GEOTECHNICAL ENGINEERING REPORT

Niehues Development
21st St Ln SE
Hickory, North Carolina 28602

CVET Project No. 25-551

June 3, 2025

PREPARED FOR:

Six Cap Enterprises, LLC

PREPARED BY:

CATAWBA VALLEY
ENGINEERING & TESTING

GEOTECHNICAL • CONSTRUCTION MATERIALS • ENVIRONMENTAL

CATAWBA VALLEY
ENGINEERING & TESTING

PO Box 747
Hickory, NC 28603

1490 South Center
Street
Hickory, NC 28602

828 578 9972
www.cvet.net

NC Firm No. C-3833
SC Firm No. 5201
VA Firm No. F2134437
TN Firm No. 10724
Massachusetts

June 3, 2025

Matt Niehues
Six Cap Enterprises, LLC
PO Box 2752
Hickory, North Carolina 28601
mattniehues@hotmail.com

Re: Geotechnical Engineering Report
Niehues Development
21st St Ln SE
Hickory, North Carolina 28602
CVET Project No.: 25-551

Dear Mr. Niehues:

Catawba Valley Engineering and Testing (CVET) is pleased to submit to you our Geotechnical Engineering Report for the proposed quick-service restaurant in Hickory, North Carolina. This report presents the findings of our subsurface exploration and geotechnical recommendations for design and construction of the project.

CVET appreciates the opportunity to provide our geotechnical engineering services for this project. If you have any questions regarding the contents of this report, or if we can provide additional services for the project such as construction materials testing or special inspection observations, please do not hesitate to contact us.

Sincerely,

CATAWBA VALLEY ENGINEERING AND TESTING, P.C.

NORTH CAROLINA PROFESSIONAL SEAL 052399 ENGINEER NEILL A. BELK

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Neill A. Belk, PhD, PE
Senior Engineer
NC 052399

Cody Dobbins, PE
Vice President
NC 058594

AASHTO ACCREDITED

Geotechnical Engineering

Environmental Services

CMT/Special Inspections

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1.0 PURPOSE AND SCOPE OF SERVICE

The purpose of the subsurface exploration and geotechnical engineering evaluation was to explore the subsurface conditions at the site, collect representative samples of soil for examination in our laboratory, and provide recommendations for design and construction of the proposed quick-service restaurant located along 21st St Ln SE in Hickory, North Carolina. CVET's scope of service included items outlined in CVET 25-156P dated April 22, 2025.

The Geoprofessional Business Association (GBA) organization has prepared important information for studies of the type performed, and we have included their document for your review in Appendix A. An assessment of the environmental aspects, regulated wetlands, groundwater recharge, or stormwater runoff conditions at the site is beyond the scope of this study.

2.0 PROJECT INFORMATION

Based on the preliminary site sketch provided to CVET on April 21, 2025, the project consists of the construction of a new 50-foot by 20-foot restaurant building with new drive-thru lanes and on-site parking. The site was vegetated with overgrown grass and some brush at the time of our field investigation. We noted existing tree stumps that have not been removed from ground throughout the site.

The site is situated at the southwest corner of the intersection of 21st St Ln SE and 13th Ave Dr SE in Hickory, North Carolina. The site is bounded by 21st St Ln SE to the east, 13th Ave Dr SE to the north, and undeveloped wooded area to the west and south.

Historic aerial imagery (Google Earth Pro, accessed May 2025 and NCDOT 1967, 1973, 1976, 1989, and 1992) indicates the site was cleared and may have been used for agricultural purposes in 1967. The 1973 imagery shows tree growth within the northern half of the site. The 1976 imagery shows the site was 70 to 80% wooded with a possible cleared access drive that runs south to north down the middle of the site. The 1989 imagery shows the site was 90 to 100% wooded until the March 1992 imagery. By December 1992, the site was cleared and possibly graded as part of the overall development of the area east and southeast of the site into commercial/retail space (currently exists). The retail development appears to have been completed by July 1993. Between 1998 and 2005, tree growth appears sparse to moderate across the site once more, which remains until 2008 imagery. The 2009 imagery shows site was cleared and possibly graded as part of the new commercial/retail development north and northeast of the site (current Hobby Lobby and Sheetz constructed between 2015 and 2017). The 2011 imagery shows the extension of 21st St Ln SE and the new 13th Ave Dr SE extending to McDonald Parkway SE to the east. The site appears relatively unchanged between

2011 and 2024 except for new patches of tree growth across the site. The 2025 imagery shows the site was cleared of trees.

Elevation data from NC One Map for Catawba County shows the site generally slopes down from the south to the north. Elevations generally range from elevation EL 1052 feet in the southwest corner to EL 1026 feet 13th Ave Dr SE. Existing elevations at the boring locations range from EL 1046 feet to EL 1030 feet. The northeastern half of the site appears to have been pre-graded to a rough pad grade ranging from about EL 1035 feet to EL 1030 feet. Based on the existing elevations and the proposed site sketch, we anticipate the site will require about 10 feet of new fill and cut to achieve finished grade. Site retaining walls may be necessary depending on the finished grade.

Once the finished site layout and grading plan has been completed, CVET must be given an opportunity to review our assumptions and recommendations and revise them accordingly, if necessary.

3.0 EXPLORATION PROCEDURES

Exploration procedures for this project included drilling test borings at the site and laboratory testing of representative soil samples at our laboratory in Hickory, North Carolina.

3.1 Field Exploration

CVET drilled six (6) soil test borings (denoted B01 to B06) at the locations indicated on Figure 2 – Boring Location Plan in Appendix B. CVET advanced the borings on May 15, 2025, to depths extending from 20 feet below existing ground surface (bgs). CVET personnel noted the exploration locations utilizing hand-held GPS, and these locations should be considered accurate to the degree in which they were located. We approximated boring elevations based on the data obtained from NC OneMap for Catawba County; therefore, the boring locations and elevations on Figure 2 and Figure 3, and the boring logs (Appendix C) should be considered approximate.

CVET performed SPT drilling with a Geoprobe track-mounted drill rig using continuous-flight hollow stem augers (HSA). We obtained soil samples by means of the split-barrel sampling procedures performed in general accordance with ASTM D1586 in which a 2-inch O.D., split-barrel sampler was driven into the soil a distance of 18 inches by means of an automatic hammer. The number of blows required to drive the sampler through the final 12-inch interval is termed the Standard Penetration Test (SPT) "N" value and is shown for each sample on the boring logs. This value can be used to provide an indication of the in-place relative density of cohesionless soils or relative consistency of cohesive soils. Note N-values presented in this report and on the individual boring logs are field

measured and have not been corrected for hammer energy (presented on logs) or overburden.

CVET selected representative portions of each SPT sample, sealed them in airtight containers, and returned the samples to our laboratory in Hickory, North Carolina for classification and storage. See the individual soil test boring logs in Appendix C for more details. Note that the soil samples will be discarded after 60 days from this report date, unless otherwise directed by Six Cap Enterprises, LLC.

3.2 Laboratory Testing

CVET geotechnical personnel examined and visually classified the soil in general accordance with the Unified Soil Classification System (USCS) (ASTM D2487). We then selected representative soil samples for laboratory testing, which included Soil Moisture Content (ASTM D2216), Grain Size Distribution (ASTM D422), and Atterberg Limits for Plasticity (ASTM D4318). The soil laboratory results are included in Appendix D of this report.

4.0 SUBSURFACE CONDITIONS

The subsurface conditions at the site are described in the following paragraphs.

4.1 Site Geology

The site is located in the Piedmont Physiographic Province of North Carolina. The name "piedmont" means "foot-of-the-mountains" which reflects remnants of an ancient mountain range that has since been extensively weathered, decomposed and eroded to form rolling terrain and hillsides. The bedrock is metamorphic in nature (igneous or sedimentary rocks that have been changed by heat and/or pressure) and typically consists of schist, gneiss and/or granite. Extensive weathering over time has reduced the bedrock in-place to form overburden residual soils that range from clay topsoil to sandy silts and silty sand that grade with depth back to saprolite and partially-weathered-bedrock. The degree of weathering varies both laterally and vertically. Based on the 1985 North Carolina Geologic Map, the site is underlain by Biotite Gneiss and Schist.

Published soil data (Soil Survey, Catawba County, North Carolina, USDA) indicates that native site soils belong to the Clifford sandy loam (CfB and CfC) map units. The Clifford soils are described as having typical profile (within 80 inches bgs) consisting of sandy loam, clay, clay loam, and loam residual soil weathered from "saprolite derived from granite and gneiss and/or schist." Saprolite is a term used for residual soils that exhibit the appearance of underlying bedrock, but it has chemically weathered insitu to a degree that can be excavated with a spade.

4.2 Soils

Soil boring logs are included in Appendix C. The subsurface soils generally consist of residual soil. The generalized subsurface conditions are described below.

CVET encountered surficial topsoil in each of the borings. The topsoil thickness ranged from 4 to 6 inches.

CVET encountered residual soil below the surficial topsoil down to the planned termination depth of 20 feet bgs. The residual generally consists of silty sand (SM). The SPT N-Value within the cohesionless residual soil ranges from 4 to 39 blows per foot (bpf), indicating very loose to dense relative soil densities.

4.3 Partially Weathered Bedrock and Bedrock

CVET did not encounter partially weathered bedrock (PWR) or bedrock within the depth of exploration during our field investigation.

4.4 Groundwater

CVET did not encounter groundwater within the depth of exploration at the time of drilling. Note that boreholes are left open for only a short period of time during the drilling operation, so the detection of groundwater during this brief period is difficult. Also note that soil moisture and groundwater conditions vary depending on conditions such as temperature, precipitation, and season. Therefore, soil moisture and groundwater location at other times of the year may vary from those observed at the time of this subsurface exploration and as described in this report.

The borehole cave-in depths ranged from about 11 to 13 feet bgs. In this geology, the cave-in depth of a boring is sometimes an indication of the stabilized water level, although the water level may be a few feet below the cave-in depth and therefore cannot be directly observed. If the location of the groundwater elevation is important at this site, we recommend the installation of temporary observation wells.

5.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

The borings indicate the site is generally suited for the proposed development; however, the extents and depths of relatively loose residual creates an elevated risk of post-construction settlement that may result in distresses within the structure and pavement. We expect construction testing and evaluation will reveal these zones that may require in-place compaction or reworking before new fill placement or building construction.

The following recommendations are for the construction of the proposed development based on the results of our understanding of the project, subsurface exploration, site observations, and experience in similar geologic settings. The recommendations stated herein shall not be applied to any other project, or used in conjunction with any other recommendation, and shall be used explicitly for this project.

5.1 Site Preparation

Site preparation should consist of removing the surface layer, razing of all existing structures and their foundations, relocation or proper abandonment of any existing utilities, as applicable, along with removing all other soft or unsuitable material from proposed building envelopes and associated pavement areas. All trees and accompanying root balls within the building and pavement footprint shall be removed and backfilled with structural fill. Site preparation operations should extend a minimum of 10 feet beyond the planned limits of any buildings and a minimum of 5 feet beyond the planned limits of the pavement areas. These limits should also extend beyond the perimeter of structural fill slopes, as applicable, laterally equal the depth of necessary structural fill to achieve finished grades.

Once stripping and rough excavation has been accomplished, the exposed subgrade should be evaluated by proofrolling. Proofrolling consists of driving the appropriate equipment, typically a dump truck with axle weights of 10 or 20 tons for single and double axles respectively, over the subgrade at a walking pace. The proofrolling equipment should first make overlapping passes across the subgrade in one direction, followed by passes in a perpendicular direction. We recommend that the proofrolling be observed by the geotechnical engineer or his qualified representative.

Instability during proofrolling of exposed subgrade soils should be anticipated if elevated in-place moisture content of the encountered elastic/plastic site soils is observed. Any unstable areas shall be undercut and replaced with approved structural fill soil, as directed by CVET. If conditions revealed during site preparation operations vary from those described in this report, the on-site geotechnical engineer shall contact the engineer of this report to discuss potential options to address the varying site conditions.

5.2 Earthwork

At the time of this report, CVET was not provided the proposed finished floor elevation (FFE) for the development. We assume 10 feet or more of new fill and cut may be required to achieve finished pad grade.

Some moisture conditioning of cut soils should be anticipated to achieve compaction with acceptable soil moisture contents during mass earthwork operations. Moisture conditioning may include mechanical drying (plowing or disking).

Any required fill soils should be compacted to at least 98 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method, with a moisture content within +/- 3% of the optimum moisture content (OMC). Acceptable fill soils should be soil that has less than 5 percent organic content and a liquid limit and plasticity index less than 50 and 20, respectively. Soils with USCS group symbols of SP, SW, SM, SC, and ML are recommended for use as controlled fill, although it is important to note that silty soils are very moisture sensitive and not as strong as sandy soils. Soils having a plastic index of 20% or greater (MH, CH, and some SC and CL) should not be utilized within 5 feet of bearing elevation if utilized as structural fill. Organic laden soils shall not be utilized as structural fill. All fill soils should be placed in horizontal loose lifts and compacted with adequately-sized equipment. Loose lift thicknesses will vary depending on the size of the compaction equipment. We recommend a maximum of 8 inches for large self-propelled compactors, 6 inches for small self-propelled compactors, and 4 inches for remote-controlled compactors and hand-operated equipment (plate tampers, wacker-packers, or jumping jacks). Vibratory smooth-drum rollers are appropriate for cohesionless/coarse-grained soils while sheepsfoot rollers are appropriate for cohesive/fine-grained soils. We anticipate the existing site soils will be suitable for reuse as structural fill. Localized undercut and replacement should be anticipated in areas to receive structural fill due to loose relatively shallow soils.

Where structural fill embankments will be constructed, the new structural fill should be benched into the existing side slopes for subgrade slopes that exceed 4H:1V. The maximum bench height should not exceed 5 feet.

The on-site soils are primarily composed of micaceous silty sand with elevated fines content (i.e., fines content greater than 35% by weight). These soil types are particularly sensitive to moisture. Traffic exposure to wet subgrades can degrade an otherwise satisfactory subgrade condition, which would require remedial work to repair them. Once the planned subgrade levels have been achieved, construction traffic should be rerouted from planned structural areas after periods of precipitation to allow the subgrade to dry.

We recommend that positive site drainage is maintained during earthwork operations to prevent the ponding of water on exposed subgrades. Soil subgrades should be protected from inclement weather (rain especially) by 'sealing' the subgrades prior to forecasted inclement weather. 'Sealing' can be performed by rolling with a smooth steel-drum roller without vibration. Ruts should not be created during the 'sealing' operation. Prior to the placement of additional fill, the 'sealed' subgrade should be scarified.

If earthwork is performed during winter months or after inclement weather, the subgrade soil conditions could potentially be more unstable due to wet soil conditions, which may require stabilization or undercutting.

We recommend the implementation of a settlement monitoring program if structural fill depths exceed 10 feet. The settlement monitoring program should consist of a series of settlement monitoring plates at the base of the fill and brass settlement hubs at the top of the fill, once completed. The settlement should be monitored until it reaches an acceptable value to begin building and pavement construction. If this is not implemented, settlement resulting from self-weight consolidation of the new fill should be anticipated and cause distress within the new structures. Regardless of the fill height, we recommend allowing primary settlement due to the self-weight of new fill within the building footprint and pavement occur before starting construction of the building and parking areas.

5.3 Excavation

The boring data indicate that the on-site soils are generally excavatable using conventional construction equipment. Trenches and other shallow excavations can be performed using medium to large, rubber-tired backhoes. Larger excavation equipment may be necessary for deeper excavations, such as utility lines, generally due to the mass of soil required to be moved.

All excavations and trenches shall be performed in accordance with Occupational Health and Safety Administration (OSHA) 1926 Subpart P regulations to provide stable and safe working conditions for any temporary excavations. Based on visual classification, we recommend that OSHA soil classification Type C be used during sloping and benching configurations for this project.

Construction site safety is the sole responsibility of the contractor, who controls the means and methods and sequencing of construction operations. CVET assumes no responsibility, implied nor inferred, for construction site safety.

5.4 Groundwater Control

We did not encounter groundwater within the depths of exploration during the time of drilling. We do not anticipate groundwater control will be necessary. Groundwater control is the purposeful drawdown of the groundwater levels to facilitate necessary construction. Temporary dewatering operations consist of well points and sump pumps, while permanent dewatering operations typically consist of French underdrains which discharge by means of gravity flow into the site storm drainage system.

Note that soil moisture and groundwater conditions vary depending on conditions such as temperature, precipitation, and season. Therefore, soil moisture and groundwater location at other times of the year may vary from those observed at the time of this subsurface exploration and as described in this report.

5.5 Foundations

We expect shallow foundations will either bear on new structural fill or native residual soils. If the subgrade is prepared in accordance with our recommendations and structural fill meets the criteria outlined in Section 5.2, shallow foundations bearing on structural fill or native residual soils can be designed with an allowable net bearing pressure of up to 2,000 pounds per square foot (psf). We recommend minimum foundation widths and embedment depths of 24 and 16 inches, respectively.

We do not recommend bearing any foundations directly on elastic/plastic fill soils, especially perimeter foundations which have a greater chance of being subjected to surface water. Plastic/elastic soils should be undercut to depths of at least 24 inches from where they are encountered at the foundation bearing elevation and replaced with approved fill materials or ABC stone. Plastic/elastic soils are moisture sensitive and prone to shrink/swell with moisture changes.

A site-specific settlement analysis has not been performed. However, based upon assumed light structural loading and the requirement that the foundation subgrade soils bear in the remedial measures stated above (to be verified by CVET or another qualified CMT firm), we expect total settlements of structures foundations to be less than 1 inch. In general, differential settlements between building components are expected to be on the order of 1/3 to 1/2 of the total settlements. We expect settlements in the building foundations to occur relatively soon after the loads are applied and after primary settlement of any grade-raised fill has been achieved. The foundation subgrade should be thoroughly evaluated using a Dynamic Cone Penetrometer (DCP) to verify the recommended bearing capacity.

Additionally, the finished grade should be sloped away from building foundations and pad to prevent water ponding near the perimeter of the foundation. We also recommend roof drains be installed such that stormwater is diverted away from the foundation perimeter. Roof drainage should also be piped and diverted away from the crest of any permanent slopes.

5.6 Floor / Concrete Slabs

We recommend that grade slabs be supported on approved fill, residual soils or newly compacted structural fill. As a result of the encountered site conditions, we recommend a modulus of subgrade reaction (ks) of up to 100 pounds per cubic inch (pci) for slabs supported by properly prepared non-elastic/plastic soil subgrade with drainage stone. This value is representative of a 1-ft square loaded area and may need to be adjusted depending on the size and shape of the loaded area and the method of structural analysis. The floor slab should be isolated from building foundations unless the connection is designed to accommodate anticipated differential settlement between the slab and foundation systems. We consider properly prepared soil subgrade to consist of approved

residuum or approved structural fill soils within the top two feet of finished grades compacted to 100% of the standard Proctor method (ASTM D698). Compacted soils should be placed within ±3% of the optimum moisture content (OMC) as determined by the standard Proctor method.

CVET recommends the use of 4 to 6 inches of free-draining granular material (NCDOT No. 57 stone or recycled concrete) as both aggregate base course under the slab and capillary break. Prior to placing the granular material, the subgrade for the entire floor slab area should be proofrolled.

Please note that site preparation and earthwork operations shall be performed in accordance with our Geotechnical Engineering Report to ensure adequate subgrade soil conditions for direct slab on grade support. The structural engineer of record should be provided with the report for review.

The use of a vapor retarder should be considered beneath concrete slabs on grade which will be covered with wood, tile, carpet or other moisture-sensitive or impervious coverings, per ACI 302 and/or ACI 360. Construction joints, contraction joints, and isolation joints should be provided in the slab to reduce the impacts of cracking and shrinkage. See ACI 302 for additional details regarding slab joint design.

5.7 Permanent Slopes

We recommend that permanent slopes be graded no steeper than 2.5H:1V for slopes. Shallower slopes should be considered if mowing equipment will be used on the slopes. Building structure footings should be situated a minimum of 15 feet behind the crest of any permanent slopes. The edge of paved areas should be situated a minimum of 10 feet behind the crest of any permanent slopes. We recommend the construction of a "key" at the toe of all structural fill slopes. Note that a slope stability evaluation was not completed as part of this project services scope.

The permanent slopes should be vegetated for long-term surficial stability. The Owner can expect minor sloughs that may need to be repaired until permanent vegetation has taken to the slope soils. One of the biggest threats to slope stability is poor control of surface water, especially if it is allowed to flow over the slope. As such, we recommend utilizing a drainage swale and/or grade the crest of permanent slopes such that stormwater surface runoff does not sheet flow over the slope crest. We also recommend permanent stormwater drainage infrastructure be situated a minimum of 15 feet from the crest of any permanent fill embankment.

5.8 Pavements

Traffic loading conditions for this project have not been provided. We assume pavement for this project will consist of light-duty asphalt parking areas (only personal vehicle

traffic) and heavy-duty asphalt drives (drive lanes). Based on the subsurface conditions encountered in the test borings, and assuming all pavement areas pass a proofroll as described in section 5.1 of this report and the subgrade achieves a minimum California Bearing Ratio (CBR) value of 4.0, we recommend thicknesses of 2.5 and 8.0 inches for surface course and compacted ABC crushed stone, respectively, for light-duty pavement. For heavy-duty pavement, we recommend thicknesses of 1.5, 2.5, and 8.0 inches for surface course, intermediate asphalt course, and compacted ABC crushed stone, respectively. We recommend an 8-inch-thick Portland cement reinforced concrete slab bearing on 6 inches of compacted ABC crushed stone for the approach and slab for any trash dumpster on site. If concrete pavements are desired, we recommend a minimum of 6 inches of concrete (jointed and doweled) overlying 8 inches of compacted ABC crushed stone base. The reinforced concrete should be air-entrained and have a minimum of 4,500 psi after 28 days of laboratory curing per ASTM C-31. We recommend a minimum of 12 inches of compacted ABC stone be placed beneath pavement sections that are placed over newly placed utility trench backfill.

It should be noted that the design recommendations stated may not satisfy North Carolina Department of Transportation guidelines; therefore, we recommend that any roadways constructed for public use with maintenance provided by the State be designed in accordance with State regulatory requirements.

If a proofroll reveals unstable soils, stabilization and/or undercut should be anticipated. We recommend an undercut of at least 18 inches and replacement with quality non-plastic fill materials. Plastic/elastic soils are moisture sensitive and prone to shrink/swell with moisture changes. If fill soil will be placed to reach final grades, we recommend an 18-inch buffer of non-plastic fill soils between the pavement subgrade and the elastic soils. Stabilization could consist of the installation of a biaxial geogrid (Mirafi BX1200 or approved equivalent), a heavy woven geotextile fabric (Mirafi HP 370 or approved equivalent) or chemical stabilization depending on the exposed subgrade soil conditions. Pavements should not bear on plastic/elastic soils.

Careful control of storm water is one of the best ways to ensure adequate long-term performance of any pavement. The surface of the pavement should be sloped to gutters and/or catch basins to prevent water from ponding and infiltrating through the pavement into the sub-base and subgrade.

We recommend compaction testing of the ABC crushed stone base prior to asphalt/concrete placement, and full-time inspection during asphalt/concrete placement.

5.9 Construction Materials Testing and Special Inspections

Construction materials testing (CMT) and inspections should be performed at regular intervals throughout the course of the project. CVET is qualified for this work and would be pleased to provide these services during construction.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Six Cap Enterprises, LLC and their agents for specific application to the referenced property, in accordance with generally accepted soils and foundation engineering practices. No warranties, express or implied, are intended or made. The recommendations presented in this report are based on the specific test borings and laboratory testing performed as part of our scope of service, and do not reflect variations in subsurface conditions that may exist between test boring locations or in unexplored portions of the site. Note that the soil data presented in this report is for the specific time of this subsurface exploration. While the type of material encountered in the test borings will not likely change significantly over time, the properties of the materials can and will change over time, including soil moisture content, density, consistency, SPT "N" values, etc. Fluctuations in the groundwater level can have a significant impact on the material properties, as can seasonal changes. Site safety, excavation support related to OSHA requirements, and construction dewatering requirements are the responsibility of others, not CVET. In the event changes are made to the proposed construction plans, design or location of the project as described within this report, the recommendations provided in this report shall not be considered valid unless CVET is given the opportunity to review the changes, and either verifies or modifies the recommendations contained in this report in writing.

APPENDIX A – GEOPROFESSIONAL BUSINESS ASSOCIATION PAMPHLET

Important Information about This

Geotechnical-Engineering Report

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

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

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

Understand the Geotechnical-Engineering Services Provided for this Report

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

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

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

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

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

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

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

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

Read this Report in Full

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

You Need to Inform Your Geotechnical Engineer About Change

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

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

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

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

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

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

This Report's Recommendations Are Confirmation-Dependent

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

This Report Could Be Misinterpreted

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

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

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

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

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

Geoenvironmental Concerns Are Not Covered

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

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

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

GEOPROFESSIONAL BUSINESS ASSOCIATION

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

APPENDIX B – PROJECT FIGURES

CATAWBA VALLEY
ENGINEERING & TESTING

P.O.B. 747 HICKORY, NORTH CAROLINA 28603
TELE: 828-578-9972

NIEHUES DEVELOPMENT

21ST ST LN SE & 13TH AVE DR SE
HICKORY, NC 28602

DRAWN BY	PROJECT NO.
SBS	25-551
DATE	SHEET NO.
04/22/2025	FIG. 1

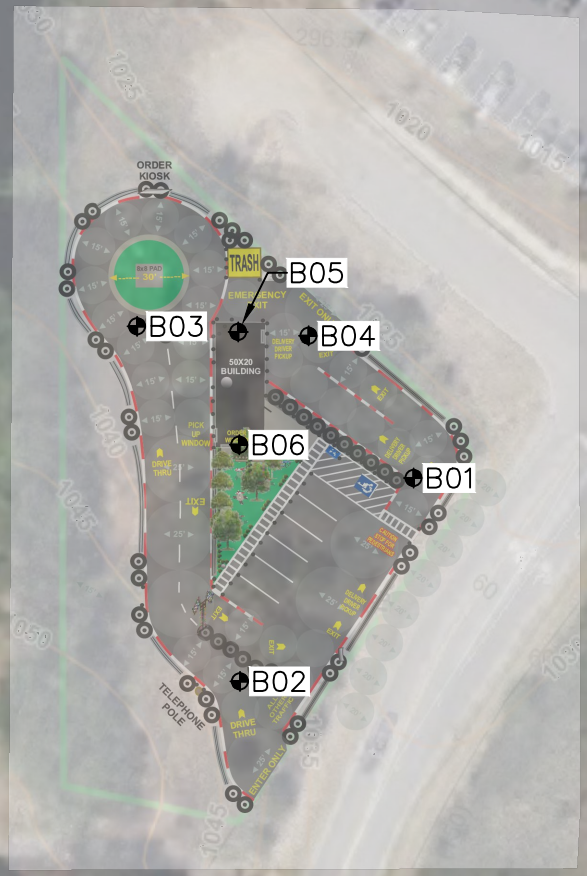
NOTES:
1) BORING LOCATIONS ARE APPROXIMATE AND FOR ILLUSTRATION ONLY

2) BORING LOCATION PLAN ADAPTED FROM "LAYOUT E" (PRELIMINARY SITE SKETCH) PREPARED BY MATT NIEHUES.

SITE MAP

1" = 250'

N



LEGEND

- STANDARD PENETRATION TEST
- CONE PENETRATION TEST (CPT)
- CPT NOT PERFORMED
- TEST PIT

CATAWBA VALLEY ENGINEERING & TESTING

P.O.B. 747 HICKORY, NORTH CAROLINA 28603
TELE: 828-578-9972

NIEHUES DEVELOPMENT

21ST ST LN SE & 13TH AVE DR SE
HICKORY, NC 28602

DRAWN BY	PROJECT NO.
SBS	25-551
DATE	SHEET NO.
04/22/2025	FIG. 2

Description	Elevation	Northing	Easting
B01	1030	720083.49	1317873.50
B02	1046	720004.03	1317805.66
B03	1034	720142.74	1317765.51
B04	1030	720139.00	1317832.50
B05	1031	720140.52	1317804.99
B06	1032	720096.45	1317805.41

BORING LOCATIONS AND ELEVATIONS ARE APPROXIMATE. BORING ELEVATIONS ARE BASED ON NC ONEMAP ACCESSED DURING PREPARATION OF THIS REPORT.

CATAWBA VALLEY
ENGINEERING & TESTING

P.O.B. 747 HICKORY, NORTH CAROLINA 28603
TELE: 828-578-9972

NIEHUES DEVELOPMENT

21ST ST LN SE & 13TH AVE DR SE
HICKORY, NC 28602

DRAWN BY	PROJECT NO.
SBS	25-551
DATE	SHEET NO.
04/22/2025	FIG. 3

APPENDIX C – BORING LOGS

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressure meter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash Sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistance to Soil Properties

Standard penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density	*Adjective Form*
Under 4 blows/ft	Very Loose
5 to 10 blows/ft	Loose
11 to 30 blows/ft	Medium Dense
31 to 50 blows/ft	Dense
Over 51 blows/ft	Very Dense

Particle Size Identification		
Boulders		8 inches and larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch
	Medium	0.42 to 2.0 mm
	Fine	0.074 to 0.42 mm
Silt and Clay		0.0 to 0.074 mm

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to Slight	0-4
3 to 4	Soft	0.25-0.49	Slight	5-7
5 to 8	Medium Stiff	0.50-0.99	Medium	8-22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00-8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL Water Level	BCR Before Casing Removal	DCI Dry Cave-in
WS While Sampling	ACR After Casing Removal	WCI Wet Cave-in
WD While Drilling	▽ Est. Groundwater Level	▽ Est. Seasonal High GWT

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

KEY TO SYMBOLS

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

CLIENT Six Cap Enterprises, LLC
PROJECT NAME Niehues Development
PROJECT NUMBER 25-551
PROJECT LOCATION Hickory, North Carolina

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


SM: USCS Silty Sand


TOPSOIL: Topsoil

SAMPLER SYMBOLS


Split Spoon

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)
TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
Water Level at Time Drilling, or as Shown
Water Level at End of Drilling, or as Shown
Water Level After 24 Hours, or as Shown

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B01

CLIENT Six Cap Enterprises, LLC
PROJECT NAME Niehues Development
PROJECT NUMBER 25-551
PROJECT LOCATION Hickory, North Carolina
DATE STARTED 5/15/25 **COMPLETED** 5/15/25
GROUND ELEVATION 1030 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 3 **HAMMER EFFICIENCY** 93%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 11.25
LOGGED BY CE **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0	TOPSOIL: (4 Inches) 1029.7					
	(SM) RESIDUAL: Silty SAND, Trace Fine Mica, Brown, Orange Brown, Red Brown, Tan, Black, Gray, Dry to Moist, Very Loose to Medium Dense	SS 1	100	3-3-3 (6)	NP	19
		SS 2	100	1-2-2 (4)		
5		SS 3	100	2-2-3 (5)		
		SS 4	100	3-5-6 (11)		
10						
		SS 5	100	7-6-9 (15)		
15						
		SS 6	100	9-6-8 (14)		
20	1010.0					

▲ SPT N VALUE ▲
20 40 60 80

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B02

CLIENT Six Cap Enterprises, LLC
PROJECT NAME Niehues Development
PROJECT NUMBER 25-551
PROJECT LOCATION Hickory, North Carolina
DATE STARTED 5/15/25 **COMPLETED** 5/15/25
GROUND ELEVATION 1046 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 3 **HAMMER EFFICIENCY** 93%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 11.7
LOGGED BY CE **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲
0		TOPSOIL: (4 Inches) 1045.7						20 40 60 80
		(SM) RESIDUAL: Silty SAND, Mica, Brown, Orange Brown, Yellow, Tan, Black, Dry to Moist, Loose to Medium Dense	SS 1	100	1-2-3 (5)			
5			SS 2	100	1-3-3 (6)	NP	29	
			SS 3	100	2-3-3 (6)			
10			SS 4	100	9-6-6 (12)			
			SS 5	100	4-6-6 (12)			
15								
			SS 6	100	2-4-6 (10)			
20		1026.0						

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B03

CLIENT Six Cap Enterprises, LLC
PROJECT NAME Niehues Development
PROJECT NUMBER 25-551
PROJECT LOCATION Hickory, North Carolina
DATE STARTED 5/15/25 **COMPLETED** 5/15/25
GROUND ELEVATION 1034 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 3 **HAMMER EFFICIENCY** 93%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 12
LOGGED BY CE **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	SPT N VALUE
0	TOPSOIL: (5 Inches) 1033.6						
	(SM) RESIDUAL: Silty SAND, Fine Mica, Brown, Gray, Black, Tan, Dry to Moist, Loose to Medium Dense	SS 1	100	4-6-4 (10)			
		SS 2	100	6-8-10 (18)			
5		SS 3	100	3-5-5 (10)	NP	18	
		SS 4	100	3-6-9 (15)			
10							
		SS 5	100	8-9-8 (17)			
15							
		SS 6	100	7-7-7 (14)			
20	1014.0						

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B04

CLIENT Six Cap Enterprises, LLC
PROJECT NAME Niehues Development
PROJECT NUMBER 25-551
PROJECT LOCATION Hickory, North Carolina
DATE STARTED 5/15/25 **COMPLETED** 5/15/25
GROUND ELEVATION 1030 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 3 **HAMMER EFFICIENCY** 93%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 12.3
LOGGED BY CE **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0	TOPSOIL: (6 Inches) 1029.5					
	(SM) RESIDUAL: Silty SAND, Fine Mica, Brown, Gray, Tan, Black, Orange Brown, Dry to Moist, Loose to Dense	SS 1	100	2-2-4 (6)	NP	23
		SS 2	100	2-2-4 (6)		
5		SS 3	100	3-3-4 (7)		
		SS 4	100	3-4-5 (9)		
10						
		SS 5	100	5-6-7 (13)		
15						
		SS 6	100	5-14-25 (39)		
20	1010.0					

▲ SPT N VALUE ▲
20 40 60 80

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
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BORING NUMBER B05

CLIENT Six Cap Enterprises, LLC
PROJECT NAME Niehues Development
PROJECT NUMBER 25-551
PROJECT LOCATION Hickory, North Carolina
DATE STARTED 5/15/25 **COMPLETED** 5/15/25
GROUND ELEVATION 1031 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 3 **HAMMER EFFICIENCY** 93%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 12.75
LOGGED BY CE **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0	TOPSOIL: (5 Inches) 1030.6					
	(SM) RESIDUAL: Silty SAND, Trace Rock Fragments, Trace Fine Mica, Gray, Orange Brown, Tan, Black, Brown, Dry to Moist, Loose to Medium Dense	SS 1	100	2-3-3 (6)		
		SS 2	100	3-6-7 (13)	NP	18
5		SS 3	78	4-6-6 (12)		
		SS 4	100	8-6-7 (13)		
10						
		SS 5	100	14-11-11 (22)		
15						
		SS 6	100	4-5-7 (12)		
20	1011.0					

▲ SPT N VALUE ▲
20 40 60 80

Bottom of borehole at 20.0 feet.

CATAWBA VALLEY ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

BORING NUMBER B06

CLIENT Six Cap Enterprises, LLC
PROJECT NAME Niehues Development
PROJECT NUMBER 25-551
PROJECT LOCATION Hickory, North Carolina
DATE STARTED 5/15/25 **COMPLETED** 5/15/25
GROUND ELEVATION 1032 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 3 **HAMMER EFFICIENCY** 93%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 12.3
LOGGED BY CE **CHECKED BY** JHC
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0		TOPSOIL: (5 Inches) 1031.6					
		(SM) RESIDUAL: Silty SAND, Trace Fine Mica, Brown, Gray, Yellow Brown, Black, Orange Brown, Dry to Moist, Loose to Dense	SS 1	100	4-4-4 (8)		
			SS 2	100	7-5-9 (14)		
5			SS 3	100	6-14-11 (25)	NP	16
			SS 4	100	13-14-9 (23)		
10							
			SS 5	100	8-13-20 (33)		
15							
			SS 6	100	14-11-8 (19)		
20		1012.0					

▲ SPT N VALUE ▲
20 40 60 80

Bottom of borehole at 20.0 feet.

APPENDIX D – SOIL LABORATORY RESULTS

CATAWBA VALLEY
ENGINEERING & TESTING
1490 S. Center St./PO Box 747 Hickory, NC 28603 828 578 9972

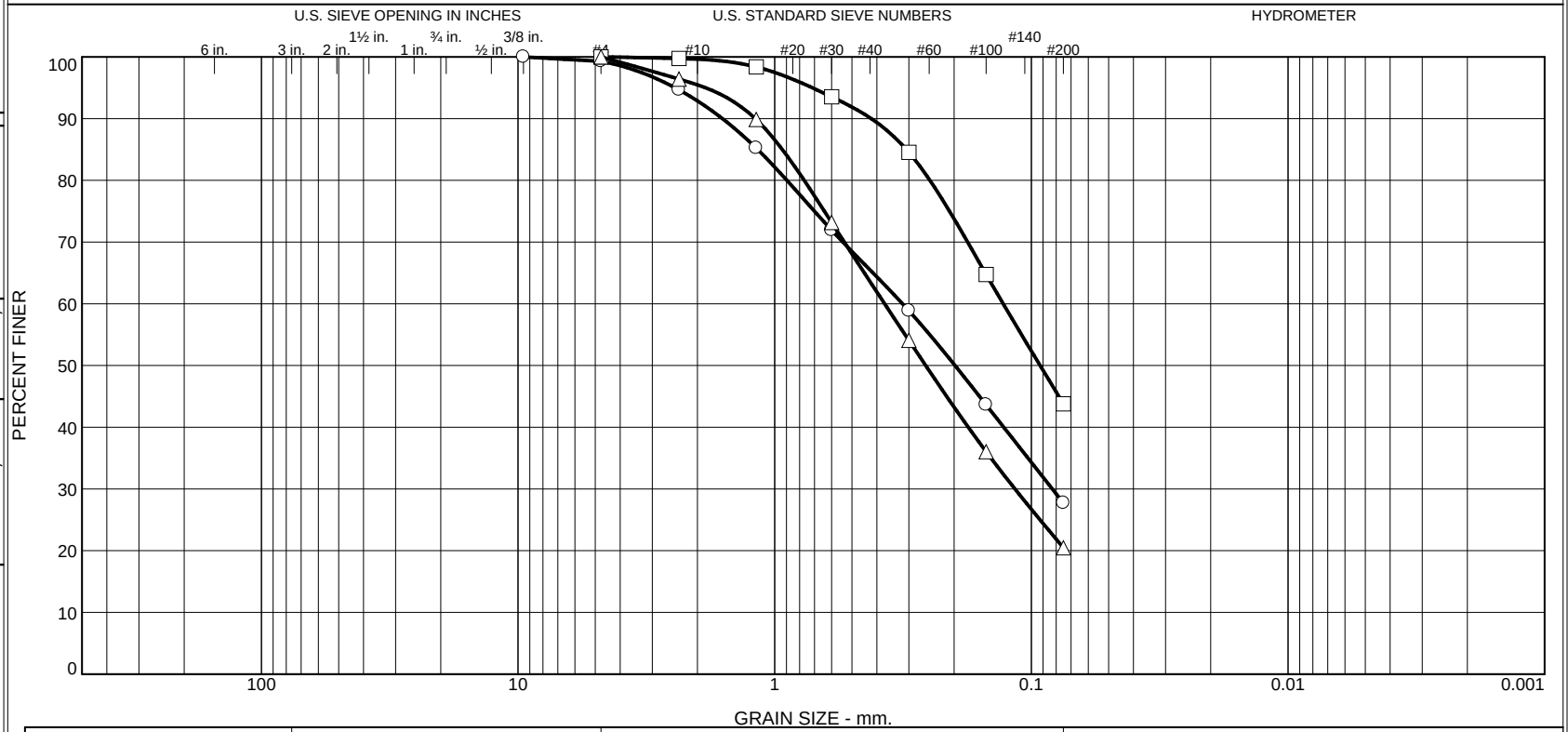
SUMMARY OF LABORATORY RESULTS

CLIENT Six Cap Enterprises, LLC **PROJECT NAME** Niehues Development

PROJECT NUMBER 25-551 **PROJECT LOCATION** Hickory, North Carolina

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Fines	Water Content (%)	Organics by Weight (%)
B01	1.0	0	0	NP	1	61	38	18.7	
B02	3.5	0	0	NP	0	56	44	29.4	
B03	6.0	0	0	NP	0	80	20	17.9	
B04	1.0	0	0	NP	2	64	34	22.9	
B05	3.5	0	0	NP	0	78	22	18.3	
B06	6.0	0	0	NP	13	65	22	16.0	

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	1	6	28	37	28	
□	0	0	0	0	10	46	44	
△	0	0	0	5	31	44	20	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	Test Borings	9668	B-01, 1-2.5'	05/21/25	SM	Reddish Brown Silty SAND	18.7	NV	NP
□	Test Borings	9669	B-02, 3.5-5'	05/21/25	SM	Brown Silty SAND	29.4	NV	NP
△	Test Borings	9670	B-03, 6-7.5'	05/21/25	SM	Brown Silty SAND	17.9	NV	NP

Client Six Cap Enterprises, LLC

Project Niehues Development

Project No. 25551 | Figure

Catawba Valley Engineering & Testing, P.C.
Hickory, North Carolina

Tested By: BV **Checked By:** DR

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	2	4	17	43	34	
□	0	0	2	3	27	46	22	
△	0	9	4	5	14	46	22	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	Test Borings	9671	B-04, 1-2.5'	05/21/25	SM	Brown Silty SAND	22.9	NV	NP
□	Test Borings	9672	B-05, 3.5-5'	05/21/25	SM	Brown Silty SAND	18.3	NV	NP
△	Test Borings	9673	B-06, 6-7.5'	05/21/25	SM	Brownish Grey Silty SAND	16.0	NV	NP

Client Six Cap Enterprises, LLC

Project Niehues Development

Project No. 25551 | Figure

Catawba Valley Engineering & Testing, P.C.
Hickory, North Carolina

Tested By: BV **Checked By:** DR