

GEOTECHNICAL ENGINEERING REPORT



The Overlook at Pettit Creek Cartersville, Georgia

PREPARED FOR:

Tiger Construction Services
2070 Peachtree Industrial Court
Suite 107
Chamblee, Georgia 30341

NOVA Project Number: 2020005

June 16, 2020



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TIGER CONSTRUCTION SERVICES
2070 Peachtree Industrial Court
Suite 107
Chamblee, Georgia 30341

Attention: Mr. Andrew Miller

Subject: Geotechnical Engineering Report
THE OVERLOOK AT PETTIT CREEK
Cartersville, Georgia
NOVA Project Number 2020005

Dear Mr. Miller,

NOVA Engineering and Environmental, LLC (NOVA) has completed the authorized Geotechnical Engineering Report for The Overlook at Pettit Creek located in Cartersville, Georgia. The work was performed in general accordance with NOVA Proposal Number 002-20193459, dated December 6, 2019. 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, conclusions, and recommendations.

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, LLC

Cameron Peebles
Staff Engineer



D.L. Gilmore, P.E., LEED AP
Senior Engineer

Copies Submitted: Addressee (electronic)

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- Appendix A – Figures and Maps
- Appendix B – Subsurface Data
- Appendix C – Laboratory Data
- Appendix D – Qualifications of Recommendations

1.0 INTRODUCTION

1.1 PROJECT INFORMATION

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

1.1.1 Site Plans and Documents

We were furnished with the following plans and documents:

- Development Plans for The Overlook at Pettit Creek Senior Condominium Community
Prepared by: Southland Engineering
Dated: November 14, 2019
- Development Plans for Tiger Lilly at Gilreath Senior Assisted Living
Prepared by: Southland Engineering
Dated: September 19, 2019

1.1.2 Proposed Structures

The proposed construction will consist of a senior condominium community to include:

- Fifty-one (51) single-story, wood-framed condominiums, with three (3) proposed floor plans;
- Four (4) retaining walls along the east side of the site;
- Paved entrance/exit drives onto Peebles Valley Road, with parking areas adjacent to the buildings;
- A new deceleration lane off Peebles Valley Road;
- A decorative pond in the center of the development;
- A garden walk open space through the center of the development, bisected by the pond;
- Rerouting of the existing sanitary sewer line; and
- A detention pond in the central-east portion of the site.

1.1.3 Maximum Loads

The anticipated structural loads provided to us include maximum 75 kips for interior and exterior columns. Maximum wall loading will be 3 kips per lineal foot.

1.1.4 Floor Elevations / Site Grading

The planned first floor elevations of the buildings for The Overlook at Pettit Creek are currently proposed at elevation 735.5 to 744.4 feet-MSL. Cuts of up to 16 feet and fills of up to 10 feet are anticipated to achieve design grades.

1.2 SCOPE OF WORK

Tiger Construction Services engaged NOVA to provide geotechnical engineering consulting services for The Overlook at Pettit Creek. This report briefly discusses our understanding of the project, describes our exploratory procedures, and presents our findings, conclusions, and recommendations.

The primary objective of this exploration was to perform a geotechnical exploration within the areas of the proposed construction and to assess these findings as they relate to geotechnical aspects of the planned site development. The authorized geotechnical engineering services included a site reconnaissance, soil test borings and sampling, laboratory testing, engineering evaluation of the field and laboratory data, and the preparation of this report.

The services were performed as outlined in our proposal number 002-20193459, dated December 6, 2019, and in general accordance with industry standards.

As authorized per the referenced proposal, the completed geotechnical report was to include:

- A description of the site, field testing, and general soil conditions encountered, with a Boring Location Plan and individual Boring Records;
- A discussion of geology for the subject area based upon available information;
- A discussion of subsurface conditions encountered including potential earthwork-related issues indicated by the exploration, such as materials that would require difficult excavation techniques, unsuitable or deleterious soils, and shallow groundwater table;
- Discussion of the review of selected aerial photographs from online sources for evidence of obvious existing sinkholes;
- Suitability of on-site soils for re-use as structural fill and backfill, including the criteria for suitable fill materials and the soil compaction requirements for foundations, structural fill, and pavements;

- Recommendations for controlling groundwater and/or run-off during construction and the need for permanent dewatering systems based on the anticipated post construction groundwater levels;
- Recommendations for foundation design and construction, including allowable bearing pressures and bearing depths;
- Estimate of total and differential settlements of foundations based on available structural loading data;
- Slab-on-grade construction recommendations based on the geotechnical findings, including the need for a sub-slab vapor barrier or a capillary barrier, as well as a modulus of subgrade reaction, k ;
- Pavement design and preparation recommendations based on provided or assumed loading information; and
- Recommended quality control measures (i.e. sampling, testing, and inspection requirements) for site grading and foundation construction.

The assessment of the presence of wetlands, floodplains, or water classified as State Waters of Georgia or the United States 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. NOVA can provide these services, if directed by our client.

The scope of this exploration did not include an evaluation of potential deep soil problems, such as sinkholes. A sinkhole evaluation may be performed at your request and authorization

2.0 SITE DESCRIPTION

2.1 LOCATION AND LEGAL DESCRIPTION

The Subject Property is located in Cartersville, Bartow County, Georgia. The site is directly east of the intersection of Peebles Valley Road and Gilreath Road.. The 30-acre (+/-) property is mapped by the the Bartow County Geographic Information System (GIS) Database as Parcel ID 0070-0197-015.

A Site Location Map and a Topographic Map depicting the location of the Subject Property and its surrounding topography are included in Appendix A (Figures 1 and 2). The latitude and longitude coordinates of the subject site are 34.224° north and 84.804° west.

2.2 SUBJECT PROPERTY AND VICINITY GENERAL CHARACTERISTICS

The generally irregularly shaped Subject Property is located within the Cartersville, Georgia, United States Geological Survey, 7.5-minute series topographic quadrangle map. Topographically, elevations in the south portion of the site slope downwards from a high point of 736 to 726. The elevation in the center portion of the site is at 728. Elevations in the north portion of the site slope upwards from 728 to 760 in the most northwest corner of the site.

The vicinity of the Subject Property is generally undeveloped, and is bordered by the following:

DIRECTION	LAND USE DESCRIPTION/OBSERVATIONS
NORTH	Crane Grading
EAST	Undeveloped wooded land and Pettit Creek
SOUTH	Peebles Valley Road Northwest
WEST	Peebles Valley Road Northwest

2.3 CURRENT USE OF THE PROPERTY

The southern and western portions of the site are currently wooded. The northeastern portion of the site is currently a grassed area. The site is bound to the east by Pettit Creek. The proposed detention pond and immediate surrounding area to the south, was graded at the time of our field exploration.

3.0 FIELD AND LABORATORY PROCEDURES

3.1 FIELD EXPLORATION

Boring locations were established in the field by NOVA personnel using the provided site plan and a handheld GPS device. The approximate locations are shown on Figure 3 in Appendix A. Boring elevations were interpolated from the topographical survey prepared by Southland Engineering, November 14, 2019. Borings B-9, B-10, and B-11 were taken from the proposed detention pond elevation from the Tiger Lilly plans prepared by Southland Engineering, 9/25/29, as we understand this area was at finished grade. The referenced boring locations and elevations are approximate. NOVA recommends that the boring locations and elevations be surveyed if increased accuracy is required.

Our field exploration was conducted from May 28 to May 29 and on June 3, 2020. It included 13 soil test borings (B-1 through B-7 and B-9 through B-14) performed to depths of 5 to 30 feet below the existing ground surface. Planned boring B-8 was not accessible to the drill rig due to soft subgrade. We performed a hand auger boring, HA-8, near the planned B-8 location. The hand auger boring was performed to 7 feet below the adjacent ground surface.

Soil Test Borings: The soil test borings were performed using the guidelines of ASTM Designation D1586, "Penetration Test and Split-Barrel Sampling of Soils". A hollow-stem auger drilling process was used to advance the borings. The penetration resistance is an index to the soil strength and density. Representative portions of the soil samples, obtained from the sampler, were placed in jars and transported to our laboratory for further evaluation and laboratory testing.

Test Boring Records in Appendix B show the standard penetration test (SPT) resistances, or "N-values", and present the soil conditions encountered in the borings. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the split-barrel samples, laboratory test data, 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.

Groundwater: The groundwater levels reported on the Test Boring Records represent measurements made at the completion of the soil test boring. Upon completion of groundwater readings, the soil test borings were subsequently backfilled with the soil cuttings.

Hand Auger Boring: The hand auger boring location is depicted on Figure 3 in Appendix A. The penetrometer measurements are used as an empirical e of the soil's load

bearing capacity and density. Please refer to the Hand Auger Boring Log included in the Appendix B.

3.2 LABORATORY TESTING

Laboratory testing was conducted to characterize materials existing at the site using a split-barrel recovered from the site. The laboratory test data are presented in Appendix C. Selected test data are presented on the Boring Records attached in Appendix B. The specific tests are briefly described in the following paragraphs.

The soil samples will be discarded 30 days following the submittal of this NOVA subsurface exploration report, unless you request otherwise.

3.2.1 Soil Classification

Soil classification provides a general guide to the engineering properties of various soil types and enables the engineer to apply past experience to current problems. In our explorations, samples obtained during drilling operations are observed in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our "Test Boring Records". The classification system discussed above is primarily qualitative; laboratory testing is generally performed for detailed soil classification. Using the test results, the soils were classified using the Unified Soil Classification Systems. This classification system and the in-place physical soil properties provide an index for estimating the soil's behavior. The soil classification and physical properties obtained are presented in this report.

3.2.2 Moisture Content

Two (2) moisture content tests were performed in general accordance with ASTM D2216.

3.2.3 Sieve Analysis

Two (2) sieve analysis tests were performed in general accordance with ASTM D6913.

3.2.4 Atterberg Limits

Two (2) tests were performed in accordance with ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

4.0 SUBSURFACE CONDITIONS

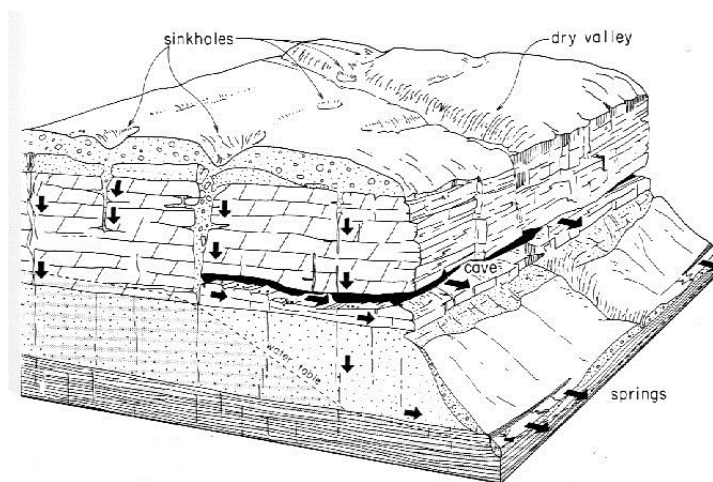
4.1 GEOLOGY

The site is in the Valley and Ridge Physiographic Province of Georgia. This province is characterized by elongated, northeasterly-trending ridges formed more than 300 million years ago, with underlying rock comprised of limestones, dolomites, sandstones and shales, depending on the location. In Georgia, the Blue Ridge Physiographic Province bounds the Valley and Ridge Province to the east, with the Piedmont Physiographic Province to the south.

According to the United States Geological Survey (USGS), the site is generally underlain by the Conasauga Group, which includes limestone, dolomite, and shale unit (Ccsi). A geologic map of the site is provided in Appendix A (Figure 4).

Soils in the region are primarily the product of in-situ chemical decomposition and chemical solution weathering of the parent rock. Sandstones and shales typically revert to sands and clays. The limestone will generally revert to a calcium and magnesium solution, with the insoluble remainder usually in the form of clay. The extent of the weathering is influenced by the mineral composition of the rock, the orientation of the rock strata and defects such as fissures, faults and fractures. Limestone, in particular, often has a slotted and pinnacled surface and may contain fingers of more resistant material projecting upward through the soil mass or contain subterranean solution caverns.

A regional Map of Karst Activity is provided in Appendix A (Figure 5). The site is located in a geologic area that has the potential for void formation within the soil mass due to soil migration into solution cavities in the underlying rock. Collapse of the soil mantle into these solution openings can result in the formation of “sinkholes” on the ground surface and/or the loss of adequate structural support. The sketch on the following page is an idealized profile of Karst activity. We note that the area where the site is located does not have the flat, relatively flat strata and bedding planes shown in this idealized sketch; the Valley and Ridge parent rocks in the Cartersville area have been folded and compressed such that the rock strata may be anywhere from relatively horizontal to near vertical.



The site is underlain by the Conasauga Group, which contains both limestones, dolomites, and shales. The shales encountered at this site are typically less susceptible to sinkhole development than the limestones and dolomites in the area. Based on a review of available aerial photographs, there does not appear to be active sinkhole near the Subject Property. However, there are less resistant limestone formations in the general area of the site and it is possible that these limestone formations exist at locations between the boring locations or possibly beneath layers of shale. Thus, the owner must understand there are inherent risks associated with building in this geologic area.

We reviewed aerial photographs of the site selected from on-line sources. We did not see evidence of current sinkhole activity within a ½ mile radius of the site. We did not see indications that this particular property is more susceptible to sinkhole/karst activity than the surrounding area.

4.2 SOIL AND ROCK CONDITIONS

The following paragraphs provide generalized descriptions of the subsurface profiles and soil conditions encountered by the borings conducted during this exploration.

The Test Boring Records in Appendix B should be reviewed to provide more detailed descriptions of the subsurface conditions encountered at each boring location. These records represent our interpretation of the subsurface conditions based on the field logs and visual observations of samples by an engineer. The lines designating the interface between various strata on the Boring Records represent the approximate interface locations and elevation. The actual transition between strata may be gradual. Groundwater levels shown on the Boring Records represent the conditions at the time of drilling. It should be understood that soil conditions may vary between boring locations.

4.2.1 Topsoil

Topsoil was encountered in the borings, as thick as 7 inches. Topsoil, for the purposes of this report, are soils which contain 5%, or more, by weight (estimated) of organic materials. Topsoil thickness is frequently erratic and thicker zones of topsoil should be anticipated.

4.2.2 Fill

Fill was encountered in the borings to depths of up to 8 feet below the existing ground surface (elevations ranging from 721 to 757 feet-MSL). The fill was described as sandy clay, clayey sand, and silty sand. Portions of the fill contained rock and small root fragments. Standard penetration resistances in the fill varied from 2 to 12 blows per foot (bpf), but more typically varied from 5 to 10 bpf. The resistances may have been amplified by the presence of the rock and root fragments.

BORING NUMBER	APPROXIMATE DEPTH OF FILL (feet)	APPROXIMATE ELEVATION OF FILL (feet-MSL)
B-1	3	757
B-2	3	744
B-3	3	727
B-4	3	742
B-5	3	729
B-6	6	721
B-7	3	727
HA-8	3	724
B-9	8	724
B-10	6	726
B-11	3	729
B-13	3	725
B-14	6	722

4.2.3 Residual Soils

Residual soils (soils weathered, in-place, from the parent rock) were encountered in the borings beneath the topsoil and/or fill. The residual soil was described as clayey sand, silty sand, and sandy clay. Standard penetration resistance values ranged from 3 to 27 bpf, but more typically varied from 7 to 12 bpf.

4.2.4 Very Dense/Very Hard Materials (Partially Weathered Rock)

Very dense or very hard soil exhibiting a standard penetration resistance exceeding 100 bpf was encountered in five (5) borings as presented in the following table. This material is referred to locally as partially weathered rock.

Very dense and very hard material was encountered in five the borings performed during this exploration at depths ranging from 6 to 15 feet below the ground surface (approximate elevations ranging from 729 to 715 feet-MSL). Very hard/very dense material was typically observed immediately above auger refusal levels. Lenses of Very hard material were also encountered within the soil matrix in borings B-11. The following table depicts locations, depths, and approximate elevations where very hard/ very dense material was encountered.

BORING NUMBER	APPROXIMATE DEPTH TO VERY DENSE/VERY HARD MATERIALS (feet)	APPROXIMATE ELEVATION OF VERY DENSE/VERY HARD MATERIALS (feet-MSL)
B-3	6	724
B-11*	8	724
B-12	6	729
B-13	13	715
B-14	6	722

*Indicates a lens of very dense/very hard materials

4.2.5 Auger Refusal Materials

Auger refusal materials are any very hard or very dense material, frequently boulders or the upper surface of bedrock, which cannot be penetrated by a power auger. Auger refusal was encountered in twelve (12) of the fourteen (14) borings at depths ranging from 5 to 21 feet below the existing ground surface. The following table depicts the locations, depths, and approximate elevations where auger refusal materials were encountered.

BORING NUMBER	APPROXIMATE DEPTH TO AUGER REFUSAL (feet)	APPROXIMATE ELEVATION OF AUGER REFUSAL (feet-MSL)
B-2	17	730
B-3	8	722
B-4	21	724
B-5	13	719
B-6	17	710
B-7	5	725
HA-8	7	720
B-9	13	719
B-10	12	720
B-11	15	717
B-12	11	724
B-14	10	718

Rock coring to determine the nature and continuity of refusal materials was beyond the scope of this exploration.

4.3 GROUNDWATER CONDITIONS

4.3.1 General

Groundwater in the Ridge and Valley 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 in the Piedmont is expected to be a subdued replica of the original surface topography.

Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff, and other site-specific factors. Groundwater levels in the Cartersville 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 vary at times.

4.3.2 Soil Test Boring Groundwater Conditions

Groundwater was encountered in seven (7) of the fourteen (14) borings performed during this exploration. Many of the borings caved upon retrieval of the augers, thus preventing groundwater measurements. Caved depths may be indicative of groundwater levels and have been included on the Test Boring Records in Appendix B.

Caved depths can be indicative of actual groundwater elevations and have been included in the Test Boring Records in Appendix B. The following table depicts the locations, depths, and approximate elevations where groundwater was encountered during this exploration.

BORING NUMBER	APPROXIMATE DEPTH OF GROUNDWATER (feet)	APPROXIMATE ELEVATION OF GROUNDWATER (feet-MSL)
B-3	4	726
B-5	7	725
B-6	3	724
HA-8	4	723
B-11	8	724
B-13	6	722
B-14	7	721

4.4 LABORATORY TESTING RESULTS

Laboratory testing was performed on representative soil samples obtained during our exploration. Laboratory tests results are presented in Appendix C. A summary of pertinent data from our laboratory testing is presented in the table below:

Summary of Laboratory Results

BORING	SAMPLE NUMBER	DEPTH (feet)	ELEVATION (feet-MSL)	USCS Class.	NATURAL WATER CONTENT (%)	% PASSING #200 (FINES)	ATTERBURG LIMITS		
							LL	PL	PI
B-1	7	23.5-25	735-736.5	CL	19.7	71.8	33	19	14
HA-8	BAG	6-7	721-720	CL	29.7	68.9	34	17	17

5.0 CONCLUSIONS AND RECOMMENDATIONS

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

Subsurface conditions in unexplored locations or at other times may vary from those encountered at specific boring locations. If such variations are noted during construction, or if project development plans are changed, we request the opportunity to review the changes and amend our recommendations, if necessary.

5.1 SITE PREPARATION

5.1.1 General

Prior to proceeding with construction, all vegetation, root systems, topsoil, and other deleterious non-soil materials should be stripped from proposed construction areas. Clean topsoil may be stockpiled and subsequently re-used in landscaped areas. Debris-laden materials should be excavated, transported, and disposed of off-site in accordance with appropriate solid waste rules and regulations. All existing utility locations should be reviewed to assess their impact on the proposed construction and relocated/grouted in-place as appropriate.

After clearing and stripping, areas that are at grade or will receive fill should be carefully evaluated by a NOVA geotechnical engineer. The engineer may require proofrolling of the subgrade with a loaded truck or other vehicle of similar size and weight. The purpose of the proofrolling would be to locate soft, weak, or excessively wet fill or residual soils present at the time of construction. Unstable materials observed during the evaluation and proofrolling operations should be undercut and replaced with structural fill or stabilized in-place by scarifying and re-densifying, as recommended by the geotechnical engineer at the time of observation.

The site should be graded during construction to maintain positive drainage away from the construction areas, to prevent ponding of storm water on the site during and shortly following significant rain events. The construction areas should be sealed and crowned with a smooth roller to minimize ponding water from storm events at the end of each day of work.

5.1.2 Existing / Old Fill

Previously placed fill materials were encountered during this exploration. Based on our experience, we anticipate fill materials likely exist at other locations between our borings. Old fills can be erratic in composition and consistency. In the event that low consistency and/or debris-laden fill materials are encountered during construction, typical recommendations would include those listed in the previous section. Actual remedial recommendations can best be determined by the geotechnical engineer in the field at the time of construction.

5.1.3 Low-Lying Areas

Although not encountered in any of the borings, based on visual observations we believe alluvial soils may exist in swales/low lying areas found in the eastern portion of the site parallel to Pettit Creek. Upon stripping topsoil/root systems in these areas, soft alluvial soils and/or shallow groundwater will likely be encountered. Prior to fill placement, a geotechnical engineer should carefully evaluate subgrade conditions in these areas. Where unstable soils are encountered, typical recommendations would include undercutting and replacing with structural fill/stone or stabilizing in-place with fabric and stone. A temporary dewatering system may be required if groundwater exists at or near subgrade levels.

5.1.4 Soft/Loose Soils

Soft or loose soils were encountered in Borings B-6 and B-10 at elevations ranging from 725 to 721 feet-MSL. We understand that these areas will be filled to achieve final grades, with ten feet or more of structural fill to be placed. If the planned site grades change to where a thinner layer of fill is required, these soft areas may need to be remediated before fill placement. If the current plans are employed, we expect the additional fill will bridge over these softer residual soils and the softer soils can remain in place.

5.1.5 Difficult Excavation

The borings did not encounter dense soil, PWR or rock above planned finished grades based on the FFEs of Overlook at Pettit Creek and Tiger Lilly at Gilreath. However, as previously discussed, the weathering process at this site is erratic and variations in the partially weathered rock or rock profile can occur in small lateral distances. Therefore, it is possible that dense soil, PWR and/or rock may be encountered in areas between the boring locations. Additionally, deep utility or other excavations could encounter dense materials if they extend to those depths. We recommend that excavations be limited in depth to at least two feet above the elevations recorded in this report for dense materials.

5.2 STRUCTURAL FILL PLACEMENT

5.2.1 Structural Fill Suitability

Structural fill materials should be low plasticity soil (Plasticity Index less than 30), free of non-soil materials and rock fragments larger than 3 inches in any one dimension. Based on visual examination and limited laboratory testing, the existing native soils, and much of the existing fill, which does not contain appreciable amounts of debris, rock, organics or other deleterious materials encountered during this exploration generally appear suitable for re-use as structural fill. Prior to construction, bulk samples of the proposed fill materials should be laboratory-tested to confirm their suitability.

Organic and/or debris-laden material is not suitable for re-use as structural fill. Topsoil, mulch, and similar organic materials can be wasted in architectural areas. Debris-laden materials should be excavated, transported, and disposed of off-site in accordance with appropriate solid waste rules and regulations.

5.2.2 Structural Fill Compaction

Structural fill should be placed in thin, horizontal loose lifts (maximum 8-inch) and compacted to at least 95 percent of the Standard Proctor Maximum Dry Density (SPMDD-ASTM D698). The upper 8 inches of soil beneath pavements and slab-on-grade should be compacted to at least 98 percent of the SPMDD. In confined areas, such as utility trenches or behind retaining walls, portable compaction equipment and thinner fill lifts (3 to 4 inches) may be necessary. Fill materials used in structural areas should have a target maximum dry density of at least 95 pounds per cubic foot (pcf). If lighter weight fill materials are used, the NOVA geotechnical engineer should be consulted to assess the impact on design recommendations.

Soil moisture content should be maintained within 3 percent of the optimum moisture content. We recommend that the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. Moisture control may be difficult during rainy weather. ***Soils excavated from below the groundwater table will likely require significant efforts to achieve acceptable moisture contents prior to re-use as fill.***

Filling operations should be observed by a NOVA soils technician, who can confirm suitability of material used and uniformity and appropriateness of compaction efforts. The technician can also document compliance with the specifications by performing field density tests using the drive cylinder, nuclear, or sand cone testing methods (ASTM D2937, D6938, or D1556, respectively). One test per 400 cubic yards and every 2 feet of placed fill is recommended,

with test locations well distributed throughout the fill mass. When filling in small areas, at least one test per day per area should be performed.

5.3 GROUNDWATER CONTROL

5.3.1 General

During the current exploration, depths to groundwater ranged from 3 to 8 feet below the existing ground surface (approximate elevations ranging from 721 to 731 feet-MSL). Based on the FFEs of 732 to 744 feet-MSL we do not anticipate significant groundwater control problems during grading. Depending on the area of the site under consideration, groundwater levels have differing implications for design and construction. The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations.

At the time of construction, groundwater must be lowered and continuously maintained at a minimum depth of 3 feet below the working elevation to permit subgrade preparation and foundation excavation and construction.

As previously noted, groundwater levels are subject to seasonal, climatic and other variations and may be different at other times and locations. The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations.

5.4 FOUNDATIONS

5.4.1 General

The following recommendations are based on anticipated maximum column loads and wall loads of 75 kips and 3 kips per foot, respectively, and on the anticipated final grades being as previously described.

Shallow Foundations - Soil

Design: After the recommended site and subgrade preparation and fill placement, we recommend that the proposed structures be supported by conventional shallow foundations. Foundations bearing on undisturbed native soils and/or compacted structural fill may be designed for a maximum allowable bearing pressure of 2,000 pounds per square foot (psf).

Previously placed fill materials were encountered on the site. If low consistency or debris-laden fill materials are present in foundation excavations, undercutting

and backfilling with crushed stone or structural fill or redesigning for a reduced bearing pressure, may be required.

Foundations should have minimum widths of 24 inches for ease of construction and to reduce the possibility of localized shear failures. Exterior foundation bottoms should be at least 18 inches below exterior grades for protection against frost damage.

Settlement: Settlements for spread foundations bearing on the higher consistency native materials were assessed using SPT values to estimate elastic modulus, based on published correlations and previous NOVA experience. We note that the settlements presented are based on random field data and an assumed subsoil profile. Conditions may be better or worse in other areas, however, we believe the estimated settlements are reasonably conservative.

Based on column loadings, soil bearing capacities and the presumed foundation elevations as discussed in previous sections, we expect primary total settlement beneath individual foundations to be on the order of 1 total inch or less.

The amount of differential settlement is difficult to predict because the subsurface and foundation loading conditions can vary considerably across the site. However, we anticipate differential settlement between adjacent foundations could vary from ½-inch. The final deflected shape of the structure will be dependent on actual foundation locations and loading.

Construction: Foundation excavations should be evaluated by the NOVA geotechnical engineer prior to reinforcing steel placement to observe foundation subgrade preparation and confirm bearing pressure capacity.

Foundation excavations should be level and free of debris, ponded water, mud, and loose, frozen, or water-softened soils. Concrete should be placed as soon as is practical after the foundation is excavated and the subgrade evaluated. Foundation concrete should not be placed on frozen or saturated soil. If a foundation excavation remains open overnight, or if rain or snow is imminent, a 3 to 4-inch thick "mud mat" of lean concrete should be placed in the bottom of the excavation to protect the bearing soils until reinforcing steel and concrete can be placed.

5.5 SLAB-ON-GRADE

5.5.1 General

The conditions exposed at subgrade levels will vary across the site and may include structural fill and/or native soils. Slabs-on-grade may be adequately

supported on these subgrade conditions subject to the recommendations in this report. Slabs-on-grade should be jointed around columns and along walls to reduce cracking due to differential movement.

An underdrain system is not required. However, we recommend a minimum of 4-inches of graded aggregate base (GAB) beneath the slabs to:

- Reduce non-uniform support conditions
- Provide a stable base to support construction traffic
- Provide a base material that can be fine graded to design tolerances.

GAB should be compacted to 98 percent of the maximum dry density as determined by the modified Proctor compaction test (ASTM D1557) and overlain by a conventional plastic vapor barrier.

Once grading is completed, the subgrade is usually exposed to adverse construction activities and weather conditions during the period of sub-slab utility installation. The subgrade should be well-drained to prevent the accumulation of water. If the exposed subgrade becomes saturated or frozen, the geotechnical engineer should be consulted.

After utilities have been installed and backfilled, a final subgrade evaluation should be performed by the geotechnical engineer immediately prior to slab-on-grade placement. If practical, proofrolling may be used to redensify the surface and to detect any soil that has become excessively wet or otherwise loosened.

5.5.2 Subgrade Modulus

A coefficient of subgrade reaction (k) of 125 pci (psi per inch) may be used for conventional slab design where slabs bear upon subgrades prepared in accordance with previous recommendations.

Please note that this magnitude of k is intended to reflect the elastic response of soil beneath a typical floor slab under light loads with a small load contact area often measured in square inches, such as loads from forklifts, automobile/truck traffic or lightly loaded storage racks. The recommended coefficient of subgrade reaction (k) of 125 pci is not applicable for heavy slab loads caused by bulk storage or tall storage racks, or for mat foundation design.

Several design methods are applicable for conventional slab design. We have assumed that the slab designer will utilize the methods discussed in the

American Concrete Institute (ACI) Committee 360 report, "Guide to Design of Slabs-on-Ground, (ACI 360R-10).

5.6 BELOW GRADE WALLS

5.6.1 Cast-in-Place Walls

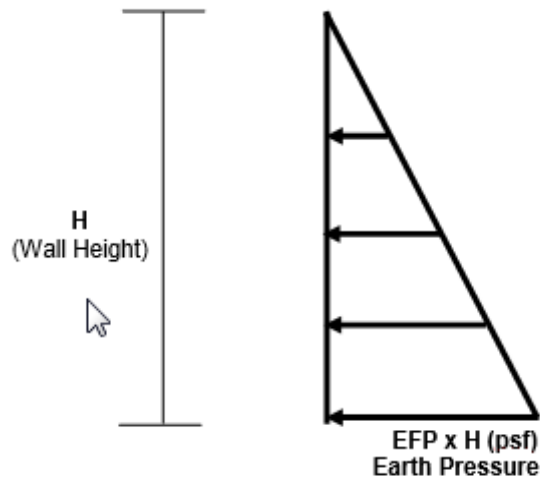
The magnitude and distribution of earth pressures against below grade walls depends on the deformation condition (rotation) of the wall, soil properties and water conditions. When the soil behind the wall is prevented from lateral strain, the resulting force is known as the at-rest earth pressure (K_0). If the retaining structure moves away from the soil mass, the earth pressure decreases with the increasing lateral expansion until a minimum pressure, known as the active earth pressure (K_A), is reached. If the wall is forced into the soil mass, the earth pressure increases until a maximum pressure, known as the passive earth pressure (K_P), is obtained.

Free-standing retaining walls are usually designed for active earth pressures. Rigid basement walls are typically designed for at-rest earth pressures. If basement walls will be backfilled before they are braced by the floor slabs, they should also be designed to withstand active earth pressures as self-supporting cantilever walls. However, the earth pressures must be compatible with the wall rotation, which is limited by the wall rigidity, foundation support conditions and connections to adjoining structures. If active earth pressure development requires horizontal wall movements that cannot occur, or which are architecturally undesirable, walls should be designed for an intermediate pressure based on restraint conditions.

Laboratory analysis to determine actual soil shear strength properties was beyond the authorized scope of services. Based on our experience with similar soils and construction, we have provided the earth pressure estimates shown in the following table:

Earth Pressure Condition	Earth Pressure Coefficient	Equivalent Fluid Pressure (pcf)	
		Above Water Table	Below Water Table
Soil Backfill			
Active (K_a)	0.33	40	80
At-Rest (K_o)	0.50	60	89
Passive (K_p)	3.00	150*	TBD**
#57 Stone Backfill			
Active (K_a)	0.29	35	75
At-Rest (K_o)	0.45	45	85
Passive (K_p)	3.40	200*	TBD**

- * Passive earth pressure is frequently used in retaining wall design to resist active earth pressures. Wall movements required to develop full passive earth pressures are significantly greater than movements necessary for active earth pressures. Consequently, this passive pressure value has been reduced by at least 50% for wall design
- * Passive earth pressure for submerged wall design shall be determined on a case-by-case basis.



We recommend a value of 0.35 as the coefficient of friction (sliding resistance) between wall foundations and the underlying residual or fill soils. A coefficient of friction of 0.45 is recommended for foundations bearing on PWR. A coefficient of friction of 0.5 is recommended for foundations bearing on rock. These design values do not contain a safety factor.

Our lateral earth pressure recommendations assume that:

- The ground surface adjacent to the wall is level,
- Residual soils will be reused for wall backfill, compacted between 95% to 98% of the standard proctor maximum dry density,
- Soil backfill weight is a maximum of 120 pcf
- Heavy construction equipment does not operate within 5 feet of the walls,
- A constantly functioning drainage system is installed between the wall and the soil backfill to prevent hydrostatic pressures from acting on the wall,
- Foundations or other significant surcharge loads are located outside the wall a distance at least equal to the wall height,
- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 H to 0.004 H, where H is wall height.
- For passive earth pressure to develop, wall must move horizontally to mobilize resistance.

5.7 PAVEMENT SECTIONS

5.7.1 Flexible Pavement

Anticipated traffic conditions were not provided. However, based on the subsurface conditions encountered at this site, the recommended site preparation, our typical recommended flexible pavement design is as follows:

Pavement Section	Standard Duty *	Heavy Duty **
Asphaltic Surface Course (9.5 mm or 12.5 mm SuperPave, GDOT approved mix)	2 inches (min)	2 inches (min)
Asphaltic Base Course (19 mm or 12.5 mm SuperPave, GDOT approved mix)	N/A	2 inches
Graded Aggregate Base (GAB) or Recycled Concrete Base Course from an approved GDOT source	6 inches	8 inches

* Standard Duty – Driveways and parking lots restricted to automobile traffic

** Heavy Duty – Driveways and parking lots subject to automobile and truck traffic with truck traffic limited to 4 trucks per day

We recommend a minimum compaction of 98 percent of the maximum dry density for the crushed stone material Graded Aggregate Base (GAB), Concrete Base

Course or Stabilized Subgrade as determined by the modified Proctor compaction test (ASTM D1557). The crushed stone should conform to applicable sections of the current GDOT Standard Specifications. All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and GDOT. A NOVA technician should observe placement and perform density testing of the base course material and asphalt.

5.7.2 Rigid Pavement

Based on the subsurface conditions at the site, assumed low volume traffic loads and an estimated subgrade modulus (k) of 125 psi/inch for traffic or wheel loading, our recommended rigid pavement design is as follows:

Pavement Section	Standard Duty *	Heavy Duty **
GDOT approved air-entrained concrete mix	5 inches (min)	7 inches (min)
Graded Aggregate Base (GAB) Course from an approved GDOT source	4 inches	4 inches
Control Joint Spacing (maximum)	10 feet X 10 feet	12 feet X 12 feet
Saw-Cut Depth (minimum)	1½ inches	2 inches

* Standard Duty – Driveways and parking lots restricted to automobile traffic

** Heavy Duty – Driveways and parking lots subject to automobile and truck traffic with truck traffic limited to 4 trucks per day

Concrete materials and placement should conform to applicable GDOT specifications. A non-woven geotextile (about 3 feet wide) must be placed beneath the construction joints to prevent upward "pumping" movement of soil fines through the joints.

Concrete used for pavement should have a minimum compressive strength of 4000 psi and a minimum 28-day flexural strength (modulus of rupture) of at least 600 pounds per square inch, based on 3rd point loading of concrete beam test samples. Layout of the saw-cut control joints should form square panels, and the depth of saw-cut joint should be approximately ¼ of the concrete slab thickness. The joints should be sawed within six (6) hours of concrete placement or as soon as the concrete has developed sufficient strength to support workers and equipment.

We recommend allowing NOVA to review and comment on the final concrete pavement design, including section and joint details (type of joints, joint spacing, etc.), prior to the start of construction. For further details on concrete pavement construction, please reference “Building Quality Concrete Parking Areas”, published by the Portland Cement Association.

Please note that the recommended pavement section is based on assumed post-construction traffic loading. If the pavement is to be constructed and utilized by construction traffic, the above pavement section will likely prove insufficient for heavy truck traffic, such as concrete trucks or tractor-trailers used for construction delivery. Unexpected distress, reduced pavement life and /or premature failure of the pavement section could result if subjected to heavy construction traffic and the owner should be made aware of this risk. If the assumed traffic loading stated herein is not correct, NOVA should review actual pavement loading conditions to determine if revisions to these recommendations are warranted.

6.0 CONSTRUCTION OBSERVATIONS

6.1 SHALLOW FOUNDATIONS

Foundation excavations should be level and free of debris, ponded water, mud, and loose, frozen or water-softened soils. All foundation excavations should be evaluated by the NOVA geotechnical engineer prior to reinforcing steel placement to observe foundation subgrade preparation and confirm bearing pressure capacity. Due to variable site subsurface and construction conditions, some adjustments in isolated foundation bearing pressures, depth of foundations or undercutting and replacement with controlled structural fill may be necessary.

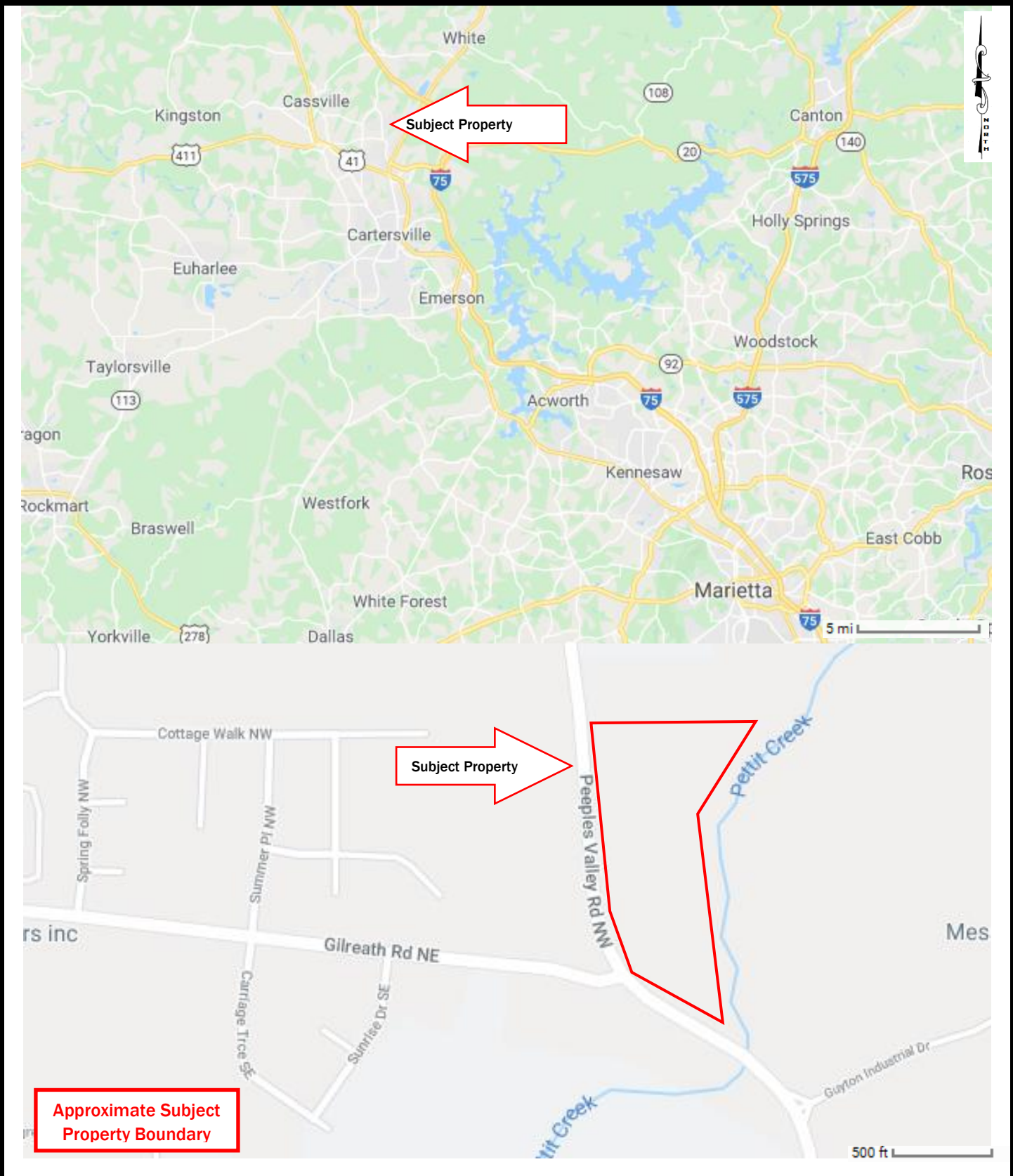
6.2 SUBGRADE

Once site grading is completed, the subgrade may be exposed to adverse construction activities and weather conditions. The subgrade should be well-drained to prevent the accumulation of water. If the exposed subgrade becomes saturated or frozen, the NOVA geotechnical engineer should be consulted.

A final subgrade evaluation should be performed by the NOVA geotechnical engineer immediately prior to pavements or slab-on-grade placement. If practical, proofrolling may be used to re-densify the surface and to detect any soil, which has become excessively wet or otherwise loosened.

APPENDIX A

Figures and Maps



**FIGURE 1
SITE LOCATION MAP**

SOURCE: Google Maps
DATE: Accessed [DATE]
SCALES: As Shown



Tiger Construction Services
The Overlook at Petit Creek
Cartersville, Georgia
NOVA Project Number 2020005

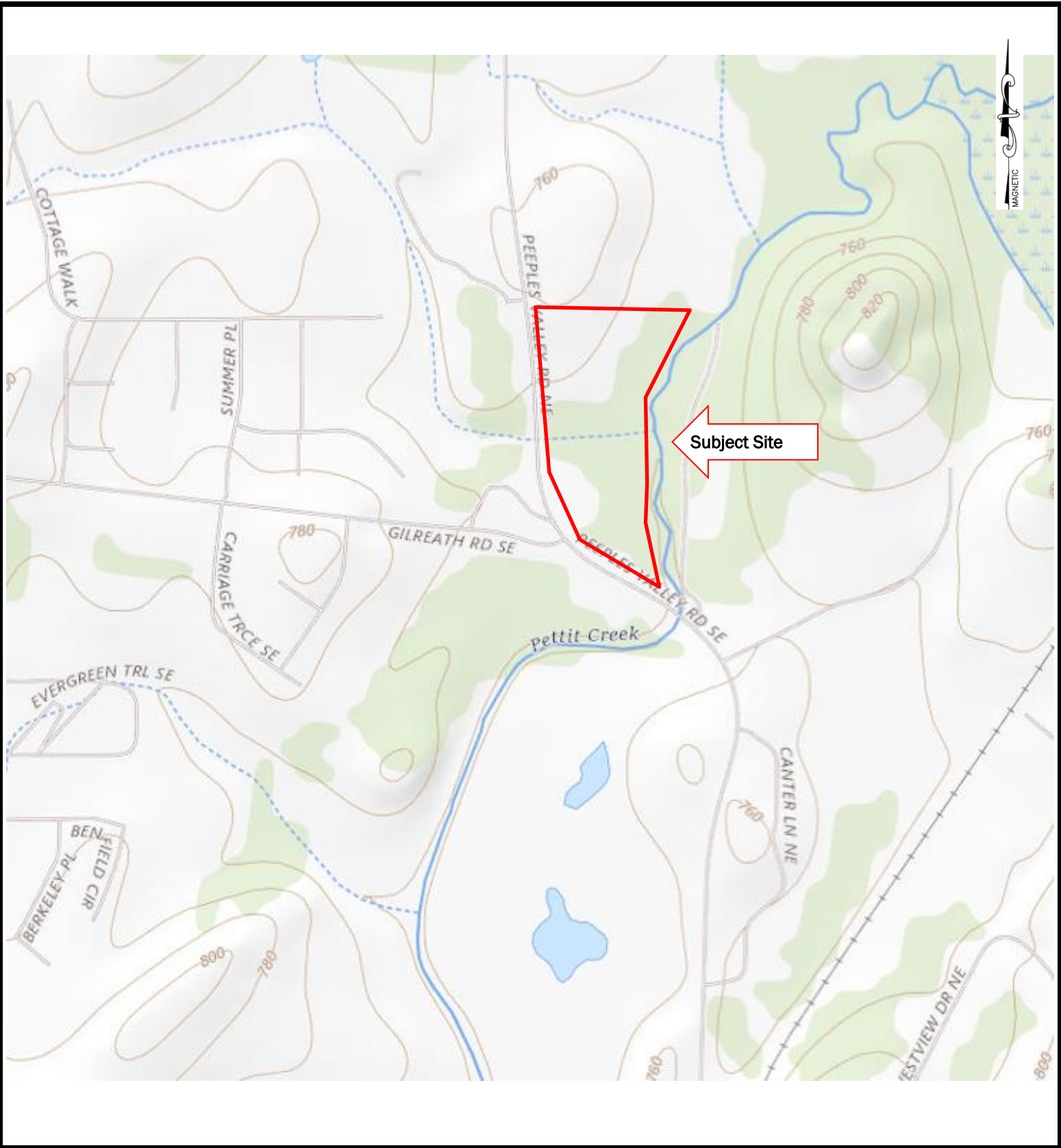


FIGURE 2
TOPOGRAPHIC MAP
SOURCE: USGS Topography Map



Tiger Construction Services
The Overlook at Pettit Creek
Cartersville, Georgia
NOVA Project Number 2020005

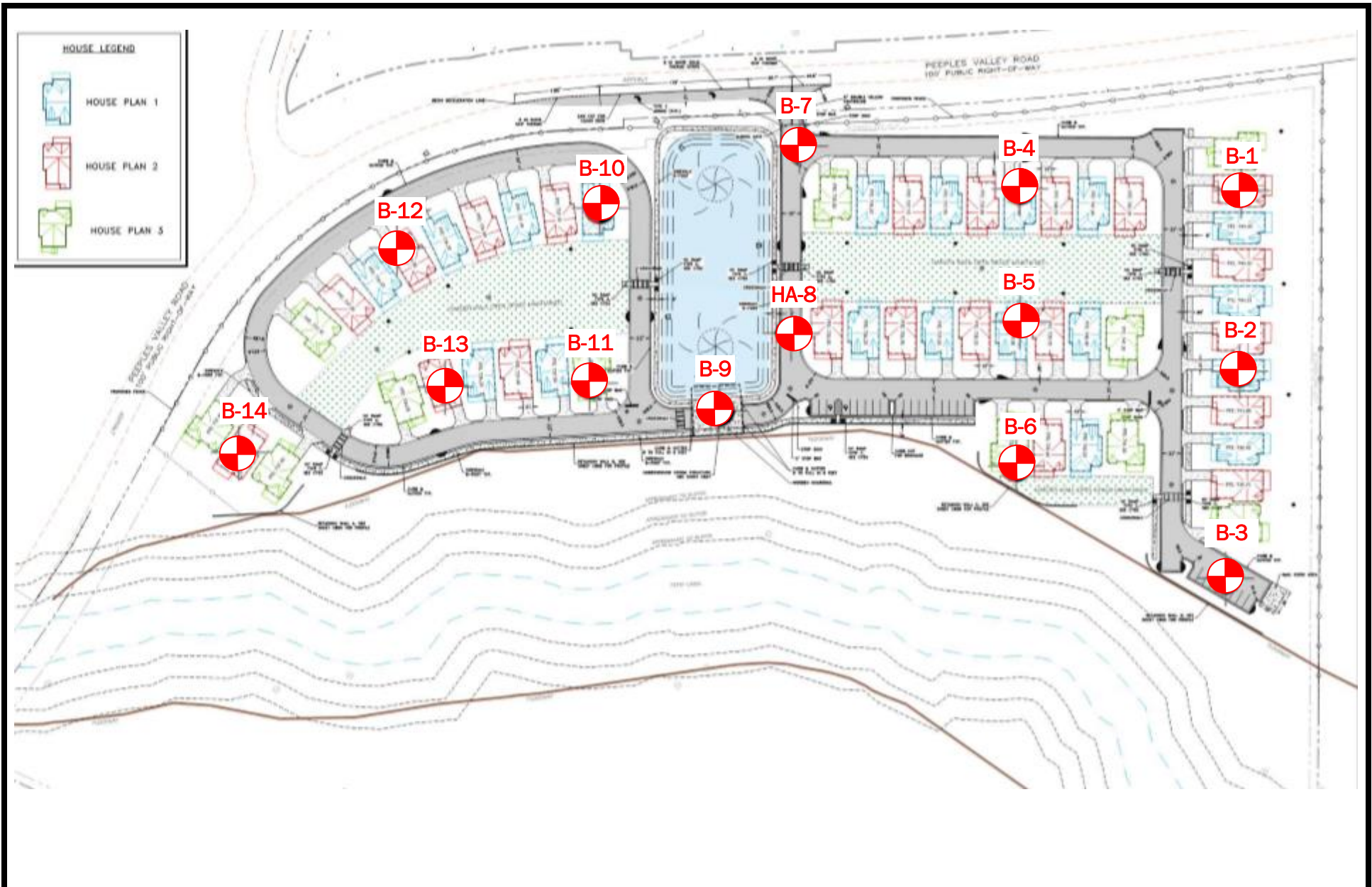
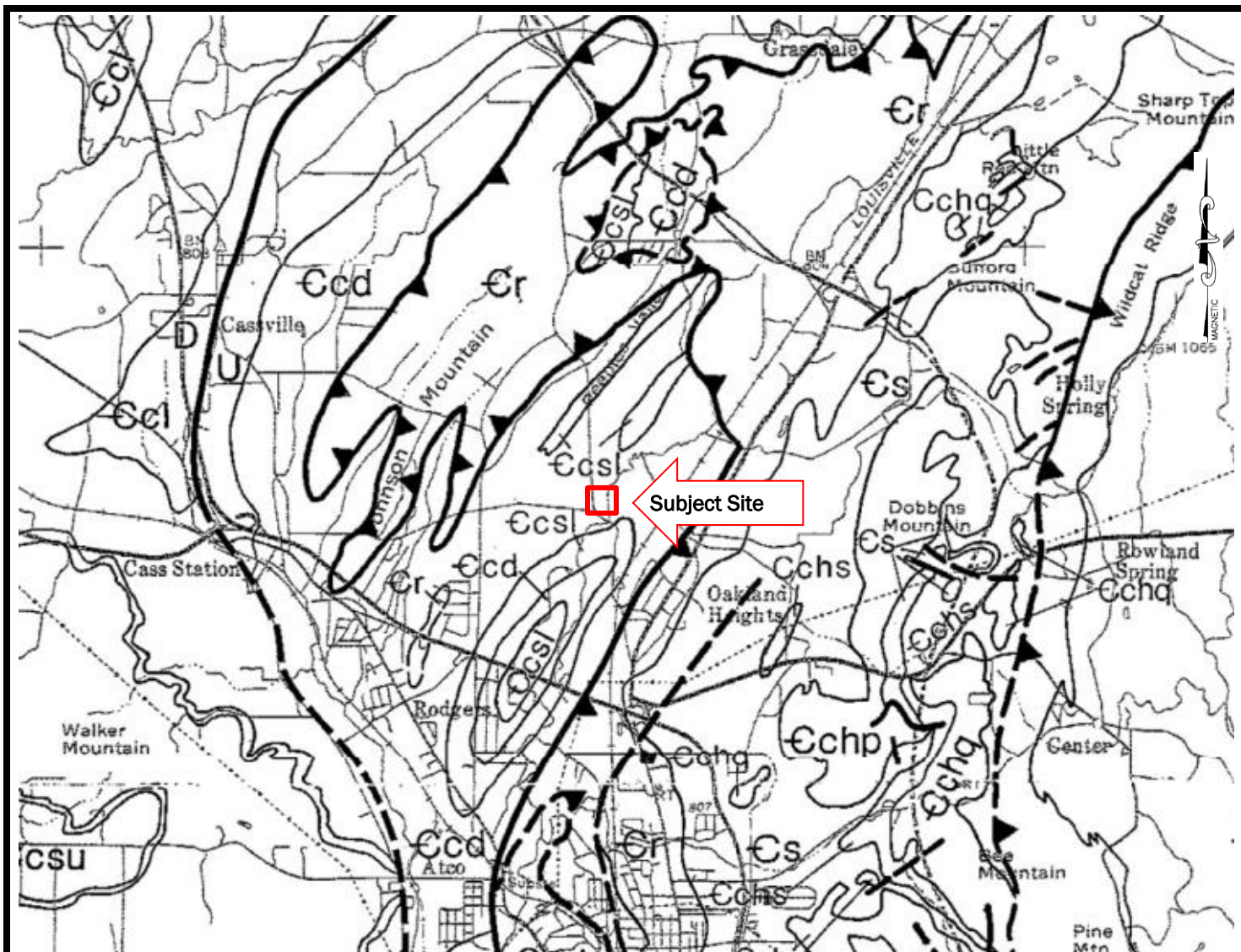


FIGURE 3
BORING LOCATION PLAN
 SOURCE: Client-Provided Plan



Tiger Construction Services
 The Overlook at Pettit Creek
 Cartersville, Georgia
 NOVA Project Number 2020005



- | | |
|-----------|-----------|
| WB | EB |
| ↵Csl | ↵Ccd |
| ↵Ccls | ↵Cc |
| ↵Ccs | ↵Ccs |
| CA | |
| ↵Ccd | |
| ↵Ccsu | |
| ↵Ccl | |
| ↵Cchl | |
| ↵Ccd | |
| Ock | |
| ↵Cr | |

Cambrian Conasauga Group (Cressler, 1970; Cressler and others, 1979): includes Western (WB) and Eastern (EB) belts in Floyd County with units of mostly shale and some limestone (↵Csl), mostly limestone and some shale (↵Ccls), siliceous shale and thin-bedded sandstone (↵Ccs), dolomite (↵Ccd), shale and limestone mixed (↵Cc), and mostly shale (↵Ccs). In the Cartersville area (CA): light- to medium-gray and brown dolomite (↵Ccd); greenish-gray, tan, purplish, and black shale (↵Cchl); limestone (↵Ccl), greenish, gray, and slightly purplish shale (↵Ccsu), and gray dolomite (↵Ccd). 1500 ft. thick (Cressler, 1970).

Upper Cambrian and Lower Ordovician Knox Group (Cressler, 1970; Cressler and others, 1979): includes light- to medium-gray, fine- to coarse-grained, thickly to massively bedded cherty dolomite and brownish-gray, medium- to coarse-grained "asphaltic" dolomite of the Copper Ridge Dolomite (↵Cr and Ock); approximately 500 feet of light- to medium-gray, thick to massively bedded dolomite interbedded with gray and tan, aphanitic limestone and sandstone of the Chepultepec Dolomite; and light- to medium-gray dolomite interbedded with light- to medium-gray, aphanitic to medium-grained, thickly bedded limestone of the Longview Limestone. The Longview Limestone locally weathers to a residuum containing angular chert and sandstone fragments. 3000 ft. thick (Cressler, 1970).

FIGURE 4
REGIONAL GEOLOGY
SOURCE: McConnell and Abrams, 1984



Tiger Construction Services
The Overlook at Pettit Creek
Cartersville, Georgia
NOVA Project Number 2020005

APPENDIX B

Subsurface Data

KEY TO SYMBOLS AND CLASSIFICATIONS

DRILLING SYMBOLS

	Split Spoon Sample
	Undisturbed Sample (UD)
	Standard Penetration Resistance (ASTM D1586-67)
	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: 2½- 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

	<u>Number of Blows, "N"</u>	<u>Approximate Relative Density</u>
SANDS	0 – 4	Very Loose
	5 – 10	Loose
	11 – 30	Medium Dense
	31 – 50	Dense
	Over 50	Very Dense
	<u>Number of Blows, "N"</u>	<u>Approximate Consistency</u>
SILTS and CLAYS	0 – 2	Very Soft
	3 – 4	Soft
	5 – 8	Firm
	9 – 15	Stiff
	16 – 30	Very Stiff
	31 – 50	Hard
	Over 50	Very Hard

DRILLING PROCEDURES

Soil sampling and standard penetration testing performed in accordance with ASTM D1586-67. The standard penetration resistance is the number of blows of a 140 pound hammer falling 30 inches to drive a 2-inch O.D., 1½-inch I.D. split spoon sampler one foot. Core drilling performed in accordance with ASTM D2113-08. The undisturbed sampling procedure is described by ASTM D1587-08 (2012). Unless other arrangements are made, NOVA will dispose of all soil and rock samples remaining at the time of report completion.

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
	MH	Elastic silt		
	Organic	OH		Organic clay and silt
HIGHLY ORGANIC SOILS		Organic matter, dark color, organic odor		PT

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

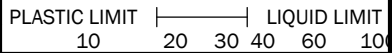


**TEST BORING
RECORD
B-1**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 760 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: ∅ N/E AFTER 24 HOURS: ∅ N/M CAVING> C N/E

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction	
							● BLOW COUNT	▲ NATURAL MOISTURE
0	760	TOPSOIL: 2 INCHES						
		FILL: Medium dense brown silty medium to fine SAND with roots fibers				12	●	
5	755	RESIDUUM: Medium dense brown tan orange silty medium to fine SAND				20	●	
						27	●	
10	750					24	●	
		Stiff brown tan orange fine sandy CLAY				15	●	
15	745							
		Medium dense tan orange brown silty medium to fine SAND with clay				12	●	
20	740							
		Stiff orange brown fine sandy CLAY				13	●	
25	735							
30	730	Boring Terminated at 30 ft.				12	●	
35	725							



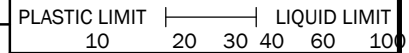


**TEST BORING
RECORD
B-2**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 747 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: ∅ N/E AFTER 24 HOURS: ∅ N/M CAVING> C 11

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction	
							● BLOW COUNT	▲ NATURAL MOISTURE
0		TOPSOIL: 7 INCHES						
745		FILL: Loose brown tan silty medium to fine SAND with roots fibers and rock fragments				8	●	
5		RESIDUUM: Medium dense brown red gray silty medium to fine SAND with rock fragments				23		●
740						17		●
10						27		●
735								
15						10	●	
730		Auger Refusal at 17 ft.						
20								
725								
25								
720								
30								
715								
35								





**TEST BORING
RECORD
B-3**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 730 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: 4 AFTER 24 HOURS: N/M CAVING> C 5

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction														
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT							
0	730	TOPSOIL: 6 INCHES																			
		FILL: Loose brown silty medium to fine SAND with clay				5	●														
5	725	RESIDUUM: Firm tan brown fine sandy CLAY				7	●														
		Auger Refusal at 8 ft.				100/ 12"															●
10	720																				
15	715																				
20	710																				
25	705																				
30	700																				
35	695																				

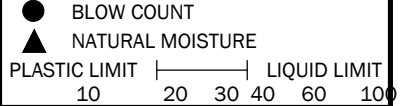


TEST BORING RECORD B-4

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 745 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: ∅ N/E AFTER 24 HOURS: ∅ N/M CAVING> C N/E

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction	
							● BLOW COUNT	▲ NATURAL MOISTURE
0	745	TOPSOIL: 4 INCHES						
		FILL: Firm brown orange fine sandy CLAY						
		RESIDUUM: Stiff red brown fine sandy CLAY						
5	740	Medium dense red tan silty medium to fine SAND with clay						
10	735							
15	730							
20	725							
		Auger Refusal at 21 ft.						
25	720							
30	715							
35	710							





TEST BORING RECORD B-5

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 732 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: 7 AFTER 24 HOURS: N/M CAVING> C 9

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction													
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT						
0		TOPSOIL: 7 INCHES																		
730		FILL: Loose brown silty fine SAND				6	●													
5		RESIDUUM: Very Stiff tan brown fine sandy CLAY with root fibers and rock fragments				22														
725		Medium dense tan brown silty fine SAND with clay		▽		15														
10		Firm tan fine sandy CLAY		C		5	●													
720		Auger Refusal at 13 ft.																		
15																				
715																				
20																				
710																				
25																				
705																				
30																				
700																				
35																				



**TEST BORING
RECORD
B-6**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 727 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: 3 AFTER 24 HOURS: N/M CAVING> C 8

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction													
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT						
0		TOPSOIL: 5 INCHES																		
0-5	725	FILL: Firm to stiff brown fine sandy CLAY	[Cross-hatch pattern]		[Diagonal lines]	5	●													
5																				
5-7	720	RESIDUUM: Soft brown black fine sandy CLAY	[Diagonal lines]		[Diagonal lines]	9	●													
7-10		Loose brown silty fine SAND with rock fragments	[Vertical lines]		[Diagonal lines]	4	●													
10-15		NO RECOVERY	[Vertical lines]		[Diagonal lines]	8	●													
15-17		Auger Refusal at 17 ft.	[Vertical lines]		[Diagonal lines]	WH														
17-20																				
20-25																				
25-30																				
30-35																				
35	695																			

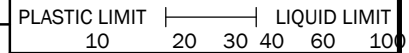


**TEST BORING
RECORD
B-7**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 730 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: ∅ N/E AFTER 24 HOURS: ∅ N/M CAVING> C 3

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction	
							● BLOW COUNT	▲ NATURAL MOISTURE
0	730	TOPSOIL: 3 INCHES FILL: Stiff red brown sandy CLAY with root fibers				12	●	
		NO RECOVERY				21		●
5	725	Auger Refusal at 5 ft.						
10	720							
15	715							
20	710							
25	705							
30	700							
35	695							





**TEST BORING
RECORD
B-9**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 732 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: ∅ N/E AFTER 24 HOURS: ∅ N/M CAVING> C 8

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction														
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT							
0																					
730		FILL: Soft to stiff orange brown fine sandy CLAY				4	●														
5																					
725																					
10		NO RECOVERY																			
720																					
15		Auger Refusal at 13 ft.																			
715																					
20																					
710																					
25																					
705																					
30																					
700																					
35																					



**TEST BORING
RECORD
B-10**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 732 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: ∅ N/E AFTER 24 HOURS: ∅ N/M CAVING> C 10

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction													
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT						
0																				
	730	FILL: Firm tan brown clayey fine SAND with rock fragments				7	●													
5																				
	725	Soft orange brown fine sandy CLAY				8	●													
	720	RESIDUUM: Soft purple tan gray fine sandy CLAY		C		2	●													
10																				
	720	Auger Refusal at 12 ft.				3	●													
15																				
	715																			
20																				
	710																			
25																				
	705																			
30																				
	700																			
35																				



**TEST BORING
RECORD
B-11**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 732 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: 8 AFTER 24 HOURS: N/M CAVING> C 9

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

Depth (feet)	Elevation (ft.-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction														
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT							
0																					
	730	FILL: Firm brown fine sandy CLAY				8	●														
	5	RESIDUUM: Firm tan orange brown sandy CLAY with rock fragments				7	●														
	725	Soft brown purple fine sandy CLAY				3	●														
	10	PARTIALLY WEATHERED ROCK: Sampled as a very hard purple brown fine sandy CLAY				100/4"															●
	720																				
	15	RESIDUUM: Loose brown red silty fine SAND with rock fragments				6	●														
	715	Auger Refusal at 15 ft.																			
	20																				
	710																				
	25																				
	705																				
	30																				
	700																				
	35																				

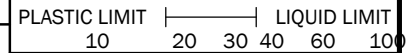


**TEST BORING
RECORD
B-12**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 735 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: ∅ N/E AFTER 24 HOURS: ∅ N/M CAVING> C 7

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction	
							● BLOW COUNT	▲ NATURAL MOISTURE
0	735	RESIDUUM: Loose tan brown black clayey medium to fine SAND with trace mica				9	●	
5	730	Medium dense gray brown silty medium to fine SAND				28	●	
10	725	PARTIALLY WEATHERED ROCK: Sampled as very dense brown gray purple silty fine SAND with clay and rock fragments		C		100/10"	●	
11	725	Auger Refusal at 11 ft.				100/2"	●	
15	720							
20	715							
25	710							
30	705							
35	700							





**TEST BORING
RECORD
B-13**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 728 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: 6 AFTER 24 HOURS: N/M CAVING> C 8

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction													
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT						
0		FILL: Soft brown red fine sandy CLAY				4	●													
725		RESIDUUM: Medium dense orange tan brown silty coarse to fine SAND with rock fragments				24														
5																				
720		Loose orange clayey medium to fine SAND with rock fragments				11														
10																				
715		PARTIALLY WEATHERED ROCK: Sampled as very dense brown clayey fine SAND with rock fragments				4	●													
15		Boring Terminated at 15 ft.				100/2"														
710																				
20																				
705																				
25																				
700																				
30																				
695																				
35																				



**TEST BORING
RECORD
B-14**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Georgia ELEVATION: 728 feet-MSL
 DRILLER: Piedmont Environmental Drilling, INC. LOGGED BY: C. Peebles
 DRILLING METHOD: Hollow Stem Auger DATE: 5/28/2020
 DEPTH TO - WATER> INITIAL: 7 AFTER 24 HOURS: N/M CAVING> C 8

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

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction													
							● BLOW COUNT	▲ NATURAL MOISTURE	PLASTIC LIMIT					LIQUID LIMIT						
							10	20	30	40	60	100								
0		FILL: Firm red brown fine sandy CLAY				7	●													
725																				
5																				
		PARTIALLY WEATHERED ROCK: Sampled as very hard brown tan fine CLAY with rock fragments				100/4"														●
720		NO RECOVERY				100/8"														●
10		Auger Refusal at 10 ft.																		
715																				
15																				
710																				
20																				
705																				
25																				
700																				
30																				
695																				
35																				



**TEST BORING
RECORD
HA-8**

PROJECT: The Overlook at Pettit Creek PROJECT NO.: 2020005
 CLIENT: Tiger Construction Services
 PROJECT LOCATION: Cartersville, Bartow County, Georgia
 LOCATION: Cartersville, Gerogia ELEVATION: 727 feet-MSL
 DRILLER: NOVA Engineering LOGGED BY: C. Peebles
 DRILLING METHOD: Hand Auger DATE: 6/3/2020
 DEPTH TO - WATER> INITIAL: 4 AFTER 24 HOURS: N/M CAVING> C N/E

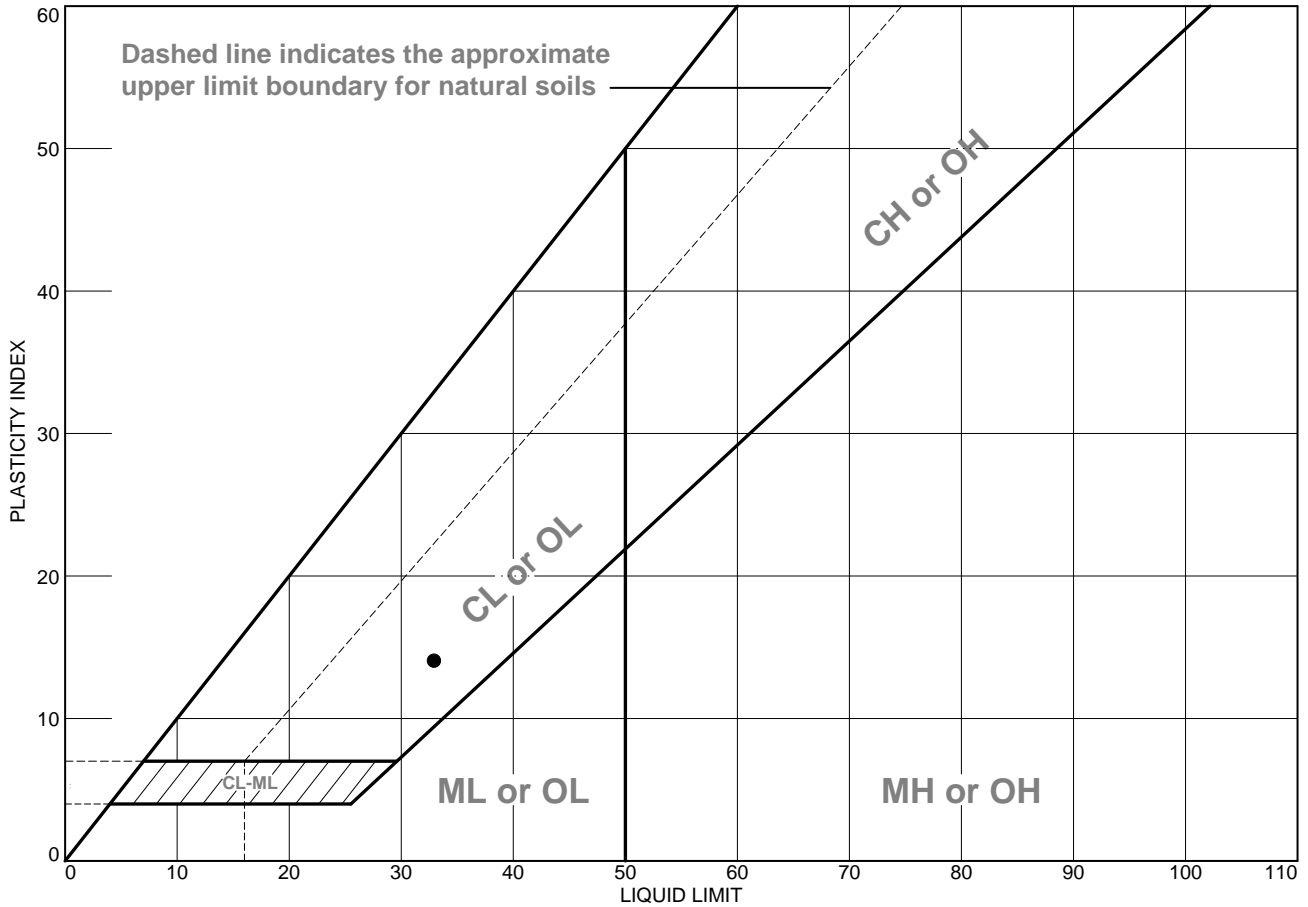
This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Elevation (ft-MSL)	Description	Graphic	Groundwater	Sample Type	N-Value	Graphic Depiction	
							● BLOW COUNT	▲ NATURAL MOISTURE
0	727	FILL: Firm orange brown fine sandy CLAY with root fibers and rock fragments				6		
5	720	RESIDUUM: Very soft to firm orange brown fine sandy CLAY				3		
7	720	Auger Refusal at 7 ft.				20		
10	715							
15	710							
20	705							
25	700							
30	695							
35								

APPENDIX C

Laboratory Data

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318



●	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light brown lean CLAY with medium to fine sand	33	19	14	84.4	71.8	CL

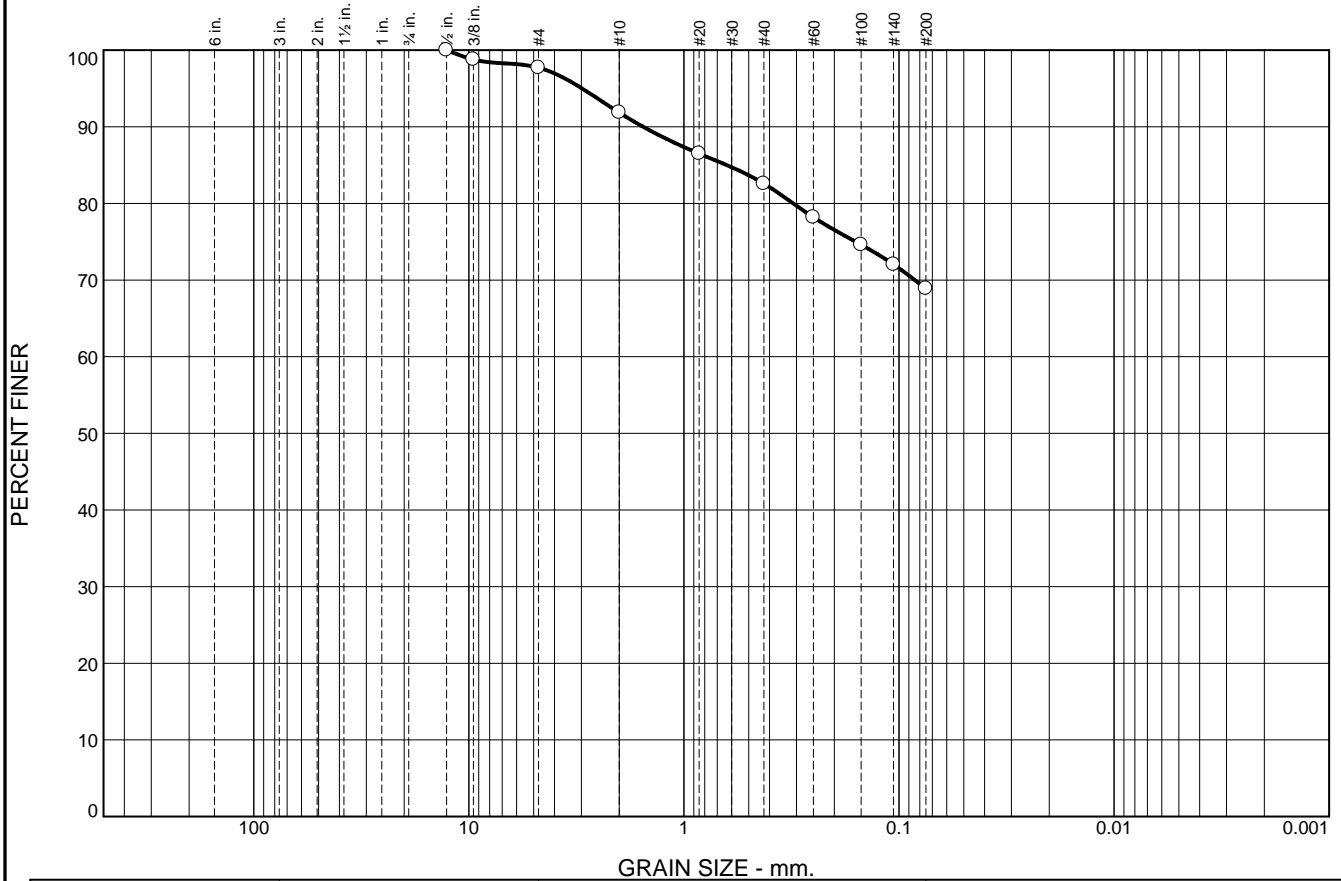
Project No. 2020005 **Client:** Tiger Construction Services
Project: Overlook at Pettit Creek
● Source of Sample: B-1 **Depth:** 23.5-25 **Sample Number:** 7

NOVA ENGINEERING
 Kennesaw, Georgia
 770-425-0777

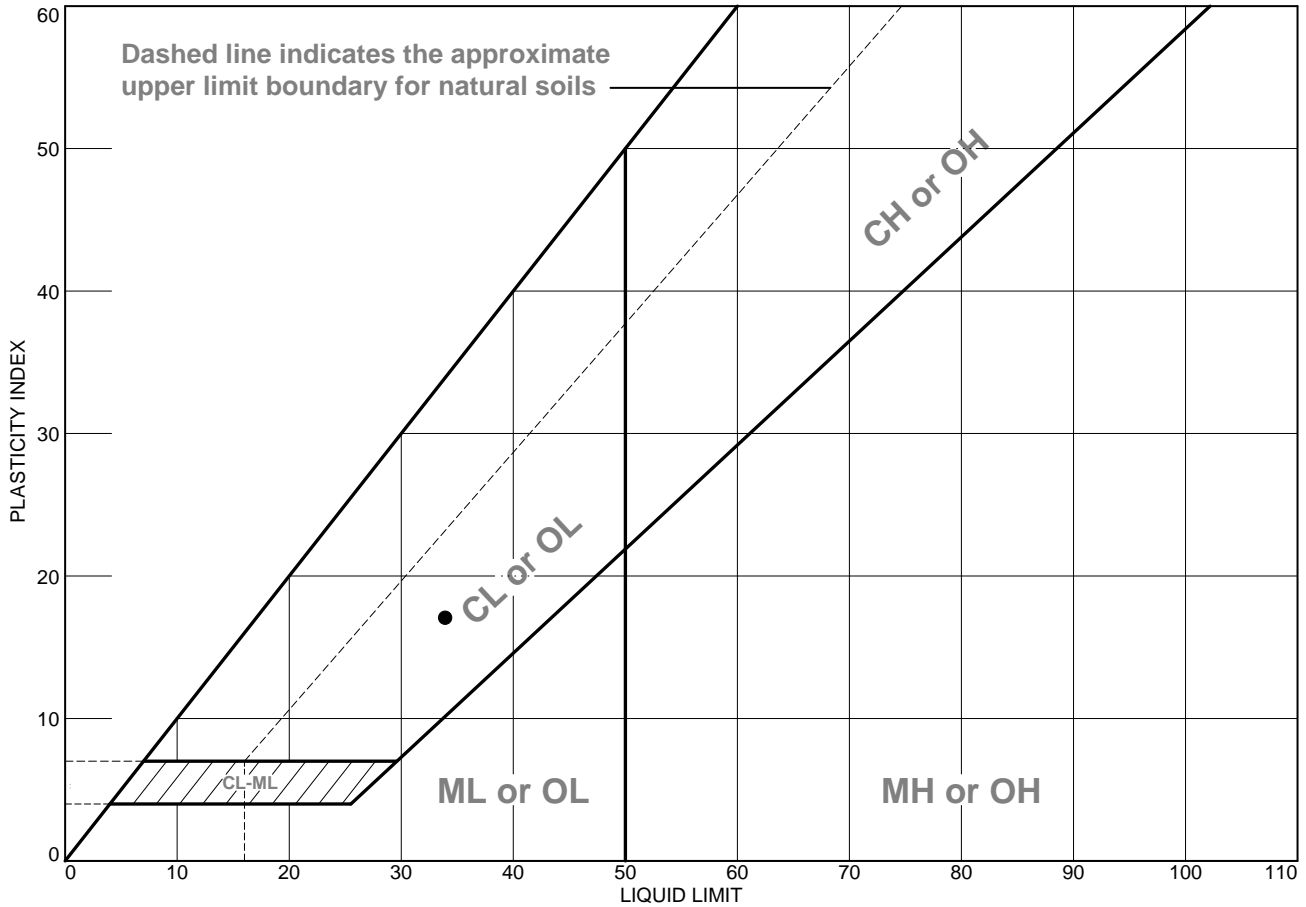
Remarks:

Tested By: MLS

Particle Size Distribution Report - ASTM D6913



LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown coarse to fine sandy lean CLAY	34	17	17	82.6	68.9	CL

Project No. 2020005 Client: Tiger Construction Services Project: Overlook at Pettit Creek ● Source of Sample: B-8 Sample Number: 7	Remarks:
NOVA ENGINEERING Kennesaw, Georgia 770-425-0777	

Tested By: MLS

APPENDIX D
Qualifications of Recommendations

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, clients can benefit from a lowered exposure to the subsurface problems 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 below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs 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. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project 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.*

This Report May Not Be Reliable

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

- for a different client;
- for a different project;
- 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, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been 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 your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment 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 from project start to project finish, so the individual can provide 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 judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed 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 full-time 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 on hand quickly 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 observation.

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 informational 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, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. 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. 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 relate any 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 yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

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, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled 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*.



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e-mail: info@geoprofessional.org www.geoprofessional.org

QUALIFICATIONS OF RECOMMENDATIONS

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 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 exploration and our past 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 borings will differ from those encountered at specific boring 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.

The professional opinions presented in this geotechnical report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to document that the conditions anticipated in this exploration actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observation and testing services.

This report is intended for the sole use of **Tiger Construction Services** only. The scope of work performed during this exploration was developed for purposes specifically intended by **Tiger Construction Services** and may not satisfy other users' 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 Georgia. This warranty is in lieu of all other statements or warranties, either expressed or implied.