

**00 91 01
ADDENDUM NUMBER 01**

Owner: Gwinnett County Board of Commissioners

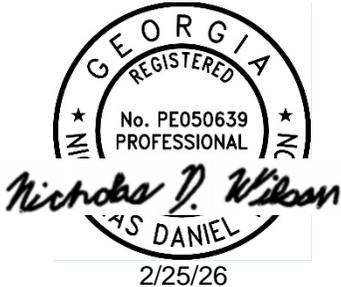
Project: BL022-26, Forest Valley Water Main Replacement

Project No.: M00737.6

Addendum No. 01

Addendum Date: February 26, 2026

The following additions, deletions, modifications, or clarifications shall be made to the appropriate portions of the Contract Documents. Bidders must acknowledge receipt of this Addendum in the space provided on the Bid Form.

<p>Approved by: <u>Stratus Team LLC</u></p> <p>Name: <u>Nicholas Wilson</u></p> <p>Date: <u>2/25/26</u></p>
<div style="text-align: center;">  <p>2/25/26</p> <p>Stratus Team LLC, Georgia Registered Engineering Firm, PEF009174</p> </div>
<p>Addendum Items:</p> <p>Article 1 – Addendum <i>Section 1.01-1.02</i></p> <p>Article 2 – Bid Requirements <i>Section 2.01</i></p> <p>Article 3 – Specifications <i>Section 3.01-3.02</i></p> <p>Article 4 – Drawings <i>Section 4.01</i></p> <p>Article 5 – Appendices <i>Section 5.01</i></p> <p>Article 6 – Questions <i>Section 6.01-6.11</i></p>

ARTICLE 1 – ADDENDUM

- 1.01 Amend the Contract Documents
 - A. Make the additions, modifications, or deletions to the Contract Documents described in this Addendum.
- 1.02 Acknowledge Addenda
 - A. Acknowledge receipt of this Addendum in the Bid Form submitted for this Project. Failure to acknowledge receipt of this addendum in the Bid Form may render the Bid as non-responsive and serve as the basis for rejecting the Bid.

ARTICLE 2 – BID REQUIREMENTS

- 2.01 Section 00 41 16 “Bid Form Exhibit A”
 - A. Delete Section 00 41 16 “Bid Form Exhibit A” and replace it with Section 00 41 16R “Bid Form Exhibit A” included with this Addendum. Submit only the revised form with the Bid.

ARTICLE 3 – SPECIFICATIONS

- 3.01 Volume II Technical Specifications
 - A. Page 282 (GENERAL SPECIAL PROVISIONS)
 - 1. Delete this page in its entirety.
- 3.02 Replace the following Specification Sections:

Replace Section		With Section	
Section	Section Title	Section	Section Title
00 73 00	Supplementary Conditions	00 73 00	Supplementary Conditions
01 11 00	Summary of Work	01 11 00	Summary of Work

ARTICLE 4 – DRAWINGS

- 4.01 Replace the following Drawings:

Replace Drawing		With Drawing	
Drawing No.	Drawing Title	Drawing No.	Drawing Title
C-203 Rev 0	FOREST VALLEY WATER MAIN PLAN	C-203 Rev 1	FOREST VALLEY WATER MAIN PLAN
C-402 Rev 0	CONSTRUCTION DETAILS	C-402 Rev 1	CONSTRUCTION DETAILS
C-507 Rev 0	WINDSOR DRIVE FINAL BACKFILL & PAVEMENT PLAN	C-507 Rev 1	WINDSOR DRIVE FINAL BACKFILL & PAVEMENT PLAN

ARTICLE 5 – APPENDICES

5.01 Replace the following Appendices:

Replace Appendix		With Appendix	
Appendix No.	Appendix Title	Appendix No.	Appendix Title
B	ECS Southeast LLC – Geotechnical Engineering Report (pgs. 29, 46-56)	B	ECS Southeast LLC – Geotechnical Engineering Report (Information Only)
C	NV5 Test Hole Report	C	NV5 Forest Valley WMR QL-A SUE Survey Report (Information Only)

ARTICLE 6 – QUESTIONS

- 6.01 If there is a concrete trench cap bid item, what is the cast in place concrete item for?
- A. Cast-in-place concrete is for miscellaneous concrete that is needed but not identified.
- 6.02 If 20 trees need to be replaced, can Gwinnett County provide more information on shape, type, size, so pricing can be provided accurately?
- A. Gwinnett County anticipates 2” to 4” caliper hardwood trees. Trees will be selected to match existing trees to be replaced at the direction of the County, if any. See specification 32 93 43.
- 6.03 Replacement of concrete sidewalk is called out on sheet C-507. Will a pay item be added for sidewalk installation?
- A. Yes, sidewalk installation pay item has been added to the revised Bid Form Exhibit A (Item No. BB-15). See Article 2 of this addendum.
- 6.04 Are portable signs allowed on this project?
- A. Portable signs are required and costs for these are to be included in Traffic Control Devices (BB-31).
- 6.05 Please provide clarification on what the Kinder Morgan observation bid item expectation is? Can an hourly or daily rate be given for the inspector to be present?
- A. There are no observation fees required for Kinder Morgan, however a Kinder Morgan Crossing Permit is required, which will be the responsibility of the Contractor to obtain. A courtesy sample Request for Permit to Cross Right-of-Way and Facilities of Plantation Pipe Line Company is attached to this addendum. The Kinder Morgan Observation bid item has been removed.
- 6.06 Is some vibration monitoring of compaction needed to reduce conflict with the culvert and/or the existing lines running near the proposed waterline?
- A. Vibration monitoring is not required unless blasting is approved.
- 6.07 Does the bid item quantity for 9.5mm asphalt include tonnage for the driveways or does the asphalt tonnage for that need to be under the restore asphalt driveway item?
- A. The estimated quantity for Bid Item BB-08 “Asphalt Pavement – 9.5mm Superpave, Type II, Group 2 Only”, does not include asphalt tonnage for driveways. Asphalt driveways must be

restored and compensated under Bid Item BB-35 "Driveway Cut Restoration – Asphalt", measured in square yards.

- 6.08 Can equipment be left on site or does the contractor need to store it someplace off site?
- A. Contractor is responsible for jobsite security, material laydown area, and equipment storage.
- 6.09 Is polywrap needed for the waterline crossing near the fuel lines on Maple Wood Drive?
- A. Yes, both polywrap and zinc coating will be required. A note and callouts have been added to Drawing C-203 for clarity.
- 6.10 There is granite header curb along some of the streets, will the awarded contractor be required to replace this curbing with granite?
- A. No, concrete can be used in lieu of granite for curb replacement.
- 6.11 How is trench rock excavation and removal to be compensated?
- A. Trench rock excavation and removal is to be included in the linear foot price of pipe. See Specification Section 01 29 01, paragraph 1.01-29.

END OF ADDENDUM NO. 01

00 41 16R Bid Form Exhibit A

Project		Forest Valley Water Main Replacement				Project No.	
Owner		Gwinnett County Board of Commissioners				M00737.6	
Design Professional		Stratus					
Bidder							
Base Bid							
Item No.	Measurement and Payment No.	Item Description	Unit	Estimated Quantity	Unit Price	Extended Amount	
Items in Base Bid (excluding Allowances) per Section 01 29 01 "Measurement and Basis for Payment"							
BB-01	1	Project Record Drawings	LS	1	\$ -	\$ -	
BB-02	3	Site Restoration and Removal of Construction Material	LS	1	\$ -	\$ -	
BB-03	4	Cast-in-Place Concrete	CY	50	\$ -	\$ -	
BB-04	6.d	Temporary Silt Fence Type 'S' (Sd1-S)	LF	7,600	\$ -	\$ -	
BB-05	6.e	Inlet Sediment Trap (Sd2)	EA	15	\$ -	\$ -	
BB-06	6.i	Mulch (Ds1)	TN	60	\$ -	\$ -	
BB-07	6.j	Temporary Seeding (Ds2)	SY	5,000	\$ -	\$ -	
BB-08	7	Asphalt Pavement - 9.5mm Superpave, Type II, Group 2 Only	TN	1,350	\$ -	\$ -	
BB-09	8	Asphalt Pavement - 12.5mm Superpave, GP2 Only	TN	20	\$ -	\$ -	
BB-10	9	Asphalt Pavement - 19mm Superpave	TN	200	\$ -	\$ -	
BB-12	11	Graded Aggregate Base (GAB)	TN	950	\$ -	\$ -	
BB-13	SUP#2	Concrete Trench Cap	CY	130	\$ -	\$ -	
BB-14	14	Curb/Combination Curb & Gutter	LF	300	\$ -	\$ -	
BB-15	15	Sidewalk Installation	SY	5	\$ -	\$ -	
BB-16	18	Sodding (Ds4)	SY	5,700	\$ -	\$ -	
BB-17	20	Tree Replacement	EA	20	\$ -	\$ -	
BB-18	21	Tree Save Barrier Fence	LF	500	\$ -	\$ -	
BB-19	29.1	Ductile Iron Pipe (Water) - 6" Diameter, Pressure Class 350	LF	150	\$ -	\$ -	
BB-20	29.2	Ductile Iron Pipe (Water) - 8" Diameter, Pressure Class 350	LF	7,750	\$ -	\$ -	
BB-21	30.1	Water Utility Distribution Valves - Gate Valves, 6" Diameter	EA	5	\$ -	\$ -	
BB-22	30.2	Water Utility Distribution Valves - Gate Valves, 8" Diameter	EA	12	\$ -	\$ -	
BB-23	31.1	Water Tapping Sleeves and Valves - 6" x 6"	EA	4	\$ -	\$ -	
BB-24	31.2	Water Tapping Sleeves and Valves - 12" x 8"	EA	2	\$ -	\$ -	
BB-25	32	Relocate Existing Water Service Meters (All Sizes)	EA	23	\$ -	\$ -	
BB-26	33	Water Service Short Side (All Sizes)	EA	65	\$ -	\$ -	
BB-27	34	Water Service Long Side (All Sizes)	EA	50	\$ -	\$ -	
BB-28	SUP#3	Water Service Extra Long Side (Willow Road)	EA	1	\$ -	\$ -	
BB-29	SUP#4	Water Service Extra Long Side (Maple Wood Drive)	EA	1	\$ -	\$ -	
BB-30	36	Fire Hydrant Assembly	EA	24	\$ -	\$ -	
BB-31	43	Traffic Control Devices	LS	1	\$ -	\$ -	
BB-32	44	Traffic Control Devices - Police Officers	HR	200	\$ 65.00	\$ 13,000.00	
BB-33	45	Traffic Control - Variable Message Signs	DAY	173	\$ -	\$ -	
BB-34	46.1	Driveway Cut Restoration - Concrete	SY	350	\$ -	\$ -	
BB-35	46.2	Driveway Cut Restoration - Asphalt	SY	200	\$ -	\$ -	
BB-36	46.3	Driveway Cut Restoration - Gravel	SY	50	\$ -	\$ -	
BB-37	SUP#5	Remove and Replace Fence	LF	20	\$ -	\$ -	
BB-38	52	Backfill Material, 57 Stone	TN	500	\$ -	\$ -	
Total BB		Total Base Bid Items Amount (Sum of Extended Amounts for each Base Bid Line Item)				\$ -	

00 41 16R Bid Form Exhibit A

Project	Forest Valley Water Main Replacement	Project No.
Owner	Gwinnett County Board of Commissioners	M00737.6
Design Professional	Stratus	
Bidder		

Base Bid						
Item No.	Measurement and Payment No.	Item Description	Unit	Estimated Quantity	Unit Price	Extended Amount
Adjustment		Add (+) or Deduct (-) Amount (See Note 1)		Line Item No:		\$ -
Total Adjusted BB		Total Adjusted Base Bid Amount (Total BB + Adjustment)				\$ -

Contract Times

Bidder agrees to reach Substantial Completion in	240	days
Bidder agrees to reach Final Completion in	270	days

Notes	
1	Provision is made for Bidder to include an addition or deduction in the Bid to reflect any last minute adjustments in price. The addition or deduction, if made, will be applied proportionately to the item indicated.

BID SUBMITTED BY:	
Bidder:	_____
Signature:	_____
Printed Name:	_____
Title:	_____
Date:	_____

00 73 00
SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC 4.05."

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Supplement Paragraph 1.01.A by inserting the following defined terms as numbered items in their proper alphabetical positions:

- “1. *Construction Manager*—The individual or entity named as Construction Manager in the Agreement. The Construction Manager provides construction management services to the Owner, as an advisor and representative.
2. *Contract Amendment*—A document issued on or after the Effective Date of the Contract and signed by Owner and Contractor which:
 - a. Authorizes new phases of the Work and establishes the Contract Price, Contract Times, or terms and conditions of the Contract for the new phase of Work; or
 - b. Modifies the terms and conditions of the Contract but does not make changes in the Work.
3. *Contractor’s Team*—Contractor, Subcontractors, Suppliers, and individuals or entities directly or indirectly employed or retained by Contractor, Subcontractors, or Suppliers to perform part of the Work, or anyone for whose acts they may be liable.
4. *Defective*—When applied to Work, refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. Does not conform to the Contract Documents;
 - b. Does not meet the requirements of applicable inspections, reference standards, tests, or approvals referred to in the Contract Documents; or
 - c. Has been damaged prior to Construction Manager’s recommendation of final payment unless responsibility for the protection of the Work has been assumed by Owner at Substantial Completion in accordance with Paragraphs 15.03 or 15.04.
5. *Design Professional*—The individuals or entity named as the Architect or Engineer in the Agreement and the subconsultants, individuals, or entities directly or indirectly employed or retained by Design Professional to provide design or other technical

services to Owner. Design Professional has responsibility for design and technical issues related to the Contract Documents.

6. *Final Completion*—The point where the Work is complete in accordance with the Contract Documents, items and documents required by the Contract Documents have been accepted by the Owner and the Project is ready for Final Payment.
7. *Owner's Project Team* —The Owner, Design Professional, Construction Manager, and the other entities identified in the Supplementary Conditions and the consultants, subconsultants, individuals or entities directly or indirectly employed or retained by them to provide services to the Owner. The Owner's Project Team consists of the following organizations:
 - a. Gwinnett County Department of Water Resources
684 Winder Highway
Lawrenceville, GA 30045
 - b. Stratus
3715 Northside Parkway NW
Building 300, Suite 200
Atlanta, GA 30327
8. *Project Construction Manager (PCM)*—The authorized representative of the Owner's Project Team assigned to assist the Construction Manager at the Site. The term Project Construction Manager includes assistants and field staff of the Construction Manager.
9. *Prompt* – Within no more than 3 days."

SC-1.02 Supplement Paragraph 1.02 by adding the following paragraphs:

- H. The terms "includes" and "including" are used as terms of enlargement and not of limitation or exclusive enumeration, and use of these terms does not create a presumption that components not expressed are excluded. The terms "consist of" or "consisting of" limits the interpretation to only those items specifically listed.
- I. It is understood that the cost of providing Work is included in the Contract Price and no additional compensation is to be paid by Owner unless specifically stated otherwise in the Contract Documents. Expressions like "at no additional cost to Owner," "at Contractor's expense," or similar words mean that the Contractor is to include the cost of this Work in their Contract Price and perform or provide specified Work without an increase in the Contract Price.
- J. Written documents are required where reference is made to notices, reports, approvals, consents, statements, instructions, opinions, or other types of documentation or communications required by the Contract Documents. Approval and consent documents must be received by Contractor prior to the action or decision for which approval or consent is given. These may be made in printed or electronic format through the Owner's Project Team's Project Management Information System or other electronic media as required by the Contract Documents or approved by the Construction Manager.
- K. Giving notice as required by the Contract Documents may be by printed or electronic media using a method that requires acknowledgment of the receipt of that notice."

ARTICLE 2 – PRELIMINARY MATTERS

SC 2.01 Delete Paragraph 2.01.B. in its entirety and insert the following in its place:

“B. Evidence of Contractor’s Insurance: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.”

SC 2.01 Delete Paragraph 2.01.C. in its entirety.

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

“A. Owner shall furnish to Contractor one printed copy of conformed Contract Documents incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.”

SC-2.06 Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

“B. *Electronic Documents Protocol*: The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol (“EDP” or “Protocol”) for exchange of electronic transmittals.

1. *Basic Requirements*

- a. To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.
- b. The contents of the information in any Electronic Document will be the responsibility of the transmitting party.
- c. Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.
- d. Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Design Professional. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.

- e. When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.
- f. Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 18.01 of the General Conditions.

2. *System Infrastructure for Electronic Document Exchange*

- a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.
 - 1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is 10 MB. Attachments larger than that may be exchanged using large file transfer functions or physical media.
 - 2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.
- b. Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.
- c. Each party will operate and maintain industry-standard, industry-accepted, ISO standard, commercial-grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.

- d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.
- e. Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.
- f. If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.
- g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.

C. *Software Requirements for Electronic Document Exchange; Limitations*

- 1. Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in Section 01 33 00 Document Management.
- 2. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.
- 3. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.
- 4. Software and data formats for exchange of Electronic Documents will conform to the requirements set forth in Section 01 33 00 Document Management, including software versions, if listed.”

SC-2.06 Supplement Paragraph 2.06 of the General Conditions by adding the following paragraph:

“D. Requests by Contractor for Electronic Documents in Other Formats

1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.
2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project information requested by Contractor (“Request”) in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner’s response to the Request, and to the following conditions to which Contractor agrees:
 - a. The content included in the Electronic Documents created by Design Professional and covered by the Request was prepared by Design Professional as an internal working document for Design Professional’s purposes solely, and is being provided to Contractor on an “AS IS” basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor’s application or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.
 - b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Design Professional to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor’s sole risk and the Contractor waives any claims against Design Professional or Owner arising from use of data in Electronic Documents covered by the Request.
 - c. Contractor shall indemnify and hold harmless Owner and Design Professional and their subconsultants from all claims, damages, losses, and expenses, including attorneys’ fees and defense costs arising out of or resulting from Contractor’s use, adaptation, or distribution of any Electronic Documents provided under the Request.
 - d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Design Professional, unless such distribution is specifically identified in the Request and is limited to Contractor’s subcontractors. Contractor warrants that subsequent use by Contractor’s subcontractors complies with all terms of the Contract Documents and Owner’s response to Request.
3. In the event that Owner elects to provide or directs the Design Professional to provide to Contractor any Contractor-requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as

being available to Contractor, the Owner shall be reimbursed by Contractor on an hourly basis (at \$213 per hour) for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Design Professional.”

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC 3.01 Delete Paragraph 3.01.C in its entirety.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC 4.01 Amend Paragraph 4.01.A by deleting the sentence “In no event will the Contract times commence to run later than the 60th day after the day of Bid Opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.”

ARTICLE 5 – SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

“E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely:

Report Title	Date of Report	Technical Data
TBD	TBD	TBD

F. There are no drawings of existing physical conditions at or adjacent to the Site that contain Technical Data.

G. Contractor may examine copies of reports and drawings identified in SC 5.03.E and SC 5.03.F that were not included with the Bidding Documents at Gwinnett County Department of Water Resources, 684 Winder Highway, Lawrenceville, Georgia or at Gwinnett County Department of Financial Services - Purchasing Division-2nd Floor, 75 Langley Drive, Lawrenceville, Georgia 30046 during regular business hours, or may request copies from Design Professional.”

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. There are no reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site.

5. There are no drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site.

SC-5.06 Delete Paragraph 5.06.I in its entirety.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.01 *Performance, Payment and Other Bonds*

- A. Add the following paragraphs immediately after Paragraph 6.01.A:
 - “1. Required *Performance Bond Form*: The performance bond that Contractor furnishes will be in the form of Section 00 61 13 Performance Bond and pursuant to O.C.G.A. § 13-10-40, 36-91-70, -71.”
 - 2. Required *Payment Bond Form*: The payment bond that Contractor furnishes will be in the form of Section 00 61 16 Payment Bond and pursuant to O.C.G.A. § 13-10-60, -62, 36-91-90 to -92.”

SC-6.02 Amend the last sentence of Paragraph 6.02.B to read as follows:

“Insurance Requirements are to comply with provisions of Section 00 73 16 “Insurance Requirements.””

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

SC-7.03 *Labor, Working Hours*

- A. Add the following new subparagraph immediately after Paragraph 7.03.C:
 - “1. Regular working hours will be 7:00 AM to 5:00 PM.”
- B. Add the following new subparagraph immediately after Paragraph 7.03.C:
 - 1. Owner's legal holidays are New Year’s Day, Martin Luther King Jr. Day, Presidents Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, and Christmas Day.”

SC-7.08 Delete Paragraph 7.08.B in its entirety.

ARTICLE 8 – OTHER WORK AT THE SITE

No suggested Supplementary Conditions in this Article.

ARTICLE 9 – OWNER’S RESPONSIBILITIES

No suggested Supplementary Conditions in this Article.

ARTICLE 10 – DESIGN PROFESSIONAL’S STATUS DURING CONSTRUCTION

No suggested Supplementary Conditions in this Article.

ARTICLE 11 – CHANGES TO THE CONTRACT

SC-11.02 Amend Paragraph 11.02.B to read as follows:

- “B. If Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.”

ARTICLE 12 – CLAIMS

No suggested Supplementary Conditions in this Article.

ARTICLE 13 – COST OF WORK; ALLOWANCES, UNIT PRICE WORK

SC-13.01 *Cost of Work*

- A. Delete Paragraph 13.01.B.5.c.(2) in its entirety, and insert the following:

“Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate not to exceed that shown for such equipment in the most current edition of the EquipmentWatch Cost Recovery Rental Rate Blue Book. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.”

- B. Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

“a. For purposes of this paragraph, “small tools and hand tools” means any tool or equipment whose current price if it were purchased new at retail would be less than \$500.”

SC-13.02 Delete Paragraph 13.02.C in its entirety.

SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

“E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the extended price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price excluding Owner-directed work (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor’s unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor’s costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.”

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

No suggested Supplementary Conditions in this Article.

ARTICLE 15 – PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

SC-15.01 *Progress Payments*

- A. Delete Paragraph 15.01.B.1 in its entirety and insert the following in its place:
 - “1. On the first working day following the last day of each month, Contractor shall submit to Owner for review an Application for Payment, filled out and signed by Contractor, covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.”
- B. Amend Paragraph 15.01.D.1 by deleting “Ten” and inserting “Thirty” in its place.
- C. Amend Paragraph 15.01.E.1 by deleting Subparagraph 15.01.E.1.l. and adding the following in its place:
 - “l. Owner has been notified of failure to make payments to Subcontractors or Suppliers or for labor;
 - m. failure to submit up to date record documents as required by the Contract Documents;
 - n. failure to submit monthly Progress Schedule updates or revised schedules as requested by the Owner or Design Professional;
 - o. failure to provide Project videos or photographs required by the Specifications; or
 - p. Other items entitle Owner to a set off against the amount recommended.”
- D. Amend Paragraph 15.01.E.3 by deleting “and subject to interest as provided in the Agreement.”
- E. Supplement Paragraph 15.01.E by adding the following subparagraph:
 - “4. Owner may permanently withhold payment from Contract Price for:
 - a. Liquidated damages incurred by Contractor pursuant to O.C.G.A. §13-6-7.
 - b. Compensation for Owner’s Project Team for overtime charges of Construction Manager, inspectors, third review of submittals, review of substitutions, re-inspection fees, inspections, or designs related to correction of defective Work, or other Services identified as requiring payment by the Contractor.

1) Compensation will be based on the following rates:

Labor Category	Hourly Rate
Project Manager	
Chief Engineer	\$253
Managing Engineer	\$230
Supervising Engineer	\$213
Principal Engineer	\$191
Senior Engineer	\$163
Engineer	\$110-142
Administrative Coordinator	\$84

- 2) Hourly rates will be adjusted to increase by 3% percent annually based on the calendar year.
- 3) Expenses will be billed at the actual cost.

- c. Costs for tests performed by the Owner to verify that Work previously tested and found to be defective has been corrected. Verification testing is to be provided at the Contractor's expense to verify products or constructed works comply after corrections have been made."

SC-15.03 Add the following new subparagraphs to Paragraph 15.03.B:

- "1. When early acceptance of a Substantially Completed portion of the Work is accomplished in the manner indicated in the Contract Documents, the correction period for that portion of the Work shall commence at the time of Substantial Completion of that Work.
- 2. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Design Professional, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

No suggested Supplementary Conditions in this Article.

ARTICLE 17 – FINAL RESOLUTIONS OF DISPUTES

No suggested Supplementary Conditions in this Article.

ARTICLE 18 – MISCELLANEOUS

SC-18.02 Supplement Paragraph 18.02 by adding the following paragraph:

- "B. All references and conditions for a "Calendar Day Contract" in the General Conditions and Supplementary Conditions shall apply for a "Fixed Date Contract." A "Fixed Date Contract" is one in which the calendar dates for reaching Substantial Completion and/or final completion are specified in lieu of identifying the actual calendar days involved."

SC-18.10 Delete Paragraph 18.10.A in its entirety and insert the following in its place:

- "A. The Article and paragraph headings in this Agreement are inserted for convenience only and do not constitute parts of these General Conditions or act as a limitation of the scope of the particular section to which they refer. This Agreement will be fairly interpreted in accordance with its terms and conditions and not for or against either party."

SC-18.11 Supplement Article 18 by adding the following paragraph:

"18.11 *Independent Contractor*

- A. Each Party will perform its duties under this Agreement as an independent contractor. The Parties and their personnel will not be considered to be employees or agents of the other Party. Nothing in this Agreement will be interpreted as granting either Party the right or authority to make

commitments of any kind for the other. This Agreement will not constitute, create, or be interpreted as a joint venture, partnership, or formal business organization of any kind.”

SC-18.12 Supplement Article 18 by adding the following paragraph:

“18.12 *Severability*

- A. If a court of competent jurisdiction renders any part of this Agreement invalid or unenforceable, that part will be severed, and the remainder of this Agreement will continue in full force and effect.”

SC-18.13 Supplement Article 18 by adding the following paragraph:

“18.13 *No Third-Party Beneficiaries*

- A. Nothing in this Agreement shall be construed to create any right in any third party not a signatory to this Agreement, and the parties do not intend to create any third-party beneficiaries by entering into this Agreement.”

SC-18.14 Supplement Article 18 by adding the following paragraph:

“18.14 *Sovereign Immunity*

- A. The parties agree that the Owner has not waived its sovereign immunity by entering into and performing its obligations under this Agreement.”

END OF SECTION 00 73 00

01 11 00
SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Construct Work as described in the Contract Documents.
 - 1. Provide the labor, materials, tools, equipment, and incidentals required to make the Project completely and fully operable.
 - 2. Provide the labor, equipment, tools, and consumable supplies required for a complete Project.
 - 3. Provide the civil, architectural, structural, mechanical, electrical, instrumentation, and all other Work required for a complete and operable Project.
 - 4. Test and place the completed Project in operation.
 - 5. Provide the special tools, spare parts, lubricants, supplies, or other materials as indicated in the Contract Documents for the operation and maintenance of the Project.
 - 6. The Contract Documents do not indicate or describe all Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Construction Manager.

1.02 DESCRIPTION OF WORK

- A. Work is described in general, non-inclusive terms as:
 - 1. Replacement of existing 6-inch ACP and PVC water mains with 8-inch DIP water mains and associated appurtenances.
 - 2. Abandonment of existing water main and appurtenances throughout project limits
 - 3. Trench repair, driveway repair, and milling and overlay of roadways as required for installation of water mains within paved areas.
 - 4. Erosion control installation along the route of the project.

1.03 WORK UNDER OTHER CONTRACTS

- A. The Owner has no knowledge of work, other than the Work included in this Contract, which may impact construction scheduling, testing, and startup.

1.04 WORK BY OWNER

- A. The Owner has no knowledge of work, other than the Work included in this Contract that may impact construction scheduling, testing, and startup.

1.05 SITE CONDITIONS

- A. Accept the project site in "as is" condition.

- B. Verify existing conditions and for existing work that is to be reused or altered.
- C. Include the costs of all required modifications or replacements in the Contract Price.

1.06 EASEMENTS AND PERMITS

- A. The anticipated necessary permits are listed as follows:

Permit Type	Submittal Date	Anticipated Approval Date	Responsible Party	Payment Status
Gwinnett County LDP	12/18/25	01/15/26	Owner	N/A
GDOT GPAS Utility Permit	1/31/25	2/XX/26	Owner	N/A
NPDES General Permit			Contractor	Not Paid
Lawrenceville ROW Utilization Permit	2/20/26	Post-Bid	Owner/Contractor	Not Paid
Kinder Morgan Crossing Permit			Contractor	Not Paid

- B. The anticipated necessary easements listed are the responsibility of the Owner and their status is as follows:
 1. All anticipated easements are expected to be obtained on or before February 2026.
 2. Review all easements for any stipulations.

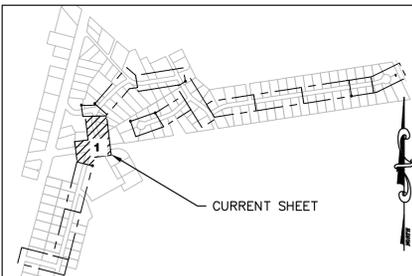
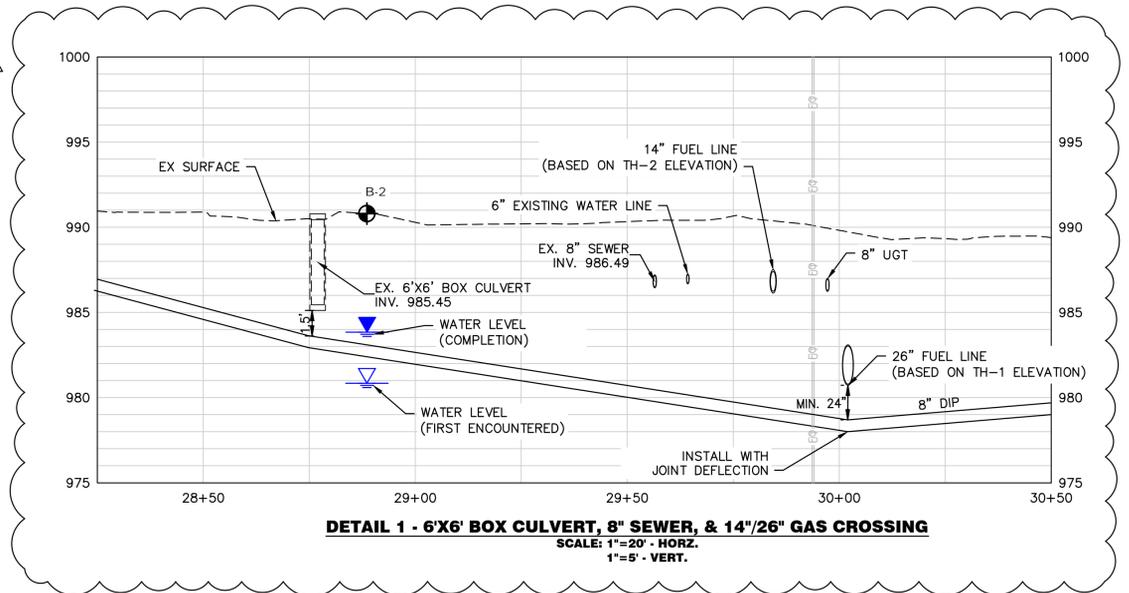
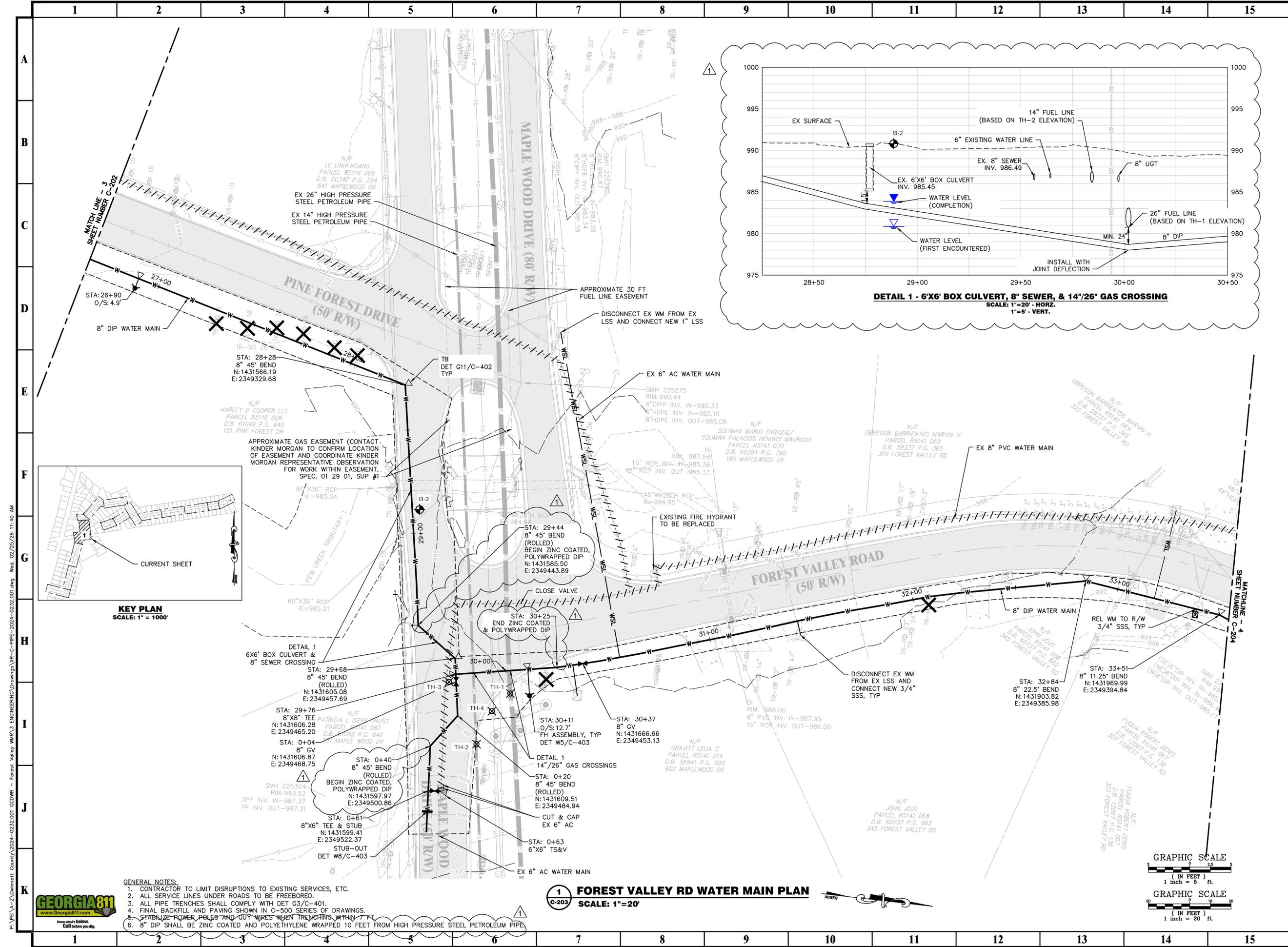
PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

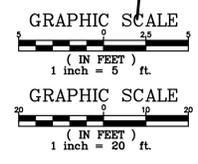
EXHIBIT A - EASEMENTS

Parcel Number	Address	Owner Name	Status
R5141 186	304 Windsor Farms Dr	Elva G & Juan Trevino	Offer Packet Creation



- GENERAL NOTES:**
- CONTRACTOR TO LIMIT DISRUPTIONS TO EXISTING SERVICES, ETC.
 - ALL SERVICE LINES UNDER ROADS TO BE FREEBORED.
 - ALL PIPE TRENCHES SHALL COMPLY WITH DET G3/C-401.
 - FINAL BACKFILL AND PAVING SHOWN IN C-500 SERIES OF DRAWINGS.
 - STABILIZE POWER POLES AND GUY WIRES WHEN TRENCHING WITHIN 7 FT.
 - 8\"/>

1 FOREST VALLEY RD WATER MAIN PLAN
C-203 SCALE: 1\"/>



PRIME
 A Stratius Team Company
 2715 NORTHSIDE PARKWAY, NW
 BUILDING 300, SUITE 200
 ATLANTA, GEORGIA 30327
 404-425-7100

PROJECT:
FOREST VALLEY WATER MAIN REPLACEMENT
PREPARED FOR:
 GWINNETT COUNTY DEPARTMENT OF WATER RESOURCES

NO.	DATE	DESCRIPTION
0	07/28/26	ISSUE FOR BID
1	02/25/26	ISSUED FOR ADDENDUM #1

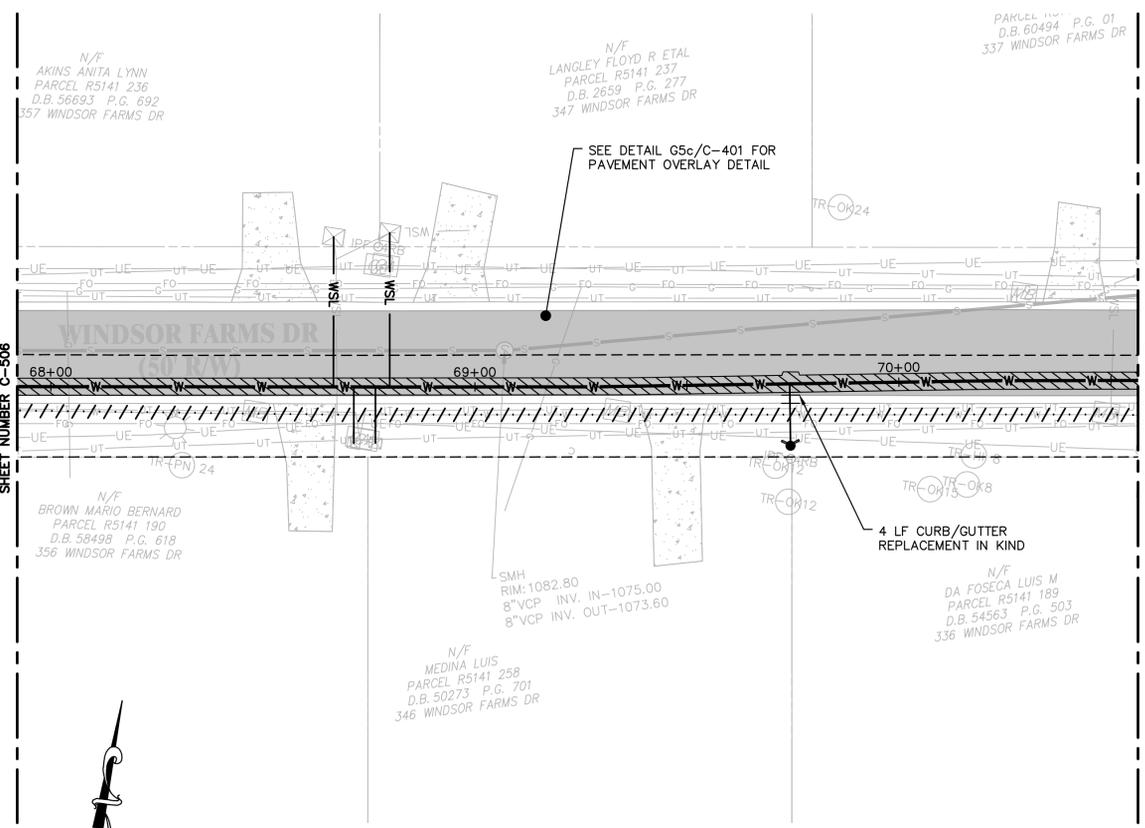
SEAL
 REGISTERED PROFESSIONAL ENGINEER
 NO. 0050639
 NICHOLAS DANIEL
 DATE: 01/28/2026

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DRAWING TITLE
FOREST VALLEY RD WATER MAIN PLAN

DRAWING DATE	01/28/2026
DRAWN BY	VPM
DESIGNED BY	NDW
CHECKED BY	MHH
PROJECT NUMBER	2024-023.001
DRAWING NUMBER	C-203
ISSUED FOR BID	

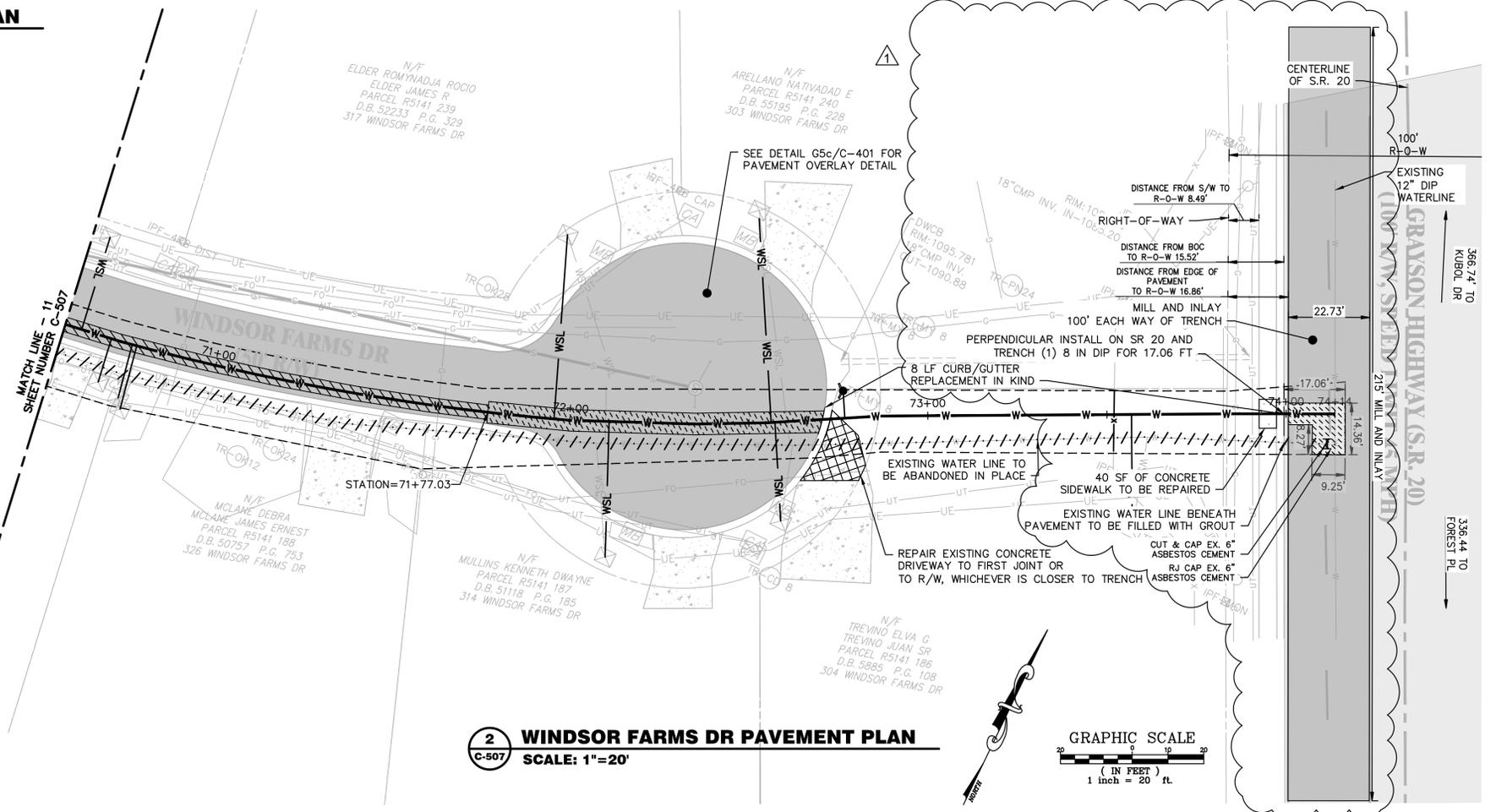
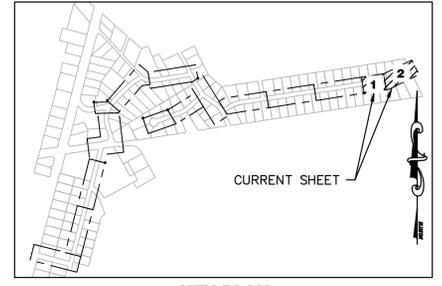
P:\PE\VA-Z\Gwinnett County\2024-0232.001 GCONR - Forest Valley Water Engineering\Drawings\VR-C-PIPE-2024-0232.001.dwg Wed, 02/25/26 11:40 AM



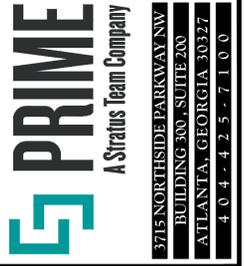
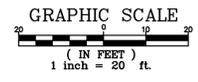
1 WINDSOR FARMS DR PAVEMENT PLAN
SCALE: 1"=20'

LEGEND:

LONGITUDINAL TRENCH REPAIR		RELEVANT DETAIL	DET G4/C-401
PERPENDICULAR TRENCH REPAIR			DET G5/C-401
OUTSIDE OF ROAD/PAVEMENT CUT	(NO HATCH)		DET G5a/C-401
MILL AND OVERLAY/EXISTING ASPHALT			DET G5c/C-401
DRIVEWAY REPAIR			DET G6/C-401



2 WINDSOR FARMS DR PAVEMENT PLAN
SCALE: 1"=20'

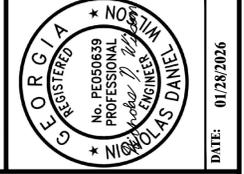


PROJECT:
FOREST VALLEY
WATER MAIN
REPLACEMENT

PREPARED FOR:
GWINNETT COUNTY
DEPARTMENT OF WATER
RESOURCES

REVISIONS

NO.	DATE	DESCRIPTION
0	01/29/26	ISSUE FOR BID
1	02/25/26	ISSUED FOR ADDENDUM #1



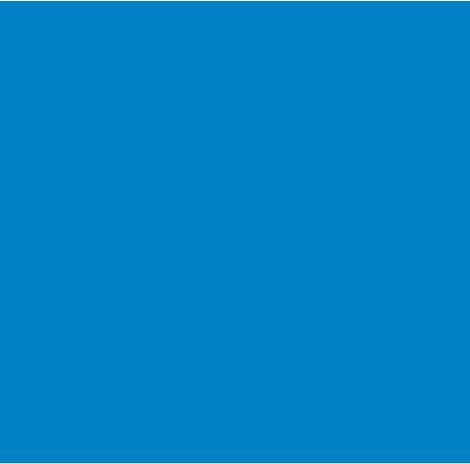
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DRAWING TITLE
WINDSOR FARMS DR
FINAL BACKFILL &
PAVEMENT PLAN

DRAWING DATE	01/28/2026	DRAWN BY	MJK
DRAWING SCALE	1" = 20'	DESIGNED BY	NDW
PROJECT NUMBER	2024-0232-001	CHECKED BY	MHH
DRAWING NUMBER	C-507	ISSUED FOR BID	



**APPENDIX B – ECS SOUTHEAST, LLC –
GEOTECHNICAL ENGINEERING REPORT
(INFORMATION ONLY)**



ECS Southeast, LLC

Geotechnical Engineering Report

M-0737-06 Forest Valley Water Main Replacement Project

Maple Wood Drive
Lawrenceville, Gwinnett County, Georgia

ECS Project No. 10:12916r1

February 24, 2026





ECS SOUTHEAST, LLC

Geotechnical • Construction Materials • Environmental • Facilities

February 24, 2026

Mr. Derek Fellows
Gwinnett County DWR
684 Winder Highway NE
Lawrenceville, GA 30045

ECS Project No. 10:12916r1

Reference: Geotechnical Engineering Report
M-0737-06 Forest Valley Water Main Replacement Project
Maple Wood Drive
Lawrenceville, Gwinnett County, Georgia

Dear Mr. Fellows:

ECS Southeast, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with the provided Geotechnical Investigation Services SCOPE OF WORK and with our agreed scope of work as outlined in the ECS Proposal No. 10:21034, dated November 25, 2025, as authorized by Mr. Jordan Mitchell of Gwinnett County on November 26, 2025, with the issuance of Purchase Order No. 226054. This report presents our understanding of the geotechnical aspects of the project, along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to serve Gwinnett County DWR during the design phase of this project. We would appreciate the opportunity to remain involved throughout the continuation of the design phase and would like to provide our services during construction-phase operations as well to verify the subsurface conditions assumed for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Southeast, LLC

Geotechnical Staff Project Manager

TSchrama@ecslimited.com

Dana Causby, P.E.

Senior Geotechnical Engineer/Team Leader

DCausby@ecslimited.com



Robert H. Barnes, P.E., P.G.

Geotechnical Principal Engineer

RBarnes@ecslimited.com

1281 KENNESTONE CIRCLE, SUITE 200, MARIETTA, GA 30066 • T: 770-590-1971

ECS Florida, LLC • ECS Mid-Atlantic, LLC • ECS Midwest, LLC • ECS Pacific, Inc. • ECS Southeast, LLC • ECS Southwest, LLP
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"ONE FIRM. ONE MISSION."

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- Site Location Diagram (Figure 1)
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- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Reference Notes for Boring Logs
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- Laboratory Test Results Summary
- Liquid and Plastic Limits Test Report
- Grain Size Analyses

Appendix D – Supplemental Report Documents and Calculations

- Important Information about this Geotechnical Engineering Report

EXECUTIVE SUMMARY

This Executive Summary provides a brief overview of the primary geotechnical conditions expected to affect design and construction. Information gleaned from this Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

- A total of 9 borings (Borings B-1 to B-9) were performed along the proposed project alignment.
- Existing fills were encountered at 7 borings to depths of approximately 3 to 8 feet below the existing grade. Based on the planned excavation and pipe depths, it appears that most of the fill soils encountered will be removed during construction. It's possible that some deeper fills may exist between the borings in other portions of the project alignment. Undercutting soft or poor-quality fill soils would be required if they encountered below the planned invert elevations.
- Alluvial soils were encountered at 1 boring (B-2) to a depth of approximately 11 feet. Shallow groundwater was typically encountered within the alluvial soils, and very loose to loose residual soils were encountered beneath them. Undercutting of soft or loose soils may be required if they are encountered at and below planned invert elevations.
- Because of the high groundwater, temporary and permanent dewatering efforts using sump pumps and French drains may be required before and/or during earthwork operations along the project alignments.
- Sandy Silt/sandy elastic Silt (ML/MH) was noted in the upper 3 to 5.5 feet at several borings. This type of soil is moderately to highly plastic. The silty/clayey site soils are moisture-sensitive and will become unstable when their moisture content exceeds their optimum. Adequate site drainage should be implemented at the onset of construction and maintained throughout the construction process. Care should be taken to keep construction traffic to a minimum during wet periods. Water should not be allowed to pond in construction areas. If these materials are reused as structural backfill in areas of existing pavements or driveways, we recommend blending them with more sandy soils to reduce their plasticity.
- Field observations, monitoring, and quality assurance testing during earthwork and foundation installation are an extension of and integral to the geotechnical design recommendation. We recommend that the owner retain these quality assurance services and that ECS be allowed to continue our involvement throughout these critical phases of construction to provide general consultation as issues arise. We would be pleased to provide an estimate of the cost for these services at the appropriate time.

1.0 INTRODUCTION

1.1 GENERAL

The purpose of this study was to provide geotechnical information for the installation of approximately 7,500 linear feet of an 8-inch diameter ductile iron water main within the right-of-way located in the residential neighborhood of Forest Hills.

The recommendations developed for this report are based on the results of our subsurface exploration and project information provided by the Gwinnett County Department of Water Resources and Prime Engineering, Inc. This report contains the results of our subsurface exploration and laboratory testing programs, site characterization, engineering analyses, and recommendations for the design and construction of the planned development.

1.2 SCOPE OF SERVICES

The purposes of this exploration were to explore the soil and groundwater conditions at the site (along with the proposed water main alignment) and to develop engineering recommendations to guide design and construction of the proposed project.

We accomplished the purposes of the study by:

1. Reviewing the available publications concerning the local geology of the site and performing a general site reconnaissance.
2. Performing pavement cores and soil test borings to explore the subsurface soil and groundwater conditions.
3. Performing laboratory tests on selected representative soil samples from the borings to evaluate pertinent engineering properties.
4. Evaluating the field and laboratory data to develop appropriate engineering recommendations.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION AND PROPOSED CONSTRUCTION

The project site is approximately 7,500 linear feet in length and is located within the right-of-way easements along Pine Forest Drive, Maple Wood Drive, Forest Valley Road, Oak Terrace, Pineview Drive, Windsor Court, and Windsor Farms Drive. The Google™ Maps imagery below shows the site's general location. A Site Location Diagram is provided in Appendix A (Figure 1).

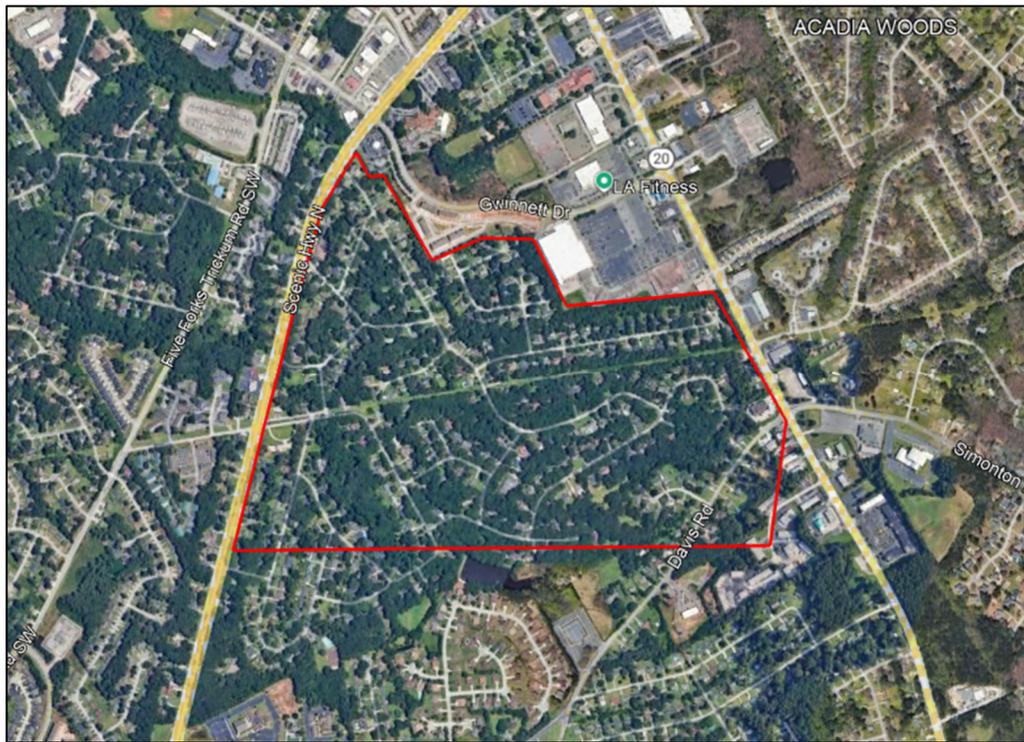


Figure 2.1.1. Image of Project Site and Surrounding Condition (Google Earth)

2.1.1 Historical Document Review

After our site reconnaissance and document review, it was determined that alluvial soils are present within the alignment near Pew Creek tributary. The historic USGS topographic map (1975) imagery and Google® Earth (1993) imagery below show the general location of the pond, intermittent stream, and stream.

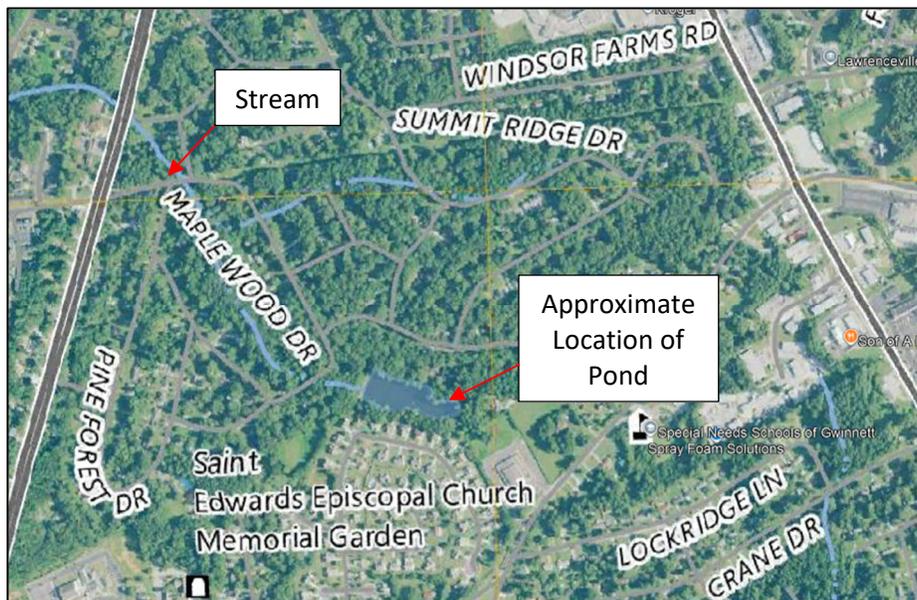


Figure 2.1.2. Site Location (2024) – Historic USGS Topographic Maps, accessed January 10, 2024).

2.3 PROPOSED CONSTRUCTION

The proposed project involves installing approximately 7,500 linear feet of 8-inch-diameter ductile iron water main within the existing right-of-way. The water main starts near Hickory Lane at Station 10+00 and runs through several streets in the Forest Hills residential area. The layout of the 8-inch DIP watermain is illustrated in Figures 2-13 of Appendix A. While the exact depth of the water main was not determined during our exploration, our general experience suggests it will be buried at least 4 feet deep, potentially up to 10 feet below existing ground level. Horizontal Directional Drilling (HDD) may be necessary at locations such as Pew Creek Tributary or crossing near the natural gas pipeline. The project alignment passes through diverse conditions, including grassed shoulders, lawns, wooded or lush vegetated shoulders, and paved roads and driveways.

If any of the information presented is incorrect or has changed, please advise ECS so that we may reevaluate our recommendations in light of any changes to the project concept.

2.3 REGIONAL GEOLOGY

The site is in the Piedmont Geologic Region of Georgia. According to the Geologic Map of Georgia (1976), the site is underlain by granite gneiss and amphibolite. The natural soils at the site consist primarily of residual materials formed from the in-place physical and chemical weathering of the underlying parent bedrock. The relative density of the residual soils is primarily dependent upon the degree of weathering, surface disturbance, groundwater action, and residual mineral bonding.

The boundary between soil and rock is not clearly defined. A transitional zone called partially weathered rock (PWR) is normally found above the parent rock. PWR is defined for engineering purposes as residual material with standard penetration resistances of more than 100 blows per foot. Weathering is facilitated by fractures, joints, and the presence of less resistant rock types. Consequently, PWR and hard rock profiles are irregular, and zones of PWR or rock may occur within the soil mantle well above the general bedrock level. In some cases, boulders can be found in the upper soil matrix.

The natural geology in portions of the site has been modified in the past by grading that included the placement of fill materials. The quality of man-placed fills can vary significantly, and it is often difficult to assess the engineering properties of existing fills. Furthermore, there is no specific correlation between N-values from Standard Penetration Tests performed in soil test borings and the degree of compaction of existing fill soils; however, a qualitative assessment of existing fills can sometimes be made based on the N-values obtained and observations of the materials sampled in the test borings.

Groundwater levels are irregular in the Piedmont Region. The surface of the groundwater table is primarily determined by topography and is generally parallel to the ground surface. It can exhibit some distortions due to differences in vertical and horizontal permeability. The groundwater table can fluctuate several feet with seasonal rainfall.

Based on the online Soil Survey of Gwinnett County, Georgia, as prepared by the US Department of Agriculture Soil Conservation Service, a summary of the predominant soil types (within the upper 5 feet below original grade) at the site and their characteristics is included in the following table and a map of the various soil types is provided in Appendix A of this report.

US Department of Agriculture Soil Conservation Service - Soil Survey					
Soil Type	Map Unit Symbol	Constituents	Parent Material	Internal Drainage	Seasonal High-Water Table (inches)
Altavista fine sandy loam, 0 to 2 percent slopes	AkA	Fine sandy loam, sandy clay loam, sandy loam	Alluvium	Moderately Well drained	18 to 30
Appling sandy loam, 6 to 10 percent slopes, moderately eroded	AmC2	Sandy loam, sandy clay loam, sandy clay	Residuum	Well drained	80+
Appling sandy clay loam, 6 to 10 percent slopes, eroded	AnC2	Sandy clay loam, sandy clay	Residuum	Well drained	80+
Appling-Hard Labor complex, 2 to 6 percent slopes	ApB	Sandy loam, sandy clay	Residuum	Well drained	80+
Chewacla silt loam, 0 to 2 percent slopes, frequently flooded	Cfs	Silt loam, silty clay loam, sandy clay loam	Alluvium	Somewhat poorly drained	6 to 24
Cecil sandy loam, 2 to 6 percent slopes, moderately eroded	CYB2	Sandy loam, clay loam, clay	Residuum	Well drained	80+
Cecil sandy loam, 6 to 10 percent slopes, moderately eroded	CYC2	Sandy loam, clay loam, clay	Residuum	Well drained	80+
Cecil sandy loam, 10 to 15 percent slopes, eroded	CYD2	Sandy loam, sandy clay loam, clay	Residuum	Well drained	80+
Gwinnett loam, 6 to 10 percent slopes, eroded	GgC2	Loam, clay sandy clay loam	Residuum	Well drained	80+
Gwinnett loam, 10 to 25 percent slopes, eroded	GgE2	Loam, clay sandy clay loam	Residuum	Well drained	80+
Hard Labor sandy loam, 2 to 6 percent slopes	HdB	Sandy loam, coarse sandy loam, clay, sandy clay loam	Residuum	Moderately Well Drained	30 to 39
Pacolet sandy loam, 2 to 6 percent slopes, moderately eroded	PfB2	Sandy loam, clay loam, sandy loam	Residuum	Well drained	80+
Pacolet sandy loam, 6 to 10 percent slopes, moderately eroded	PfC2	Sandy loam, clay loam, sandy loam	Residuum	Well drained	80+

US Department of Agriculture Soil Conservation Service - Soil Survey					
Soil Type	Map Unit Symbol	Constituents	Parent Material	Internal Drainage	Seasonal High-Water Table (inches)
Pacolet sandy clay loam, 10 to 15 percent slopes, moderately eroded	PgD2	Sandy loam, clay, sandy clay loam, sandy loam	Residuum	Well drained	80+
Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	PgE2	Sandy loam, clay, sandy clay loam, sandy loam	Residuum	Well drained	80+
Toccoa fine sandy loam, 0 to 4 percent slopes, frequently flooded	ToA	Fine sandy loam, sandy loam	Alluvium	Moderately well drained	30 to 60
Water	W	Water	N/A	N/A	N/A
Wehadkee soils, 0 to 2 percent slopes, frequently flooded	Wed	Silt loam, loam, clay loam, sandy clay loam	Alluvium	Poorly drained	0 to 12
Wedowee sandy loam, 10 to 25 percent slopes, eroded	WrE2	Sandy loam, loam sandy clay, sandy clay loam	Residuum	Well Drained	80+

3.0 FIELD EXPLORATION AND LABORATORY TESTING

The insert titled *Subsurface Exploration Procedures* in Appendix B explains our exploration procedures in greater detail. Our scope of work included drilling nine (9) SPT test borings. Our borings were located using a handheld GPS unit and other approximate methods, which include measuring distances from existing site features. The approximate boring locations are shown on the Exploration Location Diagrams in Appendix A.

Elevations: The topographic data and elevations referenced in this report and shown on the included test logs were estimated using the Geotech Scope of Work provided in Drawing Page reference in Table 3-2. The elevations and locations provided by ECS have not been ground-surveyed by a licensed surveyor and are therefore not certified by ECS as correct. The users of the reported elevations do so at their own risk.

3.1 SUBSURFACE CHARACTERIZATION

Data from the soil test borings is included in Appendix B. The subsurface conditions discussed in the following paragraphs and those shown on the boring logs represent estimates of subsurface conditions based on interpretations of the boring data using commonly accepted geotechnical engineering judgments. Please refer to the individual boring logs in the Appendix for more detailed information. We note that the transition between different soil strata is usually less distinct than that shown on the boring logs.

Stratum	Description	Ranges of SPT ⁽¹⁾ N-values (bpf ⁽²⁾)
N/A	<p>Asphalt and Gravel Base – The surface layer in Borings B-2 through B-9 was asphalt pavement, observed to be approximately 3.25 inches to 9.75 inches in thickness. Beneath the asphalt is an aggregate base varying in thickness from approximately 3 to 4 inches at the test locations. Asphalt and gravel thicknesses are expected to be variable across the paved portions of the project site.</p> <p>Topsoil – The surface layer at boring B-1 consisted of approximately 6 inches of topsoil. Thicknesses are expected to be variable across the project site.</p>	N/A
I	<p>Fill⁽³⁾ – Soils described as fill/probably fill soils were encountered in seven of the nine borings across the site (all but B-3 and B-4), consisting of stiff to hard sandy Silt/sandy elastic Silt (ML/MH), and medium dense clayey Sand (SC). The depths of the fill/probable fill soils are approximately 3 to 8 feet below the ground surface at each location. Additional fill materials will likely be encountered at other locations between our widely spaced borings. Depths at other locations may exceed the 3 to 8 feet encountered during our exploration. Blow counts in fill are likely inflated due to the presence of rock fragments.</p>	9 to 31
II	<p>Alluvium⁽⁴⁾ – The borings located along Pew Creek Tributary (B-2) encountered alluvium soils beneath the fill soils. The alluvium was described as very loose to loose, poorly graded Sand with silt (SP-SM) and stiff sandy lean Clay (CL). The alluvial soils extend to a depth of 11 feet below the existing grade.</p>	W.O.H. ⁽⁵⁾ to 10
III	<p>Residual Soils – Residual soils were encountered beneath the surface, fill/probably fill, or alluvial soils in all the borings. Residual soils were generally described as loose to dense silty Sand (SM) and firm to very stiff sandy Silt/sandy elastic Silt (ML/MH).</p>	6 to 91
IV	<p>Partially Weathered Rock⁽⁶⁾ – Partially Weathered Rock (PWR), generally described as silt sand (SM), was found at a depth of about 20 feet below the existing grade beneath the residual soil at Boring B-2.</p>	100+
V	<p>Auger Refusal Materials⁽⁶⁾ – Auger refusal was not encountered in the borings performed to their respective termination depths.</p>	N/A

Notes:

1. Standard Penetration Testing.
2. Blows per foot.
3. Fill may be any material that has been transported and deposited by man. Undocumented fill is considered any material placed without moisture-density records from the time it was placed initially.
4. Alluvium is material transported and deposited by water.
5. W.O.H. – Weight of Hammer
6. PWR is a transitional material between soil and rock, which retains the relic structure of the rock and exhibits Standard Penetration resistances greater than 100, but still can be penetrated by the power auger.
7. Auger refusal is a designation applied to any material that cannot be further penetrated by the power auger and is normally indicative of a very hard or very dense material, such as boulders, rock lenses, or the upper surface of bedrock.

3.2 GROUNDWATER OBSERVATIONS

Groundwater was encountered during drilling at one of the nine borings (B-2), at a depth of 6 feet below ground surface, corresponding to an elevation of 984 feet. Water-level measurements are shown in our boring logs in Appendix B. Variations in groundwater levels can result from changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

Summary of Subsurface Conditions									
Boring No.	Approximate Elevation* (ft)	Existing Fill Material		Alluvial Soils (ft)		End of Boring (ft)		Groundwater	
		Approx. Depth (ft)	Approx. Elevation*	Approx. Depth (ft)	Approx. Elevation*	Approx. Depth (ft)	Approx. Elevation*	Approx. Depth (ft)	Approx. Elevation*
B-1	1004	4	1000	NE	-	10	994	NE	-
B-2	990	2	988	11	979	20	970	6	984
B-3	1006	NE	-	NE	-	11.1	994.9	NE	-
B-4	1031	NE	-	NE	-	10.6	1020.4	NE	-
B-5	1042	5	1037	NE	-	10.7	1031.3	NE	-
B-6	1062	8	1054	NE	-	10.6	1051.4	NE	-
B-7	1096	6	1090	NE	-	10.8	1085.2	NE	-
B-8	1028	8	1020	NE	-	10.7	1017.3	NE	-
B-9	1032	6	1026	NE	-	10.8	1021.2	NE	-

Notes:

* - Approximate elevations are estimated from the plans provided and the Geotech Scope of Work.

The above table describes the general subsurface conditions reported in the borings. Please refer to the individual boring logs in the Appendix for more detailed information.

3.3 LABORATORY TESTING

Classification and index property tests were performed by ECS on representative soil samples obtained from the test borings to aid in classifying soils according to the Unified Soil Classification System and to quantify and correlate engineering properties. Laboratory testing included moisture content testing, Atterberg Limits, and washed sieve gradation analyses. The results of the laboratory testing program are included in Appendix C.

Each sample was visually classified based on texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

3.4 PAVEMENT CORES

The approximate asphalt and GAB thickness at each specific boring performed within the existing pavements is presented in the following table:

Asphalt and GAB Thickness at Test Locations		
Boring No.	Approximate Asphalt Thickness (in)*	Approximate GAB/Gravel Thickness (in)*
B-1	Not Performed	Not Performed
B-2	9.75	3
B-3	9.25	4
B-4	3.5	4
B-5	3.75	4
B-6	3.25	4
B-7	5.25	4
B-8	4	4
B-9	5.5	4
C-1	3	4
C-2	3.75	4
C-3	6.5	4

*Conditions/thicknesses can and will vary at other locations across the site.

4.0 DESIGN RECOMMENDATIONS

4.1 IMPACTS ON WATER CONSTRUCTION

A proposed conceptual layout of the project alignment is shown in Figures 2 through 10 in Appendix A. Geotechnical-related concerns identified during this study that may impact the project include: 1) the presence of alluvial soils and loose residual soils, 2) the presence of shallow groundwater, 3) the presence of undocumented fill, and 4) the presence of moisture-sensitive soils. Each of these concerns is discussed in more detail in the following sections of this report.

4.1.1 Geotechnical Implications of Alluvial Soils and Loose Residual Soil

Alluvial Soils: Boring B-2 encountered alluvial soils to a depth of approximately 11 feet below the existing grade. This boring was near Pew Creek. Alluvial soils should be anticipated in the portions of the alignment near the creek and adjacent wetland areas along the alignment. The alluvial soils are depicted as Toccoa fine sandy loam (ToA) and Wehadkee soils (Wed) on the soil survey map attached to this report.

Loose Residual Soils: As mentioned, portions of the residual soils were of lower consistency, with N-values of 6 to 8 bpf at depths near the existing groundwater table. Loose soils with lower N-values near the groundwater table can often be unstable and/or provide poor to marginal support for foundations.

Upon stripping the topsoil/root system in these described areas, soft alluvial/residual soils and shallow groundwater could be encountered. Where these conditions are encountered, the exposed subgrade will likely be highly unstable which could require remedial efforts, including partial undercutting, dewatering, and replacement within the cut sections.

During installation of the new 8-inch DIP watermain, the proposed bearing surface should be evaluated in the field by an ECS representative. We typically recommend using 6 to 12 inches of #57 stone for bedding. Additional remedial efforts and stabilization may be required depending on the conditions encountered during construction.

4.1.2 Design Implications of High Groundwater

Shallow groundwater was encountered at boring B-2 at an elevation near or above the planned elevation of the proposed 8-inch DIP watermain. Temporary and permanent dewatering efforts using sump pumps and French drains may be required before earthwork operations or construction on this site. *Depending on the invert grade at the bottom of the 8-inch water main, groundwater may be encountered. We recommend that the designer plan for buoyancy/uplift conditions.*

4.1.3 Implications of Undocumented Fill

As previously noted, undocumented fill materials were encountered in seven (7) borings to depths ranging from approximately 3 to 8 feet below the existing ground surface. Based on the proposed average depth of 2 to 6 feet for the new water main, it appears that some of the existing fill soils (where encountered) may be removed during excavation and general construction. However, some deeper fills may exist between the borings in other portions of the project alignment.

Lower consistency fill soils may not provide adequate support for the new watermain. If very soft soils or pockets of debris, organics, stumps, etc., exist below the proposed pipe invert elevations and are not removed during construction, localized excessive differential settlements could occur in response to ongoing volume changes in the fill. If deeper fill soils do exist in other sections of the project, some remedial efforts may be required.

During installation of the new 8-inch DIP watermain, the proposed bearing surface should be evaluated in the field by an ECS representative. Any soft or poor-quality fill soils that may be observed should be over-excavated 1 to 2 feet below the proposed invert elevation and replaced with #57 stone, GAB, or other acceptable fill. The actual extent of this over-excavation will be determined at the time of construction. We typically recommend using 6 to 12 inches of #57 stone for bedding, depending on the conditions encountered.

4.1.4 Moisture-Sensitive Soils

Based on the laboratory test results, fine-grained soils were encountered directly beneath the surface layer, which have elevated natural moisture. The silty/clayey site soils are moisture-sensitive and will become unstable when their moisture content exceeds their optimum. Adequate site drainage should be implemented at the onset of construction and maintained throughout the construction process. Care should be taken to keep construction traffic to a minimum during wet periods. Water should not be allowed to pond in construction areas. If these materials are reused as structural backfill in areas of existing pavements or driveways, we recommend blending them with more sandy soils to reduce their plasticity.

An ECS representative should evaluate wet soils. These soils may require reworking (scarification, aeration, and re-compaction) or removal. This will need to be determined at the time of construction. Some undercutting of the soft silty soils, if encountered during construction, should be anticipated during building pad and pavement subgrade preparation. ***Reworking (aeration and drying) wet soils should be expected by the site grading contractor and accounted for in the construction schedule.***

4.2 UTILITY INSTALLATIONS

4.2.1 Utility Subgrades

The soils encountered during our exploration are expected to be generally suitable for supporting the 8 inch watermain. ECS should observe and probe the pipe subgrades for stability. Any loose or poor-quality materials encountered should be removed and replaced with suitable compacted Engineered Fill or pipestone bedding material.

4.2.2 Utility Backfilling

The granular bedding material should be at least 4 inches thick, but not less than that specified by the civil engineer's project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill materials for backfill over pipes should consist of approved material free of organic matter and debris, with rocks less than 6 inches, and a Liquid Limit less than 50 and a Plasticity

Index less than 20. Unacceptable fill materials include topsoil, organic materials, lightweight material with a maximum dry density of less than 95 pcf, and highly plastic silts and clays. As mentioned, highly plastic silts (MH) were encountered in some borings, which will require blending with sandier soils to reduce their plasticity prior to use as engineered fill.

Unsuitable materials removed during grading operations should be either stockpiled for later use in landscaped areas or placed in approved disposal areas, either on-site or off-site.

Fill operations should be monitored on a full-time basis by a qualified soil technician from ECS to ensure that the minimum compaction requirements are met. At least one compaction test should be conducted for every one-foot compacted lift. The elevation and location of the tests should be clearly identified and recorded at the time of fill placement.

Fill materials should be placed in lifts not exceeding one (1) foot in thickness, loose, and moisture-conditioned to within +/- 3 percent of the optimum moisture content to facilitate proper compaction. Controlled fill soils should be compacted to a minimum of 95 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method.

4.2.3 Excavation Safety

All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

4.2.4 Temporary Dewatering

The contractor shall make their own assessment of temporary dewatering needs based upon the limited subsurface groundwater information presented in this report. If the contractor believes additional subsurface information is needed to assess dewatering needs, they should obtain such information at their own expense. ECS makes no warranties or guarantees regarding the adequacy of the provided information to determine dewatering requirements; such recommendations are beyond our scope of services.

Dewatering systems are a critical component of many construction projects. Dewatering systems must be selected, designed, and maintained by a qualified and experienced (specialty or other) contractor familiar with the project's geotechnical and other aspects. The failure to properly design and maintain a dewatering system for a given project can result in delayed construction, unnecessary foundation subgrade undercuts, detrimental phenomena such as 'running sand' conditions, internal erosion (i.e., 'piping'), the migration of 'fines' down-gradient towards the dewatering system, localized settlement of nearby infrastructure, foundations, slabs-on-grade and pavements, etc. Water discharged from any site dewatering system shall be discharged in accordance with all local, state, and federal requirements.

4.2.5 Stabilization of Wet or Soft Subgrades

If wet or soft subgrades are encountered during subgrade preparation, ECS should be notified so the conditions can be evaluated and further recommendations provided. Stabilization of soft or wet subgrades should be performed before placing new engineered fill for the embankment.

Conceptually, subgrade stabilization involves removing the surface vegetation, topsoil, and soft soils down to a firm subgrade. The exposed subgrade should be dewatered. Pumps and /or diversion trenches should be used to remove the standing water. This should be performed under the on-site ECS representative's observation.

Once the subgrade is de-watered and stripped to a firm subgrade, the bottom of the excavation should be covered with a woven geosynthetic for soil stabilization and reinforcement, such as Mirafi® 600X geotextile (or similar strength material). The geosynthetic should then be covered with approximately 12 to 18 inches of #57 stone to provide a firm working surface, protect the geotextile, and reduce subgrade pumping. Adjacent layers of geosynthetic or geogrid should be overlapped a minimum of 18 inches.

The stone should be spread across the geosynthetic and densified with lightweight tracked equipment. Care should be taken to avoid contact of the tracked equipment with the geosynthetic. A second layer of geotextile fabric should be placed over the stone before filling with soil fill or additional aggregate (ABC or #57 stone).

5.0 PAVEMENT RECOMMENDATIONS

5.1 PAVEMENT ASSESSMENT

As indicated in the table in Section 3.6 Pavement Cores, the approximate asphalt and GAB thicknesses in the Forest Hills roadways are variable. Most of the existing pavement and GAB thicknesses in community drive lanes appear typical for light-duty to medium-duty pavements, except for the following locations, B-2 and B-3, where asphalt extends to 9+ inches in thickness, and there is no apparent GAB section.

The most common types of pavement distress we observed were block cracking and load cracking, also known as “Alligator” cracking. These pavement distresses are defined below.

Block Cracking: Block cracking is a series of large (typically one foot or more), rectangular cracks on an asphalt pavement surface. This type of cracking typically covers large areas and may occur in areas with no traffic. Block cracking is typically caused by asphalt pavement shrinkage due to temperature cycles.

Load Cracking: Load cracking, also known as alligator cracking, is characterized by interconnected cracks resembling an alligator's skin. Load cracking is caused by load-related deterioration resulting from a weakened base course or subgrade, too little pavement thickness, overloading, age, or a combination of these factors.

Based on the results of our field observations and laboratory services, as well as our experience with similar projects, the primary causes of the pavement distress within the subject study area appear to be:

- The age of the existing asphalt where block cracking is present,
- A combination of age and softened/weakened subgrade conditions due to water infiltration through the cracks in the pavement.

5.2 PAVEMENT REPAIR OPTIONS

For this evaluation, subgrade soils are generally silty Sands (SM), clayey Sands (SC), and sandy Silts/Elastic Silts (ML/MH) with an estimated CBR of 4.0.

The following pavement repair and/or reconstruction options to consider include Mill and Overlay with isolated full-depth reconstruction, full-depth reconstruction, Full Depth Reclamation (FDR), and partial reconstruction. Repair of the subgrade may require geogrid stabilization in some areas. Reconstruction is hard to predict in terms of costs and is generally constructed more slowly than FDR. These four options are discussed in more detail in the following sections.

5.2.1 Mill and Overlay

Based on historical imagery, the asphalt appears to have been in place for more than 20 years and, in our opinion, has reached the end of a typical pavement design life. Because the pavements are old and exhibit moderate to severe cracking in some areas, extending their life through an overlay will likely increase long-term maintenance costs.

If the existing fatigue and block cracks extend completely through the existing pavements, then the remaining pavement section would likely exhibit the same fatigue cracks and block cracks below the top of the milled pavement section. Any cracks in the remaining pavement section could potentially reflect upward through the new asphalt pavement overlay.

To mitigate reflective cracking through an overlay, a geosynthetic product such as GlasPave® (or similar) could reduce the risk of reflective cracking and potentially extend the life expectancy of the new pavement. These types of geosynthetics are typically installed between the top of the remaining asphalt and the new asphalt overlay, in accordance with specific product installation guidelines and recommendations. However, if the existing pavement is milled and repaved with an overlay, the owner must accept the risk of reduced pavement life expectancy, including premature failures and the need for corrective measures.

If Milling and inlay is selected as the repair option, partial reconstruction will be required in sections where excavation of the water main will occur and in areas where the asphalt is insufficient after milling. The recommended minimum remaining asphalt thickness is 2 inches. We anticipate that the pavements may be repaved using standard mill-and-inlay construction methods. We recommend a mill depth of 1.5 inches of the existing pavement and a minimum inlay depth of 1.5 inches, as indicated in the table below.

Minimum Mill-and-Inlay Flexible Pavement Section			
Material	Course	Thickness	Spread Rate
9.5 Type II Superpave	Surface	1.5 inches	165 lbs./yd ²

It is possible that during the milling process, isolated areas of load- or fatigue-related cracking may become evident, and that some full-depth patches may be required, particularly in sections such as borings B-4, B-5, and B-6, where the remaining asphalt may be below the recommended remaining thickness of 2 inches. To better help determine these locations, we would recommend that, before the milling and overlay process, it may be prudent to core the pavement at additional locations to better determine the pavement and GAB thickness in unexplored areas of the two, and to determine if the present cracks extend completely through the asphalt to the underlying GAB layer.

5.2.2 Full Depth Reconstruction

This option includes the complete removal of the existing asphalt and GAB, and reconstruction per the recommended thicknesses contained in the table below. The remaining paragraphs and pavement section recommendation are provided if full-depth reconstruction is desired and selected.

As mentioned, based on the observed fatigue cracking, portions of the underlying soil subgrade may be unstable and require remedial efforts. After removal of the pavement materials, the soil subgrade should be observed to identify areas of instability. The evaluation should include proofrolling with a loaded dump truck having an axle weight of at least 10 tons, or with other similar equipment, to identify soft or yielding areas.

The need for subgrade repair is best determined at the time of construction and may include replacing poor subgrade soils with new engineered fill and, where necessary, using a geogrid such as Tensar InterAx NX750 or a similar product to stabilize the subgrade.

The thickness of a pavement section depends on many factors, including the volume and type of traffic that the proposed pavement will experience, the condition of the subgrade materials, the desired design life, and the level of serviceability. The pavement design discussed in this section is based on AASHTO guidelines, assuming the subgrades are repaired (as needed) or are unyielding during proofrolling.

Recommended Minimum Medium-Duty Flexible Pavement Section	
Material Designation	Medium-Duty Reconstructed Thickness (in.) – Option 1
Asphalt Surface Course (9.5 mm Type II Superpave)	1
Asphalt Surface Course (19 mm Type II Superpave)	2
Graded Aggregate Base (GAB)	6

Base course materials beneath pavements should be compacted to at least 98% of the modified Proctor maximum dry density (ASTM D1557). The asphalt concrete and all crushed stone materials should conform to the GDOT Standard Specifications.

An important consideration with the design, construction, and performance of pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrades and other problems related to weak subgrade can be expected. Furthermore, good drainage should help reduce the likelihood that subgrade materials will become saturated during the pavement's normal service life.

5.2.3 Full Depth Reclamation (FDR)

FDR is a pavement rehabilitation technique in which the asphalt, underlying aggregate, and subbase soils are ground together to form a combined material of these components. This new material is subsequently combined with cement and water to create a semi-rigid base layer that supports a new asphalt layer. FDR is a predictable process and is relatively quick. Generally, pavement installed over a newly constructed FDR base will be covered by a warranty from the pavement contractor.

This technique typically includes milling a portion of the existing pavement, and then mixing the remaining asphalt pavement, GAB, and subgrade soils to a pre-determined design depth, mixing the millings with cement, and compacting the mixture to create a new firm base to support the proposed asphalt pavement. Although the actual mix design for FDR is typically the contractor's responsibility, we have historically observed cement content in the range of 3 to 7 percent by weight in the FDR base material. We recommend performing an FDR mix design to determine the required amount of cement to achieve a stable pavement base. The mix design includes laboratory testing to determine the cement dosage and the combination and number of materials that yield the best pavement support with anticipated onsite materials.

The FDR typically requires a fine-grained material, which is usually obtained by extending tilling below the existing GAB. As mentioned, Location P-4 appeared to have no GAB beneath the asphalt. The specialty FDR paving contractor may require additional testing to determine the existing pavement thickness at other locations.

The FDR method has been used on similar projects in lieu of the traditional remove-and-replace method to provide an adequate pavement section at a lower cost, with improved construction times and less interference with ongoing operations during pavement rehabilitation/repair. After the FDR is installed, the FDR base is topped with a new asphalt surface course. The table below lists our recommendations for the FDR option.

Recommended Minimum FDR Flexible Pavement Section

Material Designation	Recommended Medium-Duty FDR Thickness (in.)
Asphalt Surface Course	2

(9.5 mm Type II Superpave)	
Asphalt Surface Course (19 mm Type II Superpave)	-
Full Depth Reclamation (FDR)	8

5.2.4 Partial Reconstruction

For some projects, it is occasionally possible to reuse portions of the existing GAB pavement sections. With the option to perform partial reconstruction, the existing asphalt pavement layer would be removed, leaving the existing GAB layer in place. After pavement removal, the paving contractor would need to perform some grading to recreate a relatively smooth top on the GAB layer. The GAB should then be evaluated by proofrolling with a loaded dump truck having an axle weight of at least 10 tons or other similar equipment to identify soft or yielding areas. The GAB may remain in place if the conditions are found to be stable. However, the GAB should be re-compacted to meet at least 98% of the modified Proctor maximum dry density (ASTM D1557).

Because the existing GAB thicknesses may be variable and slightly below the recommended GAB thickness for new medium-duty pavement construction, sections of the roadways may require additional GAB, or the pavement sections may be below the recommended thickness. Additional studies may be required to better determine pavement and GAB thicknesses at additional locations.

We anticipate that portions of the underlying GAB and/or soil subgrade may be wet and/or unstable, particularly in areas of observed fatigue cracking. Any unstable GAB and/or subgrade will require remediation. Before repaving, it may be prudent to core or pothole the GAB at additional locations to better determine the GAB thickness in other areas of the existing GAB.

The need for subgrade repair is best determined at the time of construction and may include replacing poor subgrade soils with new engineered fill or using a geogrid such as Tensar InterAx NX750 or a similar product to stabilize the subgrade, where necessary. Stable GAB with insufficient thickness will need to be increased with additional compacted GAB to meet the recommended thickness.

5.3 IMPLICATIONS OF HIGHLY ELASTIC/PLASTIC SOILS

This type of material can occasionally exhibit shrinking and swelling during seasonal moisture fluctuation and typically has lower strength, resulting in increased maintenance over the life of the pavement.

If reconstruction is selected, we would recommend providing a minimum 12-inch separation between any fat Clay (CH) soils and the bottom of the pavement GAB base course. This would help mitigate the effects of a highly plastic, high shrink/swell material if encountered during construction. The separation material could consist of low plasticity engineered fill or GAB material, as discussed below.

5.4 UNDERCUTTING AND FILL PLACEMENT

During pavement reconstruction, subgrade evaluations may indicate the need for selective undercutting to remove unstable subgrade soils. The need for additional undercuts should be determined by the onsite ECS representative during construction. Once the excavation has achieved a firm subgrade, the exposed subgrade should be densified in place.

For subgrade repairs, structural fill materials should consist of GAB or granular material with no more than 50 percent passing the No. 200 sieve, a Liquid Limit less than 40, and a Plasticity Index less than 20. Unacceptable fill materials include topsoil, cultivated soil, low-density soils with a maximum unit weight less than 95 pcf, organic materials, and highly plastic silts and clays.

Grade control should be maintained throughout the fill placement operations. All fill operations should be observed on a full-time basis by a qualified soil technician from ECS to determine that the minimum compaction requirements are being met. A minimum of 1 compaction test should be performed on every lift placed and on every 2,500 square feet. The elevation and location of the tests should be clearly identified and recorded at the time of fill placement.

Fill materials should be placed in lifts not exceeding 8 inches in loose thickness and moisture conditioned to within +/- 3 percentage points of the optimum moisture content to facilitate proper compaction. Controlled fill soils should be compacted to a minimum of 98% of the maximum dry density obtained in accordance with ASTM D698, the standard Proctor method. Subgrades should be "nonyielding" as determined by proofroll inspection before construction. GAB base course materials should be compacted to at least 98% of their modified Proctor maximum dry density (ASTM D1557).

6.0 ADDITIONAL TESTING AND EVALUATION

As mentioned previously, several repair options are provided in the recommendations. If FDR is selected, ECS would like to remain involved with the preliminary design of the FDR. Additionally, all repair option recommendations will require field observation, monitoring, and quality assurance testing during earthwork and pavement installation. These services are an extension of and integral to the geotechnical design recommendation. We recommend that Gwinnett County DWR retain these quality assurance services and that ECS be allowed to continue our involvement throughout these critical phases to provide general consultation if any issues arise.

7.0 CLOSING

ECS has prepared this report to guide the geotechnical aspects of the project's design and construction. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of a similar size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided by Gwinnett County DWR to ECS. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

We recommend that ECS review the project plans and specifications to confirm they are in accordance with the recommendations of this geotechnical report.

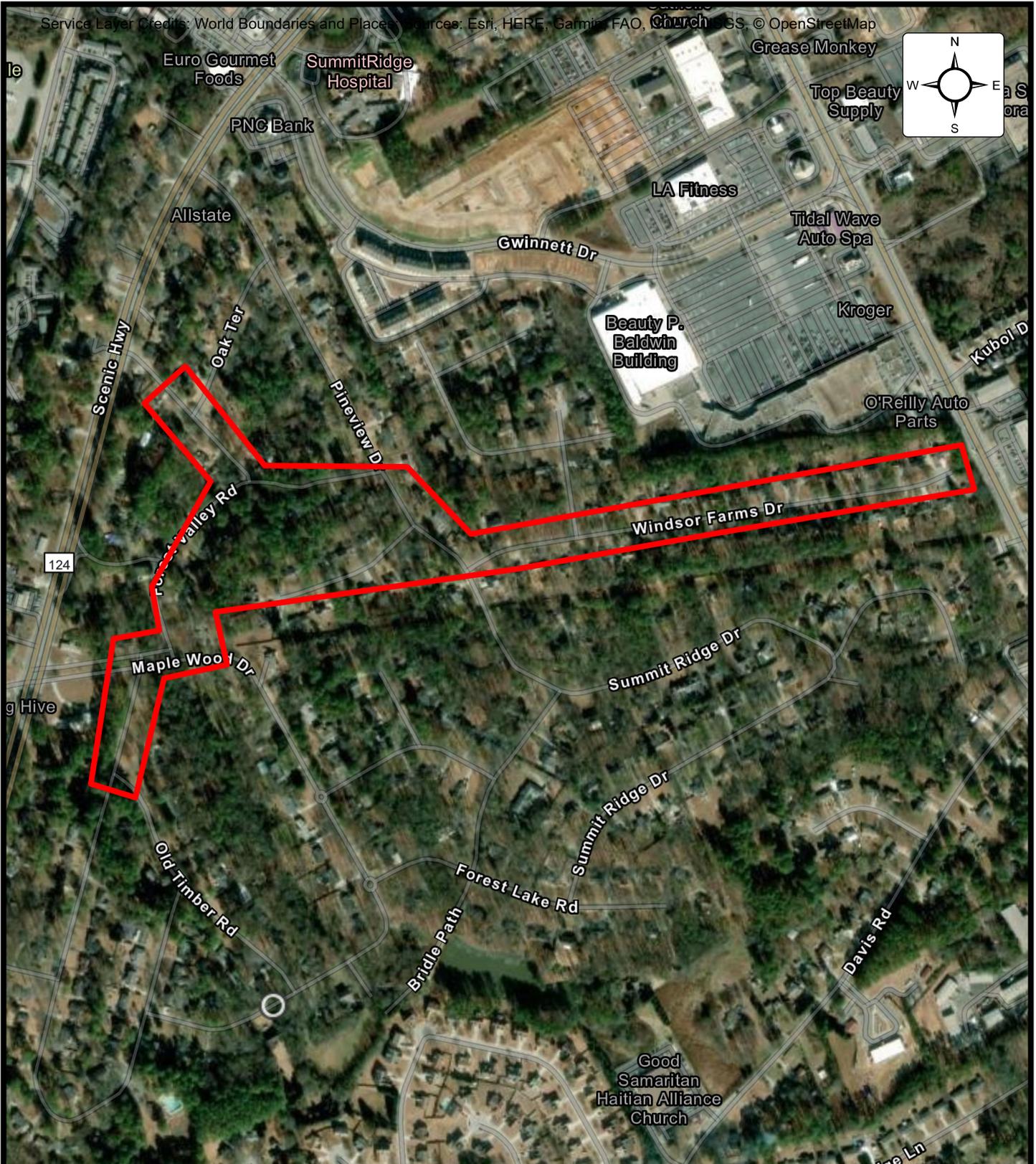
Field observations and quality assurance testing during earthwork and foundation installation are an extension of and integral to the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendations should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Drawings & Reports

Figure 1 - Site Location Diagram

Figures 2 to 13 – Exploration Location Diagrams



Service Layer Credits: World Boundaries and Places Sources: Esri, HERE, Garmin, FAO, OpenStreetMap

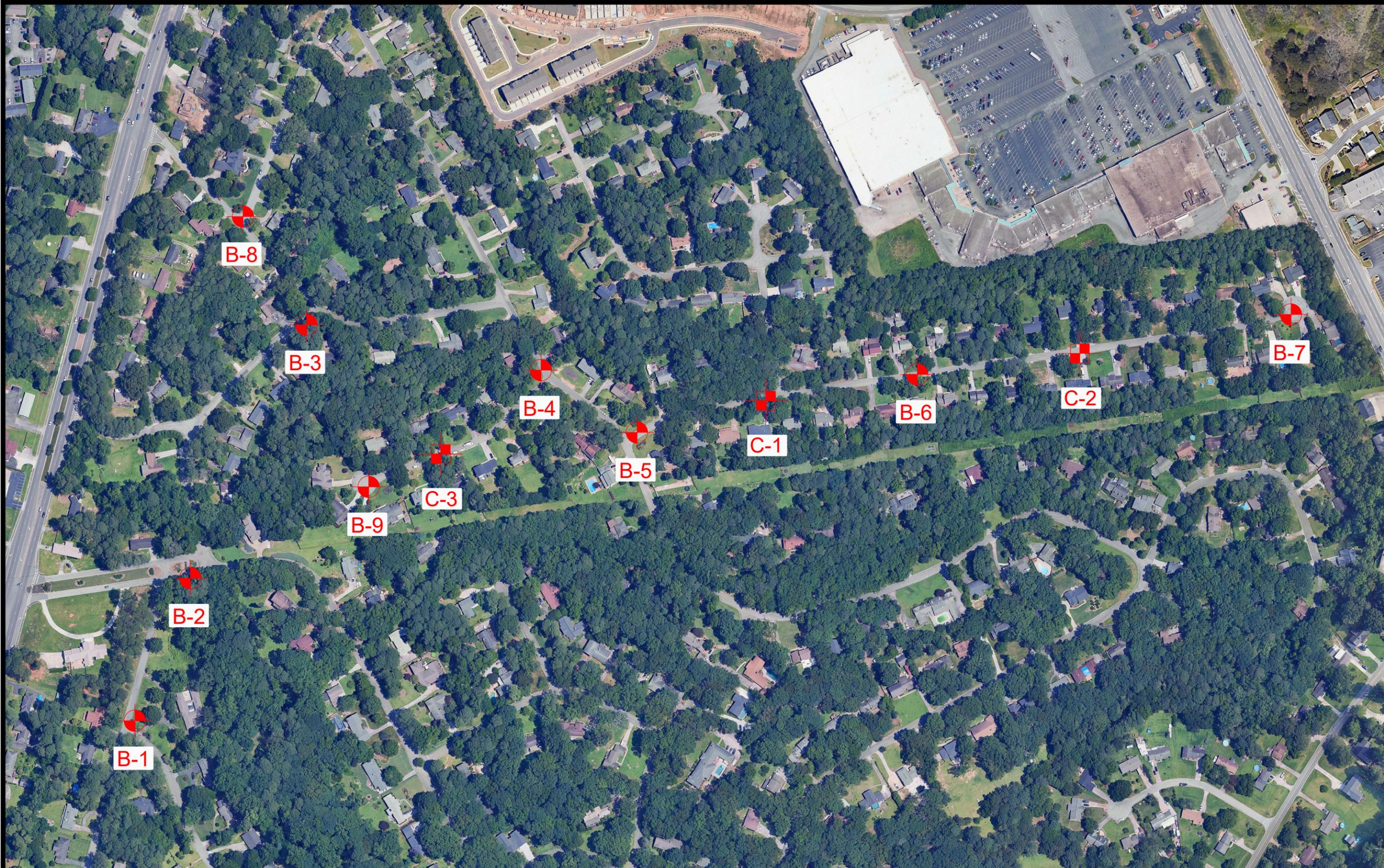


SITE LOCATION DIAGRAM
M-0737-06 Forest Valley Water Main
Replacement Project

Maple Wood Drive, Lawrenceville, Georgia

Gwinnett County DWR

ENGINEER RHB
SCALE 1" = 600'
PROJECT NO. 10:12916
SHEET 1
DATE 1/14/2026



PROJECT: Forest Valley Water Main Replacement
Lawrenceville, GA

PREPARED FOR: Gwinnett County DWR

FIGURE NAME: EXPLORATION LOCATION DIAGRAM

REFERENCE: Google Earth Aerial
06/24/2023

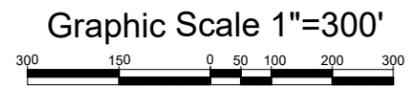
REVISIONS	

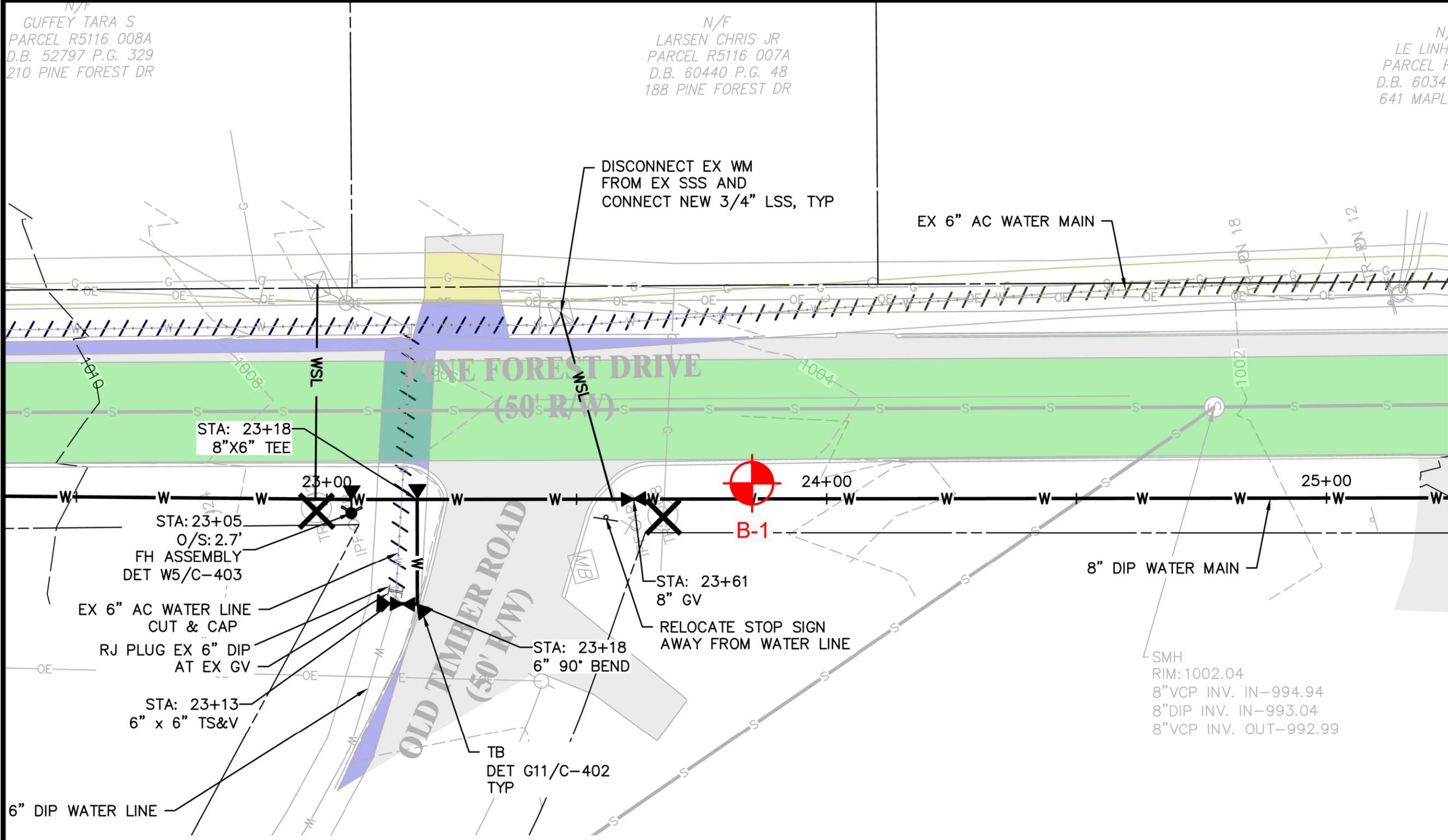
JOB NO.	10:12916
SCALE	1"=300'
DRAWN	ZRT 1/2025
APPR.	TKS 1/2025

Figure No.:
2

LEGEND

- Approximate Boring Location
- Approximate Coring Location
- B-#** Boring Designation
- C-#** Coring Designation

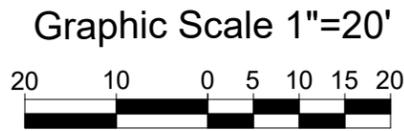




1
PINE FOREST RD WATER MAIN PLAN
 C-202 SCALE: 1"=20'

LEGEND

- +
 Approximate Boring Location
- +
 Approximate Coring Location
- B-#
 Boring Designation
- C-#
 Coring Designation



PROJECT: Forest Valley Water Main Replacement
 Lawrenceville, GA
 PREPARED FOR: Gwinnett County DWR

FIGURE NAME: EXPLORATION LOCATION DIAGRAM
 REFERENCE: Water Main Plan PRIME 08/15/2025

REVISIONS	

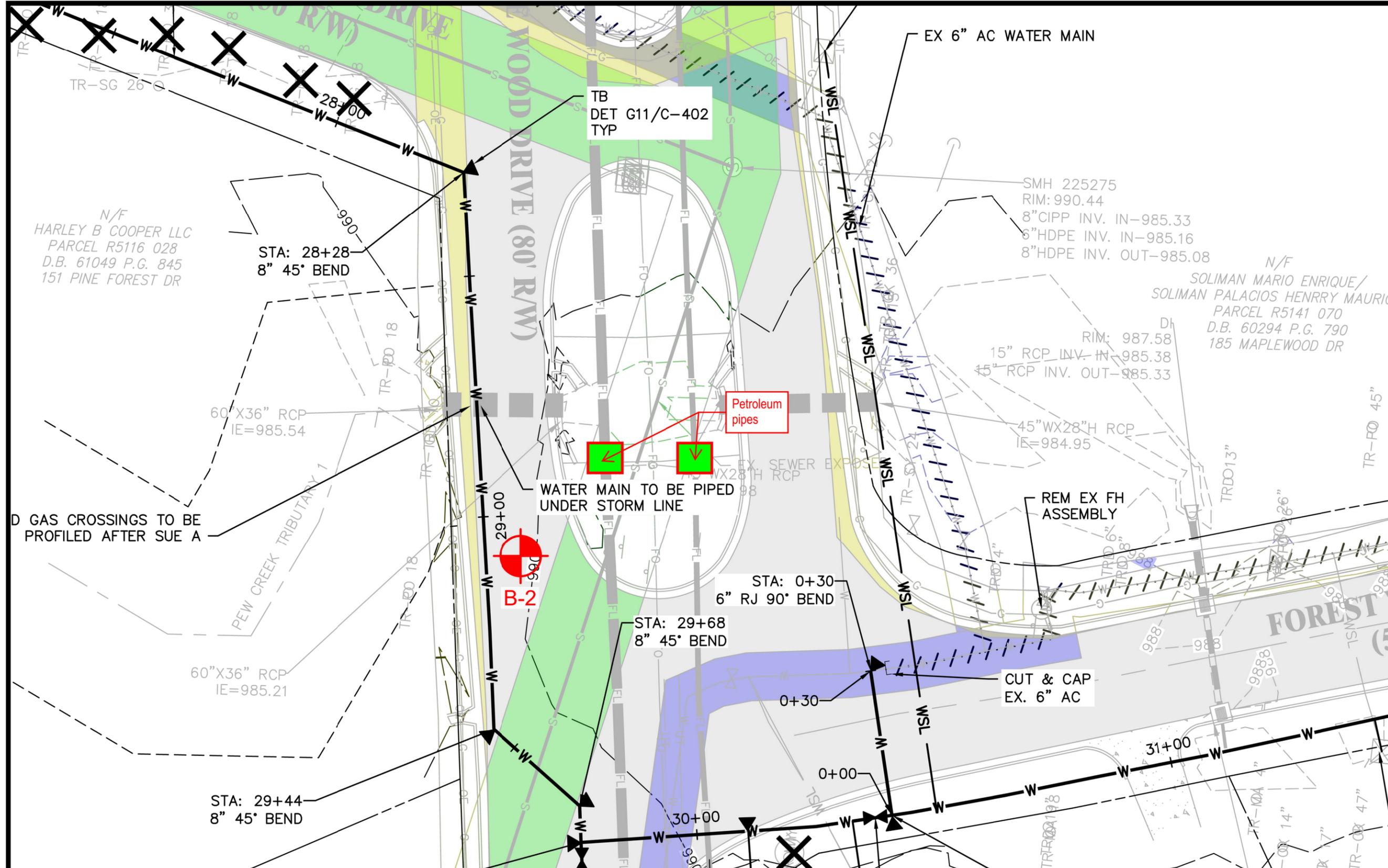
JOB NO. 10:12916
 SCALE 1"=20'
 DRAWN ZRT 1/2025
 APPR. TKS 1/2025

Figure No.: 3

N/F
GUFFEY TARA S
PARCEL R5116 008A
D.B. 52797 P.G. 329
210 PINE FOREST DR

N/F
LARSEN CHRIS JR
PARCEL R5116 007A
D.B. 60440 P.G. 48
188 PINE FOREST DR

N/
LE LINH
PARCEL R
D.B. 6034
641 MAPL



PROJECT: Forest Valley Water Main Replacement
Lawrenceville, GA

PREPARED FOR: Gwinnett County DWR

FIGURE NAME: EXPLORATION LOCATION DIAGRAM

REFERENCE: Water Main Plan PRIME 08/15/2025

REVISIONS	

JOB NO. 10:12916

SCALE 1"=20'

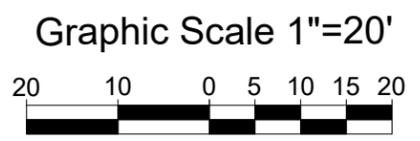
DRAWN ZRT 1/2025

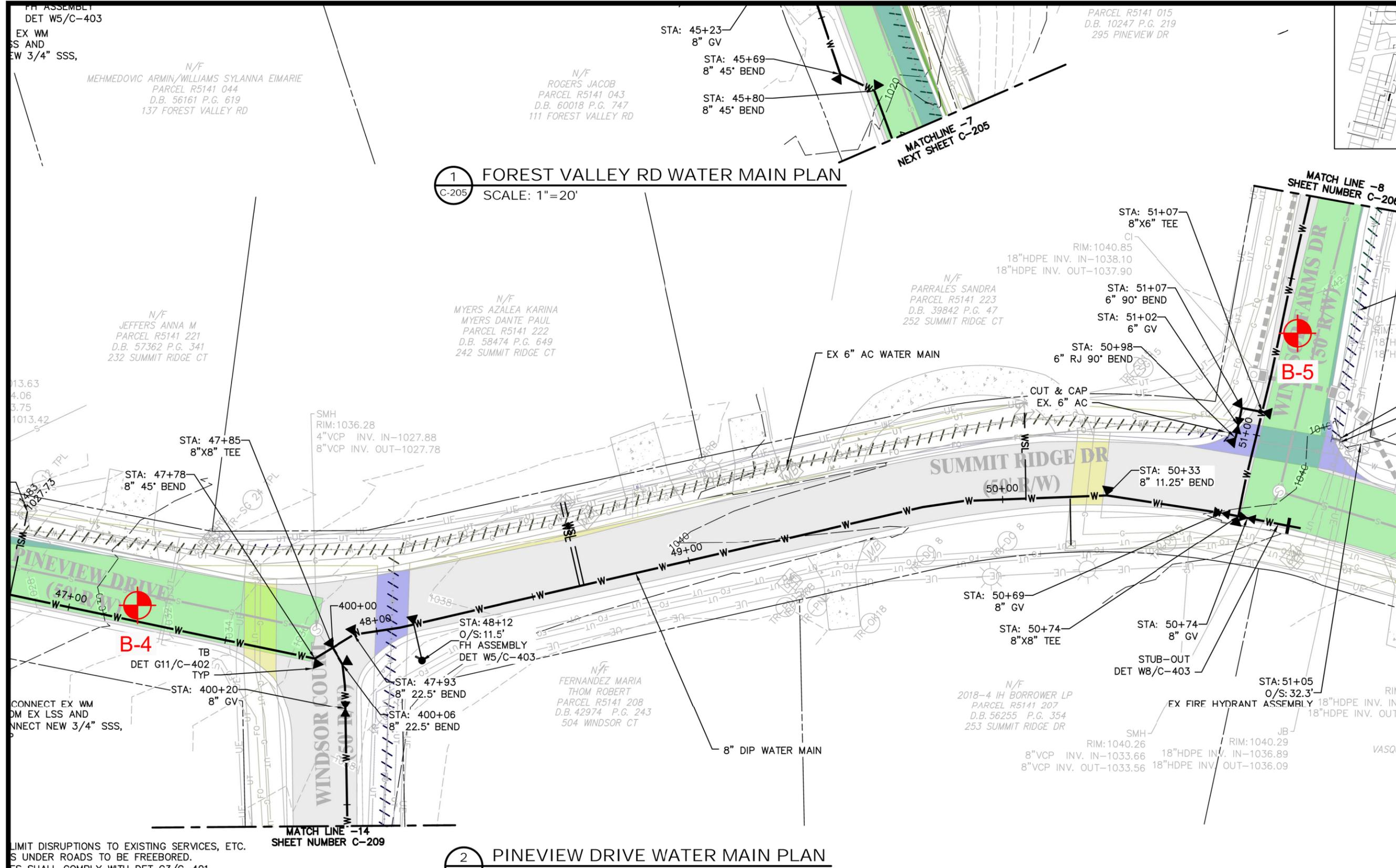
APPR. TKS 1/2025

Figure No.: **4**

LEGEND

-  Approximate Boring Location
-  Approximate Coring Location
- B-#** Boring Designation
- C-#** Coring Designation



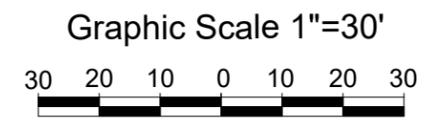


1 FOREST VALLEY RD WATER MAIN PLAN
 SCALE: 1"=20'

2 PINEVIEW DRIVE WATER MAIN PLAN

LEGEND

-  Approximate Boring Location
-  Approximate Coring Location
- B-#** Boring Designation
- C-#** Coring Designation



PROJECT: Forest Valley Water Main Replacement
 Lawrenceville, GA

PREPARED FOR: Gwinnett County DWR

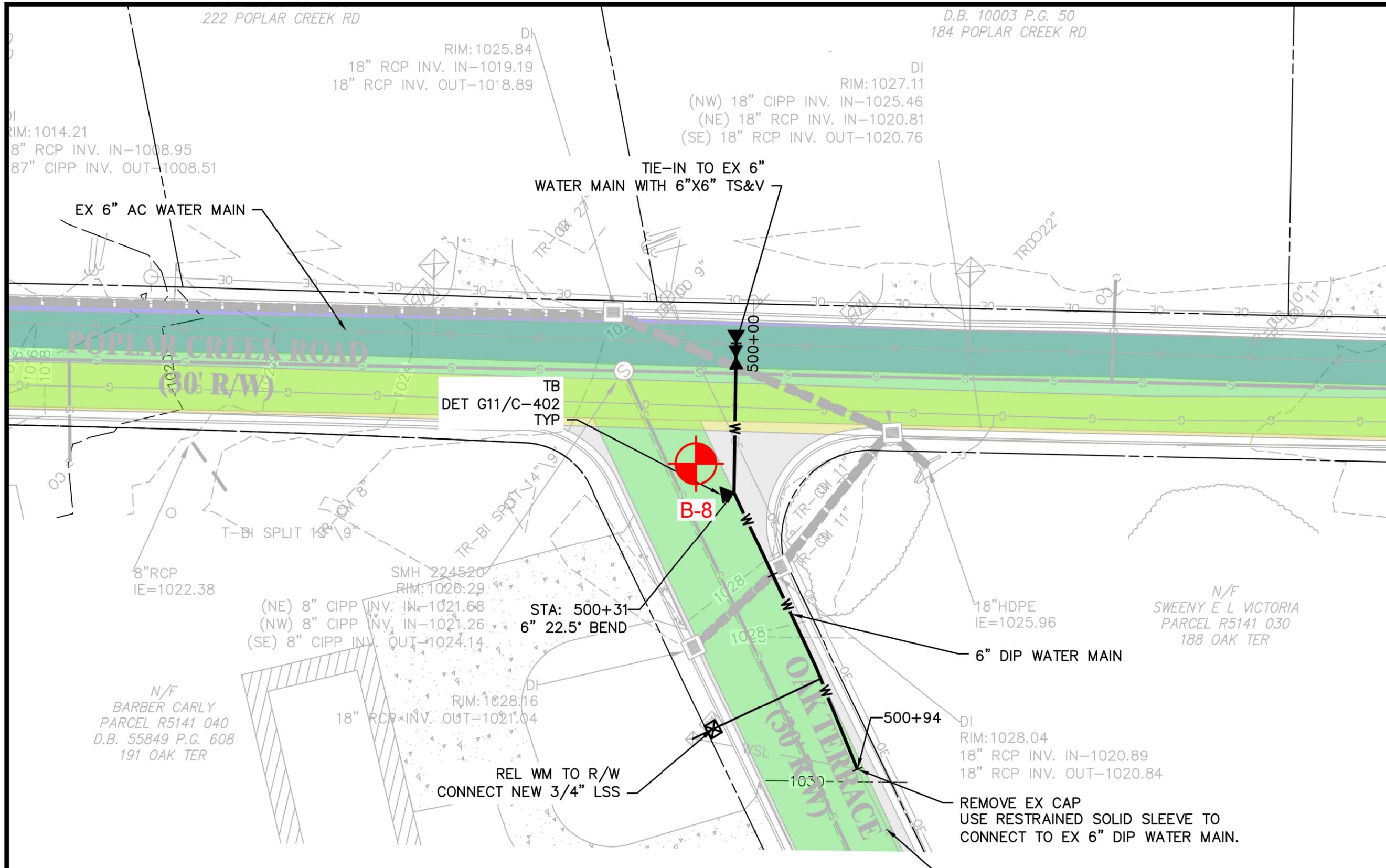
FIGURE NAME: EXPLORATION LOCATION DIAGRAM

REFERENCE: Water Main Plan PRIME 08/15/2025

REVISIONS	

JOB NO. 10:12916
 SCALE 1"=30'
 DRAWN ZRT 1/2025
 APPR. TKS 1/2025

Figure No.: **6**



PROJECT: Forest Valley Water Main Replacement
Lawrenceville, GA

PREPARED FOR: Gwinnett County DWR

FIGURE NAME: EXPLORATION LOCATION DIAGRAM

REFERENCE: Water Main Plan PRIME 08/15/2025

REVISIONS	

JOB NO. 10:12916

SCALE 1"=20'

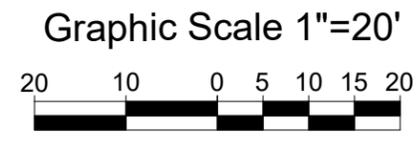
DRAWN ZRT 1/2025

APPR. TKS 1/2025

Figure No.: **11**

LEGEND

- Approximate Boring Location
- Approximate Coring Location
- B-#** Boring Designation
- C-#** Coring Designation





2

3

4

5

6

7

8

N/F
RIVAS EDER E MASS
PARCEL R5141 217
D.B. 61091 P.G. 727
545 WINDSOR CT

N/F
CONNER BARBARA C
CONNER KIPPEN C
PARCEL R5141 218
D.B. 53970 P.G. 263
525 WINDSOR CT

DWCB
RIM: 1031.85
18" CMP INV. OUT-1027.15



C-3

TB
DET G11/C-402
TYP

WINDSOR COURT
(50' R/W)

REM EX FH ASSEMBLY

STA: 403+51
O/S: 17.3'
FH ASSEMBLY
DET W5/C-403

SMH
RIM: 1031.85

DWCB
RIM: 1031.64
18" CMP INV. IN-1026.29
18" CMP INV. OUT-1026.14

N/F
MA CHUN YIP

MATCHLINE -15
NEXT SHEET C-209

DISCON
AND

PROJECT: Forest Valley Water Main Replacement
Lawrenceville, GA

PREPARED FOR: Gwinnett County DWR

FIGURE NAME: EXPLORATION LOCATION DIAGRAM

REFERENCE: Water Main Plan
PRIME
08/15/2025

REVISIONS

JOB NO. 10:12916

SCALE 1"=20'

DRAWN ZRT 1/2025

APPR. TKS 1/2025

Figure No.:

12

LEGEND

Approximate Boring Location

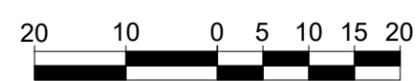
B-# Boring Designation

Approximate Coring Location

C-# Coring Designation



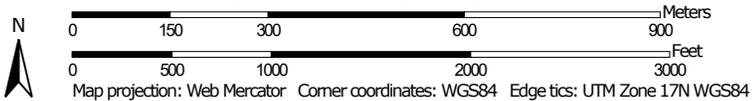
Graphic Scale 1"=20'



Soil Map—Gwinnett County, Georgia
(M-0737-06 Forest Valley Water Main Replacement Project)



Map Scale: 1:11,500 if printed on A landscape (11" x 8.5") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Gwinnett County, Georgia
Survey Area Data: Version 16, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 4, 2023—Feb 18, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AkA	Altavista fine sandy loam, 0 to 2 percent slopes	0.2	0.1%
AmC2	Appling sandy loam, 6 to 10 percent slopes, moderately eroded	68.4	23.1%
AnC2	Appling sandy clay loam, 6 to 10 percent slopes, eroded	0.0	0.0%
ApB	Appling-Hard Labor complex, 2 to 6 percent slopes	48.1	16.3%
Cfs	Chewacla silt loam, 0 to 2 percent slopes, frequently flooded	31.5	10.6%
CYB2	Cecil sandy loam, 2 to 6 percent slopes, moderately eroded	19.1	6.5%
CYC2	Cecil sandy loam, 6 to 10 percent slopes, moderately eroded	50.5	17.1%
CYD2	Cecil sandy loam, 10 to 15 percent slopes, eroded	2.9	1.0%
GgC2	Gwinnett loam, 6 to 10 percent slopes, eroded	1.3	0.4%
GgE2	Gwinnett loam, 10 to 25 percent slopes, eroded	3.6	1.2%
HdB	Hard Labor sandy loam, 2 to 6 percent slopes	3.0	1.0%
PfB2	Pacolet sandy loam, 2 to 6 percent slopes, moderately eroded	2.5	0.8%
PfC2	Pacolet sandy loam, 6 to 10 percent slopes, moderately eroded	6.6	2.2%
PgD2	Pacolet sandy clay loam, 10 to 15 percent slopes, moderately eroded	20.9	7.1%
PgE2	Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	4.0	1.3%
ToA	Toccoa fine sandy loam, 0 to 4 percent slopes, frequently flooded	0.8	0.3%
W	Water	2.3	0.8%
Wed	Wehadkee soils, 0 to 2 percent slopes, frequently flooded	0.8	0.3%
WrE2	Wedowee sandy loam, 10 to 25 percent slopes, eroded	29.4	9.9%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Totals for Area of Interest		295.9	100.0%

APPENDIX B – Field Operations

Exploration Procedures

Reference Notes

Boring Logs B-1 through B-9

Asphalt Core Photographs



SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.



**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.



REFERENCE NOTES FOR BORING LOGS

MATERIAL ^{1,2}	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION	
DESIGNATION	PARTICLE SIZES
Boulders	12 inches (300 mm) or larger
Cobbles	3 inches to 12 inches (75 mm to 300 mm)
Gravel: Coarse	¾ inch to 3 inches (19 mm to 75 mm)
Gravel: Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand: Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
Sand: Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
Sand: Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, QP ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective (ex: "Silty")	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS ⁶	
	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

FILL AND ROCK			
FILL	POSSIBLE FILL	PROBABLE FILL	ROCK

¹Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

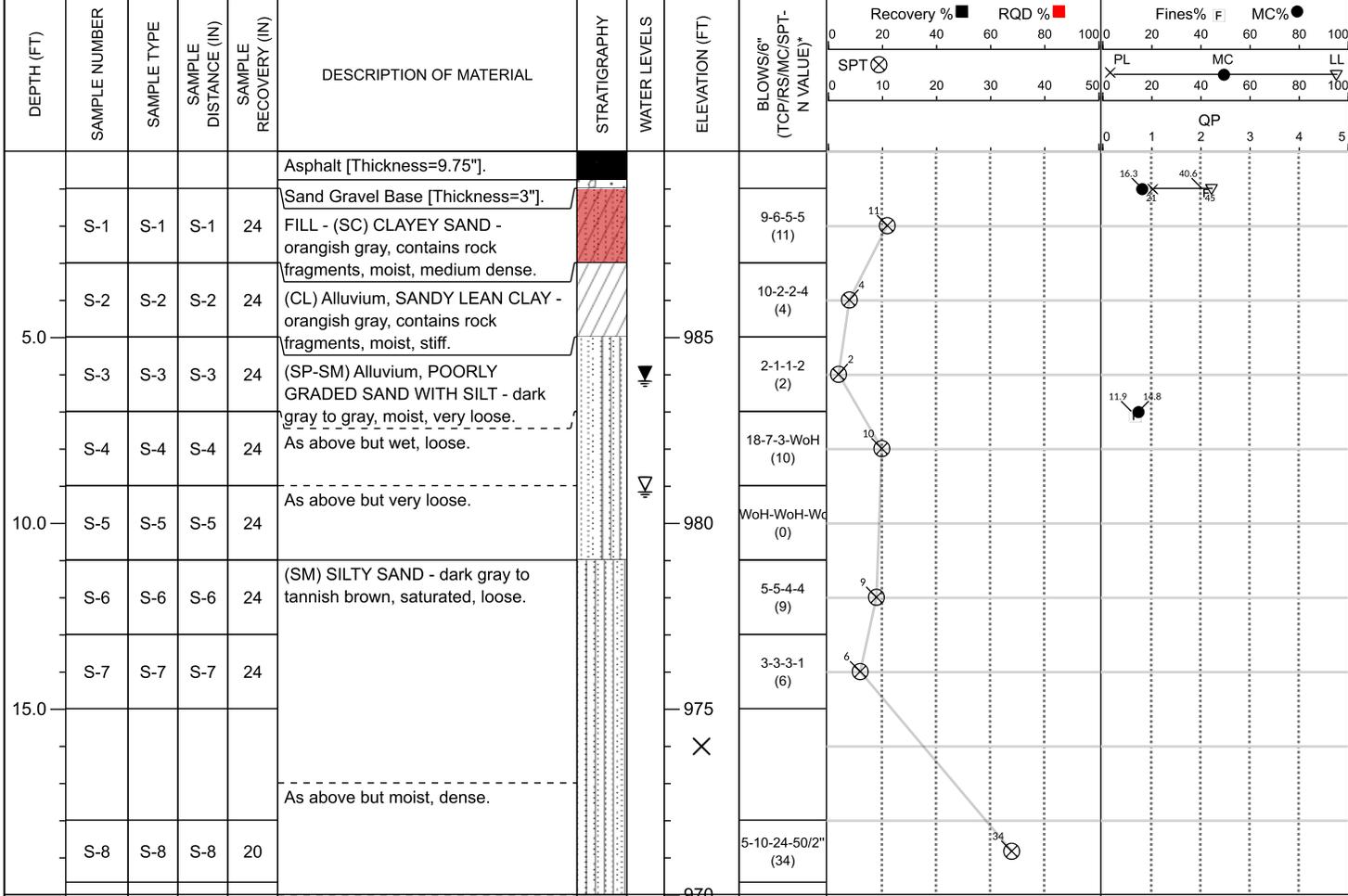
⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-17 Note 14.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-17.

CLIENT: Gwinnett County DWR				PROJECT NO.: 10:12916		BORING NO.: B-01		SHEET: 1 OF 1					
PROJECT NAME: M-0737-06 Forest Valley Water Main Replacement Project				DRILLER/CONTRACTOR: Betts Environmental									
SITE LOCATION: Maple Wood Drive, Lawrenceville, Georgia, 30519								LOSS OF CIRCULATION					
LATITUDE: 33.934143			LONGITUDE: -83.99315			STRUCTURE: 23+80		SURFACE ELEVATION: 1004		BOTTOM OF CASING			
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗		PL	MC
										0 20 40 60 80 100	0 20 40 60 80 100	0 1 2 3 4 5	
	S-1	S-1	S-1	24	Topsoil [Thickness=6"].				8-6-5-6 (11)	11			
	S-2	S-2	S-2	24	POSSIBLE FILL - (MH) SANDY ELASTIC SILT - dark orange to red, contains mica, moist, stiff.				11-4-5-10 (9)	9		31.7	74.8
5.0	S-3	S-3	S-3	24	(SM) SILTY SAND - orange to gray, contains mica, moist, medium dense.			1000	4-6-9-10 (15)	15			
	S-4	S-4	S-4	24	As above but contains significant loose.				3-3-4-4 (7)	7			
	S-5	S-5	S-5	24				995	8-4-4-6 (8)	8			
END OF BORING at 10.0 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▼ WL (First Encountered):				BORING STARTED: 01/07/2026				CAVE IN DEPTH: Not Observed					
▼ WL (Completion): Not Encountered				BORING COMPLETED: 01/07/2026				HAMMER TYPE: Automatic					
▼ WL (Seasonal High Water):				EQUIPMENT: GeoProbe 7822DT		LOGGED BY: CDF		DRILLING METHOD: Hollow Stem Auger (0'-10')					
▼ WL (Stabilized): Not Measured													
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Gwinnett County DWR		PROJECT NO.: 10:12916	BORING NO.: B-02	SHEET: 1 OF 1	
PROJECT NAME: M-0737-06 Forest Valley Water Main Replacement Project		DRILLER/CONTRACTOR: Betts Environmental			
SITE LOCATION: Maple Wood Drive, Lawrenceville, Georgia, 30519				LOSS OF CIRCULATION	
LATITUDE: 33.935349		LONGITUDE: -83.992569	STRUCTURE: 29+10	SURFACE ELEVATION: 990 +/-	BOTTOM OF CASING



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	9 FT	BORING STARTED:	01/07/2026	CAVE IN DEPTH:	16FT
WL (Completion):	6 FT	BORING COMPLETED:	01/08/2026	HAMMER TYPE:	Automatic
WL (Seasonal High Water):		EQUIPMENT:	GeoProbe 7822DT	LOGGED BY:	CDF
WL (Stabilized):	Not Measured			DRILLING METHOD:	Hollow Stem Auger (0'-20')

GEOTECHNICAL BOREHOLE LOG

CLIENT: Gwinnett County DWR				PROJECT NO.: 10:12916		BORING NO.: B-03		SHEET: 1 OF 1					
PROJECT NAME: M-0737-06 Forest Valley Water Main Replacement Project						DRILLER/CONTRACTOR: Betts Environmental							
SITE LOCATION: Maple Wood Drive, Lawrenceville, Georgia, 30519								LOSS OF CIRCULATION					
LATITUDE: 33.937487			LONGITUDE: -83.991367			STRUCTURE: 38+80		SURFACE ELEVATION: 1006 +/-		BOTTOM OF CASING			
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT-N VALUE)	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL ⊗	MC ●	LL ▽
					Asphalt [Thickness=9.25"].			1005					
	S-1	S-1	S-1	24	Sand Gravel Base [Thickness=4"]. (SM) SILTY SAND - tannish white, moist, medium dense.				10-12-8-8 (20)				
5.0	S-2	S-2	S-2	24					5-6-8-12 (14)				
	S-3	S-3	S-3	24				1000	6-7-9-10 (16)				
	S-4	S-4	S-4	24	As above but tannish white, moist, medium dense.				37-25-27-21 (52)				
10.0	S-5	S-5	S-5	24					18-42-49-29 (91)				
					END OF BORING at 11.1 FT			995					
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▼ WL (First Encountered):						BORING STARTED: 01/07/2026			CAVE IN DEPTH: Not Observed				
▼ WL (Completion): Not Encountered						BORING COMPLETED: 01/07/2026			HAMMER TYPE: Automatic				
▼ WL (Seasonal High Water):						EQUIPMENT: GeoProbe 7822DT		LOGGED BY: CDF		DRILLING METHOD: Hollow Stem Auger (0'-10')			
▼ WL (Stabilized): Not Measured													
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Gwinnett County DWR				PROJECT NO.: 10:12916		BORING NO.: B-05		SHEET: 1 OF 1					
PROJECT NAME: M-0737-06 Forest Valley Water Main Replacement Project						DRILLER/CONTRACTOR: Betts Environmental							
SITE LOCATION: Maple Wood Drive, Lawrenceville, Georgia, 30519								LOSS OF CIRCULATION					
LATITUDE: 33.936573			LONGITUDE: -83.987995			STRUCTURE: 51+25		SURFACE ELEVATION: 1042 +/-		BOTTOM OF CASING			
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT- N VALUE)	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL ⊗	MC ●	LL ▽
										0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100
										0 10 20 30 40 50	0 20 40 60 80 100	0 1 2 3 4 5	
5.0	S-1	S-1	S-1	24	Asphalt [Thickness=3.75"]. Sand Gravel Base [Thickness=4"]. FILL - (ML) SANDY SILT - reddish brown, contains significant mica, moist, stiff.			1040	8-5-6-7 (11)	11 ⊗			
	S-2	S-2	S-2	24					13-5-6-9 (11)	11 ⊗			
	S-3	S-3	S-3	24	(SM) SILTY SAND - reddish brown, contains significant mica, moist, medium dense.			1035	14-8-10-9 (18)	18 ⊗		22 ● 31 ● 5 ● F	
	S-4	S-4	S-4	24					9-9-10-10 (19)	19 ⊗			
10.0	S-5	S-5	S-5	24					10-10-10-9 (20)	20 ⊗			
END OF BORING at 10.7 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▼ WL (First Encountered):						BORING STARTED: 01/07/2026			CAVE IN DEPTH: Not Observed				
▼ WL (Completion): Not Encountered						BORING COMPLETED: 01/07/2026			HAMMER TYPE: Automatic				
▼ WL (Seasonal High Water):						EQUIPMENT: GeoProbe 7822DT		LOGGED BY: CDF		DRILLING METHOD: Hollow Stem Auger (0'-8')			
▼ WL (Stabilized): Not Measured													
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Gwinnett County DWR				PROJECT NO.: 10:12916		BORING NO.: B-07		SHEET: 1 OF 1																		
PROJECT NAME: M-0737-06 Forest Valley Water Main Replacement Project						DRILLER/CONTRACTOR: Betts Environmental																				
SITE LOCATION: Maple Wood Drive, Lawrenceville, Georgia, 30519								LOSS OF CIRCULATION																		
LATITUDE: 33.937586			LONGITUDE: -83.981287			STRUCTURE: 72+10		SURFACE ELEVATION: 1096 +/-		BOTTOM OF CASING																
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT- N VALUE)	Recovery % ■ RQD % ■		Fines% F MC% ●														
										SPT ⊗		PL ⊗	MC ●	LL ▽	QP											
									0	20	40	60	80	100	0	20	40	60	80	100	0	1	2	3	4	5
5.0	S-1	S-1	S-1	10	Asphalt [Thickness=5.25"]. Sand Gravel Base [Thickness=4"]. FILL - (ML) SANDY SILT - orangish red, moist, very stiff.			1095	8-10-10-15 (20)	20																
	S-2	S-2	S-2	10					24-14-14-13 (28)	28																
	S-3	S-3	S-3	17	(SM) SILTY SAND - brownish orange to white, moist, medium dense to dense.			1090	24-23-11-8 (34)	34					19.8		43.8		38							
	S-4	S-4	S-4	18					20-31-11-9 (42)	42																
10.0	S-5	S-5	S-5	12					11-12-13-12 (25)	25																
END OF BORING at 10.8 FT																										
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																										
▼ WL (First Encountered):						BORING STARTED: 01/07/2026				CAVE IN DEPTH: Not Observed																
▼ WL (Completion): Not Encountered						BORING COMPLETED: 01/07/2026				HAMMER TYPE: Automatic																
▼ WL (Seasonal High Water):						EQUIPMENT: GeoProbe 7822DT		LOGGED BY: CDF		DRILLING METHOD: Hollow Stem Auger (0'-10')																
▼ WL (Stabilized): Not Measured																										

GEOTECHNICAL BOREHOLE LOG

CLIENT: Gwinnett County DWR				PROJECT NO.: 10:12916		BORING NO.: B-08		SHEET: 1 OF 1					
PROJECT NAME: M-0737-06 Forest Valley Water Main Replacement Project						DRILLER/CONTRACTOR: Betts Environmental							
SITE LOCATION: Maple Wood Drive, Lawrenceville, Georgia, 30519								LOSS OF CIRCULATION					
LATITUDE: 33.938411			LONGITUDE: -83.992018			STRUCTURE: 500+30		SURFACE ELEVATION: 1028 +/-		BOTTOM OF CASING			
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)	Recovery % ■ RQD % ■		Fines% F ₁ MC% ●	
										0	100	0	100
					Asphalt [Thickness=4"].								
	S-1	S-1	S-1	24	Sand Gravel Base [Thickness=4"].			1025	7-5-6-8 (11)	11			
	S-2	S-2	S-2	24	POSSIBLE FILL - (ML) SANDY SILT - orangish brown to dark gray, moist, stiff.				10-9-6-6 (15)	15			
5.0	S-3	S-3	S-3	24	As above but POSSIBLE FILL - (ML) SANDY SILT - orangish brown to dark gray, rock fragments, very stiff to hard.				17-14-18-16 (32)	32			
	S-4	S-4	S-4	24	(ML) SANDY SILT - orange, contains mica, moist, very stiff.			1020	14-12-14-14 (26)	26			
10.0	S-5	S-5	S-5	24		13-11-12-11 (23)	23					20.7	51
END OF BORING at 10.7 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▼ WL (First Encountered):						BORING STARTED: 01/07/2026			CAVE IN DEPTH: Not Observed				
▼ WL (Completion): Not Encountered						BORING COMPLETED: 01/07/2026			HAMMER TYPE: Automatic				
▼ WL (Seasonal High Water):						EQUIPMENT: GeoProbe 7822DT		LOGGED BY: CDF		DRILLING METHOD: Hollow Stem Auger (0'-10')			
▼ WL (Stabilized): Not Measured													
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Gwinnett County DWR				PROJECT NO.: 10:12916		BORING NO.: B-09		SHEET: 1 OF 1					
PROJECT NAME: M-0737-06 Forest Valley Water Main Replacement Project						DRILLER/CONTRACTOR: Betts Environmental							
SITE LOCATION: Maple Wood Drive, Lawrenceville, Georgia, 30519								LOSS OF CIRCULATION					
LATITUDE: 33.936124			LONGITUDE: -83.990744			STRUCTURE: 406+60		SURFACE ELEVATION: 1032 +/-		BOTTOM OF CASING			
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT-N VALUE)	Recovery % ■ RQD % ■		Fines% F ₂₀₀ MC% ●	
										SPT ⊗	PL ⊗	MC ●	LL ▽
					Asphalt [Thickness=5.5"].	[REDACTED]							
	S-1	S-1	S-1	24	Sand Gravel Base [Thickness=4"].	[REDACTED]		1030	10-10-12-14 (22)				
5.0	S-2	S-2	S-2	24	FILL - (ML) SANDY SILT - dark orange, contains rock fragments, moist, very stiff.	[REDACTED]			15-8-10-10 (18)				
	S-3	S-3	S-3	24		[REDACTED]			13-9-10-10 (19)				
	S-4	S-4	S-4	24		(SM) SILTY SAND - orangish red, contains mica, moist, medium dense.	[REDACTED]	1025	6-5-7-7 (12)			18.3 ●	44.3 ● F
10.0	S-5	S-5	S-5	24		[REDACTED]			14-9-8-7 (17)				
END OF BORING at 10.8 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▼ WL (First Encountered):						BORING STARTED: 01/07/2026			CAVE IN DEPTH: Not Observed				
▼ WL (Completion): Not Encountered						BORING COMPLETED: 01/07/2026			HAMMER TYPE: Automatic				
▼ WL (Seasonal High Water):						EQUIPMENT: GeoProbe 7822DT		LOGGED BY: CDF		DRILLING METHOD: Hollow Stem Auger (0'-10')			
▼ WL (Stabilized): Not Measured													
GEOTECHNICAL BOREHOLE LOG													



Asphalt Core B-2

Asphalt Thickness: 9 ¾ inches
Aggregate Base Course Thickness: 3 inches



Asphalt Core B-3

Asphalt Thickness: 9 ¾ inches
Aggregate Base Course Thickness: 4 inches



Asphalt Core B-4

Asphalt Thickness: 3 ½ inches
Aggregate Base Course Thickness: 4 inches



Asphalt Core B-5

Asphalt Thickness: 3 ¾ inches
Aggregate Base Course Thickness: 4 inches





Asphalt Core B-6

Asphalt Thickness: 3 ¼ inches
Aggregate Base Course Thickness: 4 inches



Asphalt Core B-7

Asphalt Thickness: 5 ¼ inches
Aggregate Base Course Thickness: 4 inches



Asphalt Core B-8

Asphalt Thickness: 4 inches
Aggregate Base Course Thickness: 4 inches



Asphalt Core B-9

Asphalt Thickness: 5 ½ inches
Aggregate Base Course Thickness: 4 inches





Asphalt Core C-1

Asphalt Thickness: 3 inches
Aggregate Base Course Thickness: 4 inches



Asphalt Core C-2

Asphalt Thickness: 3 3/4 inches
Aggregate Base Course Thickness: 4 inches



Asphalt Core C-3

Asphalt Thickness: 6 1/2 inches
Aggregate Base Course Thickness: 4 inches

APPENDIX C – Laboratory Testing

Laboratory Testing Summary
Liquid and Plastic Limits Test Report
Grain Size Analyses

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-01	S-2	2.0-4.0	31.7	MH	79	44	35	74.8					
B-02	S-1	0.0-2.0	16.3	SC	45	21	24	40.6					
B-02	S-4	6.0-8.0	14.8	SP-SM	NP	NP	NP	11.9					
B-03	S-3	4.0-6.0	15.4	SM	NP	NP	NP	25.2					
B-04	S-2	2.0-4.0	19.3	SM	NP	NP	NP	38.4					
B-05	S-3	4.0-6.0	22.3	SM	NP	NP	NP	31.5					
B-06	S-2	2.0-4.0	13.3	SC	45	22	23	41.7					
B-07	S-3	4.0-6.0	19.8	SM	51	38	13	45.8					
B-08	S-5	8.0-10.0	20.7	ML	40	31	9	50.4					
B-09	S-4	6.0-8.0	18.3	SM	NP	NP	NP	44.3					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Forest Valley DWR
Client: Gwinnett County DWR

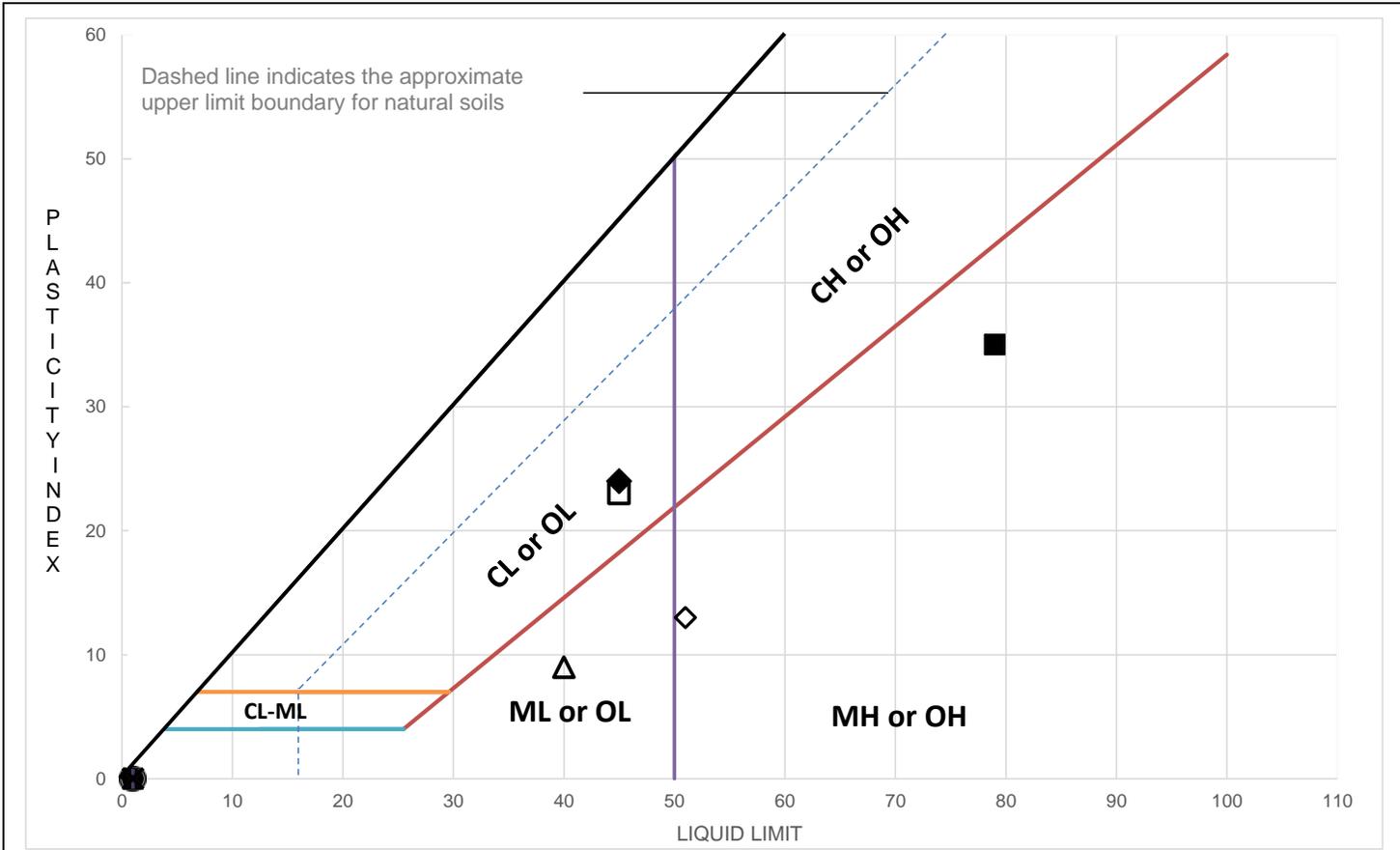
Project No.: 10:12916
Date Reported: 1/23/2026



Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Marietta	1281 Kennestone Circle NE Suite 200 Marietta, GA 30066	(770)590-1971 (770)590-1975

Tested by	Checked by	Approved by	Date Received
KShah	KShah	KShah	1/15/2026

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (SINGLE POINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-01	S-2	2.00-4.00	79	44	35	93.1	74.8	A-7-5	MH	
◆	B-02	S-1	0.00-2.00	45	21	24	74.7	40.6	A-7-6	SC	
▲	B-02	S-4	6.00-8.00	NP	NP	NP	46.0	11.9	A-1	SP-SM	
●	B-03	S-3	4.00-6.00	NP	NP	NP	95.3	25.2	A-2-4	SM	
*	B-04	S-2	2.00-4.00	NP	NP	NP	96.8	38.4	A-4	SM	
⊗	B-05	S-3	4.00-6.00	NP	NP	NP	83.1	31.5	A-2-4	SM	
□	B-06	S-2	2.00-4.00	45	22	23	96.4	41.7	A-7-6	SC	
◇	B-07	S-3	4.00-6.00	51	38	13	82.5	45.8	A-7-5	SM	
△	B-08	S-5	8.00-10.00	40	31	9	97.2	50.4	A-4	ML	
X	B-09	S-4	6.00-8.00	NP	NP	NP	94.3	44.3	A-4	SM	

Project: Forest Valley DWR
Client: Gwinnett County DWR

Project No.: 10:12916
Date Reported: 1/23/2026



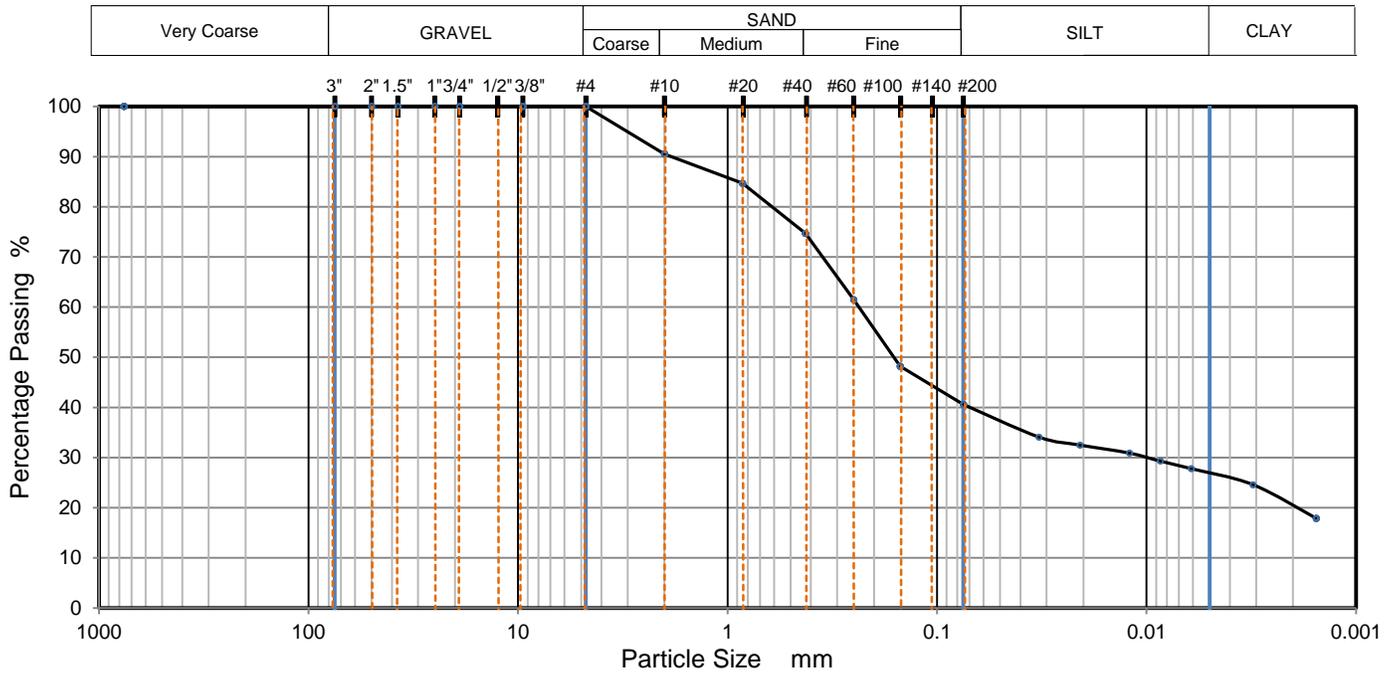
Office / Lab
ECS Southeast LLC - Marietta

Address
1281 Kennestone Circle NE
Suite 200
Marietta, GA 30066

Office Number / Fax
(770)590-1971
(770)590-1975

Tested by	Checked by	Approved by	Date Received
KShah	KShah	KShah	1/15/2026

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0327	34.1
2"	100.0	0.0208	32.5
1 1/2"	100.0	0.0121	30.9
1"	100.0	0.0086	29.3
3/4"	100.0	0.0061	27.8
3/8"	100.0	0.0031	24.6
#4	100.0	0.0016	17.9
#10	90.5		
#20	84.7		
#40	74.7		
#60	61.5		
#100	48.2		
#200	40.6		
		Specific Gravity (Historical) 2.62	

Dry Mass of sample, g

170.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	9.5
Medium Sand, #10 to #40	15.8
Fine Sand, #40 to #200	34.1
Silt, 75µm to 5 µm	13.8
Clay < 5µm	26.8

USCS	SC	Liquid Limit	45	D90	1.858	D50	0.161	D10	
AASHTO	A-7-6	Plastic Limit	21	D85	0.889	D30	0.010	Cu	
USCS Group Name	Clayey sand	Plasticity Index	24	D60	0.236	D15		Cc	

Project: Forest Valley DWR
Client: Gwinnett County DWR

Project No.: 10:12916
Depth (ft): 0.0 - 2.0

Sample Description:
Sample Source: B-02

Sample No.: S-1
Date Reported: 1/23/2026



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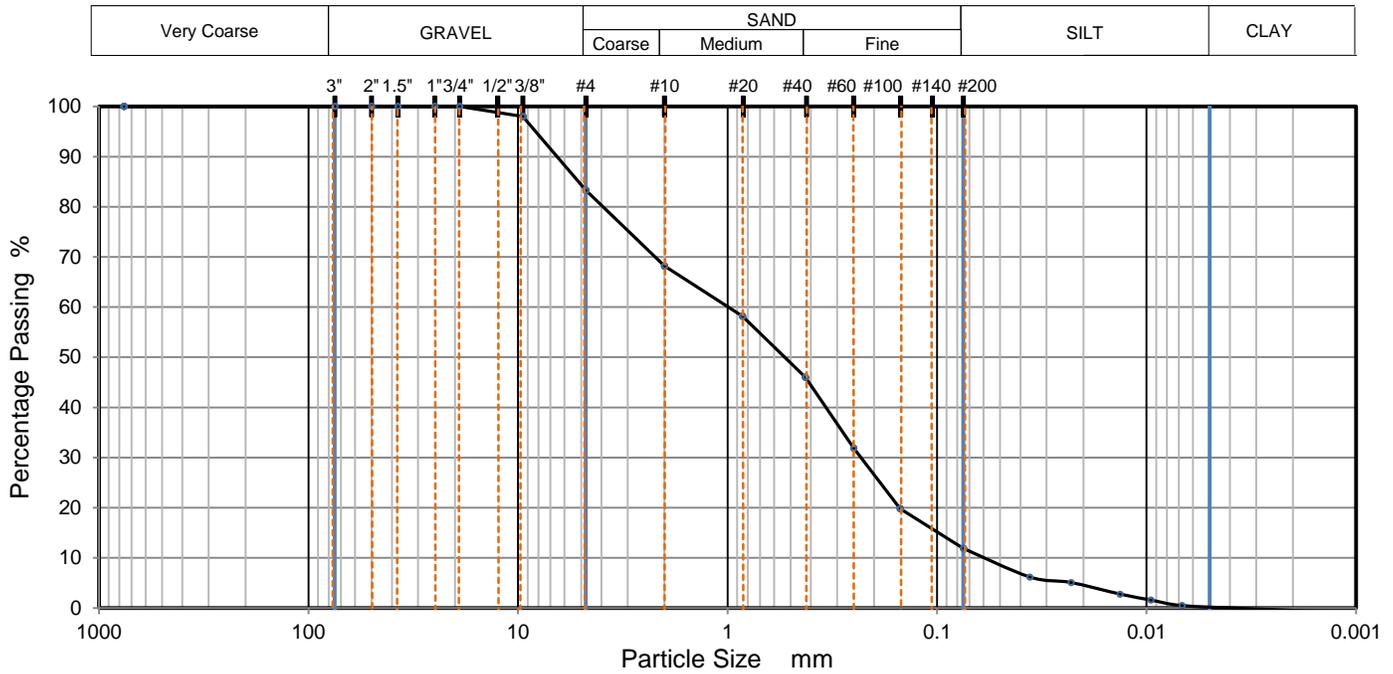
Address
1281 Kennestone Circle
NE
Suite 200
Marietta, GA 30066

Office Number / Fax
(770)590-1971

(770)590-1975

Tested by	Checked by	Approved by	Date Received	Remarks
KShah	KShah	KShah	1/15/2026	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0361	6.2
2"	100.0	0.0230	5.1
1 1/2"	100.0	0.0134	2.8
1"	100.0	0.0095	1.6
3/4"	100.0	0.0068	0.5
3/8"	98.0	0.0033	-0.1
#4	83.3	0.0014	-0.7
#10	68.2		
#20	58.2		
#40	46.0		
#60	31.9		
#100	19.8		
#200	11.9		
		Specific Gravity (Historical) 2.62	

Dry Mass of sample, g

195.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	16.7
Coarse Sand, #4 to #10 sieve	15.1
Medium Sand, #10 to #40	22.2
Fine Sand, #40 to #200	34.1
Silt, 75µm to 5 µm	11.7
Clay < 5µm	0.2

USCS	SP-SM	Liquid Limit	NP	D90	6.515	D50	0.533	D10	0.059
AASHTO	A-1	Plastic Limit	NP	D85	5.146	D30	0.231	Cu	16.865
USCS Group Name	Poorly graded sand with silt and gravel	Plasticity Index	NP	D60	0.992	D15	0.098	Cc	0.913

Project: Forest Valley DWR
Client: Gwinnett County DWR

Project No.: 10:12916
Depth (ft): 6.0 - 8.0

Sample Description:
Sample Source: B-02

Sample No.: S-4
Date Reported: 1/23/2026



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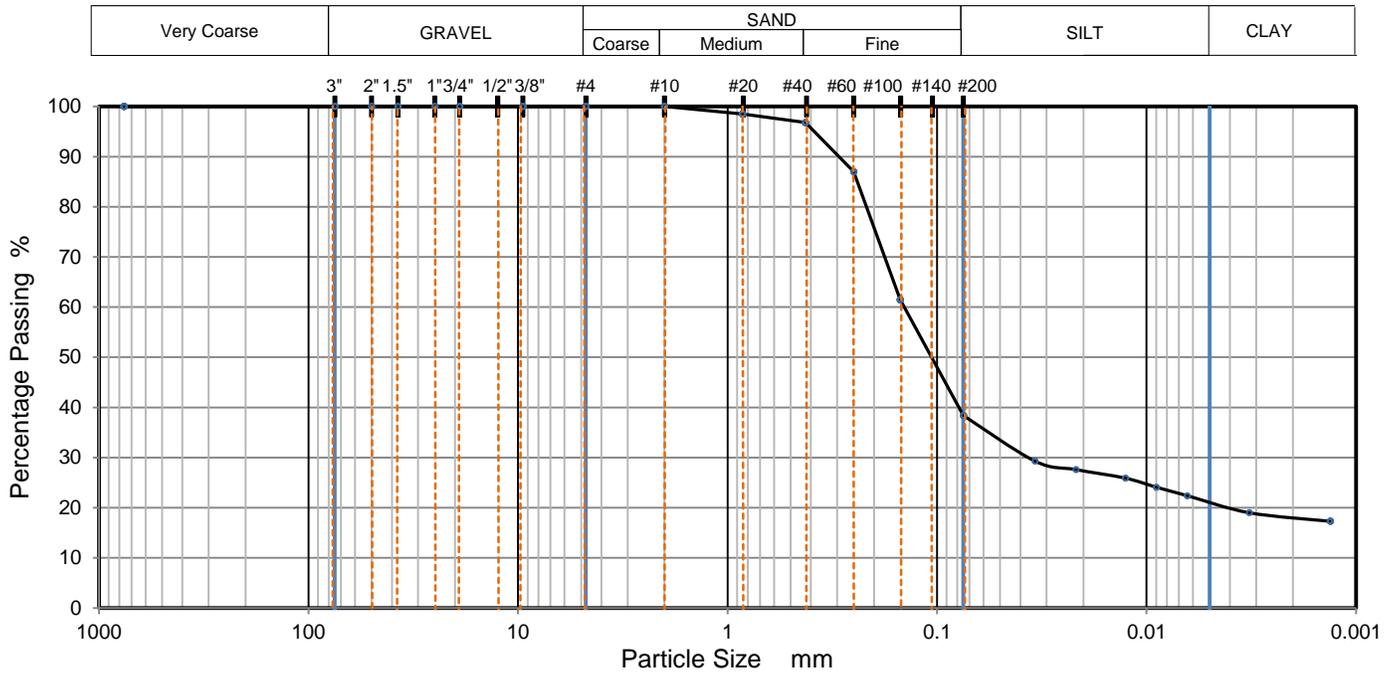
Office Number / Fax

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(770)590-1975

Tested by	Checked by	Approved by	Date Received	Remarks
KShah	KShah	KShah	1/15/2026	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0342	29.3
2"	100.0	0.0217	27.6
1 1/2"	100.0	0.0126	25.9
1"	100.0	0.0090	24.1
3/4"	100.0	0.0064	22.4
3/8"	100.0	0.0032	19.0
#4	100.0	0.0013	17.3
#10	100.0		
#20	98.5		
#40	96.8		
#60	87.0		
#100	61.5		
#200	38.4		
		Specific Gravity (Historical) 2.62	

Dry Mass of sample, g

188.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.0
Medium Sand, #10 to #40	3.2
Fine Sand, #40 to #200	58.4
Silt, 75µm to 5 µm	17.2
Clay < 5µm	21.2

USCS	SM	Liquid Limit	NP	D90	0.294	D50	0.106	D10	
AASHTO	A-4	Plastic Limit	NP	D85	0.240	D30	0.036	Cu	
USCS Group Name	Silty sand	Plasticity Index	NP	D60	0.143	D15		Cc	

Project: Forest Valley DWR
Client: Gwinnett County DWR

Project No.: 10:12916
Depth (ft): 2.0 - 4.0

Sample Description:
Sample Source: B-04

Sample No.: S-2
Date Reported: 1/23/2026



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1281 Kennestone Circle
NE
Suite 200
Marietta, GA 30066

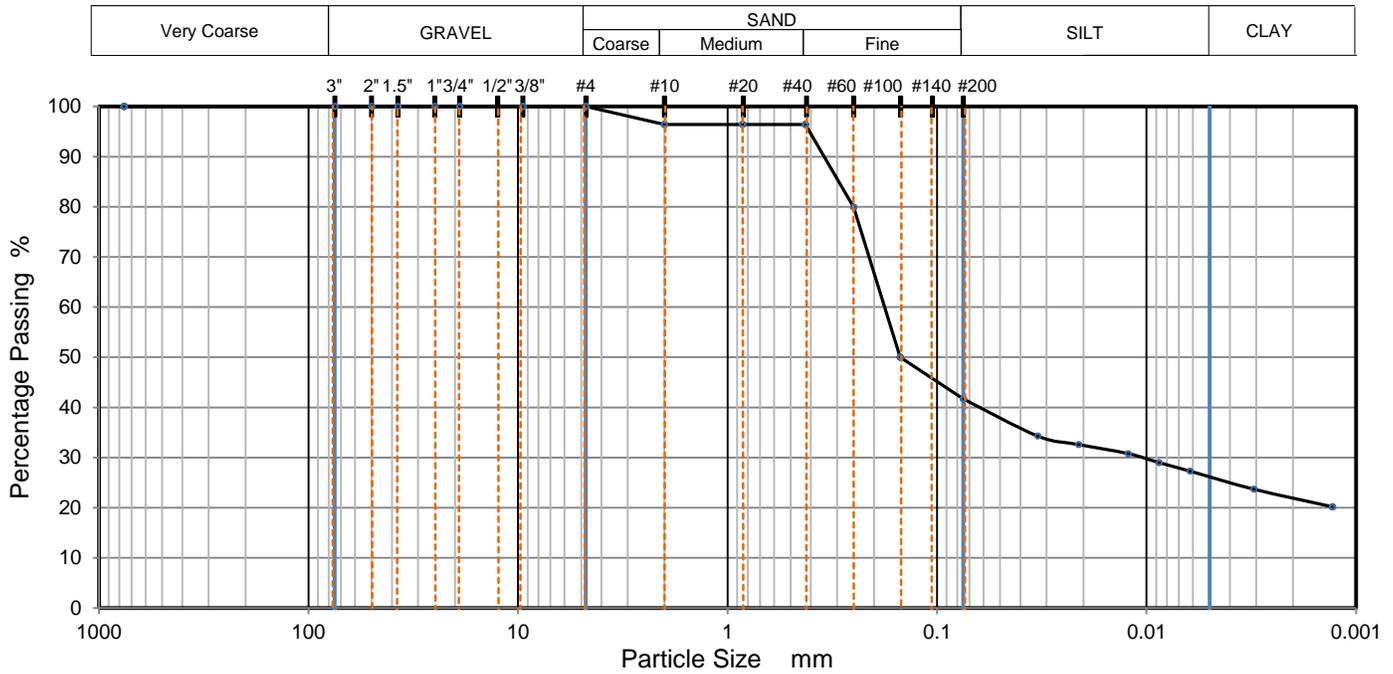
Office Number / Fax

(770)590-1971

(770)590-1975

Tested by	Checked by	Approved by	Date Received	Remarks
KShah	KShah	KShah	1/15/2026	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0331	34.3
2"	100.0	0.0211	32.6
1 1/2"	100.0	0.0123	30.8
1"	100.0	0.0087	29.0
3/4"	100.0	0.0062	27.3
3/8"	100.0	0.0031	23.7
#4	100.0	0.0013	20.2
#10	96.4		
#20	96.4		
#40	96.4		
#60	79.9		
#100	50.0		
#200	41.7		
		Specific Gravity (Historical) 2.62	

Dry Mass of sample, g

190.1

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	3.6
Medium Sand, #10 to #40	0.0
Fine Sand, #40 to #200	54.7
Silt, 75µm to 5 µm	15.5
Clay < 5µm	26.2

USCS	SC	Liquid Limit	45	D90	0.346	D50	0.150	D10	
AASHTO	A-7-6	Plastic Limit	22	D85	0.295	D30	0.011	Cu	
USCS Group Name	Clayey sand	Plasticity Index	23	D60	0.178	D15		Cc	

Project: Forest Valley DWR
Client: Gwinnett County DWR

Project No.: 10:12916
Depth (ft): 2.0 - 4.0

Sample Description:
Sample Source: B-06

Sample No.: S-2
Date Reported: 1/23/2026



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ECS Southeast LLC - Marietta

Address

1281 Kennestone Circle
NE
Suite 200
Marietta, GA 30066

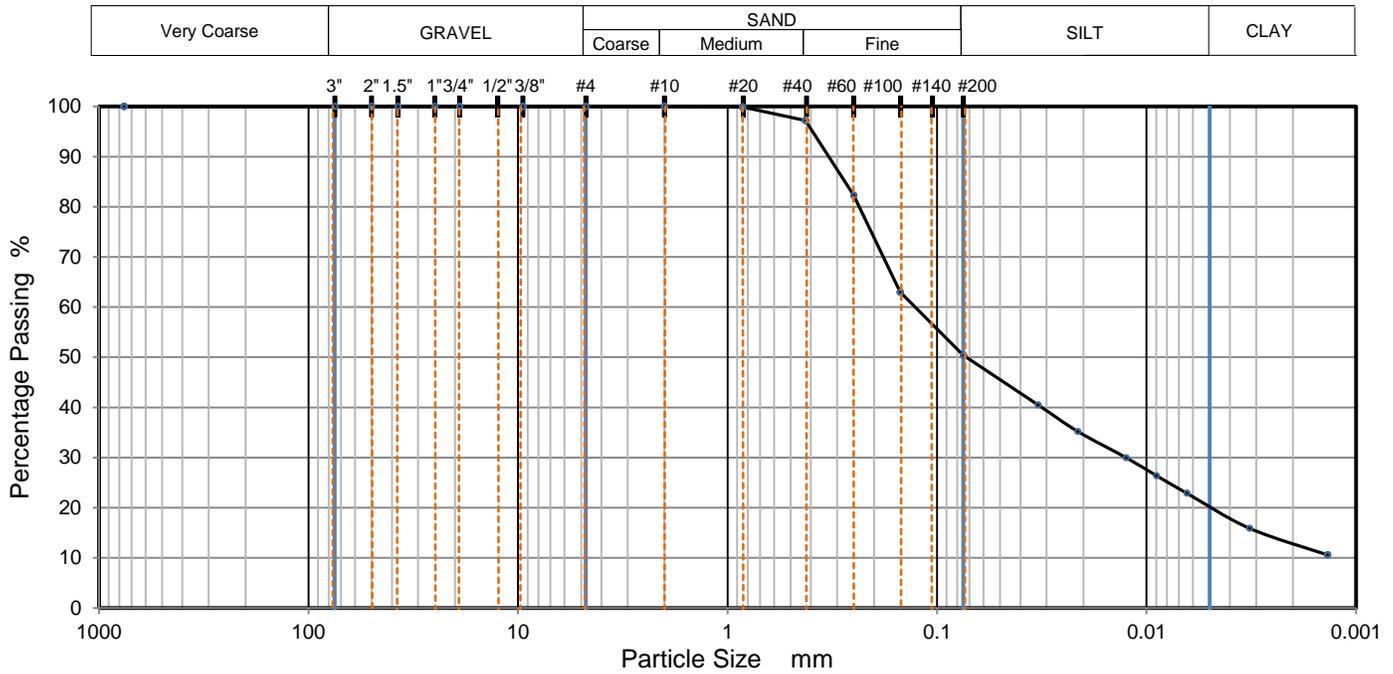
Office Number / Fax

(770)590-1971

(770)590-1975

Tested by	Checked by	Approved by	Date Received	Remarks
KShah	KShah	KShah	1/15/2026	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0330	40.5
2"	100.0	0.0213	35.2
1 1/2"	100.0	0.0125	30.0
1"	100.0	0.0090	26.4
3/4"	100.0	0.0064	22.9
3/8"	100.0	0.0032	15.9
#4	100.0	0.0014	10.6
#10	100.0		
#20	99.9		
#40	97.2		
#60	82.3		
#100	63.0		
#200	50.4		
		Specific Gravity (Historical) 2.62	

Dry Mass of sample, g

140.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.0
Medium Sand, #10 to #40	2.8
Fine Sand, #40 to #200	46.8
Silt, 75µm to 5 µm	30.1
Clay < 5µm	20.3

USCS	ML	Liquid Limit	40	D90	0.329	D50	0.073	D10	
AASHTO	A-4	Plastic Limit	31	D85	0.275	D30	0.013	Cu	
USCS Group Name	Sandy silt	Plasticity Index	9	D60	0.127	D15	0.003	Cc	

Project: Forest Valley DWR
Client: Gwinnett County DWR

Project No.: 10:12916
Depth (ft): 8.0 - 10.0

Sample Description:
Sample Source: B-08

Sample No.: S-5
Date Reported: 1/23/2026



Office / Lab

ECS Southeast LLC - Marietta

Address

1281 Kennestone Circle
NE
Suite 200
Marietta, GA 30066

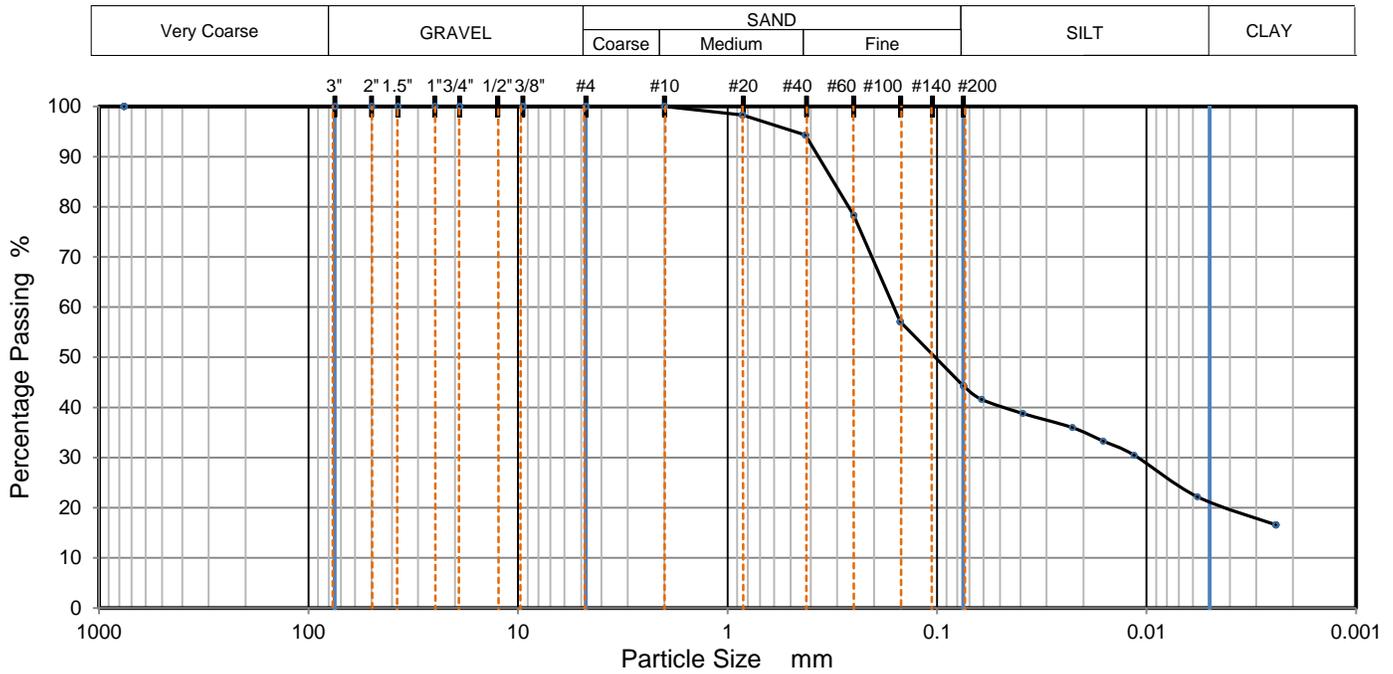
Office Number / Fax

(770)590-1971

(770)590-1975

Tested by	Checked by	Approved by	Date Received	Remarks
KShah	KShah	KShah	1/15/2026	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0614	41.6
2"	100.0	0.0391	38.8
1 1/2"	100.0	0.0227	36.0
1"	100.0	0.0161	33.3
3/4"	100.0	0.0115	30.5
3/8"	100.0	0.0057	22.2
#4	100.0	0.0024	16.6
#10	100.0		
#20	98.3		
#40	94.3		
#60	78.3		
#100	57.1		
#200	44.3		

Dry Mass of sample, g

135.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.0
Medium Sand, #10 to #40	5.7
Fine Sand, #40 to #200	50.0
Silt, 75µm to 5 µm	23.0
Clay < 5µm	21.3

USCS	SM	Liquid Limit	NP	D90	0.369	D50	0.102	D10	
AASHTO	A-4	Plastic Limit	NP	D85	0.312	D30	0.011	Cu	
USCS Group Name	Silty sand	Plasticity Index	NP	D60	0.161	D15		Cc	

Project: Forest Valley DWR
Client: Gwinnett County DWR

Project No.: 10:12916
Depth (ft): 6.0 - 8.0

Sample Description:
Sample Source: B-09

Sample No.: S-4
Date Reported: 1/23/2026



Office / Lab
ECS Southeast LLC - Marietta

Address
1281 Kennestone Circle
NE
Suite 200
Marietta, GA 30066

Office Number / Fax
(770)590-1971

(770)590-1975

Tested by	Checked by	Approved by	Date Received	Remarks
KShah	KShah	KShah	1/15/2026	

APPENDIX D – Supplemental Documents

Important Information about this Geotechnical Engineering Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* **Confront the risk of moisture infiltration** by including building-envelope or mold specialists on the design team. **Geotechnical engineers are not building-envelope or mold specialists.**



Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

**APPENDIX C – NV5 FOREST VALLEY WMR QL-A
SUE SURVEY REPORT (INFORMATION ONLY)**

February 19, 2026

Mr. Derek Fellows, P.E.
 Engineer IV
 Gwinnett County Department of Water Resources
 684 Winder Highway
 Lawrenceville, Georgia 30045

Via Email: tschrama@ecslimited.com
 CC: derek.fellows@gwinnettcountry.com

RE: Subsurface Utility Engineering Quality Level “A”
M-0737-06 Forest Valley Water Main Replacement Project
 Lawrenceville, Gwinnett County, Georgia
 NV5 Project Number: 2020270.35

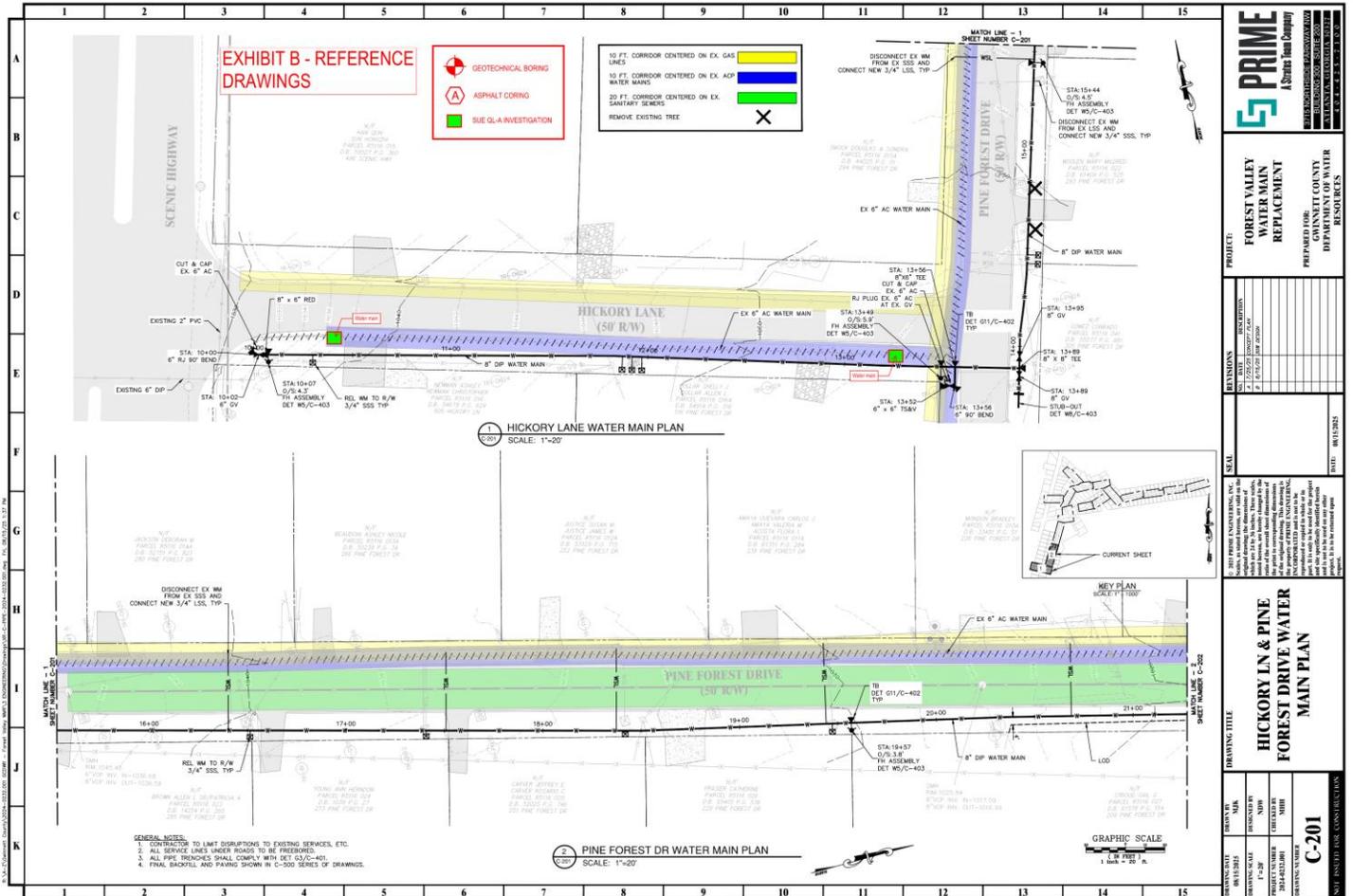
Dear Mr. Fellows:

NV5 is pleased to submit this report indicating the results of our Subsurface Utility Engineering (SUE) Quality Level “A” (QL-A) services performed at the Forest Valley Water Main Replacement (WMR) Project Site. On November 13, 2025, Mr. Tyler Schrama provided NV5 with an email requesting NV5 to provide a proposal and fee estimate for performing SUE QL-A services as part of the Forest Valley WMR project. Mr. Schrama’s email also included a .pdf attachment file titled *Forest Valley WMR Recommended Geotech-SUE SOW*. The .pdf file is a scoping document from Prime Engineering that is titled *Recommended Geotechnical and Subsurface Utilities Engineering (SUE) Scopes of Work* and is dated October 10, 2025. The scoping document included the geotechnical investigation and SUE QL-A scopes and Exhibits A and B, Scope of Work (SOW) and Reference Drawings, respectively. It should be noted that NV5’s scope only consisted of the SUE tasks referred to in the (SOW) document for this project.

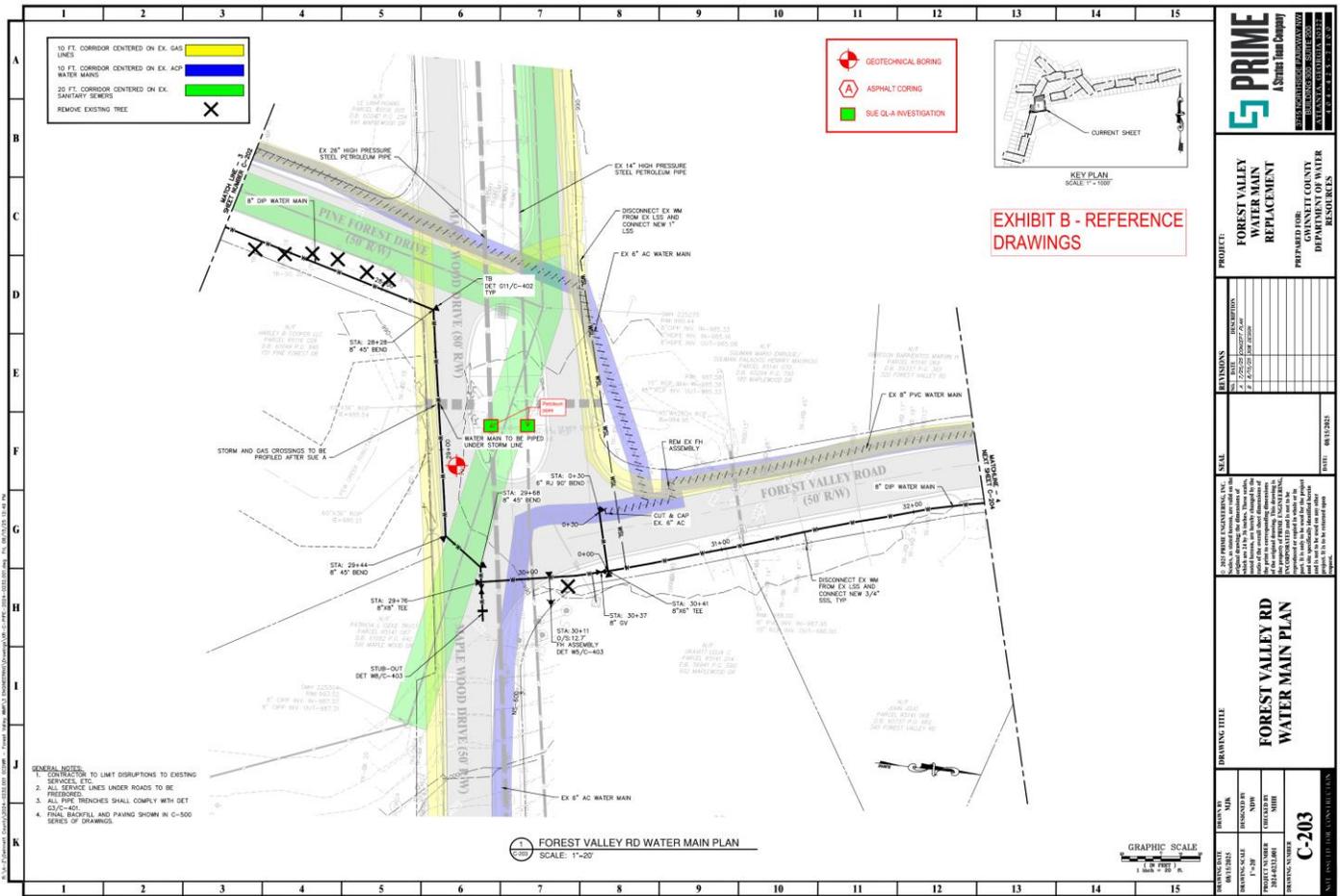
Section 4 within the SOW document included the SUE QL-A Scope tasks for this project. Exhibit B’s reference drawings included the approximate locations of the existing underground and overhead utilities, the proposed route of a new GCDWR 8-inch diameter ductile iron pipe (DIP) water main along with other installation notes on Drawing Numbers C-201 through C-209. It was our understanding that the utility mapping depicted on Exhibit B’s reference drawings resulted from a previously performed SUE Quality Level “B” (QL-B) survey performed by others. Finally, the reference drawings depicted the locations of four (4) QL-A test holes (Locations SUE 1 through SUE 4 within the SOW document) requested on existing utilities deemed to be in potential conflict with the 8-inch diameter water main design. The four (4) test hole locations were initially depicted within drawing numbers C-201 and C-203 of the reference drawings.

During coordination efforts with Kinder Morgan (to test hole on their existing petroleum pipelines), NV5 learned that the fiber optic shown on C-203 down the center of their easement is Lumen’s (formerly Level 3) and is contained within a former 10” steel Plantation pipeline. Furthermore, from photographs captured by a Kinder Morgan representative, a potential second, parallel duct bank, may be present that was not shown on C-203. Furthermore, NV5 noted that the indicated test hole locations were not requested over the proposed water main crossing (of the petroleum pipelines). On December 15th, Mr. Fellows requested for ECS/NV5 to perform additional test holes on the 10-inch steel fiber optic (Lumen) carrier pipeline, the existing 6-inch diameter asbestos coated (AC) water main, and a possible second telecommunications duct bank and to shift the planned test holes on the petroleum pipelines to the east near the proposed 8-inch DIP water main crossing. It should be noted that the other two planned test hole locations indicated on C-201 were to remain unchanged.

The initial SOW test hole locations on C-201 and C-203 are shown below as well as the revised test hole locations at C-203. The seven (7) total proposed test hole locations are depicted below in the mapping snapshots.



Two (2) requested test hole locations indicated along Hickory Lane on the GCDWR 6-inch diameter AC water main.



The initial two (2) test hole locations indicated on the Kinder Morgan 14 and 26-inch diameter petroleum mains.

During the permitting process, the City of Lawrenceville requested that NV5 repave the entirety of Maple Wood Drive in the general area of the grouping of five (5) test holes indicated on C-203. Due to time and budget constraints NV5/ECS elected to move the test hole locations to the back of curb just to the east of their revised locations. Prior to the commencement of our QL-A fieldwork, NV5's Utility Services crew employed geophysical methods including our ground penetrating radar (GPR) and our cable and pipe locators (EM) to designate the targeted utilities within the vicinities of the two (2) test hole locations at C-201 and five (5) test hole locations at C-203. It should be noted that the route of the targeted GCDWR 6-inch diameter AC water main targeted at Maple Wood Drive did not match the utility linework mapped by others on C-203. As a result, the water main did not enter the back of curb area (as anticipated) and remained within the Maple Wood Drive roadway throughout and to the east of the project area. Thus, this test hole had to be laid out within the roadway as was thus performed at the approximate proposed 8-inch DIP water main crossing. Additionally, NV5 attempted to designate the potential second Lumen fiber optic facility proposed as test hole TH 5; however, EM and GPR data did not encounter a second telecommunication facility.

SUE Utility Quality Levels

The following utility quality level descriptions are based on information gathered from the American Society of Civil Engineers (ASCE) Standard Manual ASCE/UESI/CI 38-22 titled *Standard Guideline for Investigating and Documenting Existing Utilities*. At each quality level the lower quality level(s) are included as part of the scope of that quality level (i.e. Quality Level "B" includes both Quality Level "C" and "D").

- **Quality Level "D" (QL-D)**
Information derived from existing records and oral recollection. QL-D records research would include information gathered from multiple sources including but not limited to; the local DOT, county, city, utility owners including their maps and records, one-call notification center, internet or computer database searches including available GIS records, visual site inspection and landowners.
- **Quality Level "C" (QL-C)**
Information obtained by surveying and plotting visible above-ground utility features and appurtenances of existing exiting subsurface utilities and by using professional judgment in correlating this information to QL-D information. Where discrepancies are identified between the QL-D records and information gathered in the QL-C survey the engineer would determine at what quality level these utilities should be depicted. Additional resolution may result from consultation with utility owners.
- **Quality Level "B" (QL-B)**
Information obtained through the application and interpretation of appropriate surface geophysical methods to determine and mark in the field the existence and approximate horizontal position of subsurface utilities. QL-B information should be reproducible by surface geophysics at any point of their depiction. This information is surveyed to applicable tolerances defined by the project and reduced into computer-aided design documents. This information is then correlated to the information gathered in the QL-D and QL-C surveys to identify utilities that may exist but were not able to be designated. Where discrepancies are identified between the QL-D records and information gathered in the QL-B survey the engineer would determine at what quality level these utilities should be depicted. A typical level of accuracy for QL-B is approximately ± 12 inches on both the horizontal axes.

- **Quality Level “A” (QL-A)**

Precise horizontal and vertical location of utilities obtained by the actual exposure (or verification of previously exposed and surveyed utilities) and subsequent measurement of subsurface utilities, usually at a specific point. Minimally intrusive excavation equipment is typically used to minimize the potential for utility damage. A precise horizontal and vertical location, as well as other utility attributes, is shown on plan documents. Accuracy is typically set to 0.5 inches vertical and to applicable horizontal survey and mapping accuracy as defined or expected by the project owner.

It should be noted that NV5 performed our SUE QL-A services to substantial compliance with ASCE’s QL-A quality level description; however, Stratus (formerly Prime Engineering) surveyed either the exposed utilities within the test hole or the test hole hubs set by NV5. NV5 issued our Preliminary Test Hole Report sheets to Tyler Schrama with ECS on January 23, 2026.

Maple Wood Drive Test Holes

Reference Drawing C-203 depicts the approximate locations of the test holes excavated by NV5 on the existing utilities conflicting with the proposed 8-inch diameter DIP water main design between Station Nos. 29+75 and 30+10. Test hole number TH 1 was performed by NV5 just south of Maple Wood Drive’s intersection with Forest Valley Road. According to the utility mapping depicted in C-203, TH 1 was planned on the Kinder Morgan 14-inch diameter steel petroleum main. However, TH 1 located the 26-inch diameter steel petroleum main at a depth of 7.45 feet below the set hubs. Figures 1 and 2 are photographs depicting the excavation of TH 1. Test hole number TH 2 was performed by NV5 just south of Maple Wood Drive’s intersection with Forest Valley Road. Similarly, according to the utility mapping depicted in C-203, TH 2 was planned on the Kinder Morgan 26-inch diameter steel petroleum main. However, TH 2 located the 14-inch diameter steel petroleum main at a depth of 5.31 feet below the set hubs. Figures 3 and 4 are photographs depicting the excavation of TH 2.

Test hole number TH 3 was excavated on the GCDWR 6-inch diameter AC water main at the GPR indicated location near the centerline of Maple Wood Drive to the south of Forest Valley Road. TH 3 located the 6-inch diameter water main at a depth of 4.75 feet below the set PK nails. Figures 5 and 6 are photographs depicting the excavation of TH 3. It should be noted that the route of this existing water main differed from the provided utility mapping depicted in C-203. NV5 designated the water main from its valve in the Maple Wood Drive-Forest Valley Road intersection south and then turning east within Maple Wood Drive to east of the project area for possible surveying by Stratus. Test hole number TH 4 was performed by NV5 just south of Maple Wood Drive’s intersection with Forest Valley Road. TH 4 was excavated on the Lumen fiber optic presumed to be contained within the former Plantation Pipeline 10-inch diameter steel carrier pipe. TH 4 located the 10-inch steel carrier pipe at a depth of 4.11 feet below the set hubs. Figures 7 and 8 are photographs depicting the excavation of TH 4.

Test hole number TH 5 was reserved for a potential second Lumen fiber optic telecommunication facility; however, EM and GPR data did not encounter a second telecommunication facility. It should be noted that it is possible that a second fiber optic facility was inadvertently painted during previous 811 markings associated with sanitary sewer installation efforts just to the west of the project area in the Maple Wood Drive median. While performing our QL-A services, NV5 observed two fiber optic markers set together at fixed intervals. One marker indicated Williams pipeline as the owner and the second marker as indicated belonging to Lumen. Based on our conversations with Cole Spencer with Kinder Morgan, it is our understanding that the 10-inch pipeline was formerly owned by Plantation Pipeline (Williams) and was later transferred to Level 3 (now Lumen). Thus, it is possible that the two markers indicate the same carrier facility and a second telecommunication line(s) may not exist. It should be noted that NV5 widened our test hole at TH 4 and excavated deeper than the located 10-inch steel carrier pipe to determine if a second fiber

optic was in-close proximity to the known fiber optic, but a second target was not encountered through the testing depth. Note a test hole sheet was created for test hole TH 5 to document that the targeted utility could not be designated by NV5 and that a subsequent test hole, thus could not be performed.

The performed test hole locations are approximately depicted within an NV5 marked-up drawing, C-203. Additionally, the 6-inch diameter AC water main mapped previously by others has also been indicated with "X's" within the same drawing along with the approximate location of the 6-inch water main designated (marked) in the field by NV5. Marked-up drawing C-203 has been included within the Appendix of this report.

Hickory Lane Test Holes

Reference Drawing C-201 depicts the approximate locations of the test holes excavated by NV5 on the existing GCDWR 6-inch diameter AC water main conflicting with the proposed 8-inch diameter DIP water main design at two locations between Station Nos. 10+25 and 13+50. Test hole numbers TH 6 and TH 7 were performed in the south right-of-way of Hickory Lane. Test hole number TH 6 was performed by NV5 just west of Hickory Lane's intersection with Pine Forest Drive at approximately Station No. 13+25. TH 6 was excavated on the GCDWR 6-inch diameter AC water main and located the targeted water main at a depth of 2.91 feet below the set hubs. Figures 9 and 10 are photographs depicting the excavation of TH 6.

Test hole number TH 7 was performed by NV5 just east of Hickory Lane's intersection with Scenic Highway at approximately Station No. 10+40. TH 7 was excavated on the GCDWR 6-inch diameter AC water main; however, a concrete thrust-type block or protective blocking was encountered in the vicinity of the water valve. The concrete casing was measured to have a depth of approximately 1.5 feet below the ground surface. GPR was used to determine the approximate termination of the concrete casing block and test hole TH 7 Offset was performed approximately 1 to 2 feet further east near the residential driveway edge. TH 7 Offset located the 6-inch diameter AC water main at a depth of 2.18 feet below the set hubs. Figures 11-14 are photographs depicting the excavation of TH 7 and TH 7 Offset.

Following excavation and data collection, the referenced test holes were backfilled in lifts, mechanically compacted and hubs were driven above the centerlines of the targeted utilities. Stratus surveyed the hubs and PK nails set by NV5 during our SUE survey. Due to the removal of test hole number TH 5, no hubs were set at this location.

Individual field test hole sheets were filled out with the data collected at each of the test hole locations and a test hole report compiled from the field sheets and the test hole coordinates. Note that a test hole field sheet and report sheet were completed for test hole TH 5 to account for their removal (noted in the test hole sheet comments). Additionally, a test hole field sheet and report sheet were filled out for test hole TH 7 to document the concrete block/casing encountered at this initial testing location. The depth of cover indicated in the test hole report represents the cover from the top of the set hubs to the top of the target utility. Test hole coordinates provided by Stratus were incorporated within our test hole reports with the exception of TH 7 Offset, which was not received by NV5. Our Preliminary Test Hole Report was provided via email to Mr. Schrama on January 23, 2026. Our Test Hole for this project is included in the Appendix of this report.

It has been a pleasure working with you on this project. If you have any questions, or if we can be of further assistance, please feel free to contact us at your convenience.

Sincerely,
NV5

A handwritten signature in blue ink, appearing to read 'Jonathan Pera'.

Jonathan Pera, PG
Utility Services Group Manager

A handwritten signature in blue ink, appearing to read 'Dan Adkins'.

Dan Adkins
Utility Services Program Manager



Figure 1: Photograph viewing northeast. Test hole TH 1 was excavated just south of the intersection of Maple Wood Drive with Forest Valley Road.



Figure 2: Photograph viewing the excavation of the Kinder Morgan 26-inch diameter steel petroleum pipeline located within test hole TH 1.



Figure 3: Photograph viewing northeast. Test hole TH 2 was excavated south of the intersection of Maple Wood Drive with Forest Valley Road.



Figure 4: Photograph viewing the excavation of the Kinder Morgan 14-inch diameter steel petroleum pipeline located within test hole TH 2.



Figure 5: Photograph viewing south. Test hole TH 3 was excavated within Maple Wood Drive south of its intersection with Forest Valley Road.



Figure 6: Photograph viewing the excavation of the 6-inch diameter AC water main within test hole TH 3.



Figure 7: Photograph viewing northeast. Test hole TH 4 was excavated south of the intersection of Maple Wood Drive with Forest Valley Road.



Figure 8: Photograph viewing the excavation of the Lumen 10-inch diameter steel fiber optic carrier pipe located within test hole TH 4



Figure 9: Photograph viewing southwest. Test hole TH 6 was excavated just west of Hickory Lane's intersection with Pine Forest Drive.



Figure 10: Photograph viewing the excavation of the 6-inch diameter AC water main located within test hole TH 6.



TH 7 initial attempted location

Figure 11: Photograph viewing south. Test hole TH 7 initial attempt was excavated east of Hickory Lane's intersection with Scenic Highway.



Figure 12: Photograph viewing the excavation of a concrete thrust or protective casing near an associated water valve for the 6-inch diameter AC water main. An offset test hole was performed just to the east of this initial attempt.

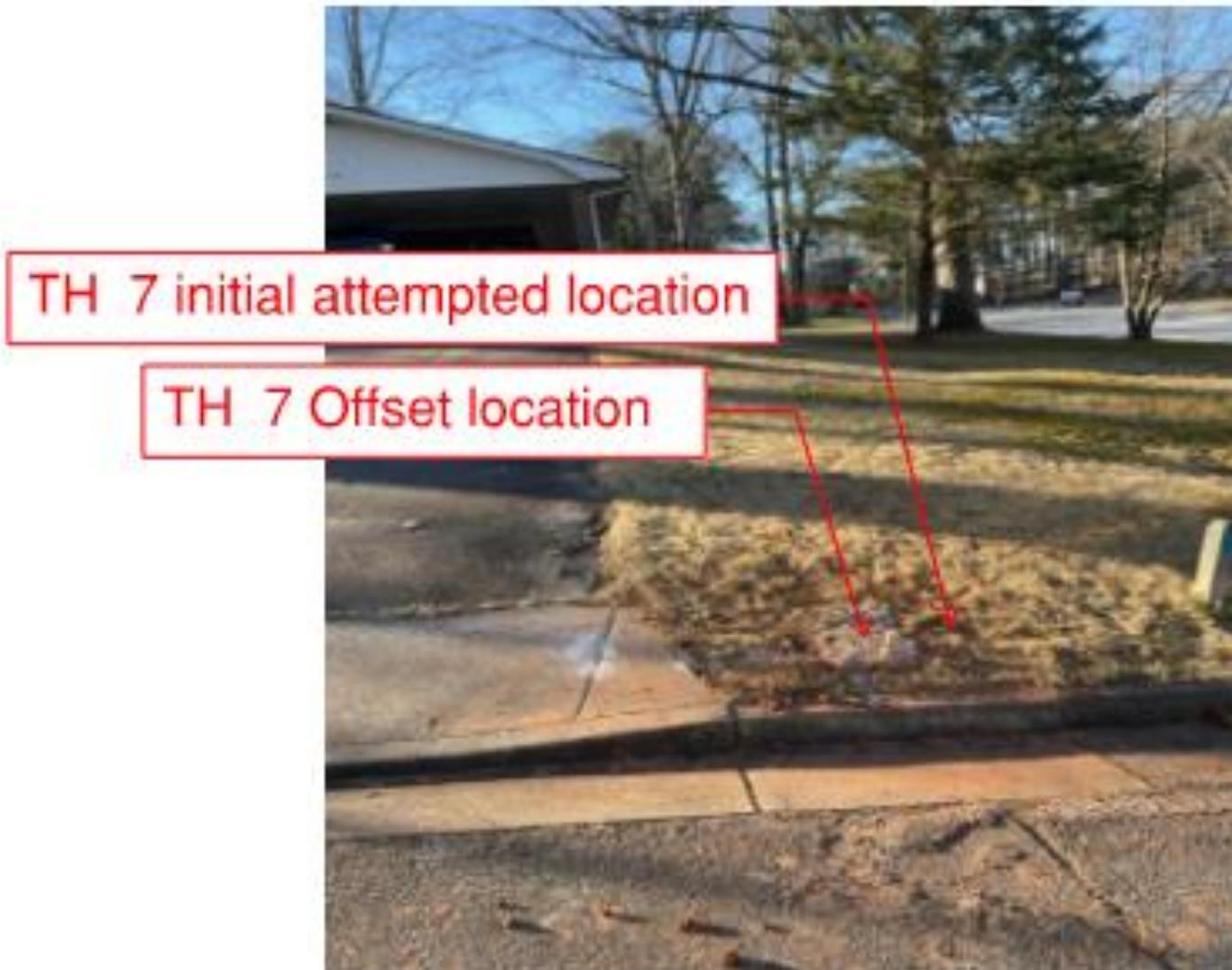


Figure 13: Photograph viewing south. Test hole TH 7 Offset was excavated east of Hickory Lane's intersection with Scenic Highway and approximately 1 to 2 feet east of initial attempt TH 7.



Figure 14: Photograph viewing the excavation of the 6-inch diameter AC water main located within test hole TH 7 Offset.

APPENDIX

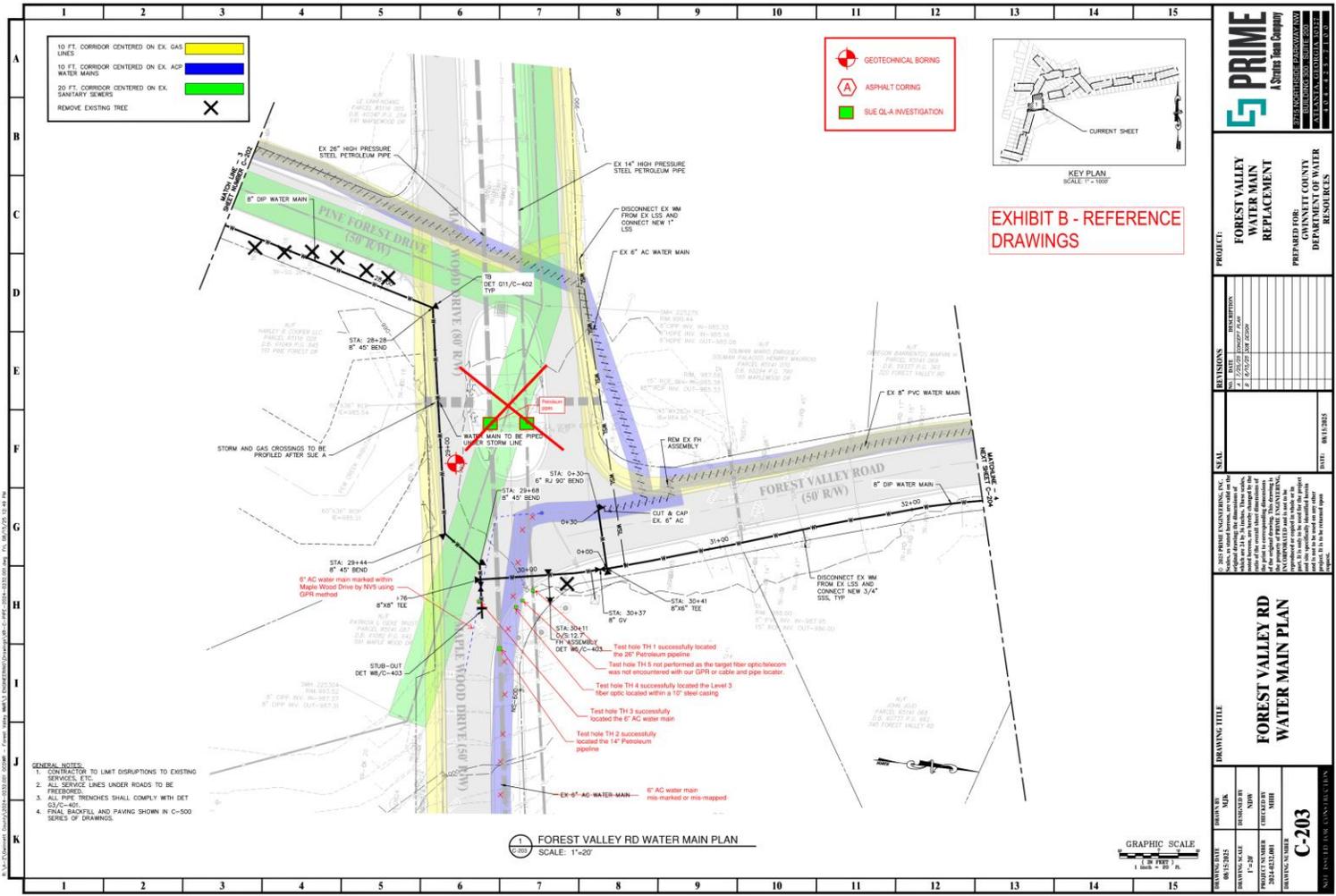


EXHIBIT B - REFERENCE DRAWINGS



PROJECT:
FOREST VALLEY WATER MAIN REPLACEMENT
PREPARED FOR:
DEPARTMENT OF WATER RESOURCES

REVISIONS	DATE	BY	CHKD

SCALE	DATE	BY	CHKD

DRAWING TITLE
FOREST VALLEY RD WATER MAIN PLAN

DESIGNED BY	DATE	REVISIONS BY	DATE	REVISIONS NUMBER

C-203

- GENERAL NOTES:**
- CONTRACTOR TO LIMIT DISRUPTIONS TO EXISTING SERVICES, ETC.
 - ALL SERVICE LINES UNDER ROADS TO BE PRESERVED.
 - ALL PIPE TRENCHES SHALL COMPLY WITH DET C-100-400.
 - FINAL BACKFILL AND PAVING SHOWN IN C-500 SERIES OF DRAWINGS.

FOREST VALLEY RD WATER MAIN PLAN
 SCALE: 1"=20'



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 License # F-1333
 10745 Westside Way
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 (678) 795-3631 Fax: (678) 461-3494



Project Information

Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	1	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	Kinder Morgan	O.D. Utility Size:	26"	Material:	Steel
Utility:	Gas	Utility Type:	Main	Condition:	Good
Excav. Crew:	JB, LE	Date Excv'd:	01/15/26	Soil Condition:	Dry
P'mnt Material:	-	P'mnt Depth:	-	P'mnt Condition:	-
Contact Name:	Cole Spencer	Contact Phone:	770.841.0574	Util. Color:	Black

Test Hole Coordinate Information

Test Hole ID: 1		Alignment 1	-	Alignment 2	-
Northing:	1,431,633.50'	Station:	-	Station:	-
Easting:	2,349,471.42'	Offset:	-	Offset:	-
Depth:	7.45'				
Elevation:	983.03'				



<p>Kinder Morgan 26" Steel Gas Main</p> <p>Sketch not to Scale</p>	<p>Comments: Bottom of utility elevation is computed, not field-verified.</p> <p>TH 1 was requested on the existing Kinder Morgan 26" steel petroleum main. NV5 located the targeted 26" petroleum main.</p>	
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Project Information

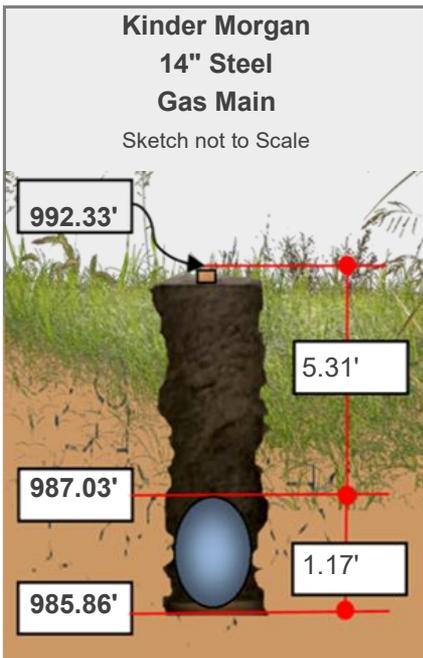
Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	2	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	Kinder Morgan	O.D. Utility Size:	14"	Material:	Steel
Utility:	Gas	Utility Type:	Main	Condition:	Good
Excav. Crew:	JB, LE	Date Excv'd:	01/15/26	Soil Condition:	Dry
P'mnt Material:	-	P'mnt Depth:	-	P'mnt Condition:	-
Contact Name:	Cole Spencer	Contact Phone:	770.841.0574	Util. Color:	Black

Test Hole Coordinate Information

Test Hole ID: 2		Alignment 1	-	Alignment 2	-
Northing:	1,431,620.15'	Station:	-	Station:	-
Easting:	2,349,497.62'	Offset:	-	Offset:	-
Depth:	5.31'				
Elevation:	987.03'				



**Kinder Morgan
 14" Steel
 Gas Main**
 Sketch not to Scale

Comments: Bottom of utility elevation is computed, not field-verified.

TH 2 was requested on the existing Kinder Morgan 14" steel petroleum main. NV5 located the targeted 14" petroleum main.



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Project Information

Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	3	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	GCDWR	O.D. Utility Size:	6"	Material:	Asbestos Concrete
Utility:	Water	Utility Type:	Main	Condition:	Good
Excav. Crew:	JB, LE	Date Excv'd:	01/16/26	Soil Condition:	Dry
P'mnt Material:	Asphalt	P'mnt Depth:	0.95	P'mnt Condition:	Good
Contact Name:	-	Contact Phone:	-	Util. Color:	Grey

Test Hole Coordinate Information

Test Hole ID: 3		Alignment 1	-	Alignment 2	-
Northing:	1,431,603.48'	Station:	-	Station:	-
Easting:	2,349,469.19'	Offset:	-	Offset:	-
Depth:	4.75'				
Elevation:	985.94'				



<p>GCDWR 6" Asbestos Concrete Water Main Sketch not to Scale</p>	<p>Comments: Bottom of utility elevation is computed, not field-verified.</p> <p>TH 3 was requested on the existing GCDWR 6" AC water main. NV5 located the targeted 6" water main.</p>	
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Project Information

Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	4	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	Lumen (Level 3)	O.D. Utility Size:	10"	Material:	Steel
Utility:	Communication	Utility Type:	Conduit	Condition:	Good
Excav. Crew:	JB, LE	Date Excv'd:	01/15/26	Soil Condition:	Dry
P'mnt Material:	-	P'mnt Depth:	-	P'mnt Condition:	-
Contact Name:	Natasha Doll	Contact Phone:	470.456.7040	Util. Color:	Silver

Test Hole Coordinate Information

Test Hole ID: 4		Alignment 1	-	Alignment 2	-
Northing:	1,431,625.64'	Station:	-	Station:	-
Easting:	2,349,480.87'	Offset:	-	Offset:	-
Depth:	4.11'				
Elevation:	987.02'				



<p>Lumen (Level 3) 10" Steel Communication Conduit Sketch not to Scale</p>	<p>Comments: Bottom of utility elevation is computed, not field-verified.</p> <p>TH 4 was requested on an existing Lumen (Level 3) fiber optic conduit. NV5 located a 10" steel conduit assumed to contain the Level 3 fiber optic cables. According to Cole Spencer with Kinder Morgan, the fiber optic conduit is a 10" steel retired petroleum pipeline previously maintained by Kinder Morgan.</p>	
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Project Information

Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	5	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	O.D. Utility Size:	Material:
Utility:	Utility Type:	Condition:
Excav. Crew:	Date Excv'd:	Soil Condition:
P'mnt Material:	P'mnt Depth:	P'mnt Condition:
Contact Name:	Contact Phone:	Util. Color:

Test Hole Coordinate Information

Test Hole ID: 5		Alignment 1	-	Alignment 2	-
Northing:	Enter Hub Offsets	Station:	-	Station:	-
Easting:	to get coords	Offset:	-	Offset:	-
Depth:	0.00'				
Elevation:	0.00'				

	<p>Comments: TH 5 was requested on a 2nd Lumen (Level 3) fiber optic cable(s) believed to be present adjacent to the Level 3 steel conduit located within test hole TH 4. However, NV5 could not designate or locate a 2nd Level 3 communication line with EM or GPR. Natasha Doll was contacted to determine if they maintain a 2nd telecommunication facility within the Kinder Morgan easement; however, Ms. Doll has not responded to our inquiries. Thus, test hole TH 5 was not attempted by NV5.</p>	
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Project Information

Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	6	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	GCDWR	O.D. Utility Size:	6"	Material:	Asbestos Concrete
Utility:	Water	Utility Type:	Main	Condition:	Good
Excav. Crew:	JB, LE	Date Excv'd:	01/16/26	Soil Condition:	Dry
P'mnt Material:	-	P'mnt Depth:	-	P'mnt Condition:	-
Contact Name:	-	Contact Phone:	-	Util. Color:	White

Test Hole Coordinate Information

Test Hole ID: 6		Alignment 1	-	Alignment 2	-
Northing:	1,430,197.73'	Station:	-	Station:	-
Easting:	2,348,903.52'	Offset:	-	Offset:	-
Depth:	2.91'				
Elevation:	1049.68'				



<p>GCDWR 6" Asbestos Concrete Water Main Sketch not to Scale</p>	<p>Comments: Bottom of utility elevation is computed, not field-verified.</p> <p>TH 6 was requested on the existing GCDWR 6" AC water main. NV5 located the targeted 6" water main.</p>	
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Project Information

Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	7	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	GCDWR	O.D. Utility Size:	Unknown"	Material:	Concrete
Utility:	Water (casing)	Utility Type:	Main	Condition:	Unseen
Excav. Crew:	JB, LE	Date Excv'd:	01/16/26	Soil Condition:	Dry
P'mnt Material:	-	P'mnt Depth:	-	P'mnt Condition:	-
Contact Name:	-	Contact Phone:	-	Util. Color:	White

Test Hole Coordinate Information

Test Hole ID: 7		Alignment 1	-	Alignment 2	-
Northing:	00.00'	Station:	-	Station:	-
Easting:	00.00'	Offset:	-	Offset:	-
Depth:	1.50'				
Elevation:	-1.50'				



TH 7 initial attempted location



Concrete casing

<p>GCDWR Unknown Concrete 6" Water (casing) Main Sketch not to Scale</p>	<p>Comments: Bottom of utility elevation is computed, not field-verified.</p> <p>TH 7 was requested on the existing GCDWR 6" AC water main. NV5 encountered a concrete casing surrounding the targeted 6" water main. The top of the casing was measured to be approximately 1.50' below the ground surface. It is presumed the casing is associated with the main's water valve (marker seen in overview photo above). An offset test hole was performed between TH 7 and the western edge of the driveway (seen above in overview photo).</p>
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Project Information

Proj. Name:	M-0737-06 Forest Valley WMR Project		NV5 Proj. No:	2020270.35	
Proj. Desc:	Excavation of Utilities		Test Hole ID:	7 Offset	
Requested By:	ECS Southeast, LLC	Report By:	Jonathan Pera	Date:	1/23/2026
City:	Lawrenceville	County:	Gwinnett	State:	Georgia

Target Utility Information

Owner:	GCDWR	O.D. Utility Size:	6"	Material:	Asbestos Concrete
Utility:	Water	Utility Type:	Main	Condition:	Good
Excav. Crew:	JB, LE	Date Excv'd:	01/19/26	Soil Condition:	Dry
P'mnt Material:	-	P'mnt Depth:	-	P'mnt Condition:	-
Contact Name:	-	Contact Phone:	-	Util. Color:	White

Test Hole Coordinate Information

Test Hole ID: 7 Offset		Alignment 1	-	Alignment 2	-
Northing:	00.00'	Station:	-	Station:	-
Easting:	00.00'	Offset:	-	Offset:	-
Depth:	2.18'				
Elevation:	-2.18'				



TH 7 initial attempted location

TH 7 Offset location



<p>GCDWR 6" Asbestos Concrete Water Main Sketch not to Scale</p>	<p>Comments: Bottom of utility elevation is computed, not field-verified.</p> <p>TH 7 Offset was performed on the existing GCDWR 6" AC water main. NV5 located the targeted 6" water main.</p>	
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