GEOTECHNICAL ENGINEERING REPORT

Spirited Cyclist – Receiving Pit

Huntersville, North Carolina

PREPARED FOR:

Spirited Cyclist
940 Jetton Street 14
Davidson, North Carolina 28036

NOVA Project Number: 10705-2023064
January 24, 2024

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January 24, 2024

SPIRITED CYCLIST
940 Jetton Street 14
Davidson, North Carolina 28036

Attention: Mr. James Good

Subject: **Geotechnical Engineering Report**
SPIRITED CYCLIST – RECEIVING PIT
Huntersville, North Carolina
NOVA Project Number 10705-2023064

Dear Mr. Good:

NOVA Engineering and Environmental, Inc. (NOVA) has completed the authorized Geotechnical Engineering Report for the Spirited Cyclist – Receiving Pit project located in Huntersville, North Carolina The work was performed in general accordance with NOVA Proposal Number 10705-2023064, dated September 25, 2023 and additional services agreement dated December 19, 2023. This report briefly discusses our understanding of the project at the time of the subsurface exploration, describes the geotechnical consulting services provided by NOVA, and presents our findings and conclusion.

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
NOVA Engineering and Environmental, Inc

NORTH CAROLINA PROFESSIONAL SEAL 10204 1-24-24 ENGINEER JAMES W. NIEHOFF

Vue Lee, EI
Project Engineer

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Business Unit Manager

James Niehoff, PE
Senior Geotechnical Engineer
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Copies Submitted: Addressee (electronic)

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APPENDICES

1.0 INTRODUCTION

This section provides information relating to our contract, the purpose of our work, and a summary of our understanding of the project,

1.1 NAME AND LOCATION OF PROJECT

Spirited Cyclist project is located west of 16601 Old Statesville Road in Huntersville, North Carolina. The location of the site is indicated on the Site Location Map included as Figure 1 in Appendix A.

1.2 AUTHORIZATION AND SCOPE OF STUDY

Our work on this project was as described in our Proposal Number 10705-2023064, dated September 25, 2023 and the additional services agreement dated September 25, 2023 authorized by Spirited Cyclist.

The primary objective of this work was to perform a geotechnical exploration at the proposed receiving pit relative to earthwork considerations, especially as it relates to the presence of partially weathered rock (PWR), bedrock and/or groundwater. The authorized geotechnical engineering services included a site reconnaissance, a soil test boring and sampling, evaluation of the field data, and the preparation of this report.

The assessment of the presence of wetlands, floodplains, or water classified as state waters was beyond the scope of this exploration. Additionally, the assessment of site environmental conditions, including the detection of pollutants in the soil, rock, or groundwater, at the site was also beyond the scope of this geotechnical exploration and evaluation.

2.0 PROJECT INFORMATION

Our understanding of this project is based on discussions with James Good of Spirited Cyclist, review of the provided site plans, a site reconnaissance during boring layout, and our experience with similar projects.

Site Plans and Documents

We were furnished with the following plans and documents:

- "2023-09-21_Spirited Cyclist – Geotech Markup

2.1 PROJECT SITE AND PROPOSED DEVELOPMENT

The Subject Property which is located west of 16601 Old Statesville Road in Huntersville, North Carolina.

The proposed development of the site is to improve the existing utility structure on the subject property. Part of the improvements will include extending a new sewer line underneath Old Statesville Road to tie into an existing sewer line. As such, a receiving pit will need to be excavated on the east side of Old Statesville Road.

3.0 SUBSURFACE EXPLORATION

3.1 AREA GEOLOGY

The project site is located in the Piedmont Geologic Region, a broad northeasterly trending province underlain by crystalline rocks up to 600 million years old. The Piedmont region is bound on the northwest by the Blue Ridge Range of the Appalachian Mountains, and on the southeast by the leading edge of Coastal Plain sediments, commonly referred to as the "Fall Line". Numerous episodes of deformation have produced varying degrees of metamorphism, folding and shearing in the underlying rock. The resulting metamorphic rock types in this area are predominantly a series of Precambrian age schists and gneisses, with scattered granitic or quartzite intrusions.

According to "Geologic Map of North Carolina: Department of Natural Resources and Community Development, Division of Land Resources, and the NC Geologic Survey: by Rhodes and Conrad, 1985, the site is underlain by Metamorphosed quartz diorite Formation.

Residual soils in the region are primarily the product of in-situ chemical decomposition of the parent rock. The extent of the weathering is influenced by the mineral composition of the rock and defects such as fissures, faults and fractures. The residual profile can generally be divided into three zones:

- An upper zone near the ground surface consisting of clays and clayey silts which have undergone both mechanical and chemical weathering.
- An intermediate zone of less weathered micaceous sandy silts and silty sands, frequently described as "saprolite", whose mineralogy, texture and banded appearance reflects the structure of the parent rock, and
- A transitional zone between soil and rock termed partially weathered rock (PWR). Partially weathered rock is defined locally as material which can be penetrated by soil augers, but which exhibits standard penetration resistances exceeding 100 blows per foot.

The boundaries between zones of soil, partially weathered rock, and bedrock are erratic and poorly defined. Weathering is often more advanced next to fractures and joints that transmit water, and in mineral bands that are more susceptible to decomposition. Boulders and rock lenses are sometimes encountered within the overlying PWR or soil matrix. Consequently, significant fluctuations in depths to materials requiring difficult excavation techniques may occur over short horizontal distances.

3.2 FIELD EXPLORATION

Our field exploration was conducted on January 11, 2024, and consisted of performing one soil test boring at the proposed receiving pit location. The test location was established in the field by NOVA personnel by estimating distances and angles from site landmarks. Prior to initiating field testing, underground utilities were marked by both public and private utility locating firms. Underground utility related adjustments of the test locations were made at the time of the field exploration. The approximate test locations are shown on Figure 2 in Appendix A. If increased accuracy is desired by the client, test locations and elevations may be surveyed.

Soil Test Boring

The soil test boring was performed using the guidelines of ASTM Designation D-1586, "Penetration Test and Split-Barrel Sampling of Soils". A hollow-stem auger drilling process was used to advance the borings. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-spoon sampler. The sampler was first seated six inches and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Penetration Resistance". The penetration resistance, when properly interpreted, is an index to the soil strength and density. Representative portions of the soil samples, obtained from the sampler, were placed in sample bags and transported to our laboratory for further evaluation.

The test Boring Record in Appendix B shows the standard penetration test (SPT) resistances, or “N-values”, and present the soil conditions encountered in the boring. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the split-spoon samples, and generally accepted geotechnical engineering practices. The stratification lines and depth designations represent approximate boundaries between various subsurface strata. Actual transitions between materials may be gradual.

3.3 SUBSURFACE CONDITIONS

The following paragraphs provide generalized descriptions of the subsurface profile and soil conditions encountered by the boring conducted during this exploration. The lines designating the interface between various strata on the Test Boring Record represent the approximate interface locations and elevation. The actual transition between strata may be gradual.

Surface Materials

The boring performed for this study initially encountered 6 inches of topsoil.

Native (or Residual) Soils

Residual soils were encountered in the boring beneath surface material and extended to the termination depth of approximately 20 feet below the existing ground surface. The sampled residuum typically consisted of sandy silts (ML), silty sand (SM) and clayey sand (SC). Standard penetration resistance values recorded in the residuum ranged from 4 to 16 blow per foot (bpf).

Groundwater Conditions

Groundwater in the piedmont typically occurs as an unconfined or semi-confined aquifer condition. Recharge is provided by the infiltration of rainfall and surface water through the soil overburden. More permeable zones in the soil matrix, as well as fractures, joints and discontinuities in the underlying bedrock can affect groundwater conditions. The groundwater table is expected to be a subdued replica of the original surface topography.

Groundwater was not encountered in the boring at the time of drilling. Due to safety concerns, the boring was immediately backfilled upon completion. Therefore, 24-hour groundwater level measurements, which are usually more indicative of stabilized subsurface water conditions, were not obtained from within the borehole.

Caving was noted in the boring following retrieval of the augers at a depth of approximately 17 feet below the existing ground surface. In addition, a decrease in N-values was also encountered at a depth of approximately 13 ½ feet below the existing ground surface. Caved depths and associated decreases in N-values are sometimes indicative of groundwater elevations and should be considered when planning the receiving pit excavation. The cave depth is included on the Test Boring Record in Appendix B.

Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff, and other site-specific factors. Groundwater levels in the piedmont area are generally lowest in the late summer-early fall and highest in the late winter-early spring, with annual groundwater fluctuations of 4 to 8 feet; consequently, the water table may be different than measured during this study at other times.

4.0 GEOTECHNICAL ASSESSMENT

The following assessment is based on our understanding of the proposed construction, site observations, our evaluation and interpretation of the field data obtained during this exploration, our experience with similar subsurface conditions, and generally accepted geotechnical engineering principles and practices.

No partially weathered rock or material causing auger refusal was encountered in our borehole that was extended to a depth of approximately 20 feet below the existing ground surface. It is expected that the materials within the depth of the receiving pit excavation will consist primarily of residual soils. We anticipate these materials can generally be excavated with conventional earth moving equipment.

All materials to be used for backfill or compacted fill construction should be evaluated and, if necessary, tested by NOVA prior to placement to determine if they are suitable for the intended use. In general, based upon the exploration results, the soils encountered within the site can be used as structural fill as well as general subgrade fill and backfill, provided that the fill material is free of rubble, clay, rock, roots and organics. Any off-site materials used as fill should be approved by NOVA prior to acquisition.

5.0 LIMITATIONS

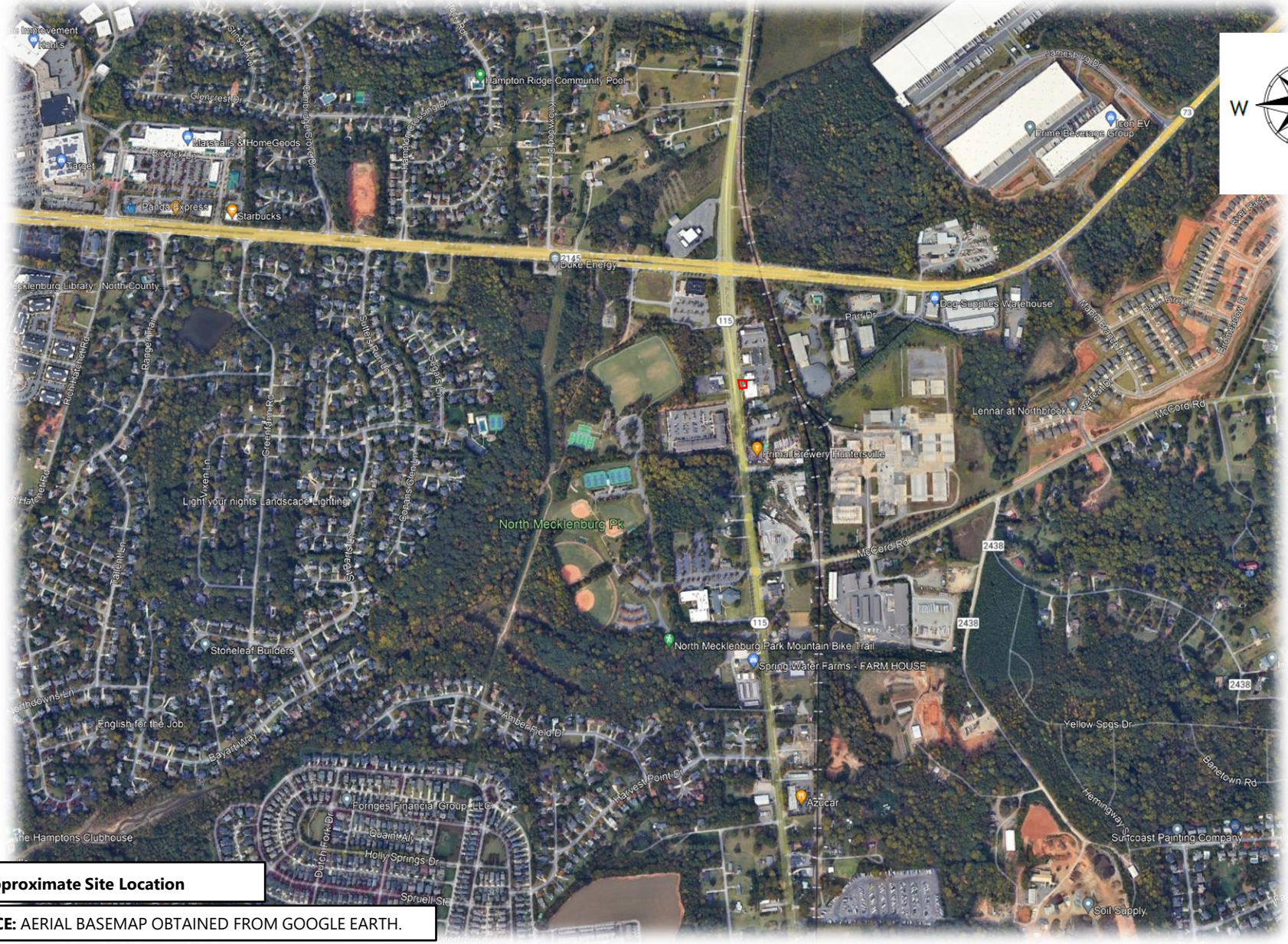
The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at significantly later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study and our experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for NOVA to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between test locations will differ from those encountered at specific test locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process have altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

This report is intended for the sole use of Spirited Cyclist for the above noted project. The scope of work performed during this study may not satisfy other user's requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of North Carolina. This warranty is in lieu of all other statements or warranties, either expressed or implied.

APPENDIX A
Figures and Maps



Approximate Site Location

REFERENCE: AERIAL BASEMAP OBTAINED FROM GOOGLE EARTH.

NOVA

SITE LOCATION MAP

SPIRITED CYCLIST – RECEIVING PIT
HUNTERSVILLE, MECKLENBURG COUNTY, NORTH CAROLINA

SCALE:	FIGURE NO.
AS SHOWN	1
DATE: January 2024	
PROJECT NO: 10705-2023064	

Approximate Boring Location

REFERENCE: AERIAL BASEMAP OBTAINED FROM GOOGLE EARTH.

NOVA

TEST LOCATION PLAN

SPIRITED CYCLIST – RECEIVING PIT
HUNTERSVILLE, MECKLENGBURG COUNTY, NORTH CAROLINA

SCALE:	FIGURE NO.
AS SHOWN	2
DATE: January 2024	
PROJECT NO: 10705-2023064	

APPENDIX B
Subsurface Data

KEY TO SYMBOLS AND CLASSIFICATIONS

DRILLING SYMBOLS

	Split Spoon Sample
	Undisturbed Sample (UD)
	Standard Penetration Resistance (ASTM D1586)
	Water Table at least 24 Hours after Drilling
	Water Table 1 Hour or less after Drilling
100/2”	Number of Blows (100) to Drive the Spoon a Number of Inches (2)
NX, NQ	Core Barrel Sizes: 2⅛- and 2-Inch Diameter Rock Core, Respectively
REC	Percentage of Rock Core Recovered
RQD	Rock Quality Designation – Percentage of Recovered Core Segments 4 or more Inches Long
	Loss of Drilling Water
MC	Moisture Content Test Performed

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	Number of Blows, “N”	Approximate Relative Density
	0 – 4	Very Loose
	5 – 10	Loose
SANDS	11 – 30	Medium Dense
	31 – 50	Dense
	Over 50	Very Dense

	Number of Blows, “N”	Approximate Consistency
	0 – 2	Very Soft
	3 – 4	Soft
SILTS	5 – 8	Firm
and	9 – 15	Stiff
CLAYS	16 – 30	Very Stiff
	31 – 50	Hard
	Over 50	Very Hard

DRILLING PROCEDURES

Soil sampling and standard penetration testing performed in accordance with ASTM D1586. The standard penetration resistance is the number of blows of a 140 pound hammer falling 30 inches to drive a 2-inch O.D., 1⅜-inch I.D. split spoon sampler one foot. Core drilling performed in accordance with ASTM D2113. The undisturbed sampling procedure is described by ASTM D1587. Soil and rock samples will be discarded 30 days after the date of the final report unless otherwise directed.

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SOIL CLASSIFICATION CHART

COARSE GRAINED SOILS	**GRAVELS**	Clean Gravel less than 5% fines	GW	Well graded gravel
			GP	Poorly graded gravel
		Gravels with Fines more than 12% fines	GM	Silty gravel
			GC	Clayey gravel
	SANDS	Clean Sand less than 5% fines	SW	Well graded sand
			SP	Poorly graded sand
		Sands with Fines more than 12% fines	SM	Silty sand
			SC	Clayey sand
FINE GRAINED SOILS	**SILTS AND CLAYS** Liquid Limit less than 50	Inorganic	CL	Lean clay
			ML	Silt
		Organic	OL	Organic clay and silt
	SILTS AND CLAYS Liquid Limit 50 or more	Inorganic	CH	Fat clay
			MH	Elastic silt
		Organic	OH	Organic clay and silt
HIGHLY ORGANIC SOILS		Organic matter, dark color, organic odor	PT	Peat

PARTICLE SIZE IDENTIFICATION

GRAVELS	Coarse	¾ inch to 3 inches
	Fine	No. 4 to ¾ inch
SANDS	Coarse	No. 10 to No. 4
	Medium	No. 40 to No. 10
	Fine	No. 200 to No. 40
SILTS AND CLAYS		Passing No. 200

NOVA

TEST BORING RECORD B-1

PROJECT: Spirited Cyclist | PROJECT NO.: 10705-2023064
CLIENT: Spirited Cyclist/ SCHNC, LLC
PROJECT LOCATION: Statesville
LOCATION: See Boring Location Plan | ELEVATION:
DRILLER: Wells Geotech, LLC | LOGGED BY: JBS
DRILLING METHOD: HA/ SPT via HSA | DATE: 1/11/24
DEPTH TO - WATER> INITIAL: ▽ DRY | AFTER 24 HOURS: ▼ NA | CAVING> C 17

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction
0		Topsoil (6 inches)					
		Residuum: Very moist, red to orange, slightly micaceous silty SAND (SM) with trace root fragments					
		Moist, orange to brown, slightly micaceous clayey SAND (SC)					
5							
		Moist, very stiff to soft, red to orange, slightly micaceous SILT (ML)				10-14-18	16
						7-12-12	12
10							
		(Very micaceous with manganese deposits)				3-5-5	5
15				C			
						3-4-4	4
20		Boring Terminated at 20 feet.					
25							
30							
35							

Graphic Depiction: ● BLOW COUNT; ▲ NATURAL MOISTURE; PLASTIC LIMIT ⊢—⊣ LIQUID LIMIT; 10 20 30 40 60 100

This information pertains only to this boring and should not be interpreted as being indicative of the site.