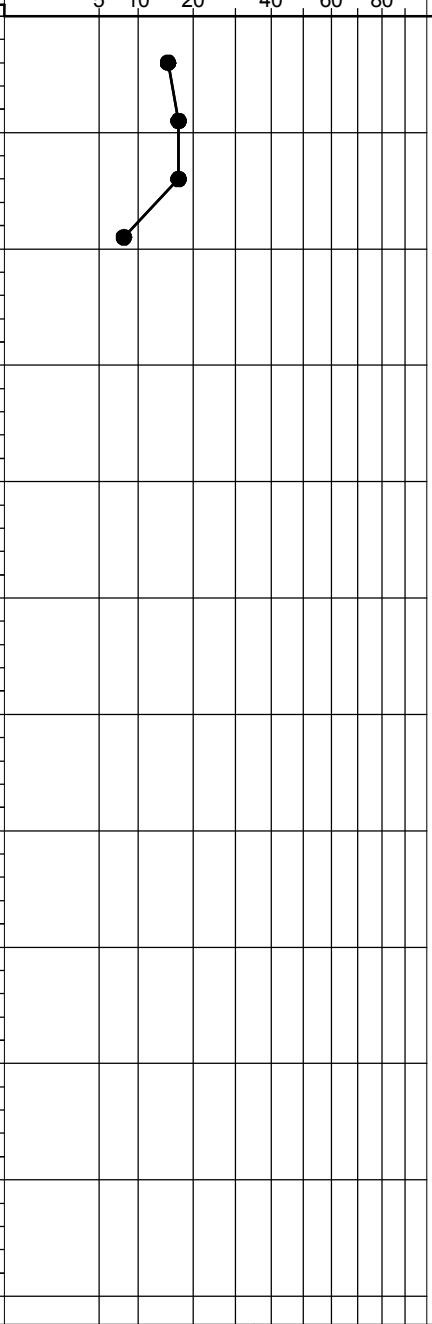
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **924.00** Station: **63+00**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/29/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 7"	GAB	924.0		
		SS			GRADED AGGREGATE BASE = 1"	SM			15
		SS			FILL: Medium dense tan and red silty medium to fine **SAND**	SM	920		17
5		SS			RESIDUUM: Medium dense tan, red, and brown silty medium to fine **SAND** (very micaceous)				17
		SS			Firm red and brown medium to fine sandy **CLAY** (slightly micaceous)	CL	915		8
10					Boring was terminated at 10 feet below the existing ground surface.		910		
15					Groundwater was not encountered at the time of boring completion.		905		
20							900		
25							895		
30							890		
35							885		
40							880		
45							875		
50							870		
55									



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-14**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-15**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **931.00** Station: **68+25**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/29/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 6"	931.0		
					GRADED AGGREGATE BASE = 1"	GAB		
					PARTIALLY WEATHERED ROCK: Sampled as very dense tan, white, and black silty medium to fine **SAND** (slightly micaceous)	PWR		
		SS				930		50/5"
		SS						50/5"
5		SS			- becomes very micaceous	925		50/5"
		SS						50/4"
10					Boring was terminated at 10 feet below the existing ground surface.	920		
15					Groundwater was not encountered at the time of boring completion.	915		
20						910		
25						905		
30						900		
35						895		
40						890		
45						885		
50						880		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-15**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-16**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **938.00** Station: **73+25**

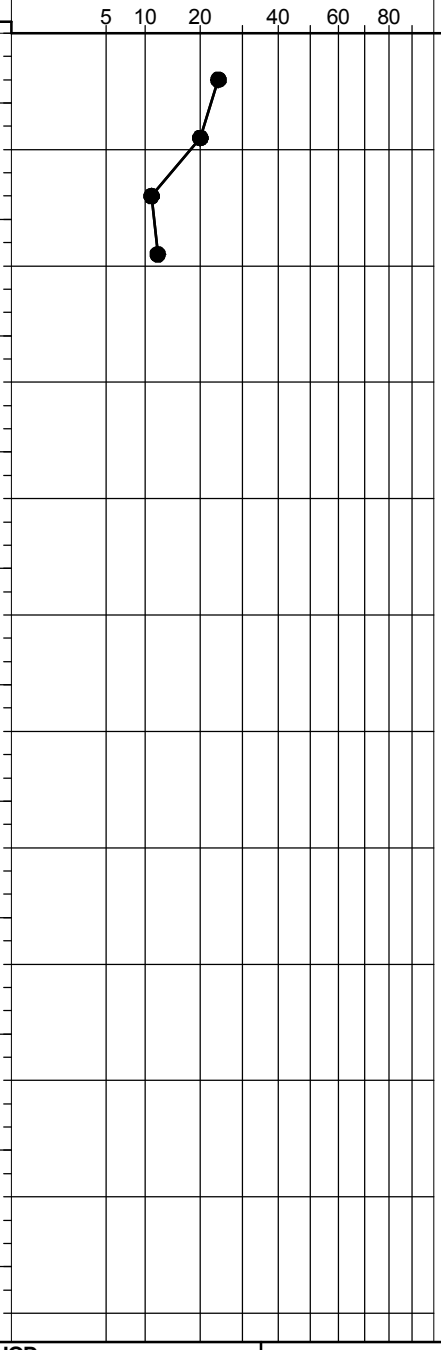
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/29/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					ASPHALT = 4" **SM**	938.0	
		SS			RESIDUUM: Medium dense brown, red, and tan silty medium to fine **SAND** (micaceous)	935	24
5		SS					20
		SS			Stiff tan and reddish-white medium to fine sandy **SILT** (micaceous) **ML**	930	11
10		SS					12
					Boring was terminated at 10 feet below the existing ground surface.	925	
15					Groundwater was not encountered at the time of boring completion.		
20						920	
25						915	
30						910	
35						905	
40						900	
45						895	
50						890	
55						885	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-16**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project:	Johns Creek Reuse Line and Boles Road Reuse Line	**HOLE No. B-17**	
Location:	Fulton County, Georgia	Sheet 1 of 1	
Project Number:	71.4152	Location:	SEE FIGURE 2

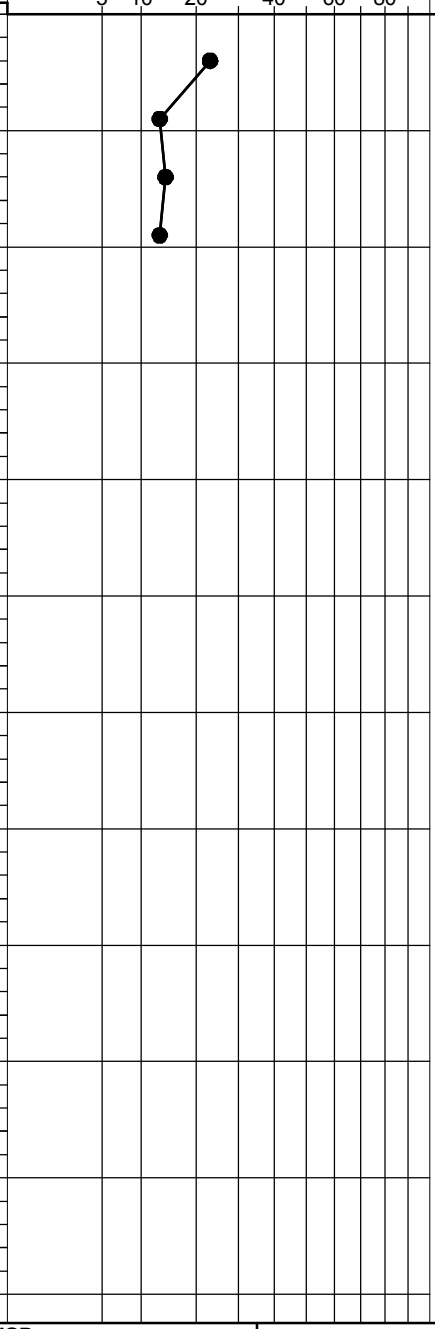
Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 948.00 Station: 78+65

Drilling Equipment: TRUCK-MOUNTED CME 45 Drilling Method: HSA - AUTOMATIC HAMMER

Core Boxes: N/A Samples: 4 Overburden (ft): N/A Rock (ft): N/A Total Depth (ft): 10.0

Logged By: ER Date Drilled: 9/29/16

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 4" SM	948.0		
		SS			RESIDUUM: Medium dense tan, red, and brown silty medium to fine **SAND** (micaceous)	945		23
5		SS						13
		SS				940		14
10		SS						13
					Boring was terminated at 10 feet below the existing ground surface.	935		
15					Groundwater was not encountered at the time of boring completion.			
20						930		
						925		
25								
						920		
30								
						915		
35								
						910		
40								
						905		
45								
						900		
50								
						895		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-17**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-18**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **961.00** Station: **84+00**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

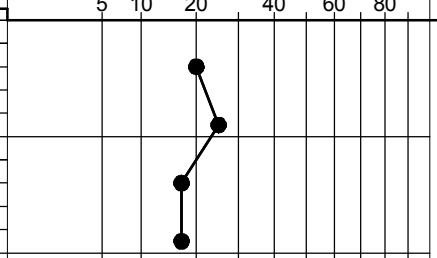
Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/29/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
0					ASPHALT = 4"	961.0	
					GRADED AGGREGATE BASE = 8"	960.9	
		SS			RESIDUUM: Very stiff red and tan medium to fine sandy **CLAY** (slightly micaceous)	960	20
5		SS				955	25
		SS					17
10		SS					17
					Boring was terminated at 10 feet below the existing ground surface.	950	
					Groundwater was not encountered at the time of boring completion.		
15						945	
20						940	
25						935	
30						930	
35						925	
40						920	
45						915	
50						910	
55							

GAB
CL

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-18**

SPTN LOGS.GPJ 10/26/16

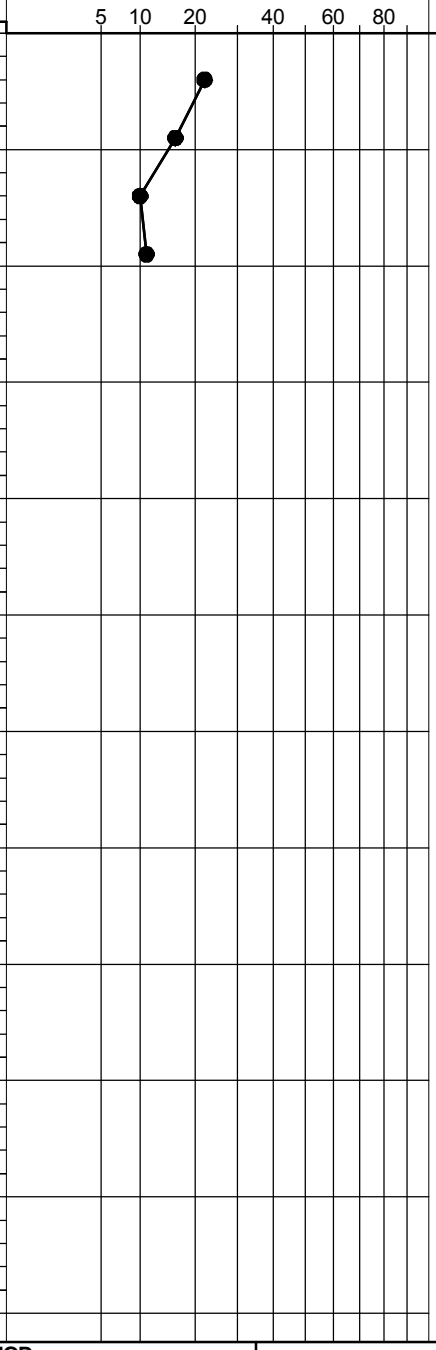
WILLMER Engineering

Project:	**Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-19**	
Location:	**Fulton County, Georgia**	Sheet 1 of 1	
Project Number:	**71.4152**	Location:	**SEE FIGURE 2**

Azimuth:	--	Angle from Horizontal:	**90**	Surface Elevation (ft):	**969.00**	Station:	**89+00**
Drilling Equipment:	**TRUCK-MOUNTED CME 45**			Drilling Method:	**HSA - AUTOMATIC HAMMER**		
Core Boxes:	**N/A**	Samples:	**4**	Overburden (ft):	**N/A**	Rock (ft):	**N/A**	Total Depth (ft): **10.0**
Logged By:	**ER**			Date Drilled:	**9/29/16**		

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					ASPHALT = 6"	969.0	
		SS			RESIDUUM: Medium dense and loose brown, tan, and white silty medium to fine **SAND** (slightly micaceous) **SM**		22
5		SS				965	16
		SS					10
10		SS				960	11
					Boring was terminated at 10 feet below the existing ground surface.		
					Groundwater was not encountered at the time of boring completion.		
15						955	
20						950	
25						945	
30						940	
35						935	
40						930	
45						925	
50						920	
55						915	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-19**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-20**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **985.00** Station: **94+25**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/29/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					FILL: Medium dense red and brown clayey medium to fine **SAND**	SC	985.0		
		SS							15
		SS							17
5					RESIDUUM: Medium dense tan and white silty medium to fine **SAND**	SM	980		
		SS				PWR			50/6"
		SS			PARTIALLY WEATHERED ROCK: Sampled as very dense tan and white silty medium to fine **SAND** (micaceous)				50/4"
10					- becomes brown, black, and tan		975		
					Boring was terminated at 10 feet below the existing ground surface.				
15					Groundwater was not encountered at the time of boring completion.		970		
20							965		
25							960		
30							955		
35							950		
40							945		
45							940		
50							935		
55							930		

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-20**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-21**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

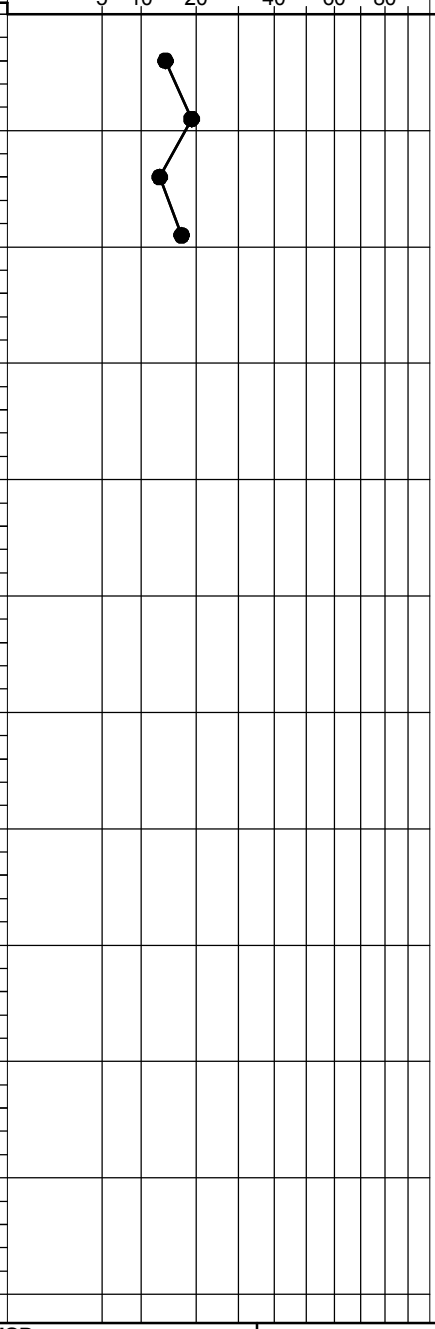
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1017.00** Station: **99+50**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/29/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 4" SM	1017.0		
		SS			RESIDUUM: Medium dense tan, red, and white silty medium to fine **SAND** (slightly micaceous) SC	1015		14
5		SS						19
		SS			Medium dense red and tan clayey medium to fine **SAND** (slightly micaceous)	1010		13
10		SS						17
					Boring was terminated at 10 feet below the existing ground surface.	1005		
15					Groundwater was not encountered at the time of boring completion.			
						1000		
20								
						995		
25								
						990		
30								
						985		
35								
						980		
40								
						975		
45								
						970		
50								
						965		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-21**

WILLMER Engineering

Project:	Johns Creek Reuse Line and Boles Road Reuse Line	**HOLE No. B-22**	
Location:	Fulton County, Georgia	Sheet 1 of 1	
Project Number:	71.4152	Location:	SEE FIGURE 2

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 1037.00 Station: 104+75

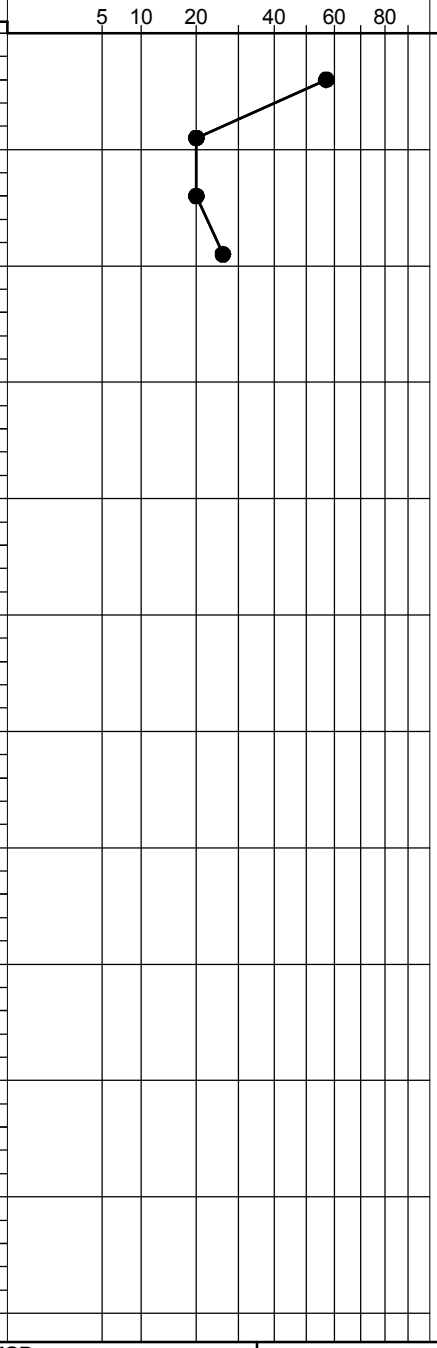
Drilling Equipment: TRUCK-MOUNTED CME 45 Drilling Method: HSA - AUTOMATIC HAMMER

Core Boxes: N/A Samples: 4 Overburden (ft): N/A Rock (ft): N/A Total Depth (ft): 10.0

Logged By: ER Date Drilled: 9/30/16

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 4"	GAB	1037.0	
		SS			GRADED AGGREGATE BASE = 8"	SM	1035	57
5		SS			RESIDUUM: Very dense to Medium dense reddish-gray silty medium to fine **SAND** (slightly micaceous)	CL		20
		SS			Very stiff red and tan medium to fine sandy **CLAY** (slightly micaceous)		1030	20
10		SS						26
					Boring was terminated at 10 feet below the existing ground surface.		1025	
15					Groundwater was not encountered at the time of boring completion.			
20							1020	
							1015	
25								
							1010	
30								
							1005	
35								
							1000	
40								
							995	
45								
							990	
50								
							985	
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-22**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-23**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1056.00** Station: **109+98**

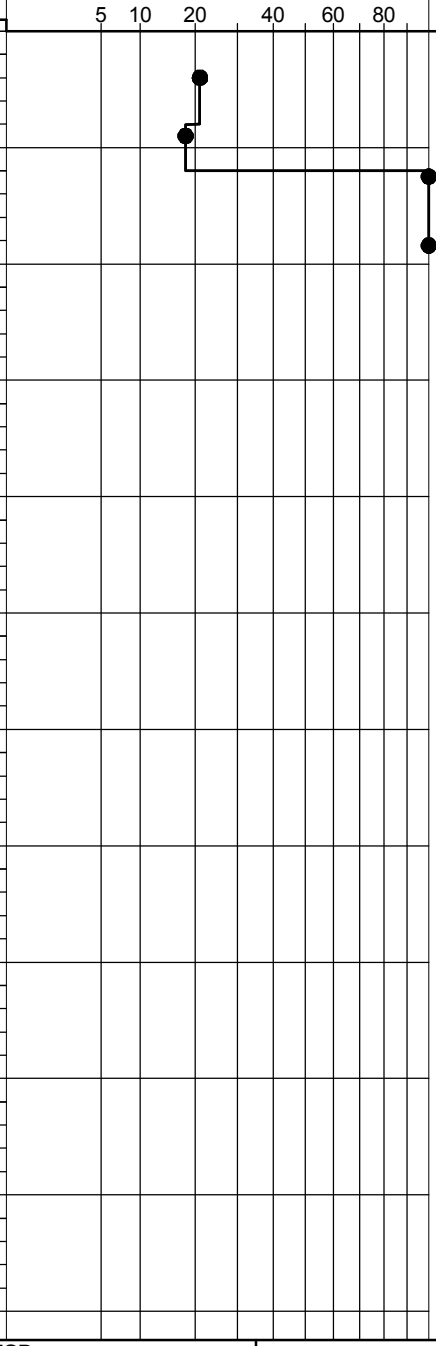
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
				ASPHALT = 6"	SM	1056.0	
	SS			FILL: Medium dense tan and brown silty medium to fine **SAND** (slightly micaceous)	SM	1055	21
5	SS						18
	SS			RESIDUUM: Medium dense tan and brown silty medium to fine **SAND**	PWR	1050	50/6"
	SS			PARTIALLY WEATHERED ROCK: Sampled as very dense tan, white, and brown silty medium to fine **SAND** (very micaceous)			50/5"
10						1045	
				Boring was terminated at 10 feet below the existing ground surface.			
15						1040	
				Groundwater was not encountered at the time of boring completion.			
20						1035	
25						1030	
30						1025	
35						1020	
40						1015	
45						1010	
50						1005	
55							

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-23**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-24**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1046.00** Station: **114+75**

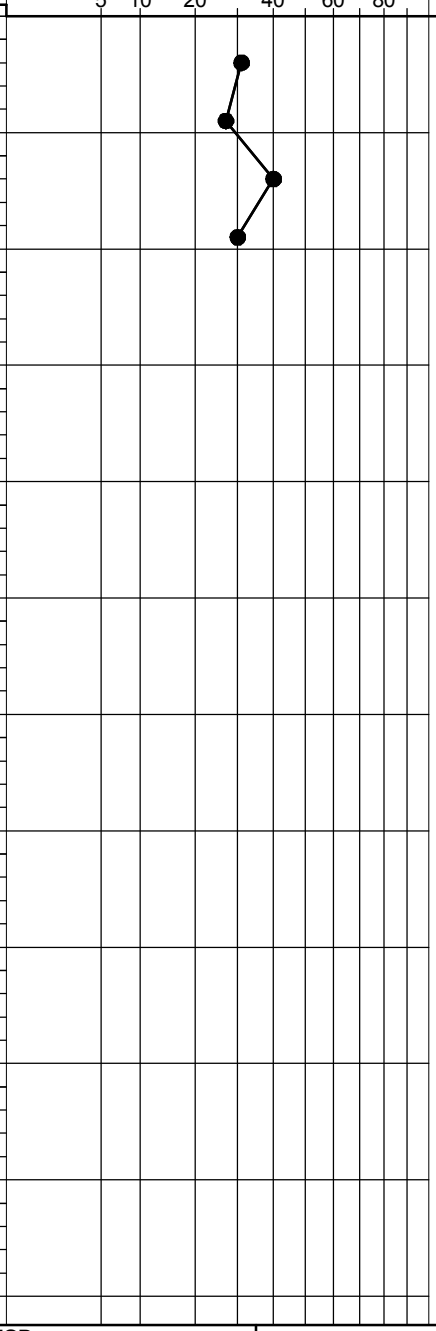
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 6"		1046.0	
		SS			GRADED AGGREGATE BASE = 1"	GAB	1045	31
		SS			RESIDUUM: Dense red, brown and white clayey medium to fine **SAND** (slightly micaceous)	SC / SM	1040	27
5		SS			Medium dense brown silty medium to fine **SAND**	CL	1035	40
10		SS			Hard to very stiff red and brown medium to fine sandy **CLAY** (slightly micaceous)		1030	30
15					Boring was terminated at 10 feet below the existing ground surface.		1025	
20					Groundwater was not encountered at the time of boring completion.		1020	
25							1015	
30							1010	
35							1005	
40							1000	
45							995	
50								
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-24**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-25**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1029.00** Station: **119+50**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 6"	1029.0		
		SS			GRADED AGGREGATE BASE = 1" (GAB)			50/5"
		SS			PARTIALLY WEATHERED ROCK (PWR): Sampled as very dense tan, orange, and white silty medium to fine **SAND** (micaceous)	1025		50/4"
5		SS						50/1"
		SS			- becomes brown, tan, and black (very micaceous)	1020		50/5"
10					Boring was terminated at 10 feet below the existing ground surface.			
15					Groundwater was not encountered at the time of boring completion.	1015		
20						1010		
25						1005		
30						1000		
35						995		
40						990		
45						985		
50						980		
55						975		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-25**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-26**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

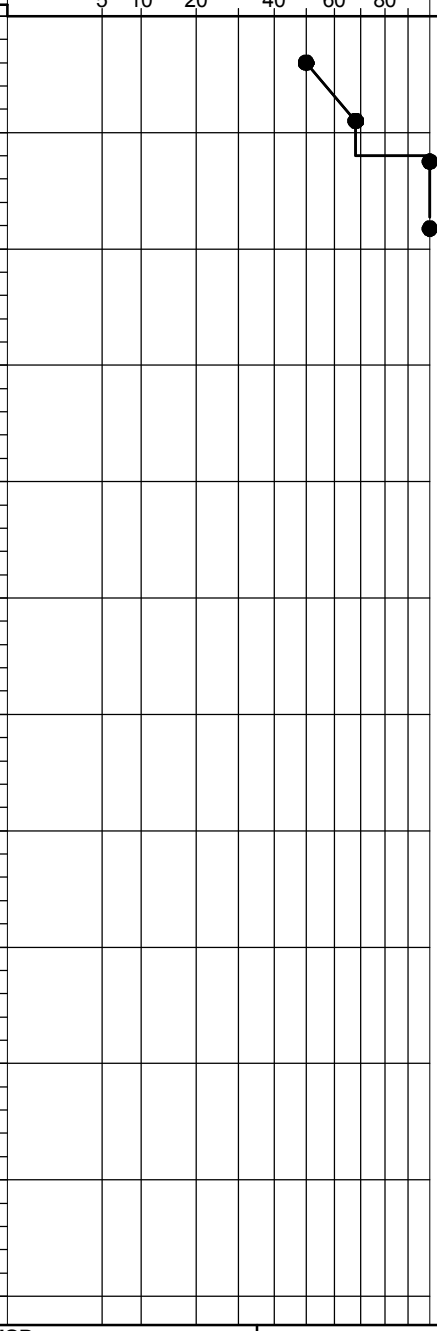
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1030.00** Station: **125+75**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 3" **SM**	1030.0		
		SS			RESIDUUM: Very dense reddish-pink and tan silty medium to fine **SAND** (micaceous)			50
5		SS				1025		68
		SS			PARTIALLY WEATHERED ROCK: Sampled as very dense brown, tan, and white silty medium to fine **SAND** (micaceous) **PWR**			50/6"
		SS						50/3"
10						1020		
					Boring was terminated at 10 feet below the existing ground surface.			
15					Groundwater was not encountered at the time of boring completion.	1015		
20						1010		
25						1005		
30						1000		
35						995		
40						990		
45						985		
50						980		
55						975		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-26**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-27**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1055.00** Station: **131+00**

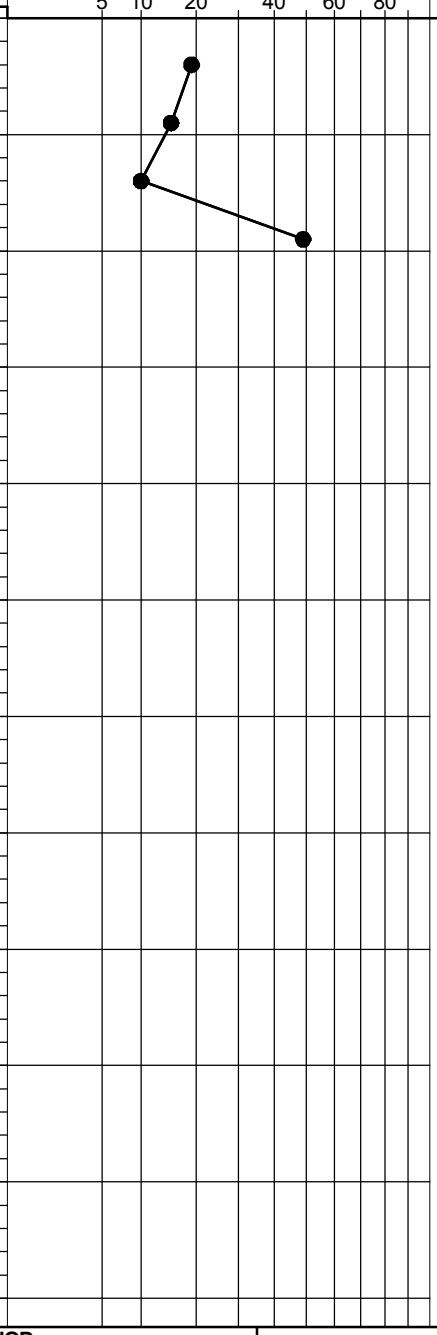
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 6"	GAB	1055.0	
		SS			GRADED AGGREGATE BASE = 1"	SM		19
		SS			RESIDUUM: Medium dense tan, red, and brown silty medium to fine **SAND** (slightly micaceous)	SC	1050	15
5		SS			Loose red and brown clayey medium to fine **SAND** (slightly micaceous)	SM		10
		SS			Dense tan, gray, and white silty medium to fine **SAND** (micaceous)		1045	49
10					Boring was terminated at 10 feet below the existing ground surface.			
15					Groundwater was not encountered at the time of boring completion.		1040	
20							1035	
25							1030	
30							1025	
35							1020	
40							1015	
45							1010	
50							1005	
55							1000	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-27**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-28**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1080.00** Station: **136+25**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 8"		1080.0		
		SS			GRADED AGGREGATE BASE = 4"	GAB			15
		SS			RESIDUUM: Stiff to very stiff red and tan medium to fine sandy **CLAY** (micaceous)	CL	1075		17
5		SS			Medium dense tan, gray and brown silty medium to fine **SAND** (micaceous)	SM			14
10		SS			PARTIALLY WEATHERED ROCK: Sampled as very dense tan and white (mottled black) silty medium to fine **SAND** (micaceous)	PWR	1070		50/5"
15					Boring was terminated at 10 feet below the existing ground surface.		1065		
20					Groundwater was not encountered at the time of boring completion.		1060		
25							1055		
30							1050		
35							1045		
40							1040		
45							1035		
50							1030		
55							1025		

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-28**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-29**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1095.00** Station: **141+50**

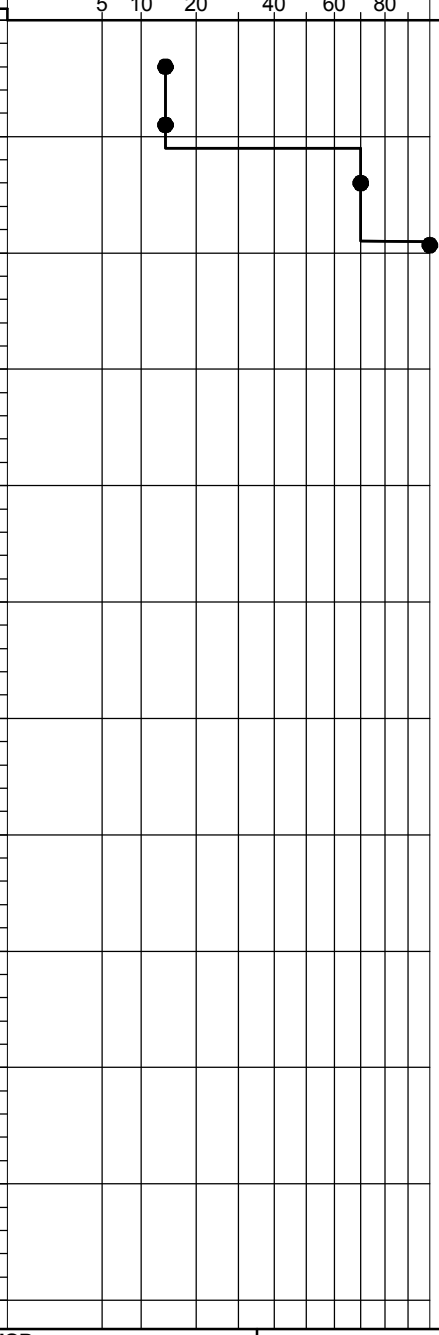
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **9/30/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 6"	SM	1095.0	
		SS			FILL: Medium dense brown silty medium to fine **SAND** (slightly micaceous)			14
5		SS					1090	14
		SS			RESIDUUM: Very dense reddish-brown and tan silty medium to fine **SAND** (slightly micaceous)	SM		70
10		SS			PARTIALLY WEATHERED ROCK: Sampled as very dense reddish-brown and tan silty medium to fine **SAND** (micaceous)	PWR	1085	50/4"
15					Boring was terminated at 10 feet below the existing ground surface.		1080	
20					Groundwater was not encountered at the time of boring completion.		1075	
25							1070	
30							1065	
35							1060	
40							1055	
45							1050	
50							1045	
55							1040	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-29**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-30**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1039.00** Station: **196+70**

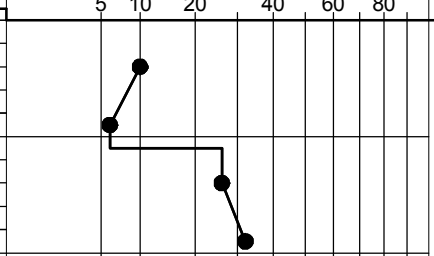
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 3"	GAB	1039.0	
		SS			GRADED AGGREGATE BASE = 4"	CL		10
		SS			FILL: Stiff to firm red and brown medium to fine sandy **CLAY**		1035	6
5		SS			RESIDUUM: Medium dense to dense red and brown silty medium to fine **SAND** (micaceous)	SM		26
		SS					1030	32
10					Boring was terminated at 10 feet below the existing ground surface.			
					Groundwater was not encountered at the time of boring completion.		1025	
15								
20							1020	
25							1015	
30							1010	
35							1005	
40							1000	
45							995	
50							990	
55							985	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

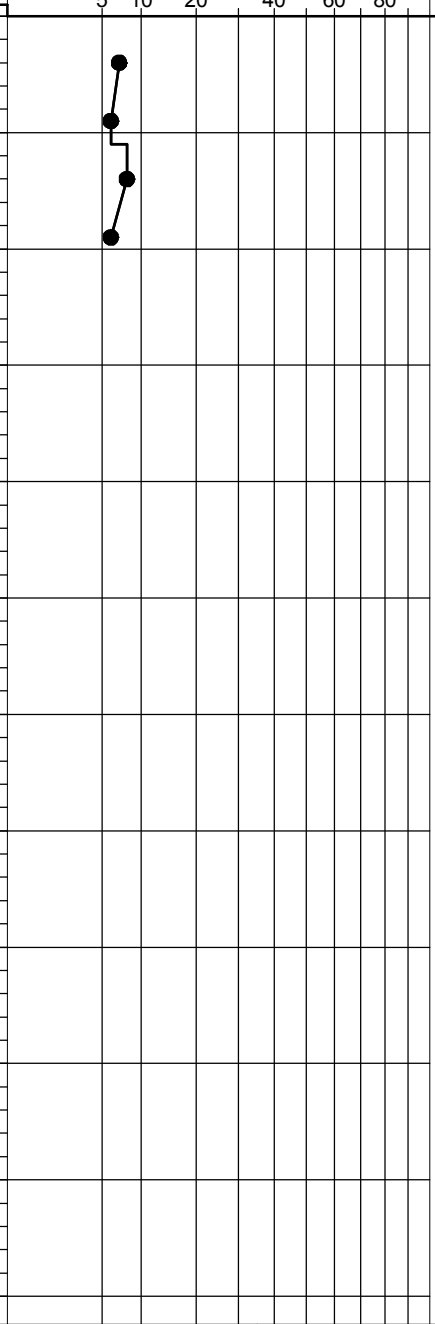
Hole No. **B-30**

WILLMER Engineering

Project:	Johns Creek Reuse Line and Boles Road Reuse Line	**HOLE No. B-30B**	
Location:	Fulton County, Georgia	Sheet 1 of 1	
Project Number:	71.4152	Location:	SEE FIGURE 2

Azimuth:	--	Angle from Horizontal:	90	Surface Elevation (ft):	1025.00	Station:	198+60
Drilling Equipment:	TRUCK-MOUNTED CME 45			Drilling Method:	HSA - AUTOMATIC HAMMER		
Core Boxes:	N/A	Samples:	4	Overburden (ft):	N/A	Rock (ft):	N/A	Total Depth (ft):	10.0
Logged By:	NR			Date Drilled:	10/3/16		

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 3"	GAB	1025.0		
		SS			GRADED AGGREGATE BASE = 4"	CL			7
		SS			FILL: Firm red and brown medium to fine sandy **CLAY** (slightly micaceous)		1020		6
5		SS			RESIDUUM: Firm gray medium to fine sandy **CLAY** (micaceous)	CL			8
		SS			Firm brown, tan, and red medium to fine sandy **CLAY**	CL	1015		6
10					Boring was terminated at 10 feet below the existing ground surface.				
15					Groundwater was not encountered at the time of boring completion.		1010		
20							1005		
25							1000		
30							995		
35							990		
40							985		
45							980		
50							975		
55							970		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-30B**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-31**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1004.00** Station: **201+27**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			RESIDUUM: Stiff to firm red and gray medium to fine sandy **CLAY** (micaceous)	CL	1004.0		9
		SS					1000		7
5		SS			RESIDUUM: Medium dense red and brown silty medium to fine **SAND** (micaceous)	SM			14
		SS					995		18
10					Boring was terminated at 10 feet below the existing ground surface.				
					Groundwater was not encountered at the time of boring completion.		990		
15									
							985		
20									
							980		
25									
							975		
30									
							970		
35									
							965		
40									
							960		
45									
							955		
50									
							950		
55									

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-31**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-32**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **983.00** Station: **205+70**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 3"	GAB	983.0		
		SS			GRADED AGGREGATE BASE = 3"	CL	980		7
5		SS			FILL: Firm to stiff red and brown medium to fine sandy **CLAY** (micaceous)				11
		SS			RESIDUUM: Loose pink and brown silty medium to fine **SAND** (micaceous)	SM	975		6
10		SS							6
					Boring was terminated at 10 feet below the existing ground surface.		970		
15					Groundwater was not encountered at the time of boring completion.				
20							965		
25							960		
30							955		
35							950		
40							945		
45							940		
50							935		
55							930		

STANDARD PENETRATION TEST DATA (blows/foot): 5, 10, 20, 40, 60, 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-32**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-33**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **975.00** Station: **210+00**

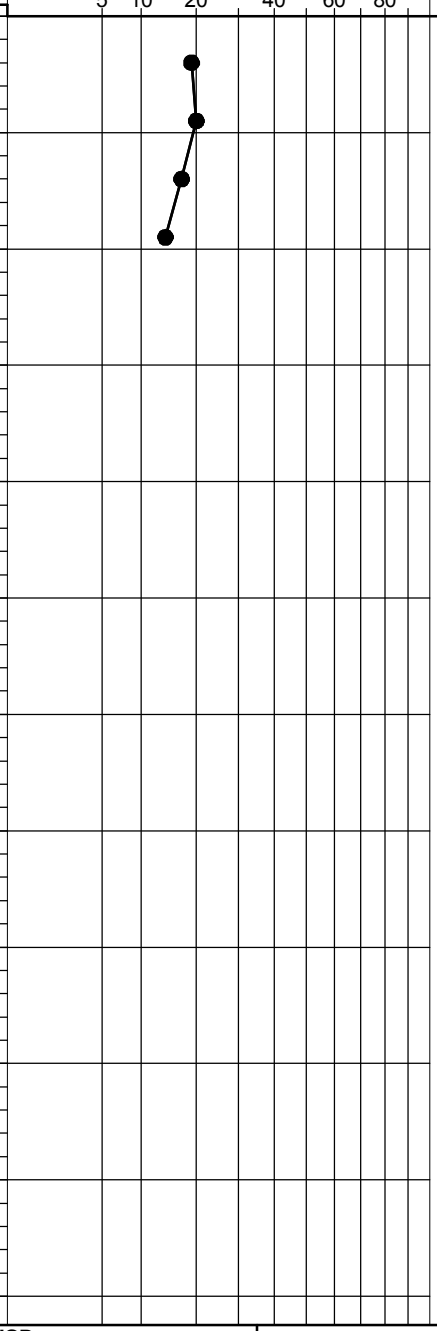
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/3/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 8"	SM	975.0	
		SS			RESIDUUM: Medium dense red and brown silty medium to fine **SAND** (micaceous)			19
5		SS					970	20
		SS			Very stiff to stiff red and brown medium to fine sandy **CLAY** (micaceous)	CL		17
10		SS					965	14
					Boring was terminated at 10 feet below the existing ground surface.			
15					Groundwater was not encountered at the time of boring completion.		960	
20							955	
25							950	
30							945	
35							940	
40							935	
45							930	
50							925	
55							920	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-33**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-34**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **913.00** Station: **2+00**

Drilling Equipment: **Hand-Auger** Drilling Method: **Hand-Auger**

Core Boxes: **N/A** Samples: Overburden: **N/A** Rock: **N/A** Total Depth (ft): **6.0**

Logged By: **DCP** Date Logged: **10/18/16**

VERTICAL DEPTH	GRAPHIC LOG	SAMPLE TYPE	RCD%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	DYNAMIC CONE PENETRATION TEST DATA (blows/1.75 inch increment) 5 10 20 40 60 80	BLOWS/1.75 IN.
					Topsoil = 8"	913.0		
1					RESIDUUM: Auger cuttings sampled as orange and tan silty medium to fine sand **SM**	912		
2								
3						910		
4								
5						908		
6					Boring was advanced using hand-auger. Boring was terminated at 6 feet below the existing ground surface. No groundwater was encountered at the time of boring completion.			

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-34**

A&PLOG LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-34B**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **929.00** Station: **6+00**

Drilling Equipment: **Hand-Auger** Drilling Method: **Hand-Auger**

Core Boxes: **N/A** Samples: Overburden: **N/A** Rock: **N/A** Total Depth (ft): **7.0**

Logged By: **DCP** Date Logged: **10/18/16**

VERTICAL DEPTH	GRAPHIC LOG	SAMPLE TYPE	RCD%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	DYNAMIC CONE PENETRATION TEST DATA (blows/1.75 inch increment) 5 10 20 40 60 80	BLOWS/1.75 IN.
					Topsoil = 6"	929.0		
1					RESIDUUM: Auger cuttings sampled as orange and tan silty medium to fine sand **SM**	928		
2								
3						926		
4								
5						924		
6								
7					Boring was advanced using hand-auger. Boring was terminated at 7 feet below the existing ground surface. No groundwater was encountered at the time of boring completion.	922		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-34B**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-35**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **934.00** Station: **8+50**

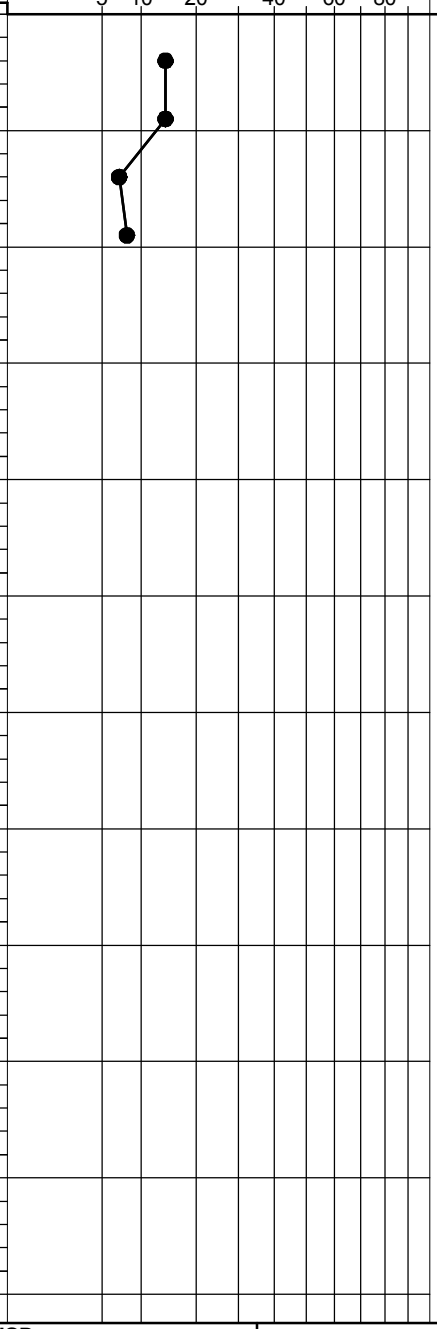
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
				ASPHALT = 6"	GAB	934.0	
	SS			GRADED AGGREGATE BASE = 4"	CL		14
	SS			FILL: Stiff dark gray medium to fine sandy **CLAY**	SM	930	14
5	SS			RESIDUUM: Medium dense orange and brown silty medium to fine **SAND**	CL		7
	SS			Firm gray and brown medium to fine sandy **CLAY**		925	8
10				Boring was terminated at 10 feet below the existing ground surface.			
15				Groundwater was not encountered at the time of boring completion.		920	
20						915	
25						910	
30						905	
35						900	
40						895	
45						890	
50						885	
55						880	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-35**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-36**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

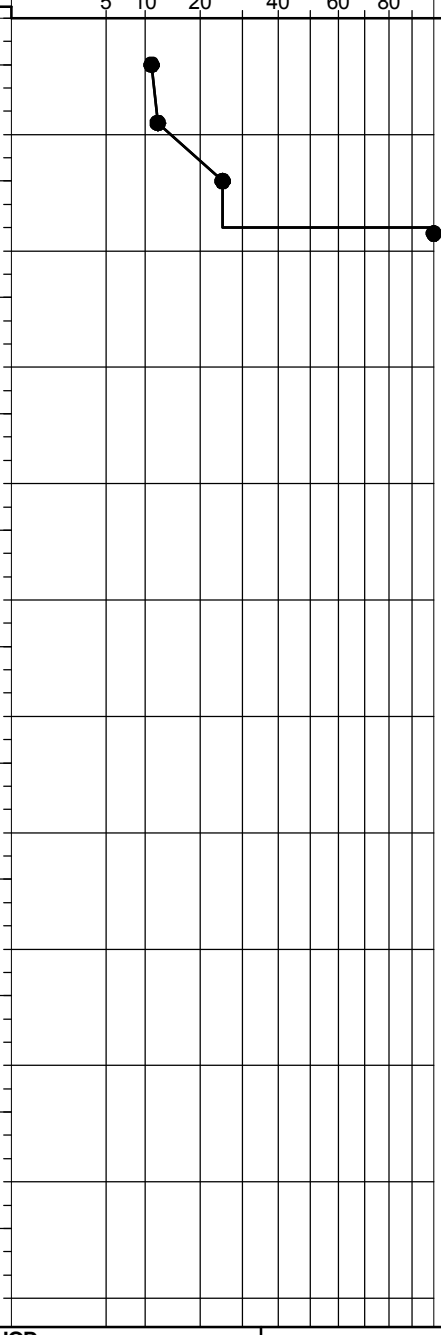
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **962.00** Station: **12+50**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 6"	GAB	962.0		
		SS			GRADED AGGREGATE BASE = 4"	SM	960		11
5		SS			RESIDUUM: Medium dense orange and tan silty medium to fine **SAND**		955		12
		SS							25
10		SS			PARTIALLY WEATHERED ROCK: Sampled as orange and tan silty medium to fine **SAND**	PWR	950		50/6"
15					Boring was terminated at 10 feet below the existing ground surface.		945		
20					Groundwater was not encountered at the time of boring completion.		940		
25							935		
30							930		
35							925		
40							920		
45							915		
50							910		
55									



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-36**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-37**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

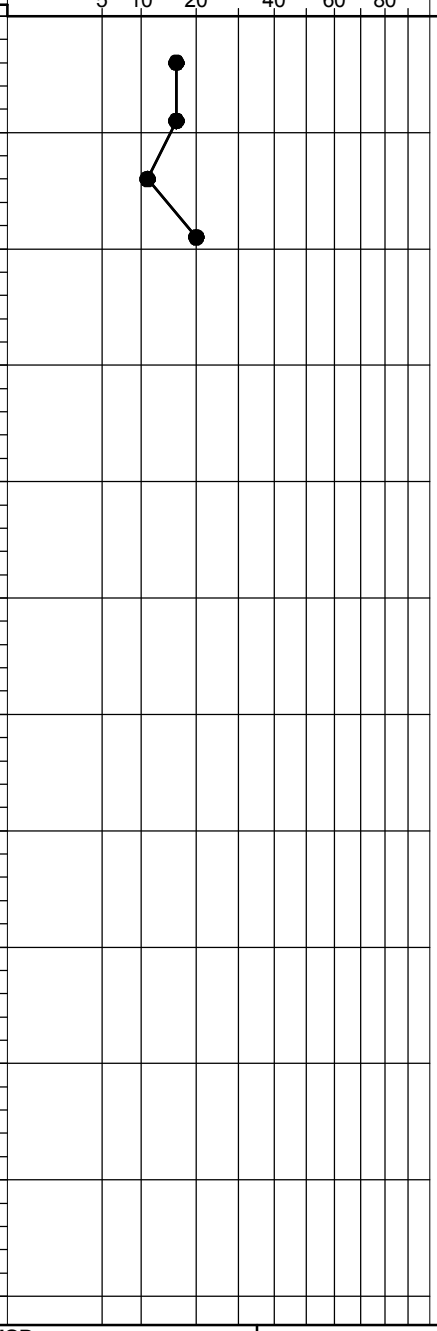
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **980.00** Station: **16+50**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 4"	GAB	980.0		
		SS			GRADED AGGREGATE BASE = 3"	SC			16
		SS			RESIDUUM: Medium dense orange and brown clayey medium to fine **SAND**	SM	975		16
5		SS			Medium dense orange and brown silty medium to fine **SAND**	CL			11
10		SS			Stiff to very stiff orange and brown medium to fine sandy **CLAY**		970		20
					Boring was terminated at 10 feet below the existing ground surface.				
15					Groundwater was not encountered at the time of boring completion.		965		
20							960		
25							955		
30							950		
35							945		
40							940		
45							935		
50							930		
55							925		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-37**

SPTN LOGS.GPJ 10/26/16

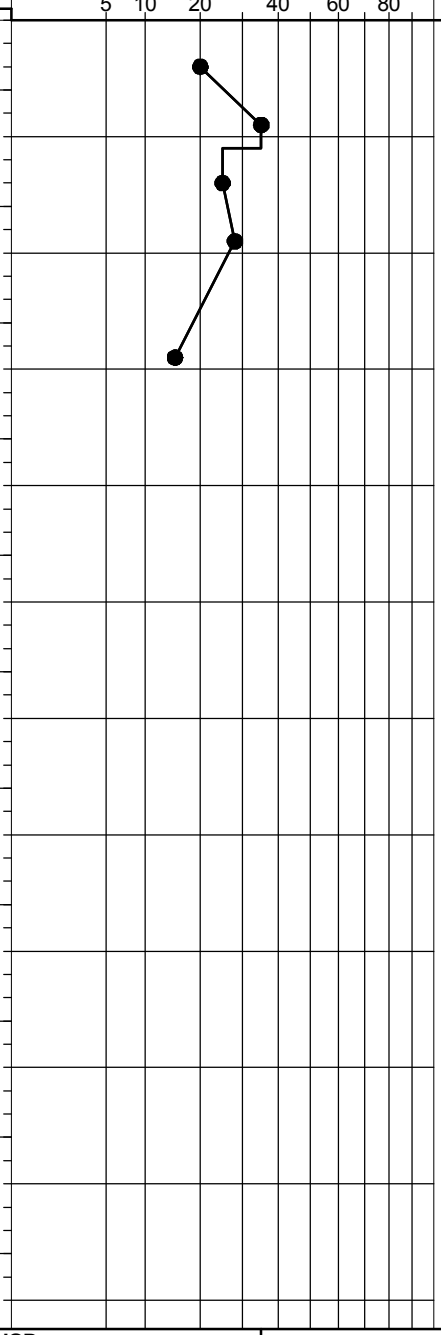
WILLMER Engineering

Project:	**Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-38**	
Location:	**Fulton County, Georgia**	Sheet 1 of 1	
Project Number:	**71.4152**	Location:	**SEE FIGURE 2**

Azimuth:	--	Angle from Horizontal:	**90**	Surface Elevation (ft):	**993.00**	Station:	**21+00**
Drilling Equipment:	**TRUCK-MOUNTED CME 45**			Drilling Method:	**HSA - AUTOMATIC HAMMER**		
Core Boxes:	**N/A**	Samples:	**5**	Overburden (ft):	**N/A**	Rock (ft):	**N/A**	Total Depth (ft): **15.0**
Logged By:	**NR**			Date Drilled:	**10/4/16**		

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
				ASPHALT = 6"	GAB	993.0	
	SS			GRADED AGGREGATE BASE = 3"	SM		20
	SS			FILL: Medium dense black and brown silty medium to fine **SAND**	CL	990	35
5	SS			Hard red and brown medium to fine sandy **CLAY** (micaceous)	SM		25
	SS			RESIDUUM: Medium dense tan and brown silty medium to fine **SAND** (micaceous)		985	28
10	SS					980	15
15				Boring was terminated at 15 feet below the existing ground surface.		975	
20				Groundwater was not encountered at the time of boring completion.		970	
25						965	
30						960	
35						955	
40						950	
45						945	
50						940	
55							

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-38**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-39**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1005.00** Station: **25+25**

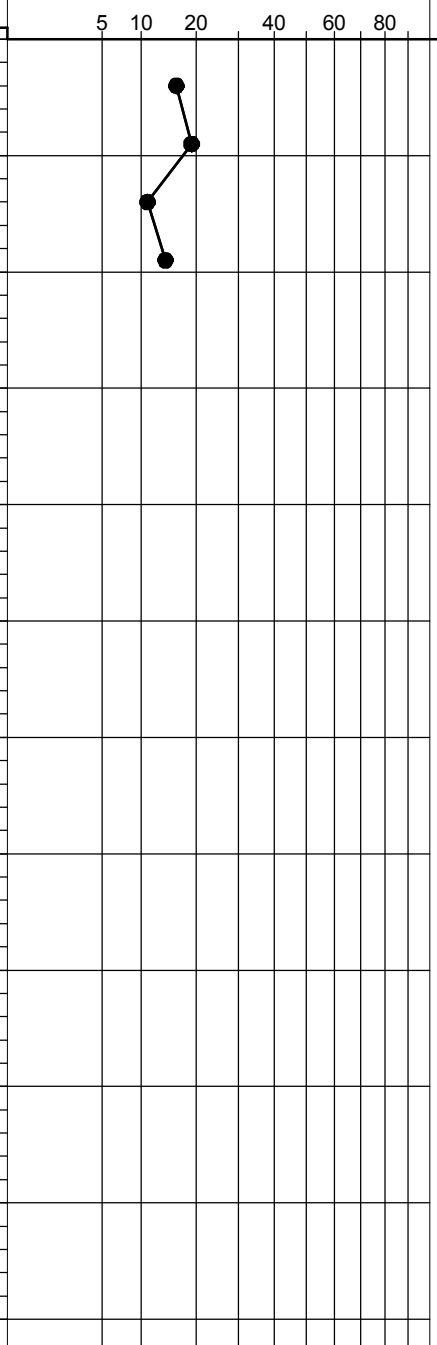
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 4"	GAB	1005.0	
		SS			GRADED AGGREGATE BASE = 3"	SC		16
		SS			RESIDUUM: Medium dense red and brown clayey medium to fine **SAND** (micaceous)	CL	1000	19
5		SS			Stiff red and brown medium to fine sandy **CLAY** (slightly micaceous)			11
		SS						14
10					Boring was terminated at 10 feet below the existing ground surface.		995	
					Groundwater was not encountered at the time of boring completion.			
15							990	
20							985	
25							980	
30							975	
35							970	
40							965	
45							960	
50							955	
55							950	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-39**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-40**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1011.00** Station: **28+96**

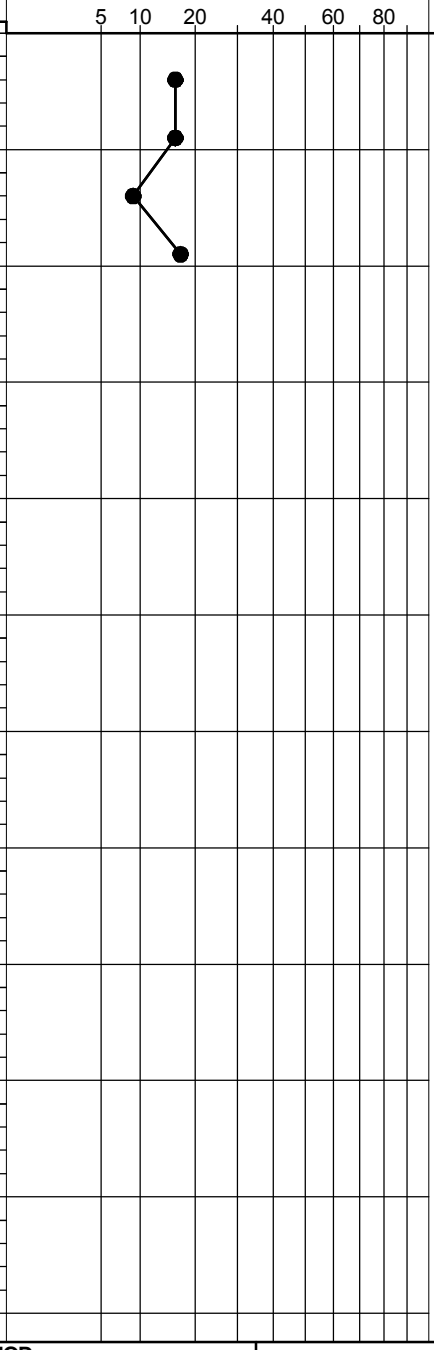
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					RESIDUUM: Medium dense red and brown clayey medium to fine **SAND** (micaceous)	SC	1011.0	
		SS					1010	16
		SS						16
5					Loose to medium dense tan and brown silty medium to fine **SAND** (micaceous)	CL	1005	
		SS						9
		SS						17
10					Boring was terminated at 10 feet below the existing ground surface.		1000	
					Groundwater was not encountered at the time of boring completion.			
15							995	
20							990	
25							985	
30							980	
35							975	
40							970	
45							965	
50							960	
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-40**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-41**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

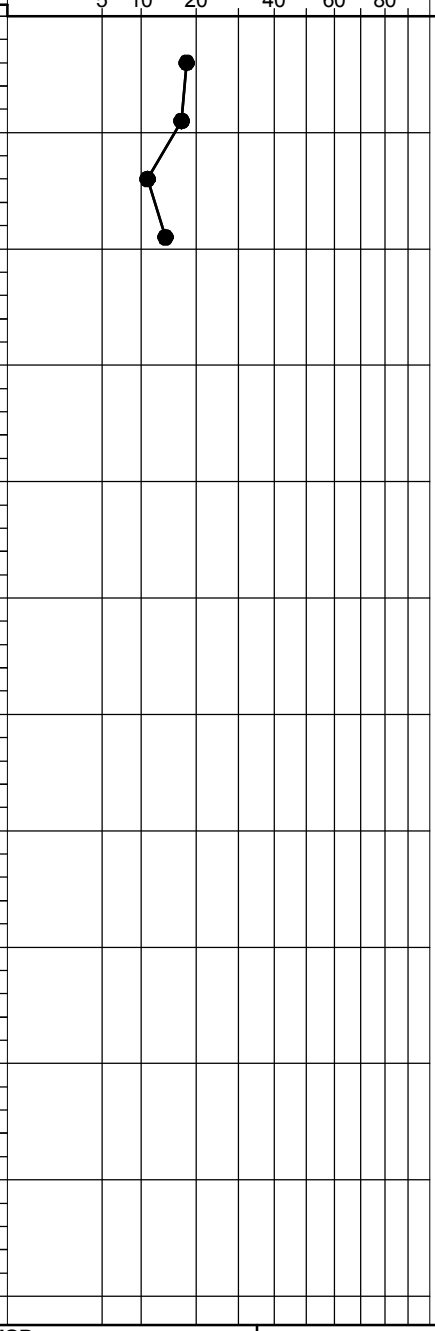
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **1003.00** Station: **33+75**

Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					ASPHALT = 5" GAB	1003.0		
		SS			GRADED AGGREGATE BASE = 2" CL	1000		18
5		SS			RESIDUUM: Very stiff red and brown medium to fine sandy **CLAY** (slightly micaceous) SC			17
		SS			Medium dense pink and brown clayey medium to fine **SAND**	995		11
10		SS			Boring was terminated at 10 feet below the existing ground surface.			14
					Groundwater was not encountered at the time of boring completion.	990		
15								
						985		
20								
						980		
25								
						975		
30								
						970		
35								
						965		
40								
						960		
45								
						955		
50								
						950		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-41**

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-42**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **970.00** Station: **39+50**

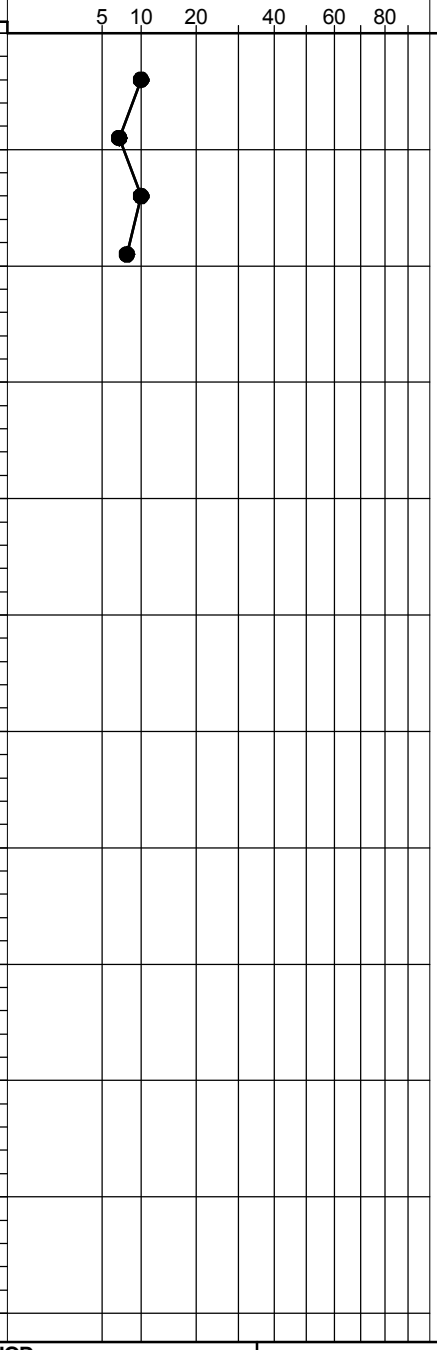
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 6"	GAB	970.0	
		SS			GRADED AGGREGATE BASE = 2"	CL		10
		SS			RESIDUUM: Stiff to firm red and brown medium to fine sandy **CLAY**		965	7
5								
		SS			Loose pink and brown clayey medium to fine **SAND**	SC		10
		SS					960	8
10					Boring was terminated at 10 feet below the existing ground surface.			
					Groundwater was not encountered at the time of boring completion.			
15							955	
20							950	
25							945	
30							940	
35							935	
40							930	
45							925	
50							920	
55							915	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-42**

SPTN LOGS.GPJ 10/26/16

WILLMER Engineering

Project: **Johns Creek Reuse Line and Boles Road Reuse Line**	**HOLE No. B-43**
Location: **Fulton County, Georgia**	Sheet 1 of 1
Project Number: **71.4152**	Location: **SEE FIGURE 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **989.00** Station: **44+75**

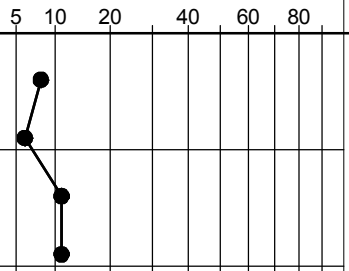
Drilling Equipment: **TRUCK-MOUNTED CME 45** Drilling Method: **HSA - AUTOMATIC HAMMER**

Core Boxes: **N/A** Samples: **4** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **10.0**

Logged By: **NR** Date Drilled: **10/4/16**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT = 8"		989.0	
		SS			GRADED AGGREGATE BASE = 4"	GAB		8
		SS			RESIDUUM: Firm orange and brown medium to fine sandy **CLAY**	CL	985	6
5		SS			Medium dense tan and brown silty medium to fine **SAND**	SM		11
		SS			Stiff brown medium to fine sandy **SILT** (slightly micaceous)	ML	980	11
10					Boring was terminated at 10 feet below the existing ground surface.			
15					Groundwater was not encountered at the time of boring completion.		975	
20							970	
25							965	
30							960	
35							955	
40							950	
45							945	
50							940	
55							935	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

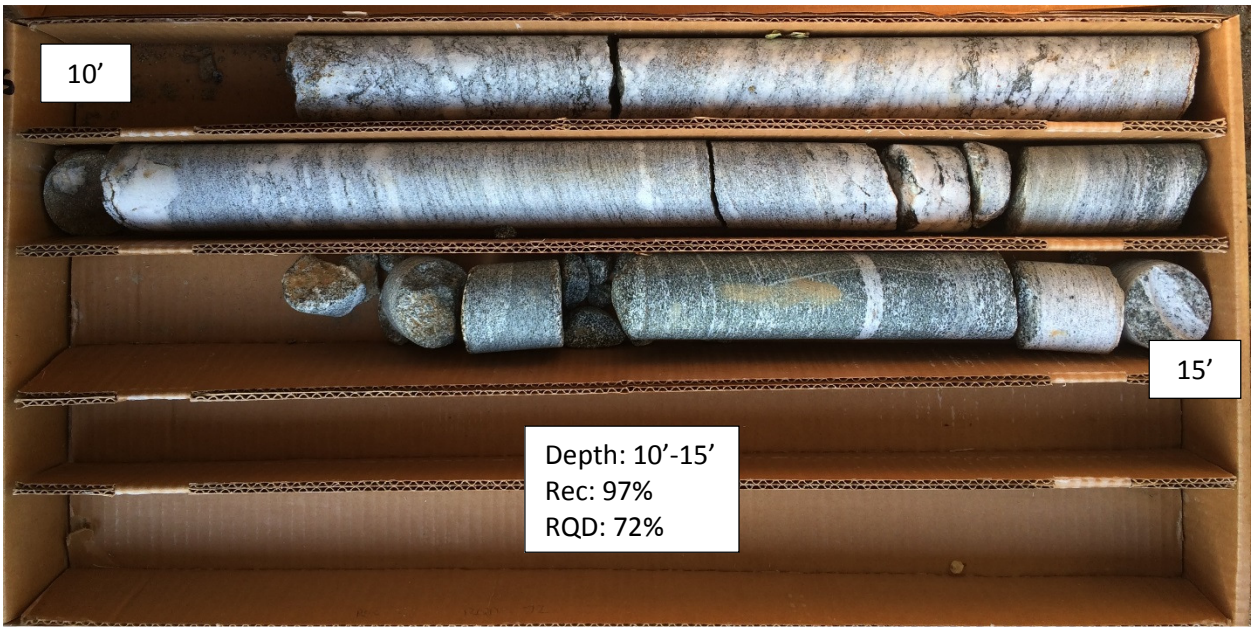
DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-43**

SPTN LOGS.GPJ 10/26/16

APPENDIX II



Core Obtained from B-11

Core Obtained from B-12