WIEDEMAN AND SINGLETON, INC.

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March 1, 2024

Mr. Bill Randolph
Project Engineer Manager
State Revolving Fund
S.C. Dept. of Health & Environmental Control
P.O.Box 11706
Rock Hill, SC 29731

Re: Wildcat Force Main Relocation-Conveyance
Rock Hill, South Carolina
W&S No: 056-20-220

Dear Mr. Randolph:

Attached for your review and approval is Addenda #1 for the above referenced project. Should you have any questions or comments, please contact me at your earliest convenience.

Sincerely,

WIEDEMAN AND SINGLETON, INC.

Rick Carter, Project Manager

Cc: Mr. Troy Began

T:\RH DATA\CLIENTS\ROCKHILL\056-20-220 - Wildcat Creek Force Main Relocation-Conveyance\3_bid phase\Addendum #1

ADDENDUM NO. 1
TO
PROJECT MANUAL, TECHNICAL SPECIFICATIONS AND DRAWINGS FOR
WILDCAT CREEK FORCEMAIN RELOCATION/CONVEYANCE
FOR
THE CITY OF ROCK HILL, SOUTH CAROLINA

Bids Received until 2:00 PM, Local Time, March 21, 2024

ACKNOWLEDGE RECEIPT OF THIS ADDENDUM BY INSERTING ITS NUMBER IN THE PROPOSAL: FAILURE TO DO SO MAY SUBJECT BONA FIDE BIDDER TO DISQUALIFICATION. THIS ADDENDUM FORMS A PART OF THE PROJECT DOCUMENTS; IT MODIFIES THEM AS FOLLOWS:

PROJECT MANUAL

Section 00100 Instructions to Bidders Paragraph 41(g) Page 13 of 18	**Delete** the following language from this paragraph of this section: ~~Lobbying: The Bidder shall complete and submit the "Disclosure of Lobbying Activities," in accordance with its instructions~~.
Section 00100 Instructions to Bidders Page 14 of 18	**Delete** the following language **from** Item 2 of the Agency Request – City of Rock Hill Bid Submittal Checklist of this section: ~~"Certification Regarding Lobbying"~~

SPECIFICATIONS

Section 00 01 10 Pages 1 - 2	**Revise** the Table of Contents to **include**: ➢ ***02 32 00 Geotechnical Investigations*** ➢ ***Appendix A – Geotechnical Investigation Report***
Section 02 32 00 Add No. 1, Pages 1-1	**Add** the specification section "02 32 00 – Geotechnical Investigations" attached with this addenda.
Appendix A	**Add** the geotechnical engineering report entitled "*Geotechnical Engineering Report, Wildcat Creek Force Main/Sewer Improvements*" and dated February 22, 2024 **to** the Appendix

DRAWINGS

DRAWING C.03 **SHEET 5 OF 16**	**Replace** the drawing with revised Drawing ***C.03*** attached with this addendum dated March 1, 2024.

SECTION 02 32 00

GEOTECHNICAL INVESTIGATIONS

PART 1 GENERAL

1.1 SUMMARY

A. A subsurface investigation report entitled Geotechnical Engineering Report, Wildcat Creek Force Main/Sewer Improvements, dated February 22, 2024 has been prepared by S&ME, Inc. for this project. The approximate location and elevation of the soil borings is indicated in the soil investigation report and is shown on the construction drawings. The actual elevation and location of the investigations that were completed may vary from that shown.

B. The purpose of the report was to explore subsurface conditions at select locations along the force main and gravity sewer alignment. The Contractor shall make his own analysis of the methods and equipment required to complete the trenchless utility installations and excavations, the amount and quantity of various types of materials to be removed, how they shall be removed and the cost. The quantity and type of soil investigations contained in the report may be helpful, but are not sufficient to determine the quantities of the various materials to be excavated and removed, difficulty of excavation and removal or dewatering requirements.

C. This soil investigation report is offered as an aid in bidding only and shall not supersede any contract requirements or relieve the Contractor from his responsibilities outlined in the contract documents for the proper installation of the force main, sewer and appurtenances. A copy of the subsurface investigation report is included in the Appendix of the specifications but is not a warranty of subsurface conditions. The Owner, Engineer, and Geotechnical Engineer assume no responsibility for any variation between the materials encountered during construction and those indicated in the report or for any variation between the location of the water table encountered and that indicated on the boring logs at the date the borings were taken.

D. The Contractor shall visit the site and become aquatinted with site conditions. Prior to bidding, prospective Contractors may make their own subsurface investigations to satisfy themselves with site and subsurface conditions. The location of these investigations shall be limited to areas where easements have been acquired and are subject to the approval of the Owner. Contractor shall provide adequate notification to the Owner of the date and location of said investigations and shall assume all responsibility for any damage to property caused as a result of the Contractor’s investigation.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

Geotechnical Engineering Report
Wildcat Creek Force Main/Sewer Improvements
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

PREPARED FOR:

Wiedeman & Singleton, Inc.
131 E. Main Street, Suite 300
Rock Hill, South Carolina 29730

PREPARED BY:

S&ME, Inc.
8848 Red Oak Boulevard, Suite A
Charlotte, North Carolina 28217

February 22, 2024

February 22, 2024

Wiedeman & Singleton, Inc.
131 E. Main Street, Suite 300
Rock Hill, South Carolina 29730

Attention: Mr. Troy Began, P.E.

Reference: **Geotechnical Engineering Report**
Wildcat Creek Force Main/Sewer Improvements
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

Dear Mr. Began:

S&ME, Inc. is pleased to submit this Geotechnical Engineering Report for the Wildcat Creek Force Main/Sewer Improvements project in Rock Hill, South Carolina. This exploration was performed in general accordance with our revised Proposal No. 13-1900409 dated September 6, 2019, with scope modifications requested by Wiedeman & Singleton in April of 2022. This report supersedes our August 12, 2022 report.

The purpose of this geotechnical study was to determine the general subsurface conditions along the new utility alignments and to evaluate those conditions with regard to the design and construction of the project. This report presents our findings together with our geotechnical conclusions and recommendations.

S&ME appreciates the opportunity to assist you during this phase of the project. If you have any questions concerning this report or if we may be of further assistance, please contact us.

Sincerely,

S&ME, Inc.

DocuSigned by:
72275FD8BA38431...

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No.29638 LUIS A. CAMPOS

Luis A. Campos, P.E.
Senior Engineer
SC Registration No. 29638

Kristen H. Hill, P.E.
Principal Engineer

SOUTH CAROLINA S & ME, INC. No. C00473 CERTIFICATE OF AUTHORIZATION

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Appendix

1.0 Introduction

1.1 Project Information

Project information is based on email correspondence between Troy Began of Wiedeman & Singleton, Inc. (W&S) and Luis Campos of S&ME in August/September of 2019 and between Mark Scherger of W&S and Mr. Campos in April/May of 2022. Additional alignment information was provided by W&S on February 12, 2024.

W&S is providing design services to the City of Rock Hill for a replacement section of the Wildcat Creek Sewer project. This project consists of the installation of about 2,199 linear feet of 36-inch diameter force main (Line A) and about 1,594 linear feet of 36-inch diameter gravity sewer (Line B). Line A begins at the intersection of Porter Road and Clara Street, heads east along Clara Street towards Firetower Road, turns west for several hundred feet, then crosses beneath Firetower Road at the west end of the Performance Food Group property. It then follows the western boundary of the Performance Food Group property and terminates just before reaching the Norfolk Southern Railroad. Line B begins north of East Main Street (SC 5), crosses beneath the road, and heads southward along the eastern edge of the Commercial Industrial Supply property until it joins the force main portion of the line at the Norfolk Southern Railroad. The approximate alignment location is shown in the Site Vicinity Plan (Figure 1) in the Appendix.

The roadway and railroad crossings are planned to be installed via jack-and-bore techniques. Along Clara Street, the force main will be installed via cut and cover techniques. Plan sheets provided by W&S, dated April 11 and May 31, 2022, included the initial alignment and profile information which our exploration was based on, and updated information was provided in the Plan Set dated February 7, 2024. Based on the provided drawings, invert elevations will range between 8 and 18 feet below existing grades at the exploration/crossing areas.

1.2 Purpose and Scope

The purpose of this geotechnical study was to explore the subsurface conditions at the specific locations along the utility alignments and develop geotechnical recommendations for the design and construction of the proposed project. S&ME has completed the following scope of geotechnical services for this project:

- Coordinated field activities with W&S personnel and property owners.
- Visited the site, observed surface conditions, and marked boring locations.
- Contacted South Carolina 811 to have them mark the locations of existing underground utilities in the exploration areas.
- Provided signs indicating drilling activities along the shoulder/roadways.
- Subcontracted traffic control to perform lane/shoulder closures for safe boring access.
- Mobilized an all-terrain vehicle drill rig and crew to the site.
- Drilled seven (7) soil test borings.
- Temporarily installed slotted PVC standpipe in one borehole to help facilitate water level measurements.
- Attempted water level measurements in boreholes and removed standpipe.

- Backfilled the boreholes with soil cuttings to the ground surface, and patched the surface in asphalt areas with cold-mix asphalt patch.
- Performed analysis and prepared this geotechnical report.

2.0 Exploration Procedures

2.1 Field Testing

In order to explore the subsurface conditions along the proposed force main and sewer alignment, seven soil test borings (Borings B-1 through B-7) were drilled to depths ranging from 8 to 20 feet below existing grades. We note that the planned Firetower Road crossing shifted between the exploration and the issuance of this report. The borings were advanced at the approximate locations shown on the Boring Location Plan drawings (Figures 2 through 5) in the Appendix. The boring locations were selected by W&S but required some modification due to underground and overhead utilities. The boring locations were marked in the field by a staff professional from our office using existing site features as references. The borings were performed between July 21 and 25, 2022. Ground surface elevations indicated on the logs were obtained from the provided plans (round to the nearest foot), and should be considered approximate. The northings and eastings shown on the logs should also be considered approximate.

A CME 550X drill rig mounted on an ATV carrier was used to advance the borings with hollow-stem, continuous flight augers. Standard Penetration Test (SPT) split spoon sampling was performed at designated intervals in the soil test borings and in general accordance with ASTM D1586 to provide an index for estimating soil strength and relative density or consistency. The drill rig used to perform the borings is equipped with a hydraulic automatic hammer for penetration testing with a reported efficiency of 82%. In conjunction with the SPT testing, samples were obtained for soil classification purposes. Representative portions of each soil sample were placed in sealed containers and taken to our laboratory.

Water level measurements were attempted in the soil test borings at the termination of drilling activities in each boring. Slotted PVC standpipe was installed in Boring B-4 to help facilitate water level readings. A secondary water level measurement was performed after at least a 1-day waiting period in borings performed outside of roadway areas (Borings B-2, B-4, B-5, and B-7). Upon completion of water level measurements, the standpipe was removed, the boreholes were backfilled with soil cuttings, and the pavements were patched with cold-mix asphalt.

2.2 Laboratory Testing

Once the split-spoon samples from the soil test borings were received in our laboratory, a geotechnical staff professional visually examined each sample to estimate the distribution of grain sizes, plasticity, organic content, moisture condition, color, presence of lenses and seams and apparent geological origin. The soils were classified in general accordance with the Unified Soil Classification System (USCS) and ASTM D2488. The results of the classifications, as well as the field test results, are presented on the individual boring logs included in the Appendix. Similar soils were grouped into strata on the logs. The strata contact lines represent approximate boundaries between the soil types; the actual transition between the soil types in the field may be gradual in both the horizontal and vertical directions.

3.0 Area Geology and Subsurface Conditions

3.1 Physiography and Area Geology

The site is located in the Charlotte Belt of the Piedmont Physiographic Province of South Carolina as shown in Figure 3-1. The Piedmont Province generally consists of well-rounded hills and ridges, which are dissected by a well-developed system of draws and streams. The Piedmont Province is predominantly underlain by metamorphic rock (formed by heat, pressure and/or chemical action) and igneous rock (formed directly from molten material), which were initially formed during the Precambrian and Paleozoic eras. The volcanic and sedimentary rocks deposited in the Piedmont Province were the host for the metamorphism and were changed to gneiss and schist. The more recent Paleozoic era had periods of igneous emplacement, with at least several episodes of regional metamorphism resulting in the majority of the rock types seen today.

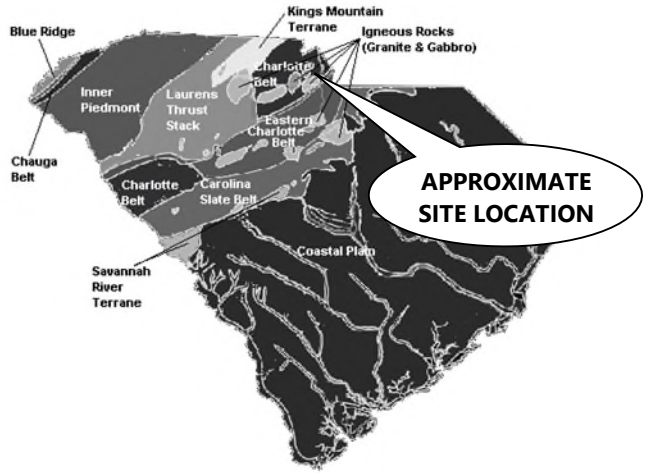


Figure 3-1: Physiographic Provinces of South Carolina

The topography and relief of the Piedmont Province have developed from differential weathering of the igneous and metamorphic rock. Because of the continued chemical and physical weathering, the rocks in the Piedmont Province are now generally covered with a mantle of soil that has weathered in place from the parent bedrock. These soils have variable thicknesses and are referred to as residuum or residual soils. The residuum is typically finer grained and has higher clay content near the surface because of the advanced weathering. Similarly, the soils typically become coarser grained with increasing depth because of decreased weathering. As the degree of weathering decreases, the residual soils generally retain the overall appearance, texture, gradation, and foliations of the parent rock.

The boundary between soil and rock in the Piedmont is not sharply defined. A transitional zone termed "Partially Weathered Rock" is normally found overlying the parent bedrock. Partially Weathered Rock (PWR) is defined for engineering purposes as residual material with Standard Penetration Resistances (N-values) exceeding 100 blows per foot. The transition between hard/dense residual soils and PWR occurs at irregular depths due to variations in degree of weathering. A depiction of typical weathering profiles in the Piedmont Province is presented in Figure 3-2.

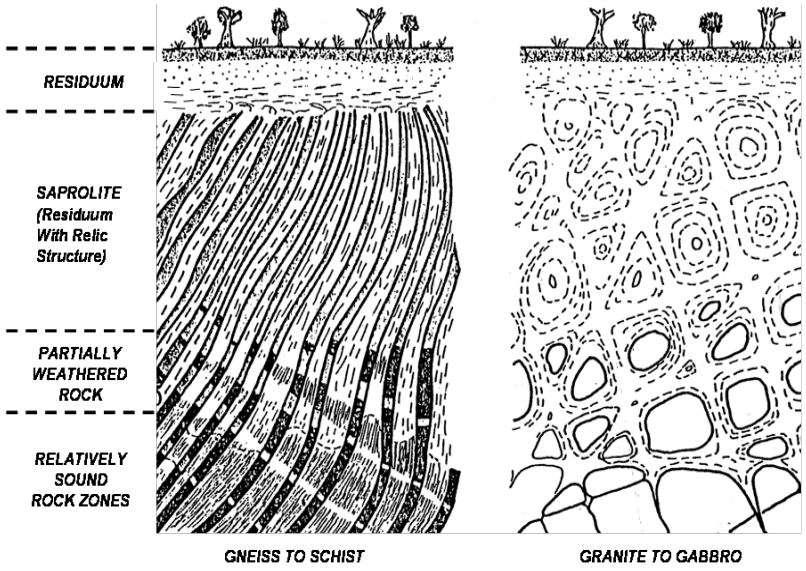


Figure 3-2: Typical Piedmont Weathering Profiles

Groundwater is typically present in the residual soils and within fractures in the PWR or underlying bedrock in the Piedmont. On upland ridges in the Piedmont, groundwater may or may not be present in the residual soils above the PWR and bedrock. Alluvial soils, which have been transported and deposited by water, are typically found in floodplains and are generally saturated to within a few feet of the ground surface. Fluctuations in groundwater levels are typical in residual soils and PWR in the Piedmont, depending on variations in precipitation, evaporation, and surface water runoff. Seasonal high groundwater levels are expected to occur during or just after the typically wetter months of the year (November through April).

3.2 Subsurface Conditions

Subsurface conditions as indicated by the soil test borings generally consist of surficial pavement or topsoil underlain by fill soils, residual soils, PWR, and auger refusal material. The generalized subsurface conditions at the site are described below. Also, two Boring Profile sheets (Figures 6 and 7) showing conditions along the force main/ gravity sewer alignment are presented in the Appendix. Elevations referenced on the boring logs were interpolated from topographic information from W&S plan/profile sheets and should be considered approximate. For more detailed soil descriptions and stratifications at a particular boring location, the respective boring log should be reviewed.

3.2.1 Clara Street (B-1)

A Boring Profile of the subject area is included as Figure 6 in the Appendix.

Surface Materials: Approximately 2 inches of asphalt was encountered at the road surface.

Fill Soils: Fill soils were encountered beneath the pavement to a depth of about 5.5 feet. The fill soils consisted of very loose silty sand (USCS classification SM) and soft silty clay (CH). The fill soils were moist to wet and exhibited SPT N-values of 2 to 3 blows per foot (bpf).

Residual Soils: Residual soils were encountered underlying the fill soils. The residuum consisted of dense silty sand (SM) which was noted as moist and exhibited SPT N-values ranging from 37 to 42 bpf.

Partially Weathered Rock: The residual soils transitioned into PWR at a depth of about 11.5 feet (approximate elevation of 620.5 feet). When sampled, the PWR generally breaks down into silty sand.

Auger Refusal Material: Boring B-1 was terminated upon encountering auger refusal at a depth of 13 feet (approximate elevation of 619 feet) beneath the existing ground surface. Auger refusal is a relative term used to describe material that could not be penetrated by the drilling equipment used at the site. Auger refusal may be due to the presence of boulders, rock ledges, lenses, or seams, or the top of parent bedrock. Rock coring would be required to confirm the type and continuity of the refusal material; however, rock coring was beyond our scope of services.

Groundwater: A water level measurement was attempted in the boring at the termination of drilling activities, but water was not encountered. A secondary water level measurement was not attempted as the boring was performed in the roadway. Water levels tend to fluctuate with seasonal and climatic variations, as well as with some types of construction operations. Therefore, water may be encountered during construction at depths not indicated by the borings.

3.2.2 Firetower Road Initially-Planned Crossing (B-2 and B-3)

A Boring Profile of the subject area is included as Figure 6 in the Appendix.

Surface Materials: Approximately 3 inches of topsoil was encountered in Boring B-2 (southwest side of crossing). Approximately 5 inches of asphalt was encountered in Boring B-3 (northeast side of crossing).

Fill Soils: Fill soils were encountered beneath the pavement in Boring B-3 to a depth of about 3 feet. The fill soils consisted of firm clayey silt (MH) which was noted as wet and exhibited an SPT N-value of 7 bpf.

Residual Soils: Residual soils were encountered underlying the surface topsoil or fill soils. The residuum consisted of medium dense to very dense silty sand (SM) which was noted as moist and exhibited SPT N-values ranging from 11 to 57 bpf. Boring B-3 was terminated in residual soils at its planned depth.

Partially Weathered Rock: The residual soils in Boring B-2 transitioned into PWR at a depth of about 9 feet (approximate elevation of 619 feet). When sampled, the PWR generally breaks down into silty sand.

Auger Refusal Material: Boring B-2 was terminated upon encountering auger refusal at a depth of 9.5 feet (approximate elevation of 618.5 feet) beneath the existing ground surface.

Groundwater: Water level measurements were attempted in both borings at the termination of drilling activities. As Boring B-2 was performed in the grassed ditch, a secondary water measurement was performed after at least a 1-day waiting period. A secondary water level measurement was not attempted in Boring B-3 as it was performed in the roadway. Boring B-2 (southwest side of crossing) encountered water at a depth of 4.2 feet at drilling termination and at a depth of 4 feet (approximate elevation of 624 feet) after the waiting period. Boring B-3 (northeast side of crossing) did not encounter water at drilling termination.

3.2.3 Norfolk Southern Crossing (B-4 and B-5)

A Boring Profile of the subject area is included as Figure 7 in the Appendix.

Surface Materials: Approximately 2 to 4 inches of topsoil was encountered in the borings.

Fill Soils/Materials: Fill soils were encountered beneath the topsoil to a depth of about 3 feet on the south side of the crossing (B-4) and to a depth of about 13 feet on the north side of the crossing (B-5). The fill soils consisted of stiff sandy clay (CL), loose clayey sand (SC), soft to stiff clayey silt (MH), and wood debris. The fill soils were dry to wet and exhibited SPT N-values of 3 to 15 bpf.

Residual Soils: Residual soils were encountered underlying the fill soils. The residuum consisted of stiff silty clay (CH) and soft to stiff sandy silt (ML). The residual soils were moist to wet and SPT N-values ranging from 3 to 13 bpf. Both borings were terminated in residual soils at their planned depth.

Groundwater: Water level measurements were attempted in both borings at the termination of drilling activities and after at least a 1-day waiting period. Boring B-4 (south side of crossing) encountered water at a depth of 16 feet at drilling termination and at a depth of 15.9 feet (approximate elevation of 628.1 feet) after the waiting period. Boring B-5 (north side of crossing) did not encounter water at either measurement time.

3.2.4 E. Main Street Crossing (B-6 and B-7)

A Boring Profile of the subject area is included as Figure 7 in the Appendix.

Surface Materials: Approximately 8 inches of gravel was encountered in Boring B-6 (south side of crossing). Approximately 2 inches of topsoil was encountered in Boring B-7 (north side of crossing).

Fill Soils: Fill soils were encountered beneath the gravel to a depth of about 3 feet in Boring B-6 and to a depth of about 5.5 feet in Boring B-7. The fill soils consisted of loose clayey sand (SC) and firm silty clay (CH). The fill soils were moist and exhibited SPT N-values of 6 to 8 bpf.

Residual Soils: Residual soils were encountered underlying the fill soils in both borings. The residuum consisted of medium dense to very dense silty sand (SM) which was noted as dry and exhibited SPT N-values ranging from 20 to 53 bpf.

Partially Weathered Rock: The residual soils in Boring B-6 transitioned into PWR at a depth of about 7 feet (approximate elevation of 633 feet). In Boring B-7, they transitioned into PWR at a depth of about 8 feet (approximate elevation of 631 feet). The PWR in Boring B-7 transitioned back into residual soils and again into PWR. When sampled, the PWR generally breaks down into silty sand. Boring B-7 was terminated in the PWR near is planned depth.

Auger Refusal Material: Boring B-6 was terminated upon encountering auger refusal at a depth of 8 feet (approximate elevation of 632 feet) beneath the existing ground surface.

Groundwater: Water level measurements were attempted in both borings at the termination of drilling activities. A secondary water level measurement was not attempted in Boring B-6 as it was performed in a parking/drive area. As Boring B-7 was performed off of the road, a secondary water measurement was performed after a 1-day waiting period. Boring B-6 (south side of crossing) did not encounter water at drilling termination. Boring B-7 (north side of crossing) did not encounter water at drilling termination, but did encounter water at a depth of 12.2 feet (approximate elevation of 626.8 feet) after the waiting period.

4.0 General Construction Recommendations

4.1 Existing Underground Utilities

Based on our review of the provided drawings and visual observations during the subsurface exploration, we understand that existing utility lines are currently located along Clara Street and each of the three crossing areas. These utility lines can provide a conduit for water to enter excavations or tunneling/jack-and-bore pit areas; therefore, special attention should be given to the proximity of these lines to the construction areas and adequate protection provided to prevent surface water from entering and ponding in the excavations. Additionally, care should be taken as to not damage the utility lines during construction.

Excavations resulting from removal of existing utility lines should be backfilled with properly compacted structural fill as outlined later in this report. This is of particular importance if new utilities will bear in backfilled trench excavations. For any utilities that are not removed, care should be taken as to not damage the utility lines during construction.

We note that a reported underground high voltage power line was not shown on the initial W&S plans provided to S&ME in the vicinity of Boring B-7. Final designs and construction plans should be adjusted to avoid existing underground utilities or plan for their removal/protection accordingly.

4.2 Site Preparation

Prior to excavating the installation pits or in the cut/cover areas along Clara Street, surficial topsoil, pavement, debris and other deleterious materials should be removed a minimum of 5 feet from the area to reduce the potential of these materials from entering the excavation and/or being mixed with the soils to be used as backfill.

4.3 Excavations

Based on the results of the soil test borings, it appears that the general excavation for the force main/gravity sewer line will be mostly in existing fill soils and residual soils. Generally, the existing fill and residual soils, as well as any newly placed fill soils, can be excavated using typical earthmoving equipment (e.g., backhoes, trackhoes, and front-end loaders).

Additionally, PWR and auger refusal material were encountered in several borings (Borings B-1, B-2, B-6, and B-7), as summarized in the following table:

Table 4-1: Difficult Excavation Summary

Area	Test Location	Station (Approx.)	PWR		Refusal		Comments
			Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)	
Clara Street	B-1	2+70 (Line A)	11.5	620.5	13	619	PWR above planned invert elevation, Refusal within 3 feet of planned invert elevation
Firetower Road	B-2	9+10 (Line A)	9	619	9.5	618.5	PWR and Refusal within 3 feet of planned invert elevation
E. Main Street Crossing	B-6	5+55 (Line B)	7	633	8	632	PWR and Refusal above planned invert elevation
	B-7	4+20 (Line B)	8	631	-	-	PWR above planned invert elevation

The depth to, and thickness of, PWR, rock lenses or seams and bedrock, can vary dramatically in short distances and between boring locations; therefore, PWR, boulders, or bedrock may be encountered during general excavation or depths between boring locations not encountered during this exploration. **We note that boulders are common in the general project area and should be anticipated.**

While PWR may be considered rippable, PWR (and large boulders) may be more quickly excavated by using blasting, pneumatic hammers, or hydraulic hammers. Auger refusal material will require either blasting or pneumatic hammers in order to be removed from the trenches. However, due to the proximity of existing sewer line, we anticipate blasting will be prohibited.

For temporary excavations, shoring and bracing or flattening (laying back) of the slopes should be performed to obtain a safe working environment. Excavations should be sloped or shored in accordance with local, state and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. We recommend that all excavated soils be placed away from the edges of the excavation, at a distance equaling or exceeding the depth of the excavation. The contractor is solely responsible for site safety. This information is provided only as a service and under no circumstances should we be assumed responsible for construction site safety.

4.4 Groundwater/Temporary Dewatering

As previously noted, groundwater was encountered in several borings; however, groundwater was above or near the bottom of the invert elevations in Borings B-2 (Firetower Road Crossing) and B-7 (E. Main Street Crossing).

An overall groundwater summary is presented in Table 4-2:

Table 4-2: Groundwater Summary

Line	Area	Test Location	Station (Approx.)	Groundwater		Comments
				Depth (feet)	Elevation (feet)	
Line A (Force Main)	Clara Street	B-1	2+70	-	-	No secondary water reading (in road)
	Firetower Road	B-2	9+10	4	618.5	Above planned invert elevation
		B-3	-	-	-	No secondary water reading (in road)
Line B (Gravity Sewer)	Norfolk Southern Crossing	B-4	16+20	15.9	628.1	Below planned invert elevation
		B-5	14+40	-	-	-
	E. Main Street Crossing	B-6	5+55	-	-	Likely similar to B-7
		B-7	4+20	12.2	626.8	Above planned invert elevation

In order to excavate the trenches and construct the appropriate jack-and-bore pits for the force main and gravity sewer line installation, temporary dewatering measures will be required for the E. Main Street Crossing. It also may be required for the Firetower Road crossing based on nearby borings B-2 and B-3; however, borings were not performed at the final crossing location due to the alignment change. Depending on the time of year construction proceeds and the depths of the proposed excavations, groundwater may be encountered during construction at levels which deviate from this report.

Depending on the amount of groundwater flow encountered, a back-up dewatering system should be readily available by the contractor. Dewatering should be maintained until the pipeline installation and backfilling around the pipeline is complete. If pumping is used, at no time should pumping be performed directly beneath the exposed pipe bearing elevation since this could result in disturbance of the bearing materials and a loss of soil strength and increased settlement.

We recommend, independent of the temporary de-watering methods used, that the water level be kept at a minimum of three feet below the bottom of the advancing excavation and three feet below the bottom of the excavations at all times during construction. Dewatering must be maintained **continuously** for any beneficial de-watering to be derived. Discontinuous pumping, for example, will result in softening of the subgrade soils and additional undercutting or pipe bedding preparation may be required. The contractor should also be prepared to implement additional de-watering techniques should the need arise.

Positive site drainage should be maintained away from working areas at all times to prevent ponding of water that could soften and disturb the subgrade materials. We recommend that all subgrade surfaces and fill surfaces be adequately sloped to provide positive drainage as construction progresses.

4.5 Fill Material and Placement

All fill used for backfilling should consist of a clean (free of organics and debris) soil. The proposed fill should have a maximum dry density of at least 90 pounds per cubic foot as determined by a standard Proctor compaction test, ASTM D698. All fill should be placed in loose lifts not exceeding 8 inches in thickness. See the following table for compaction recommendations:

Table 4-3: Backfill Placement Recommendations

General Area	Vertical Zone	Minimum Compaction Effort (%)	Maximum Moisture Content Range (%)	Other Backfill Requirements
Non-Roadway	Excavation bottom to minimum 2′ above force main/gravity sewer pipe	95	± 3	low plasticity soil, <3″ particle size
	Minimum 2′ above force main/gravity sewer pipe and higher	92	± 5	-
Roadway	Excavation Bottom to minimum 2′ above force main/gravity sewer pipe	95	± 3	low plasticity soil, <3″ particle size
	Minimum 2′ above force main/gravity sewer pipe and within 18″ of pavement subgrade	95	± 3	-
	Upper 18″ of pavement subgrade	98	± 3	low plasticity soil, <3″ particle size

In Table 4-3, "Roadway" areas are considered as trafficked/roads (Clara Street, parking areas) and also areas adjacent to roadways/railroads within a horizontal distance equal to the excavation depth. For example, if a 10-foot-deep excavation is adjacent to a roadway/railroad, a 10-foot lateral area should also be treated as roadway for backfilling purposes. Also in Table 4-3, the compaction effort and compaction moisture range area based on the material's standard Proctor maximum dry density and optimum moisture content. "Low plasticity soil" indicates that the Liquid Limit (LL) is less than 50 and that the Plasticity Index (PI) is less than 25. These soil types generally classify as CL, ML, SC, SM, SW, or GW in accordance with the USCS.

We recommend that field density tests, including one-point Proctor verification tests, be performed on the fill as it is being placed at a minimum frequency of one per lift per 3,000 square feet while backfilling installation pit areas. Additionally, we recommend that at least one density test be performed per 100 linear feet of pipe installation per lift of fill placement.

Backfilling around the pipes should be conducted in accordance with the pipe manufacturer's recommendations. Typically, backfill on the sides of the pipe should be brought up simultaneously to prevent differential loading on the pipe. During backfilling, care should be taken to prevent over compaction of the backfill, as this could result in increased lateral stresses against the pipe.

Based on the results of the soil test borings performed and our experience with similar type materials, the clean existing low plasticity fill soils and low plasticity residual soils can typically be reused as pipe backfill. Existing fill soils should be evaluated during construction to determine their suitability for re-use as structural fill. If unsuitable fill materials are excavated during trenching activities, such as the wood debris encountered in Boring B-5, these materials should be separated from the other excavated soils to avoid material contamination.

As excavations approach the water table, the moisture content of the soils will typically become higher and it will be difficult to achieve proper compaction. The soils may also become moist due to weather conditions and on-going construction activities. Therefore, moisture conditioning ("drying back" or "wetting") of the soils may be required prior to re-use as structural fill. **If project sequencing and/or space does not allow for drying of backfill soils, importing of dry backfill soils should be planned.**

5.0 Force Main / Gravity Sewer Design Recommendations

5.1 Pipe Bedding

The pipe bedding material should comply with all requirements of the pipe manufacturer. In excavations where groundwater is encountered, we recommend that adequate temporary de-watering measures be provided to help maintain stable subgrade conditions. It may be necessary, depending on the actual subsurface conditions, that the excavation bottoms and sides be lined with a needle punched non-woven filter fabric such as Mirafi 140N, or equivalent and the granular backfill wrapped in the fabric to prevent the infiltration of soil fines into the granular material which could otherwise result in the creation of voids and corresponding subsidence of these soils. The fabric should be placed in areas where the water table is encountered during construction.

5.2 Uplift Forces

Uplift or buoyancy will be a factor where the pipelines will be installed below the groundwater table. If the uplift forces are approximately equal to the weight of the pipe (empty) and backfill or larger, it will be necessary to anchor the pipe. We recommend a minimum factor of safety of 1.25 be provided against uplift when utilizing dead load for resistance.

5.3 Jack-and-Bore Installations

5.3.1 General

As indicated, we understand plans are to use jack-and-bore/tunneling methods to install the subject force main and gravity sewer pipes at the roadway and railroad crossings. Jack-and-bore/tunneling methods generally consists of excavating a pit adjacent to the proposed tunnel location and hydraulically pushing sections of pipe or casing along the tunnel alignment. After installation of the first section of casing, additional sections of casing are subsequently welded to the previous section of casing and advanced. A receiving pit is constructed at the other end of the tunnel to receive the casing. Earth removal is generally accomplished by mechanical means such as augers or boring equipment. Auger excavation is generally practical for diameters up to about 60 inches. However, the relatively soft soil conditions and depth below groundwater could cause caving/instability at the face. Additionally, PWR and refusal material (rock) was encountered at the E. Main Street crossing borings and the nearby Firetower Road borings, and our experience suggests it may be difficult to maintain a vertical alignment at the Rock/PWR/soil boundary and augers may become obstructed with boulders.

For jack-and-bore/tunneling methods, the pipe/casing is advanced forward using a hydraulic installation system. Horizontal forces induced by the installation are resisted by the pit sidewalls or support system. It is necessary to provide a relatively uniform distribution of load around the pipe or casing periphery to prevent localized stress concentrations. This is accomplished by using a cushion material between the pipe sections and installation system. Where extreme pressures are anticipated due to long distances or excessive friction forces are anticipated, additional pipe casing thickness may be required.

The pipe or casing section should be designed by a registered structural engineer with regard to the anticipated overburden, hydrostatic, and anticipated installation pressures. If specific design parameters for the design of the steel casing with regard to soil loads and installation resistance along the tunnel axis are required, S&ME will be happy to provide.

5.3.2 Design and Installation Considerations

Based on the design elevations for the proposed sewer line, the tunneling/jack-and-bore alignments will extend through existing fill, residuum, PWR, and rock. Partially Weathered Rock and refusal/rock was encountered at 2 of crossings, and based on our experience, the depth at which PWR and rock is encountered in the Piedmont can vary considerably. Additionally, boulders may be present near the residual soil/PWR interface. Boulders, stumps or other debris greater than 6 inches in diameter have the potential to obstruct the boring augers and mixed-face conditions can cause alignment issues.

Tunneling should comply with SCDOT and Norfolk Southern/AREMA requirements and the casing should be designed to accommodate the roadway and traffic loading or the railroad and train (likely a Cooper E80) loading. Deflections from settlement or heave should be limited to SCDOT and Norfolk Southern/AREMA requirements. Limiting settlement and heave within tolerable limits is dependent on both the overburden material and on the installation method. Temporary dewatering performed solely for the pit locations for installation should cause settlement in the vicinity of the pits, with settlement decreasing with distance. The magnitude of the potential settlement is dependent on the amount of dewatering (controlled by invert elevations). Survey control should be

established at the ground surface along the boring alignment and should be monitored regularly. The horizontal boring contractor should be prepared to notify Norfolk Southern and SCDOT and take remedial actions if any distress is noted at the railroad/roadway surface.

During installation, any voids between the casing and surrounding soil should be filled with grout upon completion of the casing installation. Care should be taken to avoid excessive grouting pressures that could damage the casing or cause surface disruption to the roadway. If the casing is hydraulically advanced, friction or adhesion between the casing and surrounding materials can be reduced by injecting bentonite slurry or other lubricant through ports within the casing. Alternatively, a coating could be applied to the outside of the casing prior to installation to reduce friction, as well as provide some corrosion resistance.

5.3.3 Boring and Receiving Pits

The following items should be appropriately addressed with regard to the design and construction jack-and-bore/ tunneling pits:

1. The design and construction of the temporary excavation and/or shoring and bracing systems for the pits should be the responsibility of the contractor. Shoring for the pits should be designed by a registered structural engineer and should be designed to withstand the lateral loads exerted by the surrounding soils, hydrostatic pressures, as well as any anticipated surcharge loads. For boring pits, the back of the pit should be designed to provide adequate thrust for the installation system. Some displacement of the wall will be necessary to develop the passive resistance of the soils behind the wall. Based on our experience we conservatively estimate the following design parameters:

Table 5-1: Jack-and-Bore Installation Pit Design Recommendations

Material	Moist Unit Weight γ_m (pcf)	Friction Angle φ'	Effective Cohesion, c' (psf)	Earth Pressure Coefficient		
				At Rest K_o	Active K_a	Passive K_p
Existing Fill	115	26°	50	0.56	0.39	2.56
Newly Placed Fill	120	28°	100	0.53	0.36	2.77
Residual Soils (N<10 bpf)	115	26°	50	0.56	0.39	2.56
Residual Soils (10 bpf<N<30 bpf)	120	28°	100	0.53	0.36	2.77
Residual Soils (N>30 bpf)	130	30°	200	0.50	0.33	3.00
PWR	145	40°	500	0.36	0.22	4.60

2. For temporary excavations, shoring and bracing or flattening (laying back) of the slopes should be performed to obtain a safe working environment. Excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. We recommend that all excavated soils be placed away from the edges of the excavation, at a

distance equaling or exceeding the depth of the excavation. The contractor is solely responsible for site safety. This information is provided only as a service and under no circumstances should we be assumed responsible for construction site safety.

3. Surface water must be directed away from the pit areas and sumps with pumps should be available to drain the pits if necessary. Groundwater was encountered within two of the borings so temporary dewatering should be anticipated during excavation and installation of the shoring systems and during construction. Temporary dewatering is discussed in more detail in Section 4.4.
4. A registered geotechnical engineer should visit the site once the pits are excavated. The purpose of the engineer's visit will be to confirm that adequate drainage is in place, dewatering techniques are available, if needed, and settlement hubs or other methods available to take deflection readings are in place.
5. The boring pits should be backfilled immediately after pipe installation is complete and all slopes repaired, as required.

6.0 Limitations of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made.

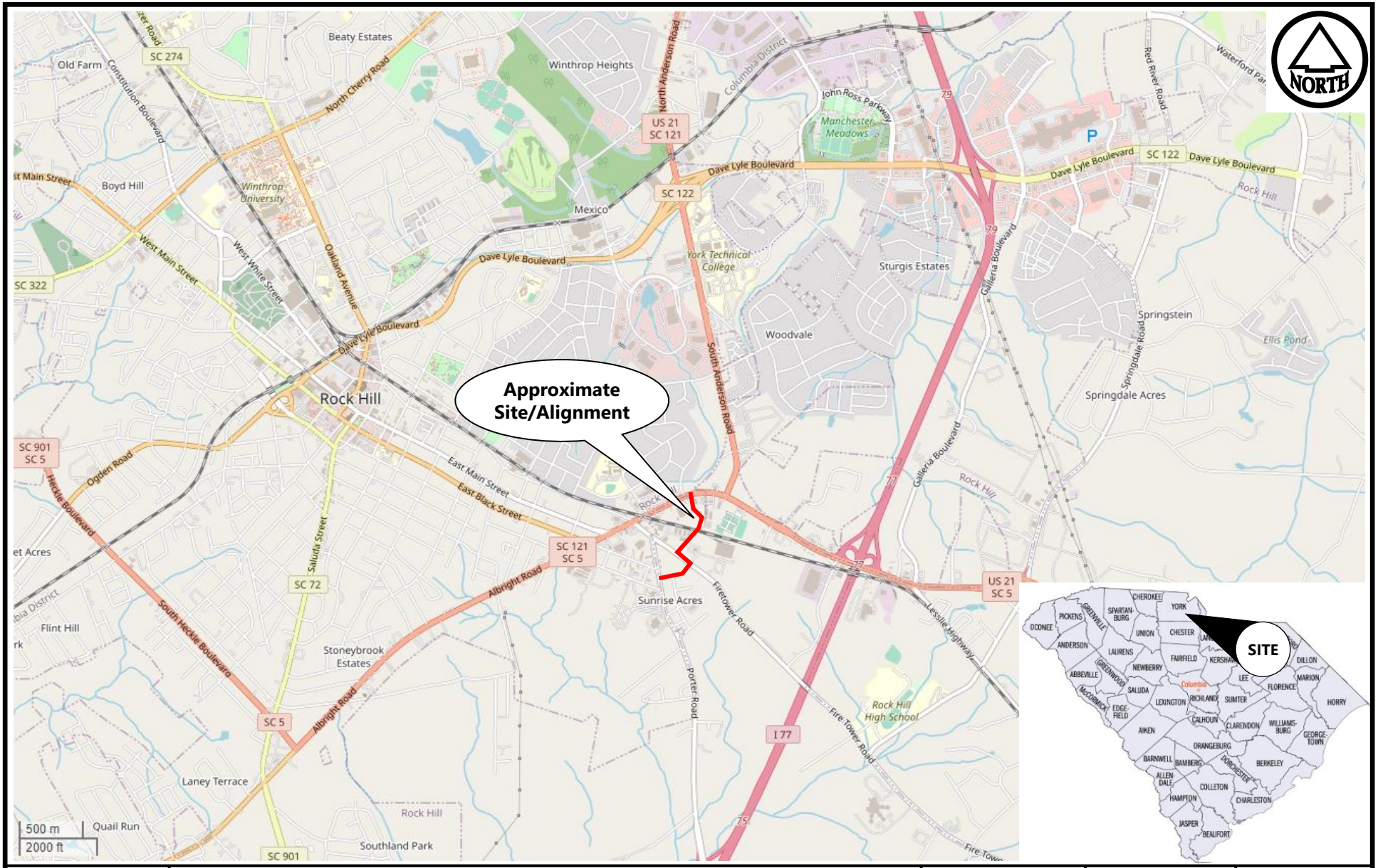
We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and construction activities.

Appendix

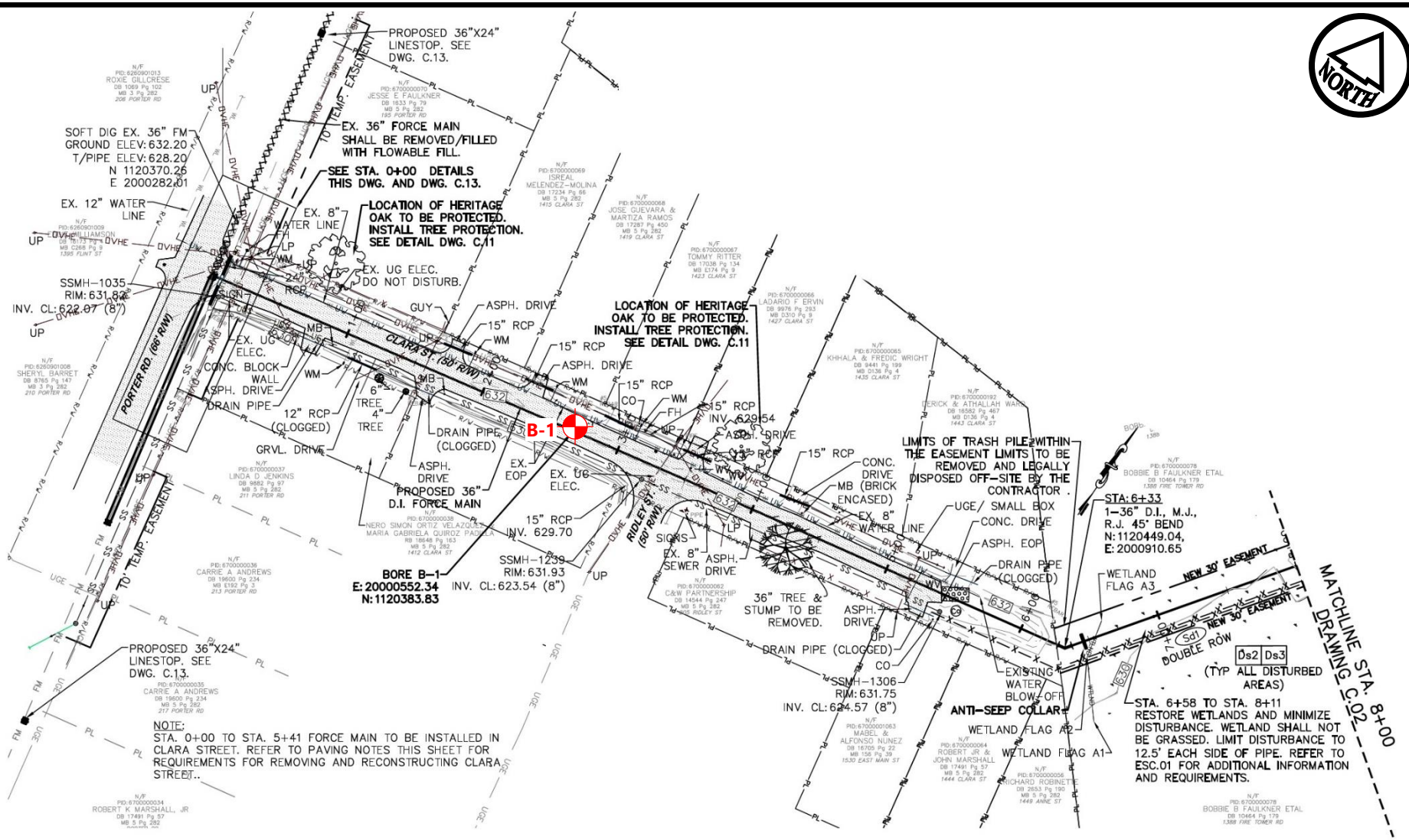


SITE VICINITY PLAN

WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS

ROCK HILL, SOUTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: LAC	FIGURE NO. 1
DATE: FEBRUARY 2024	CHECKED BY: KHH	
PROJECT NO: 1535-20-004		



GRAPHIC SCALE

0′ 50′ 100′

NOTE: FORCE MAIN PLAN DRAWING PROVIDED BY WIEDEMAN & SINGLETON, DATED FEBRUARY 2024. MODIFIED BY S&ME TO SHOW APPROXIMATE TEST LOCATIONS. DO NOT USE DRAWING TO DETERMINE DISTANCES OR QUANTITIES.

LEGEND

APPROXIMATE BORING LOCATION

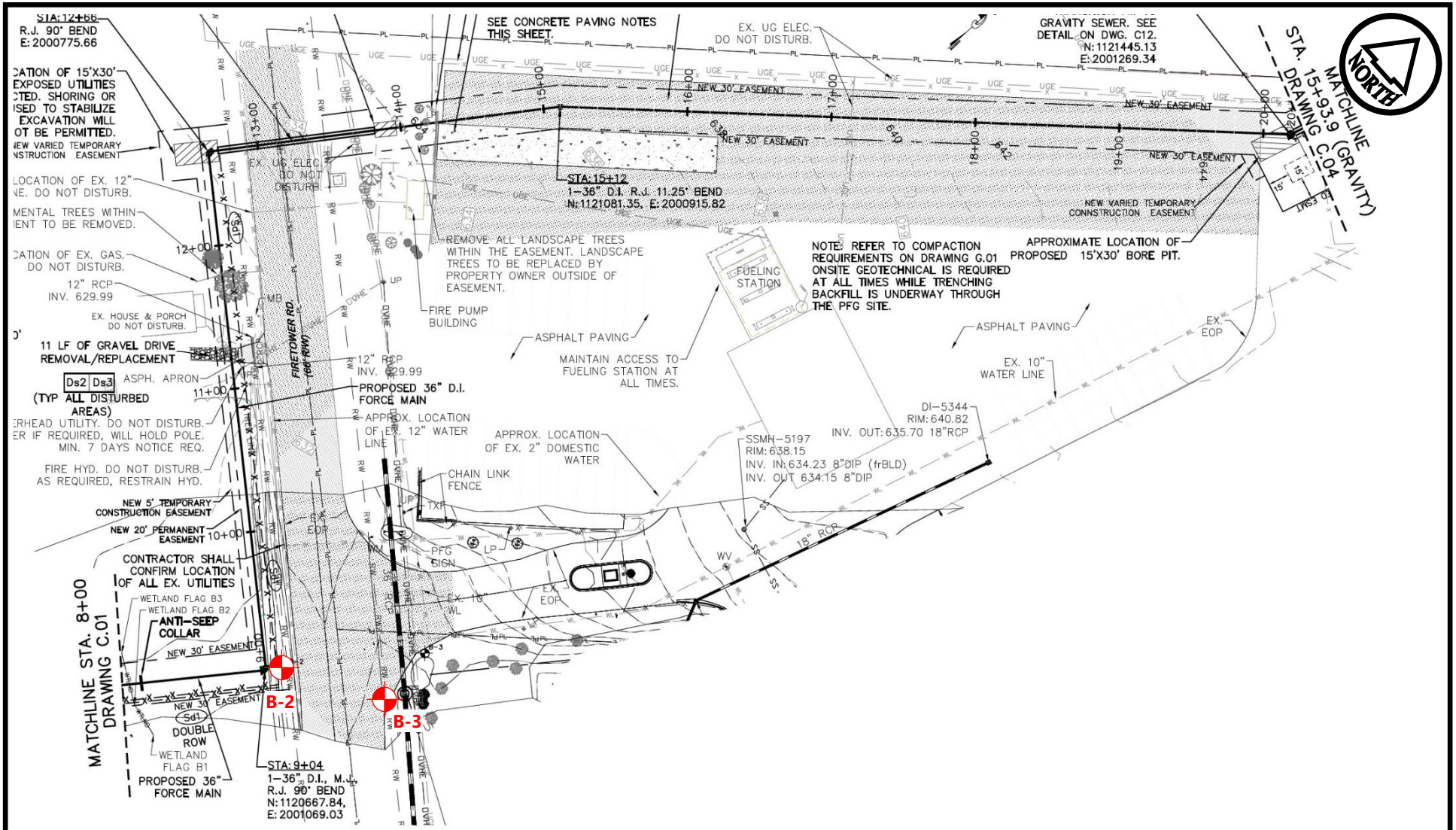
BORING LOCATION PLAN

WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS

CLARA STREET

ROCK HILL, SOUTH CAROLINA

SCALE: 1″ = 100′	DRAWN BY: LAC	FIGURE NO. 2
DATE: FEBRUARY 2024	CHECKED BY: KHH	
PROJECT NO: 1535-20-004		



GRAPHIC SCALE

0′ 50′ 100′

NOTE: FORCE MAIN PLAN DRAWING PROVIDED BY WIEDEMAN & SINGLETON, DATED FEBRUARY 2024. MODIFIED BY S&ME TO SHOW APPROXIMATE TEST LOCATIONS. DO NOT USE DRAWING TO DETERMINE DISTANCES OR QUANTITIES.

LEGEND

APPROXIMATE BORING LOCATION

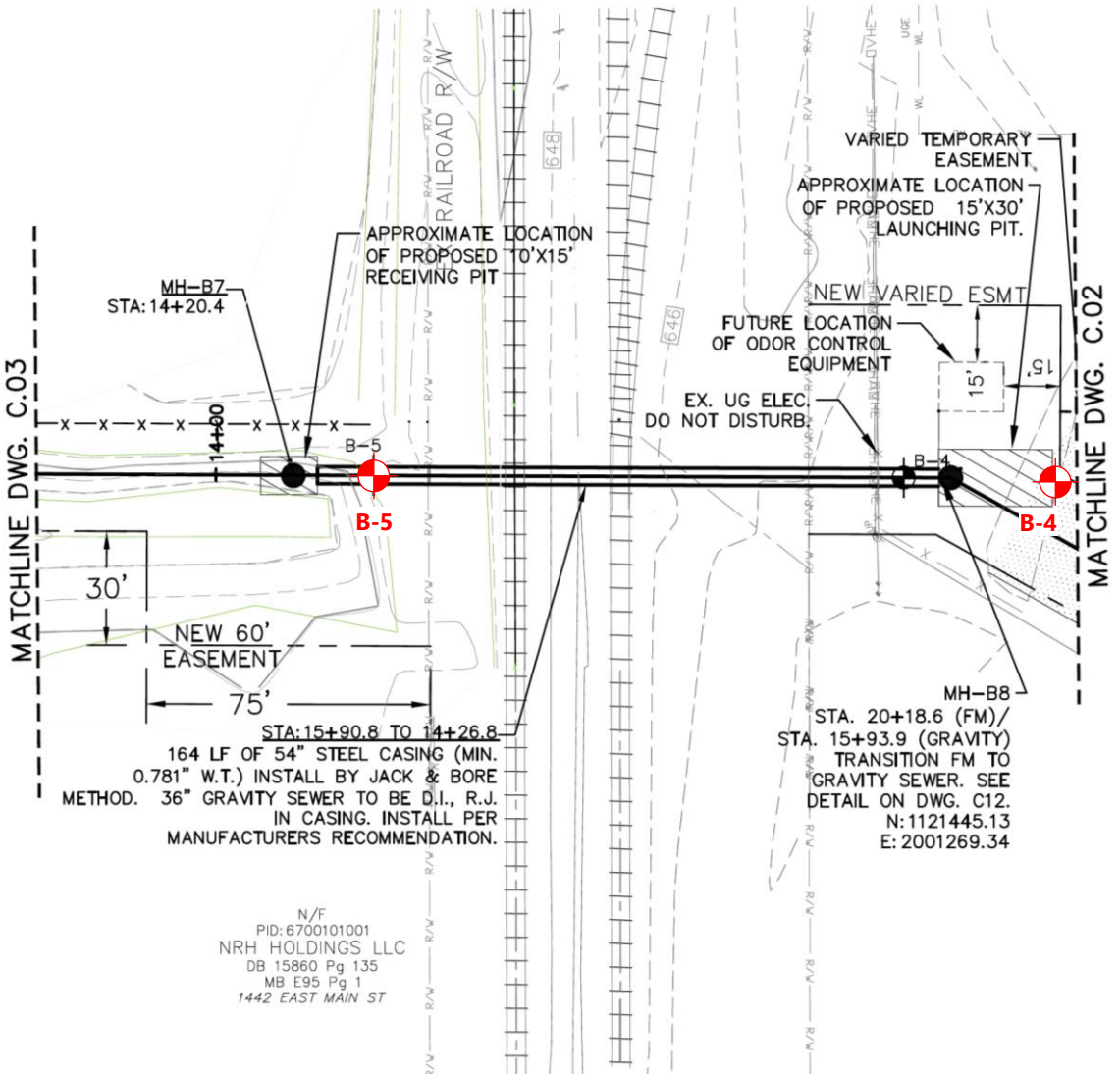
BORING LOCATION PLAN

WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS

FIRETOWER ROAD

ROCK HILL, SOUTH CAROLINA

SCALE: 1″ = 100′	DRAWN BY: LAC	FIGURE NO. 3
DATE: FEBRUARY 2024	CHECKED BY: KHH	
PROJECT NO: 1535-20-004		



GRAPHIC SCALE

0' 25' 50'

NOTE: GRAVITY SEWER PLAN DRAWING PROVIDED BY WIEDEMAN & SINGLETON, DATED FEBRUARY 2024. MODIFIED BY S&ME TO SHOW APPROXIMATE TEST LOCATIONS. DO NOT USE DRAWING TO DETERMINE DISTANCES OR QUANTITIES.

LEGEND

APPROXIMATE BORING LOCATION

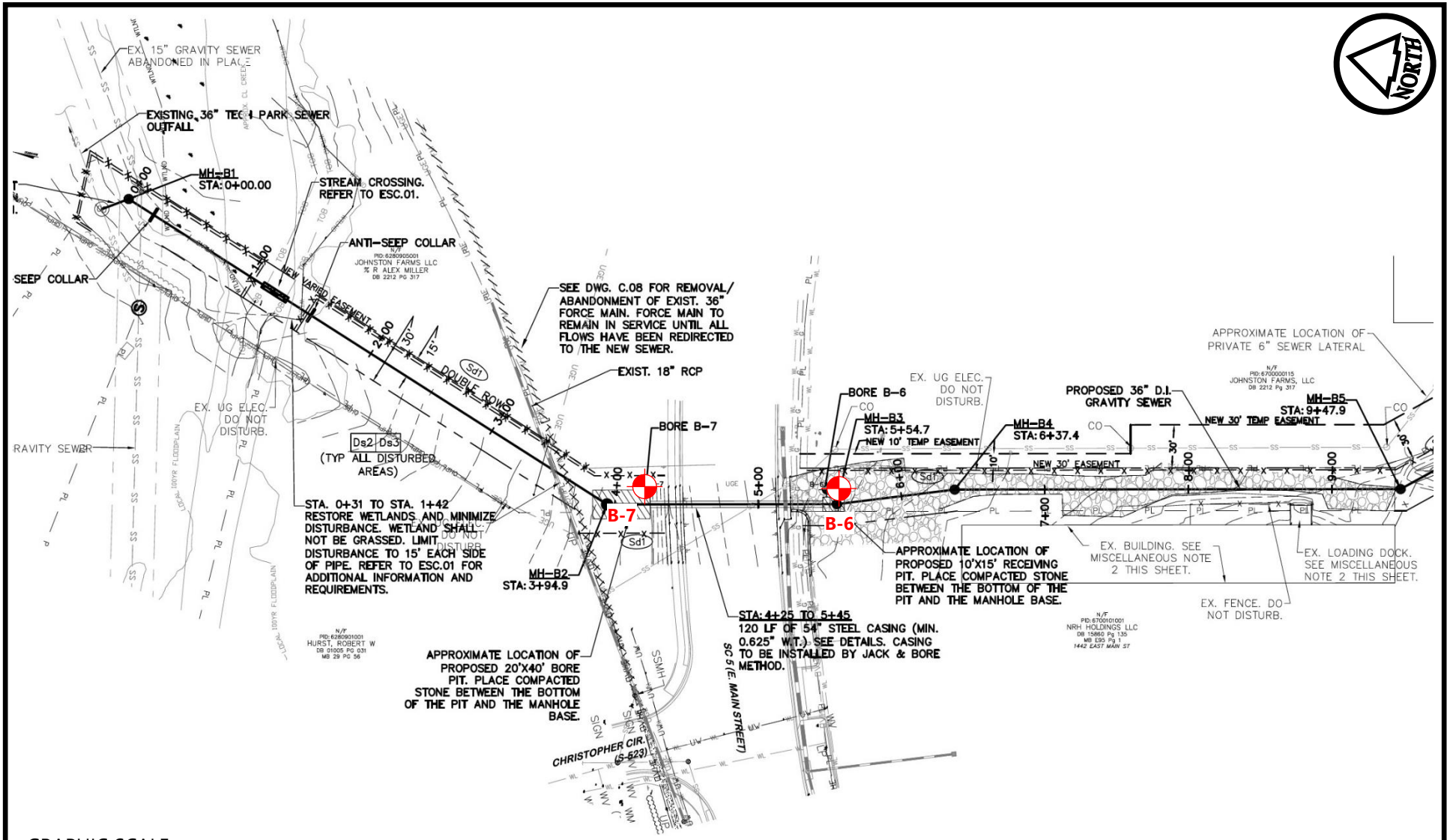
BORING LOCATION PLAN

WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS

NORFOLK SOUTHERN RAILROAD

ROCK HILL, SOUTH CAROLINA

SCALE: 1" = 50'	DRAWN BY: LAC	FIGURE NO. 4
DATE: FEBRUARY 2024	CHECKED BY: KHH	
PROJECT NO: 1535-20-004		



GRAPHIC SCALE

0′ 50′ 100′

NOTE: GRAVITY SEWER PLAN DRAWING PROVIDED BY WIEDEMAN & SINGLETON, DATED FEBRUARY 2024. MODIFIED BY S&ME TO SHOW APPROXIMATE TEST LOCATIONS. DO NOT USE DRAWING TO DETERMINE DISTANCES OR QUANTITIES.

LEGEND

APPROXIMATE BORING LOCATION

BORING LOCATION PLAN

WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS

E. MAIN STREET

ROCK HILL, SOUTH CAROLINA

SCALE: 1″ = 100′	DRAWN BY: LAC	FIGURE NO. 5
DATE: FEBRUARY 2024	CHECKED BY: KHH	
PROJECT NO: 1535-20-004		

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)


Fill


Asphalt


Concrete


Topsoil


Partially Weathered Rock


Cored Rock


GW — WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES


GP — POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES


GM — SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES


GC — CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES


SW — WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES


SP — POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES


SM — SILTY SANDS, SAND - SILT MIXTURES


SC — CLAYEY SANDS, SAND - CLAY MIXTURES


ML — INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY


CL — INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS


OL — ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY


MH — INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS, ELASTIC SILTS


CH — INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS


OH — ORGANIC SILTS AND ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY

WATER LEVELS

(Shown in Water Level Column)

- ▽ = Water Level At Termination of Boring
- ▼ = Water Level Taken After 24 Hours
- ◄ = Loss of Drilling Water
- HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	31 to 50
Very Hard	Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	Over 50

SAMPLER TYPES

(Shown in Samples Column)

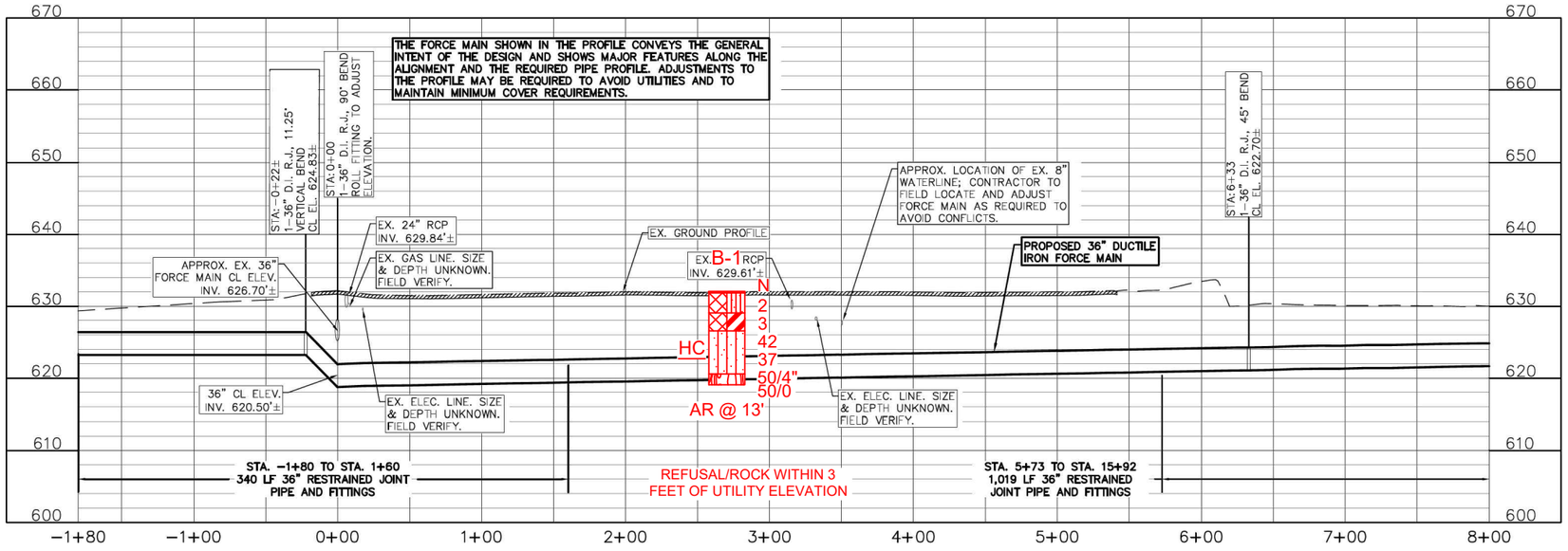
- Shelby Tube
- Split Spoon
- Rock Core
- No Recovery

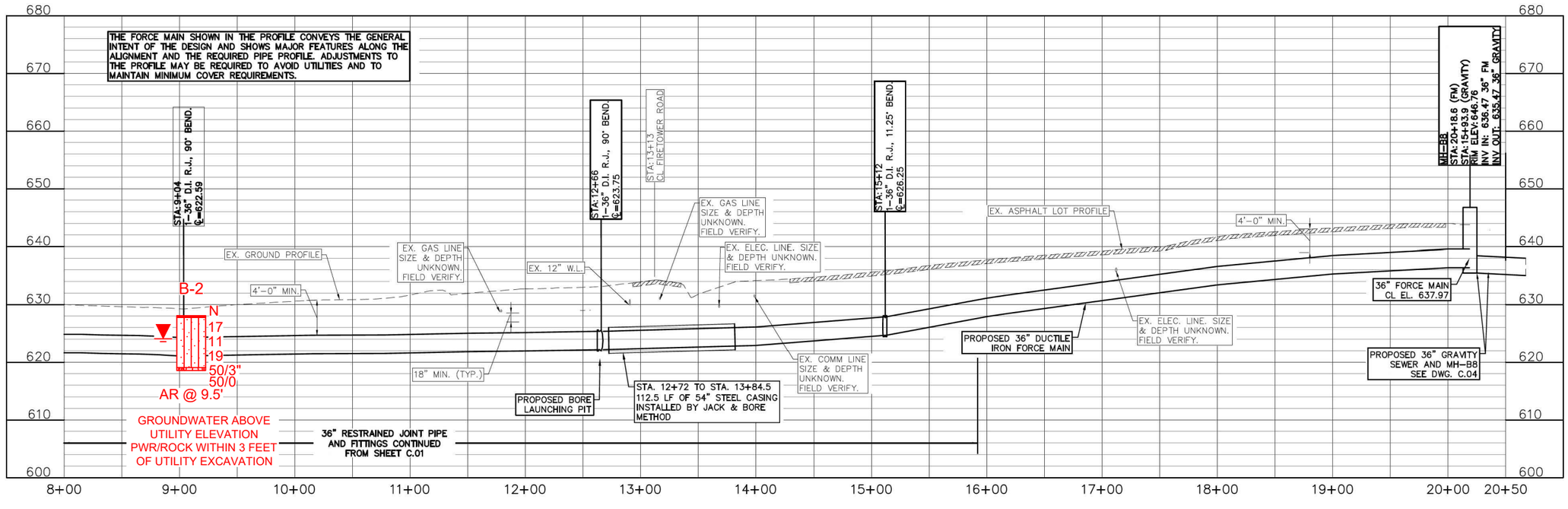
TERMS

Standard Penetration Resistance – The Number of Blows of 140 lb. Hammer Falling 30 in. Required to Drive 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D 1586.

REC – Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%.

RQD – Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.





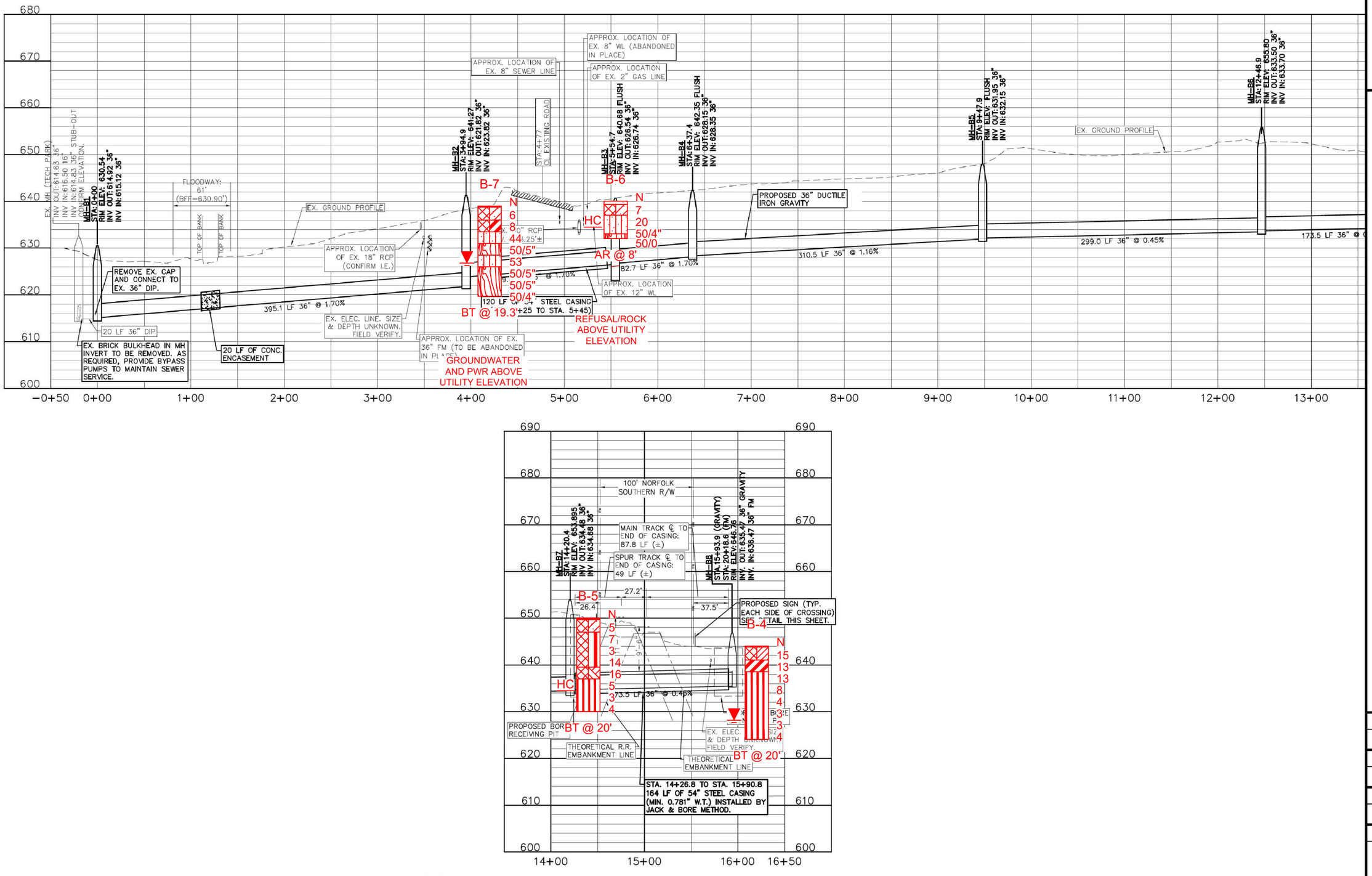
FORCE MAIN PROFILE INFORMATION DATED FEBRUARY 2024 AND PROVIDED BY WIEDEMAN & SINGLETON. PROFILES OVERLAID WITH BORING INFORMATION BY S&ME, AND SOME PROFILE INFORMATION REMOVED FOR CLARITY. DO NOT USE DRAWING TO DETERMINE DISTANCES OR QUANTITIES.

BORING PROFILES

WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS
FORCE MAIN - LINE A
ROCK HILL, SOUTH CAROLINA

SCALE: AS SHOWN
DATE: FEBRUARY 2024
PROJECT NUMBER 1535-20-004
FIGURE NO. 6

Drawing path: T:\Charlotte-1350\Projects\2020\1535-20-004_Wiedeman & Singleton_Wildcat Creek Force Main Relo_Rock Hill\CAD\Locations Feb 2024.dwg



GRAVITY SEWER PROFILE INFORMATION DATED FEBRUARY 2024 AND PROVIDED BY WIEDEMAN & SINGLETON. PROFILES OVERLAID WITH BORING INFORMATION BY S&ME, AND SOME PROFILE INFORMATION REMOVED FOR CLARITY. DO NOT USE DRAWING TO DETERMINE DISTANCES OR QUANTITIES.

BORING PROFILES

WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS
GRAVITY SEWER - LINE B
ROCK HILL, SOUTH CAROLINA

SCALE:
AS SHOWN

DATE:
FEBRUARY 2024

PROJECT NUMBER
1535-20-004

FIGURE NO.
7

PROJECT: **Wildcat Creek Force Main/Sewer Improvements**
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

BORING LOG B-1

DATE DRILLED: **7/25/22**	ELEVATION: **632.0 ft**	NOTES: **STA 2+70 (Force Main)**
DRILL RIG: **CME 550X**	BORING DEPTH: **13.0 ft**	
DRILLER: **L. Shrader**	WATER LEVEL: **Not Encountered**	
HAMMER TYPE: **Automatic**	LOGGED BY: **A. Rodriguez**	
SAMPLING METHOD: **Split spoon**	NORTHING: **1120383**	EASTING: **2000552**
DRILLING METHOD: **3¼" H.S.A.**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SPT REC. (in.) / SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	REMARKS STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
	Asphalt (2 inches)									
	FILL: SILTY SAND (SM) - very loose, gray, fine to coarse grained, moist			SS-1		2	1	1	2	2
	FILL: SILTY CLAY (CH) - soft, brown, wet			SS-2		woh	1	2	3	3
5			627.0							
	RESIDUUM: SILTY SAND (SM) dense, gray brown, fine to coarse grained, moist	HC		SS-3		10	13	29	42	42
				SS-4		6	13	24	37	37
10			622.0							
	PARTIALLY WEATHERED ROCK: SILTY SAND - gray, fine to coarse grained			SS-5		9	50/4"		100 50/4"	
				SS-6		50/0			100 50/0	
	Refusal at 13 feet Boring terminated at 13 feet Boring backfilled immediately after drilling.									

S&ME BORING LOG WILDCAT CREEK SEWER LOGS.GPJ S&ME.GDT 2/22/24

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: **Wildcat Creek Force Main/Sewer Improvements**
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

BORING LOG B-2

DATE DRILLED: **7/22/22**	ELEVATION: **628.0 ft**	NOTES: **STA 9+10 (Force Main)**
DRILL RIG: **CME 550X**	BORING DEPTH: **9.5 ft**	
DRILLER: **J. Little**	WATER LEVEL: **4 Feet on 7/25/2022**	
HAMMER TYPE: **Automatic**	LOGGED BY: **A. Rodriguez**	
SAMPLING METHOD: **Split spoon**	NORTHING: **1120670**	EASTING: **2001068**

DRILLING METHOD: **3¼" H.S.A.**

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SPT REC. (in.) / SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	REMARKS STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
	Topsoil (3 inches)									
	RESIDUUM: SILTY SAND (SM) medium dense, gray brown, fine to coarse grained, dry			SS-1		6	8	9	17	17
				SS-2		3	5	6	11	11
5		HC	623.0	SS-3		9	8	11	19	19
				SS-4		6	50/3"		100	50/3"
	PARTIALLY WEATHERED ROCK: SILTY SAND - brown gray, fine to coarse grained			SS-5		50/0				50/0
	Refusal at 9.5 feet Boring terminated at 9.5 feet									

S&ME BORING LOG WILDCAT CREEK SEWER LOGS.GPJ S&ME.GDT 2/22/24

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: **Wildcat Creek Force Main/Sewer Improvements**
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

BORING LOG B-3

DATE DRILLED: **7/22/22**	ELEVATION: **630.0 ft**	NOTES:
DRILL RIG: **CME 550X**	BORING DEPTH: **15.0 ft**	
DRILLER: **J. Little**	WATER LEVEL: **Not Encountered**	
HAMMER TYPE: **Automatic**	LOGGED BY: **A. Rodriguez**	
SAMPLING METHOD: **Split spoon**	NORTHING: **1120713**	EASTING: **2001132**
DRILLING METHOD: **3¼" H.S.A.**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SPT REC. (in.) / SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	REMARKS / STANDARD PENETRATION TEST DATA (blows/ft)	N VALUE
	Asphalt (5 inches)									
	FILL: CLAYEY SILT (MH) firm, red brown, wet			SS-1		2	2	5	7	7
	RESIDUUM: SILTY SAND (SM) medium dense to very dense, brown, fine to coarse grained, moist		625.0	SS-2		6	12	17	29	29
5		HC		SS-3		7	10	12	22	22
			620.0	SS-4		5	7	17	24	24
10				SS-5		8	18	38	56	56
			615.0	SS-6		18	29	28	57	57
15	Boring terminated at 15 feet Boring backfilled immediately after drilling.									

REMARKS / STANDARD PENETRATION TEST DATA (blows/ft): 10 20 30 60 80

S&ME BORING LOG WILDCAT CREEK SEWER LOGS.GPJ S&ME.GDT 2/22/24

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: **Wildcat Creek Force Main/Sewer Improvements**
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

BORING LOG B-4

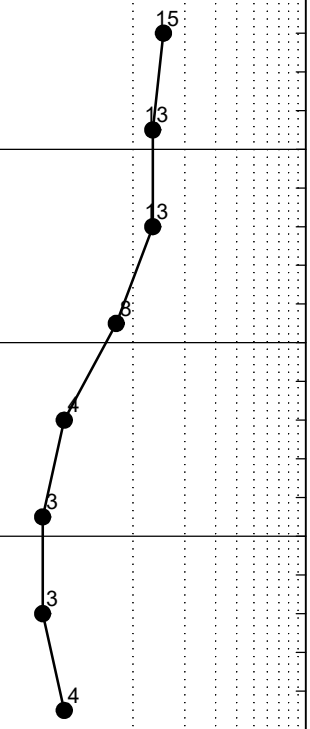
DATE DRILLED: **7/22/22**	ELEVATION: **644.0 ft**	NOTES: **STA 16+20 (Gravity)**
DRILL RIG: **CME 550X**	BORING DEPTH: **20.0 ft**	
DRILLER: **J. Little**	WATER LEVEL: **15.9 Feet on 7/25/2022**	
HAMMER TYPE: **Automatic**	LOGGED BY: **A. Rodriguez**	
SAMPLING METHOD: **Split spoon**	NORTHING: **1121430**	EASTING: **2001265**

DRILLING METHOD: **3¼" H.S.A.**

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet)	SAMPLE NO.	SPT REC. (in.)	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
0	Topsoil (2 inches)								
	FILL: SANDY CLAY (CL) stiff, orange red, dry		SS-1			5	7	8	15
	RESIDUUM: SILTY CLAY (CH) stiff, tan brown, moist	639.0	SS-2			4	6	7	13
5			SS-3			4	6	7	13
	SANDY SILT (ML) stiff to soft, brown tan, moist to wet	634.0	SS-4			3	3	5	8
10			SS-5			2	2	2	4
		629.0	SS-6			2	1	2	3
15			SS-7			1	1	2	3
		624.0	SS-8			1	1	3	4
20	Boring terminated at 20 feet								

WATER LEVEL ▽

REMARKS
STANDARD PENETRATION TEST DATA (blows/ft)
10 20 30 60 80



S&ME BORING LOG WILDCAT CREEK SEWER LOGS.GPJ S&ME.GDT 2/22/24

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: **Wildcat Creek Force Main/Sewer Improvements**
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

BORING LOG B-5

DATE DRILLED: **7/25/22**	ELEVATION: **650.0 ft**	NOTES: **STA 14+40 (Gravity)**
DRILL RIG: **CME 550X**	BORING DEPTH: **20.0 ft**	
DRILLER: **L. Shrader**	WATER LEVEL: **Not Encountered**	
HAMMER TYPE: **Automatic**	LOGGED BY: **A. Rodriguez**	
SAMPLING METHOD: **Split spoon**	NORTHING: **1121592**	EASTING: **2001309**

DRILLING METHOD: **3¼" H.S.A.**

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SPT REC. (in.) / SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	REMARKS STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
	Topsoil (4 inches)									
	FILL: CLAYEY SAND (SC) loose, orange brown, fine to coarse grained, wet			SS-1		3	3	2	5	5
	FILL: CLAYEY SILT (MH) soft to stiff, red brown, moist			SS-2		3	4	3	7	7
5			645.0	SS-3		1	2	1	3	3
				SS-4		1	2	12	14	14
10			640.0							
	FILL - <u>WOOD DEBRIS</u>			SS-5		6	9	7	16	16
	RESIDUUM: SANDY SILT (ML) firm to soft, orange brown, wet	HC		SS-6		2	3	2	5	5
15			635.0	SS-7		2	1	2	3	3
				SS-8		1	2	2	4	4
20			630.0							
	Boring terminated at 20 feet									

S&ME BORING LOG WILDCAT CREEK SEWER LOGS.GPJ S&ME.GDT 2/22/24

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2. ***BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.***
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PROJECT: **Wildcat Creek Force Main/Sewer Improvements**
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

BORING LOG B-6

DATE DRILLED: **7/25/22** | ELEVATION: **640.0 ft** | NOTES: **STA 5+55 (Gravity)**

DRILL RIG: **CME 550X** | BORING DEPTH: **8.0 ft**

DRILLER: **L. Shrader** | WATER LEVEL: **Not Encountered**

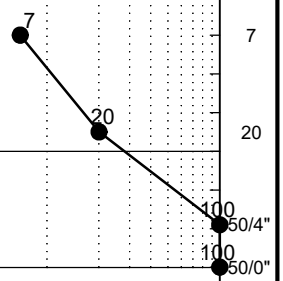
HAMMER TYPE: **Automatic** | LOGGED BY: **A. Rodriguez**

SAMPLING METHOD: **Split spoon** | NORTHING: **1122396** | EASTING: **2001079**

DRILLING METHOD: **3¼" H.S.A.**

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SPT REC. (in.) / SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	REMARKS	N VALUE
	Gravel (8 inches)									
	FILL: CLAYEY SAND (SC) loose, gray, fine to coarse grained, moist			SS-1		6	4	3		7
	RESIDUUM: SILTY SAND (SM) medium dense, brown, fine to coarse grained, dry			SS-2		2	8	12		20
5		HC	635.0	SS-3		14	11	50/4"		50/4"
	PARTIALLY WEATHERED ROCK: SILTY SAND - gray, fine to coarse grained			SS-4		50/0"				50/0"
	Refusal at 8 feet Boring terminated at 8 feet Boring backfilled immediately after drilling.									

STANDARD PENETRATION TEST DATA (blows/ft): 10 20 30 60 80



S&ME BORING LOG WILDCAT CREEK SEWER LOGS.GPJ S&ME.GDT 2/22/24

NOTES:

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4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: **Wildcat Creek Force Main/Sewer Improvements**
Rock Hill, South Carolina
S&ME Project No. 1535-20-004

BORING LOG B-7

DATE DRILLED: **7/21/22**	ELEVATION: **639.0 ft**	NOTES: **STA 4+20 (Gravity)**
DRILL RIG: **CME 550X**	BORING DEPTH: **19.3 ft**	
DRILLER: **J. Little**	WATER LEVEL: **12.2 Feet on 7/22/2022**	
HAMMER TYPE: **Automatic**	LOGGED BY: **A. Rodriguez**	
SAMPLING METHOD: **Split spoon**	NORTHING: **1122519**	EASTING: **2001052**

DRILLING METHOD: **3¼" H.S.A.**

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SPT REC. (in.) / SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	REMARKS STANDARD PENETRATION TEST DATA (blows/ft) 10 20 30 60 80	N VALUE
	Topsoil (2 inches)									
	FILL: CLAYEY SAND (SC) loose, gray, fine to coarse grained, moist			SS-1		2	3	3	6	6
	FILL: SILTY CLAY (CH) firm, gray brown, moist			SS-2		2	4	4	8	8
5	**RESIDUUM: SILTY SAND (SM)** dense, gray, fine to coarse grained, dry		634.0	SS-3		22	20	24	44	44
	PARTIALLY WEATHERED ROCK: SILTY SAND - gray, fine to coarse grained			SS-4		26	36	50/5"	100 50/5"	
10	**RESIDUUM: SILTY SAND (SM)** very dense, fine to coarse grained, dry	▼ HC	629.0	SS-5		18	23	30	53	53
	PARTIALLY WEATHERED ROCK: SILTY SAND - gray, fine to coarse grained			SS-6		24	50/5"		100 50/5"	
15			624.0	SS-7		16	45	50/5"	100 50/5"	
				SS-8		32	50/4"		100 50/4"	
	Boring terminated at 19.3 feet									

S&ME BORING LOG WILDCAT CREEK SEWER LOGS.GPJ S&ME.GDT 2/22/24

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CLEARING NOTES:
1. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL CLEAR TO RIGHT-OF-WAY LIMITS ONLY. PRIOR TO CLEARING, THE CLEARING LIMITS SHALL BE FLAGGED FOR REVIEW AND APPROVAL OF ENGINEER AND OWNER. NO SEPARATE PAYMENT WILL BE MADE FOR CLEARING IN THE R/W LIMITS. THE COST FOR CLEARING SHALL BE INCLUDED IN THE UNIT COST FOR THE WORK TO WHICH IT PERTAINS.
2. TREES TO BE REMOVED SHALL BE CAREFULLY REMOVED OR GROUND WITHIN THE RIGHTS-OF-WAY/ EASEMENT. UNCONTROLLED FELLING OF THE ENTIRE TREE OR SECTION OF THE TREE IS NOT ACCEPTABLE.
3. LAND CLEARING DEBRIS SHOULD BE GROUND. ANY DEBRIS THAT AREN'T GROUND SHALL BE REMOVED AND DISPOSED OFF SITE. AFTER THE SEWER/FORCE MAIN INSTALLATION, GRADE EASEMENT BEFORE GRASSING. ANY AREAS THAT WERE MULCHED BUT NOT DISTURBED, GRADE OFF THE MULCH BEFORE SEEDING.

MISCELLANEOUS NOTES:
1. STA. 5+28 TO STA. 9+48 GRAVITY SEWER TO BE INSTALLED IN GRAVEL DRIVE. 420 LF OF GRAVEL DRIVE REMOVAL/REPLACEMENT (WIDTH OF NEW PERMANENT EASEMENT). GRAVEL DRIVE REMOVAL/REPLACEMENT IS NOT SHOWN FOR CLARITY. STONE TO BE 6" COMPACTED GRADED AGGREGATE BASE TOPPED WITH 2.5"/3" OF #57 STONE.
2. STA. 6+42 TO STA. 9+48 DO NOT DISTURB EX. BUILDING/LOADING DOCK OR UNDERMINE FOUNDATION. SHORING OR SHIELDING MUST BE USED TO STABILIZE EXCAVATION. SLOPING OF EXCAVATION WILL NOT BE PERMITTED.
3. CONTRACTOR WILL FILL IN THE RUT AREAS WITHIN PROPOSED EASEMENT AREAS AS WELL ANY AREA OUTSIDE OF EASEMENT AREAS AS NEEDED IN ORDER FOR DELIVERY TO OCCUR TO THE NFF OUTLET AT 1460 E. MAIN STREET DURING CONSTRUCTION. HOWEVER, THE AREAS IN QUESTION, ARE LIMITED TO THE DRIVEWAY THAT THE NEW SEWER SYSTEM IS BEING INSTALLED AS WELL AS THE PARKING AREA JUST SOUTH OF THE BUSINESS STRUCTURE FOR THE NFF OUTLET AT 1460 E. MAIN STREET AS NOTED.

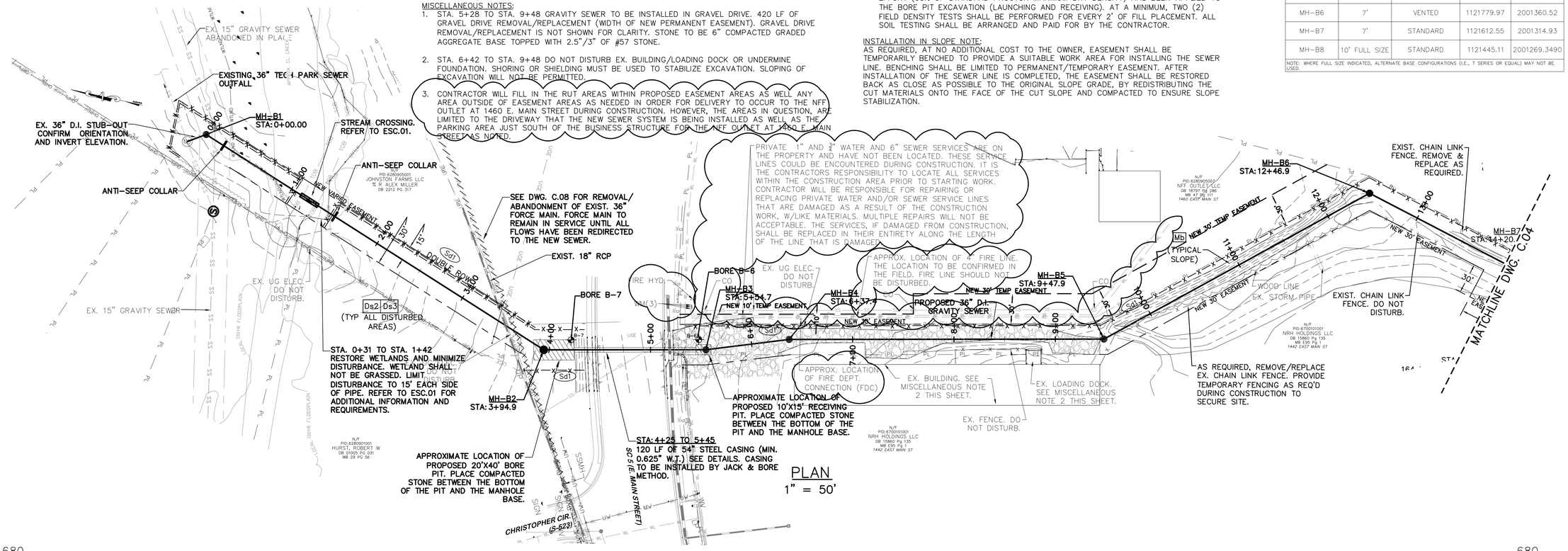
MAIN STREET CROSSING NOTES:
1. AT LEAST 15 DAYS PRIOR TO PERFORMING THE ROAD CROSSING, THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES IN THE AREA AND PROVIDE THE ENGINEER WITH A WRITTEN PLAN FOR CONSTRUCTING ACROSS THE ROADWAY. CONTRACTOR TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION.
2. ALL EXCAVATION LOCATED WITHIN THE SCDOT RIGHT-OF-WAY MUST BE CLOSED BY THE END OF CONSTRUCTION EACH DAY OR MEASURES PROVIDED, AS REQUIRED BY THE CITY AND SCDOT, TO PROTECT MOTORISTS WHILE OPEN EXCAVATIONS ARE MAINTAINED (I.E., FIXED BARRICADES, ETC.).
3. THE CONTRACTOR SHALL PERFORM TESTING TO VERIFY THAT ADEQUATE COMPACTION EFFORT (95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY) HAS BEEN APPLIED TO THE BORE PIT EXCAVATION (LAUNCHING AND RECEIVING). AT A MINIMUM, TWO (2) FIELD DENSITY TESTS SHALL BE PERFORMED FOR EVERY 2' OF FILL PLACEMENT. ALL SOIL TESTING SHALL BE ARRANGED AND PAID FOR BY THE CONTRACTOR.

INSTALLATION IN SLOPE NOTE:
AS REQUIRED, AT NO ADDITIONAL COST TO THE OWNER, EASEMENT SHALL BE TEMPORARILY BENCHED TO PROVIDE A SUITABLE WORK AREA FOR INSTALLING THE SEWER LINE. BENCHING SHALL BE LIMITED TO PERMANENT/TEMPORARY EASEMENT. AFTER INSTALLATION OF THE SEWER LINE IS COMPLETED, THE EASEMENT SHALL BE RESTORED BACK AS CLOSE AS POSSIBLE TO THE ORIGINAL SLOPE GRADE, BY REDISTRIBUTING THE CUT MATERIALS ONTO THE FACE OF THE CUT SLOPE AND COMPACTED TO ENSURE SLOPE STABILIZATION.

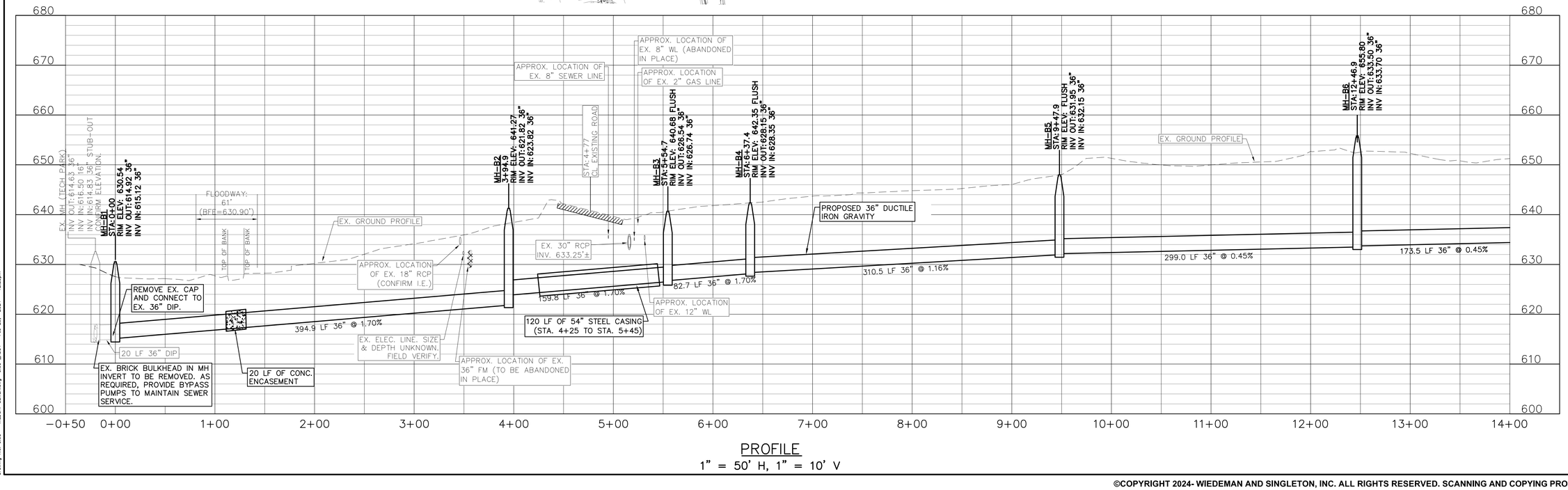
WILDCAT CREEK FORCE MAIN/SEWER IMPROVEMENTS (LINE B) MH COORDINATE TABLE

MH ID NUMBER	MH DIA.	FRAME/COVER TYPE	NORTHING	EASTING
MH-B1	7'	W/T WITH VENT	1122913.86	2001173.65
MH-B2	7' FULL SIZE	STANDARD	1122543.31	2001036.63
MH-B3	7'	STANDARD	1122386.97	2001070.71
MH-B4	7'	STANDARD	1122308.91	2001098.03
MH-B5	7'	STANDARD	1122005.54	2001164.27
MH-B6	7'	VENTED	1121779.97	2001360.52
MH-B7	7'	STANDARD	1121612.55	2001314.93
MH-B8	10' FULL SIZE	STANDARD	1121445.11	2001269.3490

NOTE: WHERE FULL SIZE INDICATED, ALTERNATE BASE CONFIGURATIONS (I.E., T SERIES OR EQUAL) MAY NOT BE USED.



PLAN
1" = 50'



PROFILE
1" = 50' H, 1" = 10' V

REV.	DATE	DESCRIPTION	BY
1	12/31/2021	PRELIMINARY - UTILITY REVIEW	MRS
2	06/07/2023	REGULATORY REVIEW SET	MRS
3	07/12/2023	SCDHEC RESUBMITTAL	MRS
4	02/07/2024	BID READY	LBJ
5	03/01/2024	ADDENDA #1	LBJ
6	----	----	----

SEAL
SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 17952 TROY A. BENFIELD
SOUTH CAROLINA WIEDEMAN & SINGLETON, INC NO. C00146 CERTIFICATE OF AUTHORIZATION

OWNER
ROCK HILL SOUTH CAROLINA Always Green

CONSULTANT INFORMATION
PROJECT MANAGER: TAB
DESIGNED BY: MRS
DRAWN BY: MRS
CHECKED BY: TAB
FILENAME: C.03 - WILDCAT SEWER.dwg
PROJECT NO.: 056-20-220

WIEDEMAN AND SINGLETON, INC.
Civil and Environmental Engineers
131 EAST MAIN STREET
SUITE 300
ROCK HILL, SOUTH CAROLINA 29730
(803) 329-2944
WWW.WIEDEMAN.COM

PROJECT INFORMATION
PROJECT: CITY OF ROCK HILL
WILDCAT CREEK FORCE MAIN RELOCATION-CONVEYANCE
ROCK HILL, SOUTH CAROLINA
SHEET TITLE: PROPOSED WILDCAT FORCE MAIN IMPROVEMENTS (LINE B)
GRAVITY SEWER PLAN & PROFILE - STA. 0+00 TO 14+00

SCALE: AS SHOWN
NOTE: DRAWING SCALE IS BASED ON 24x36 SHEETS.
0 1" 2"

DRAWING C.03
SHEET 5 OF 16

Drawing file: C.03 - WILDCAT SEWER.dwg C.03_A001 Feb 29, 2024 - 12:25pm