Geotechnical Engineering Report

Proposed Strickland Brothers 10 Minute Oil Change Ward Boulevard at Harrison Drive Wilson, North Carolina

July 12, 2022

TRC Project No. 496842

Prepared For:

N3 PROPERTY ADVISORS, LLC
1240 N. Kimball Avenue
Southlake, Texas 76092

Prepared By:

TRC
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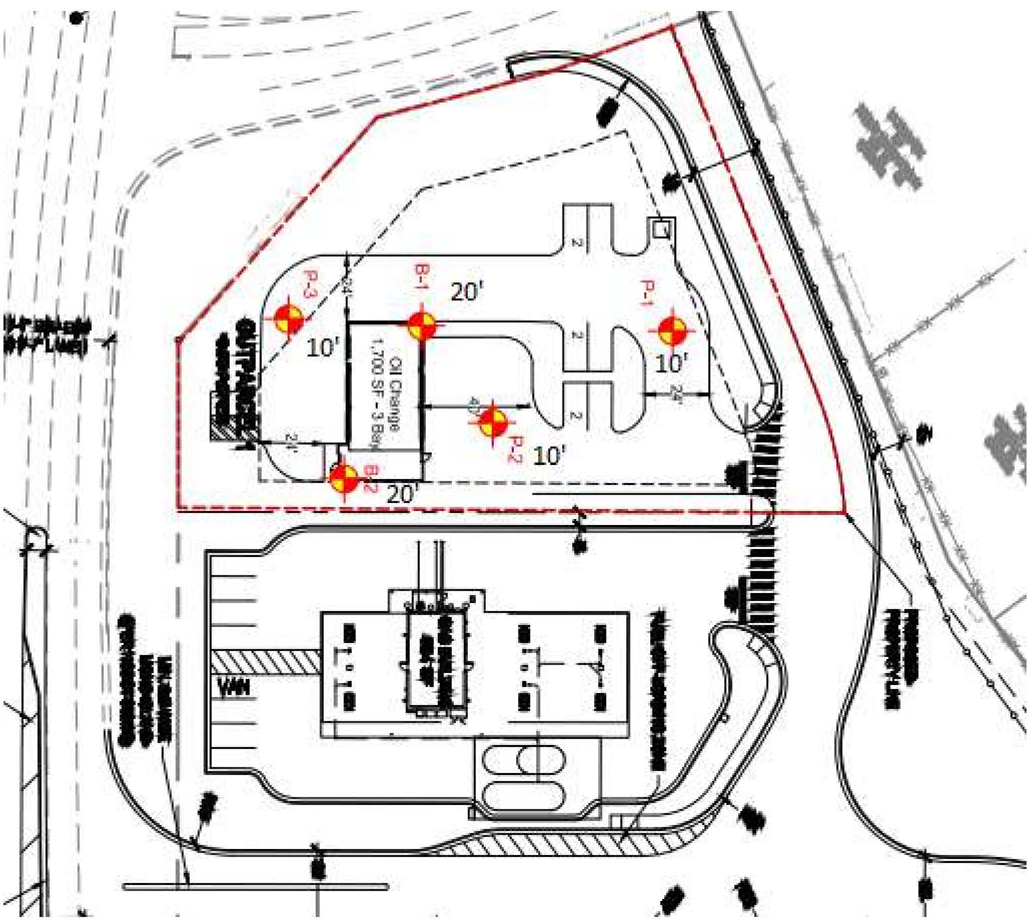

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July 12, 2022

Ms. Colleen Thelen
Construction & Asset Manager
N3 Property Advisors, LLC
1240 N. Kimball Avenue
Southlake, Texas 76092

Re: GEOTECHNICAL ENGINEERING REPORT
Proposed Strickland Brothers 10 Minute Oil Change Shop
Ward Boulevard at Harrison Drive, Wilson, NC
TRC Project No. 496842

Dear Ms. Thelen:

TRC Environmental Corporation (TRC) is pleased to present this Geotechnical Engineering Report for the referenced site. The attached report describes the exploration procedures, summarizes existing subsurface conditions, presents results of our laboratory analysis, and provides our geotechnical findings and recommendations as relates to the referenced project.

TRC appreciates this opportunity to provide these services and looks forward to working with N3 Property Advisors, LLC on future projects. Please contact us if you have questions regarding the contents of this report or if you require additional information.

Sincerely,
TRC Engineers, Inc. *for* TRC Environmental

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APPENDICES

ACRONYM LIST

AASHTO	American Association of State Highway and Transportation Officials
ASTM	American Society for Testing and Materials
bgs	Below Existing Ground Surface
ksi	Kilo-pounds per square inch
NCDOT	North Carolina Department of Transportation
OSHA	Occupational Health and Safety Administration
PCCP	Portland Cement Concrete Pavement
psf	Pounds Per Square Foot
psi	Pounds Per Square Inch
tsf	Tons per Square Foot
UCS	Unconfined Compressive Strength
USCS	United Soil Classification System

1.0 Introduction

1.1 Project Description

N3 Property Advisors, LLC (hereafter referred to as Client) retained TRC to provide geotechnical engineering services for the development of foundation, pavement, and site (earthwork) preparation recommendations at a proposed Strickland Brothers 10 Minute Oil Change site located south of the intersection of Ward Boulevard and Harrison Drive in Wilson, North Carolina (Site). Authorization to provide our services was given by signature of TRC Proposal No. N3040422 on April 4, 2022.

At the time of the field exploration, the Site consisted of a relatively flat, vacant lot. The property was reportedly previously developed with a single-story restaurant building that has since been removed. Indications of fill soil associated with the previous development were noted in the near-surface soil samples recovered during this study. The Site is approximately 0.71 acres and is located at the south corner of the intersection of Ward Boulevard and Harrison Drive. The general arrangement of the proposed development on the Site is shown on the Site/Boring Location Plan included in Appendix A.

It is anticipated that the proposed construction will consist of a single-story building (1,725 sf) having a slab on grade floor, three (3) below grade oil change pits and no other below grade portions of the building with associated flexible or Portland cement concrete drive and parking areas. Details regarding structural loadings were not available at the time of the writing of this report. No unusual loading conditions or settlement restrictions have been specified by the Client.

Final site grading plans were not provided to TRC; however, for purposes of this project we anticipate that minor regrading will be required to achieve final grades and that finished floor elevation of the proposed shop will be established within 1 foot above the existing grade (i.e., ground surface existing at the time of our field exploration). Approximate location and plan area of the proposed structure and parking areas were obtained from a Site Plan prepared by The John R. McAdams Company, Inc. (dated 5/25/2022) and was used to prepare the attached Site/Boring Location Plan.

Recommendations for pavement subgrade preparation and design of Portland Cement Concrete (PCCP) and flexible asphalt pavement (to be designed by others) are included in Section 5.0. It is anticipated that traffic in the proposed pavement area will consist primarily of automobile and light truck traffic, waste collection vehicle (garbage truck) with an occasional semi-tractor trailer.

If the details of the proposed construction differ from that described herein, TRC should be contacted to evaluate the potential impact on the recommendations provided in this report.

1.2 Purpose and Scope

The scope of services presented in this report has been based upon the information provided by the Client. To accomplish its intended purpose, this work has been conducted in the following phases:

1. Drilling of test borings to determine the general subsurface conditions to the depths of the test borings and to obtain samples for laboratory testing;

2. Performing laboratory tests on selected samples to determine pertinent engineering properties of the subsurface materials; and,

3. Performing engineering analyses, using the field and laboratory data to develop geotechnical-related information to be used by others for the design of building foundation and pavement for the proposed development.

Exploration for underlying geologic conditions or evaluation of potential geologic hazards, such as landslides, salt contamination, karst conditions, sinkholes, surface and underground mines, solution cavities, seismic activity, faulting, growth faulting, ground heaving/subsidence associated with hydrocarbon production, and/or ground subsidence/cracking potential due to groundwater withdrawal/injection well activities, were beyond the scope of this report.

2.0 Field Exploration and Laboratory Testing

2.1 Field Exploration

The field exploration was conducted at the Site on June 9, 2022. TRC retained the services of an independent local drilling contractor, J&L Drilling Inc., to drill the test borings and collect samples for laboratory analysis. Subsurface conditions beneath the Site were explored by advancing five (5) geotechnical test borings at the locations shown on the attached Boring Location Diagram. The borings within the building footprint area were drilled to a depth of 20 feet below existing ground surface (bgs) while the parking area borings were drilled to a depth of 10 feet bgs. The test boring locations and depths were established by TRC and were presented to the Client prior to field drilling activities. Prior to drilling, the NC 811 One Call system was contacted to verify utility locations within public right-of-way and easements where these utilities may exist in the project.

A truck-mounted rotary drilling rig, using hollow stem augers, was used to advance the test borings. The soils encountered in the borings were sampled by employing split-spoon sampling procedures by the Standard Penetration Test (SPT) Method in general accordance with ASTM Standard Method D 1586. Samples considered representative of the foundation materials were obtained by driving the split spoon sampler 18 inches into the soil with a 140-pound automatic hammer free-falling 30 inches. The number of blows required for each 6 inches of penetration was recorded separately. The blow count ("N-value") of the soil was calculated as the number of blows required to penetrate the 6 to 18 inch interval. The SPT N-value serves as an indicator of relative consistency for cohesive soils and relative density of granular soils. Groundwater levels were measured during and immediately after completion of drilling. Representative portions of each sample were selected and placed in a moisture tight glass jar with lid to minimize loss of moisture and for use in future visual examination and possible testing in the laboratory. Samples were transported to the laboratory for visual observations and assignment of laboratory testing. Upon completion of the drilling operations, boreholes were backfilled to the ground surface with the auger cuttings. Any excess soil materials which did not fit back down the holes was spread out on the ground surface at the boring location. No additional restoration was included.

Test borings were logged by J&L Drilling. The field boring logs and samples were sent to TRC's subsidiary partner Draper Aden Associates (DAA) testing laboratory where the samples were reviewed and examined by an experienced geologist or engineer. The logs were edited using the results of the sample observations and field test data.

The Boring Logs provided in Appendix B represent the geotechnical engineer's interpretations of the subsurface conditions based on the field observations recorded, visual-manual examination of the samples provided to TRC. Lines designating the interface between various strata on the Boring Logs

represent the approximate positions of the interface. The in-situ transition between strata may be gradual. Groundwater conditions recorded on the Boring Logs are based on the field observations at the time the field exploration was conducted.

2.2 Laboratory Testing

The soil samples were reviewed and edited by an experienced engineer or geologist from TRC's geotechnical team. Representative soil samples were then selected for geotechnical laboratory testing to determine soil index properties (moisture contents, particle gradations, and plasticity) of select samples. All phases of the laboratory analysis program were conducted in general accordance with applicable American Society for Testing and Materials (ASTM) specifications. Soil descriptions recorded on the Boring Logs in Appendix B result from field observations as well as from laboratory test data. Copies of the laboratory results are provided in Attachment 4. Soil samples will be stored at the laboratory for 30 days from the date of this Report unless otherwise directed by the Client.

3.0 SUBSURFACE CONDITIONS

3.1 Subsurface Conditions

Generally, the subsurface materials within the maximum depth explored (20 feet bgs) consist of a surficial layer of Silty Sand FILL over interbedded layers of Silty/Clayey SAND (SM/SC) and Elastic SILT and CLAY (MH/CH). The FILL layer was approximately 2.5 ft thick at the boring locations and consisted of silty sand with varying percentages of rock fragments. The most significant soils-related condition affecting the proposed development of this project will be the presence of a soft, compressible layer of soils from approximately six (6) to ten (10) feet bgs. The recommendations provided in this report are intended to reduce the amount of stress applied to this soil layer and should be incorporated into the structural design and planned grading for the project.

Abandoned wiring was recovered near the surface in Boring B-1, indicating the presence of fill. It was reported that the site was formerly occupied by a restaurant that was removed at some time prior to this study. Boring P-3 encountered auger refusal at a depth of five (5) feet below ground surface. The refusal is believed to be due to remnants of the former construction.

Site Class - Part of the International Building Code (IBC) procedure to evaluate seismic forces requires the evaluation of the Seismic Site Class, which categorizes the site based upon the characteristics of the subsurface profile within the upper 100 feet of the ground surface. To define the Seismic Site Class for this project, we have interpreted the results of our soil test borings drilled within the project site and estimated appropriate soil properties below the base of the test borings to a depth of 100 feet, as permitted by the IBC. Based upon our evaluation, it is our opinion that the subsurface conditions within the Site are generally consistent with the characteristics of Site Class D as listed in Chapter 16, Section 1613.2.2 of the 2018 edition of the IBC and as defined in Table 20.3-1, Chapter 20 of ASCE 7.

3.2 Groundwater Observations

During and upon completion of the drilling operations, indications of groundwater were encountered at a depth of six (6) feet bgs in Boring B-2. Water levels were not present in the remaining borings. Borehole cave-in was observed in Borings P-1 and P-2 at a depths of 7.5 and 7.0 ft bgs, respectively (a possible indication of groundwater). The presence, depth, and quantity of groundwater seepage

may fluctuate based on variations in seasonal rainfall, climatic conditions, site surface runoff characteristics, permeability of on-site soils, continuity of pervious materials, irrigation practices, and other factors. These observations do not constitute a long-term groundwater study nor was such an evaluation authorized as a part of the scope of this project. Any changes noted in groundwater levels during the construction process may require a review of the recommendations presented in this report.

4.0 Observations and Recommendations

4.1 Proposed Construction

The Site is located on the south corner of the intersection of Ward Boulevard and Harrison Drive in Wilson, North Carolina. It is anticipated that the proposed construction will consist of a single-story structure having a slab on grade floor with 3 oil change bays each including a below grade oil change (lube) pit extending to an anticipated depth of approximately 7 feet below finished floor elevation. Plan area of the new shop is approximately 1,725 square feet. Details regarding structural loadings were not available at the time of this report. However, it is anticipated that maximum column, wall, and floor loads will not exceed approximately 30 kips, 1 kip/foot and 125 pounds per square foot, respectively. No unusual loading conditions or settlement restrictions have been specified by the Client. Final site grading plans were not provided to TRC; however, for purposes of this project we anticipate that minimal grading will be required to achieve final grades and that finished floor elevation of the proposed shop will be established within 1 foot above the existing grade (i.e., ground surface existing at the time of our field exploration). The general arrangement of the proposed development is shown on the Site/Boring Location Plan included Appendix A.

TRC has developed geotechnical-related information to be used by others in the building foundation and pavement design based on the previously described project characteristics and subsurface conditions observed in the test borings drilled during the field exploration and as previously discussed in this report. After final design plans and specifications are available, a general review by TRC is recommended to check that the evaluations made in preparation of this report are correct, and that earthwork, foundation, pavement, and subgrade preparation recommendations are properly interpreted and implemented.

4.2 Foundation Considerations

Based on the subsurface conditions encountered, there appears to be some risk associated with the layer of soft soils encountered at approximately 6 to 8 feet below ground surface at this site. TRC recommends that potential ground improvement options be assessed to best balance the potential costs related to ground improvement and risks associated with the layer of compressible soils. Several ground improvement options may be beneficial for this site. These systems are typically installed as a design/build project by a specialty geotechnical contractor. TRC has included three known specialty contractors in Section 4.7 of this report.

4.3 Site Preparation

Based on our understanding of the proposed construction, significant grading and earthwork operation are not anticipated unless material removal and replacement would be considered for support of foundation.

Before proceeding with construction any old building foundations, buried structures, construction debris, vegetation, root systems, topsoil, refuse, and other deleterious non-soil materials should be stripped/removed from proposed construction areas. The actual stripping depth should be based on field observations with particular attention given to old drainage areas, uneven topography, unexpected fill material areas, and excessively wet soils (if present). The stripped areas should be observed to determine if additional excavation is required to remove weak or otherwise objectionable materials that would adversely affect the fill placement. The stripping should extend at least 5 feet beyond the limits of construction areas.

The on-site soils is suitable to be used as fill. However, due to high silt and clay content, the soils are moisture sensitive and will likely become unstable when saturated (wet). Generally, more undercutting and delays due to the need for extended drying times can be expected if the grading is performed in the seasonally wet period of the year. This material is best utilized for grading the exterior of the building and in landscaping area across the site.

Additionally, the existing near-surface fill material is considered undocumented and may not have been placed with benefit of proper compaction or moisture control. It is recommended that the existing near-surface fill material be undercut and replaced in a controlled manner in all building and pavement areas.

Pavement & Other Flatwork Areas - After site stripping/removal, the pavement and other exterior flatwork subgrades shall be proofrolled to detect soft spots, which, if they exist shall be reworked. Proofrolling shall be performed using a heavy pneumatic tired roller, loaded dump truck, or similar piece of equipment weighing approximately 25 tons. The proofrolling operations shall be observed by a geotechnical engineer or his/her representative. The subgrade shall be firm and able to support the construction equipment without displacement. Soft or yielding subgrade shall be corrected and made stable before construction proceeds. The depth and extent of the undercut operations at the site should be established by a qualified geotechnical engineer during earthwork construction activities based on the results of the proofroll. Following site preparation and prior to placement of any select fill and/or construction of the pavement or other exterior flatwork, the existing subgrade should be prepared as recommended in Section 5.2

Building Pad Area - The building pad should be prepared as recommended in Section 4.6.

4.4 Placement and Compaction

The project may include the placement and compaction of a variety of fill materials, including on-site soils, non-expansive select fill and crushed aggregate base. Typical material requirements and compaction specifications for each of these materials are provided below.

- **On-site Silty Sand / Sandy Clay -** Compact to at least 95 and not greater than 100 percent of maximum laboratory dry density and at 2 percentage points below to 3 percentage points above the optimum moisture content (-2 to +3) as determined by Standard Proctor method (ASTM D 698).

- **Select Fill -** Non-expansive select fill should consist of sandy clay or clayey sand having a plasticity index between 5 and 30, a liquid limit less than 50, no particles greater than 3 inches, a maximum of 40 percent passing #200 sieve and be free of roots or any other organic debris. Organic content should be less than 2 percent. The select fill material used at this site should be compacted to at least 95 percent (*not greater than 100 percent behind*

oil change pit walls) of maximum laboratory dry density within plus or minus 2 percentage points of optimum moisture content (-2 to +2) as determined by the Standard Proctor method (ASTM D 698). TRC recommends that any grade-raise fill placed beneath the proposed building area meet the requirements of non-expansive select fill.

The moisture content must be maintained until placement of the first fill lift. Fill material, whether non-expansive select fill or moisture conditioned on site soils, should be placed in horizontal loose lifts not exceeding 8 inches in uncompacted thickness. The fill material should be uniform with respect to material type and moisture content.

Each lift should be compacted, tested, and approved before another lift is added. As a guide, one field density test per lift for each 5,000 square feet of compacted area is recommended. For small areas or critical areas (e.g., building subgrade/pad or pavement subgrade), the frequency of testing may need to be increased to one test per 2,500 square feet. A minimum of two tests per lift should be required. The purpose of the field density tests is to provide some indication that uniform and adequate compaction and moisture control are being achieved. The actual quality of the fill, as compacted, should be the responsibility of the contractor and satisfactory results from the tests should not be considered as a guarantee of the quality of the contractor's work.

Backfill placed within utility trenches that cross-pavement or building areas should be properly compacted. Numerous parking, drive, sidewalk, and landscape areas for other projects typically experience settlement due to soft backfill within utility trenches. Backfill placed in utility trenches or other excavated areas within the building or paved area should be placed in lifts, compacted, and tested in accordance with these earthwork recommendations. Trenches should be opened a sufficient width to safely allow compaction equipment access to the backfill and to safely allow for confirmation testing to occur. Backfill should be placed in horizontal lifts, and if the trench is over 5 feet deep, a trench box should be used, or the side slopes benched prior to placing the backfill.

4.5 Site Excavation Characteristics

Finished grades at the Site have not been provided. We anticipate that excavations present the following general comments regarding our opinion of the excavation conditions for the designers' information with the understanding that they are opinions based on information from widely spaced test borings. More accurate information regarding the excavation conditions should be evaluated by contractors or other interested parties from test excavations using the equipment that will be used during construction.

As previously noted, indications of groundwater were noted at depths of 6 ft bgs, 7.5 ft bgs, and 7.0 ft bgs in Borings B-2, P-1 and P-2, respectively. TRC recommends that the contractor be prepared for dewatering at this site. The presence, depth, and quantity of groundwater seepage may fluctuate based on variations in seasonal rainfall, climatic conditions, site surface runoff characteristics, permeability of on-site soils, continuity of pervious materials, irrigation practices and other factors. These observations do not constitute a long-term groundwater study nor was such an evaluation authorized as a part of the scope of this project. Any changes noted in groundwater levels during the construction process may require a review of the recommendations presented in this report. Groundwater traveling through the soil and rock is often unpredictable. This could be due to seasonal changes in groundwater and due to the unpredictable nature of groundwater paths. Therefore, it is necessary during construction for the contractor to be observant for groundwater seepage in excavations to assess the situation and make necessary changes and/or recommendations.

The design and maintenance of all excavations and excavation retention systems is the sole

responsibility of the Contractor. Attention is drawn to OSHA Standards 29 CFR - 1926 Subpart P for guidance in the design of such systems.

4.6 Building Pad Preparation Recommendations

Based on our understanding of the proposed construction, significant grading of the current grade is not anticipated unless material removal and replacement would be considered for support of foundations. The following recommendations are provided based on the site soils encountered.

Any existing subsurface utilities which conflict with the proposed development should be removed or relocated, where applicable. In areas of backfill placement and/or construction of shallow foundations, all pavements, topsoil, and organic or otherwise deleterious material should be removed before foundation construction or new fill placement. Any obstructions that would interfere with new foundation construction must be removed in their entirety from a foundation location. Loose or unstable areas identified during the course of excavation should be densified in-place or excavated and replaced with compacted load bearing fill.

All exposed subgrades should be thoroughly proofrolled in the presence of the geotechnical engineer to check for any soft, loose or unstable areas. Proofrolling should be performed using a loaded triaxle truck or as large a compactor (minimum 10- ton) as is practical in static mode. Any soft, loose, or unstable areas detected during proofrolling should be densified in-place or excavated and replaced with compacted fill. Once a subgrade has been prepared, construction traffic should be controlled in such a fashion as to minimize subgrade disturbance

4.7 Ground Improvement Options and Foundation Support

Due to the soil conditions at this property, support of the proposed facility without some type of ground improvement will involve special grading and site preparation requirements. For the purposes of this report, TRC assumes that ground improvement will offer the most favorable balance between cost and risk. For a standard shallow foundation system without ground improvement, a reinforced mat slab with an allowable bearing capacity of 1,500 psf may be utilized – however, this design requires following the special grading recommendations outlined in Section 4.7.1 below.

Once the various design options have been priced and the appropriate solution is selected, TRC should be contacted to refine and finalize the recommendations of this report.

Given the presence of soft/compressible soils at depths of around six (6) to ten (10) feet bgs and the potential presence of groundwater, there is considerable risk of unacceptable settlement without some type of ground improvement at this site. TRC recommends that a specialty design/build contractor be engaged to provide potential ground improvement options in order to reduce anticipated settlement to tolerable limits. Potential ground improvement applications for this site include 1) aggregate piers; 2) grout or chemical injection; and 3) deep soil mixing.

Note that with Option 1 and Option 2 (aggregate piers or grout/chemical injection) may be designed in such a way to extend through the layer of existing fill and waive the need to undercut and replace this material. The specialty system designer should provide recommendations for support with the existing fill left in place, if appropriate.

TRC recommends contacting several qualified specialty contractors to determine the most cost-effective solution for this site. The following are known qualified contractors that may be able to assist:

Keller
208 Little Santee Road, Colfax, NC
(336) 668-0884
www.keller.com

Earth Tech
75 Port City Landing, Mount Pleasant, SC
(843) 302-1777
www.earthtech.com

GeoStructures
Attn: Abiy Ghirmay; Raleigh, NC
aghirmay@geostructures.com
(704) 519-7735

TRC will be available to work closely with the selected specialty contractor to finalize the shallow foundation design to work with the ground improvement technology.

Foundation excavations should be properly observed by the geotechnical engineer or his representative to confirm that loose, soft, or otherwise undesirable materials are removed such that foundation will bear on sound material. Soils exposed in the bases of all satisfactory foundation excavations should be protected against detrimental change in condition such as rain or excessive drying. Surface runoff should be directed away from the excavations and not allowed to pond within or near formed foundation excavations. If possible, all concrete for foundations should be placed the same day the excavation is made.

Furthermore, it is recommended that floor slabs be supported on at least 4 inches of clean granular material such as sand, sand and gravel, crushed stone or recycled concrete having no more than 5 percent fines passing No. 200 US Standard Sieve. This is to help distribute concentrated loads and equalize moisture conditions beneath slab. If a capillary moisture barrier is desired, the blanket should consist of a free-draining granular material meeting the following gradation shown in Table 1, as determined by ASTM D 422:

Table 1: Rock Gradation Requirements for Capillary Moisture Barrier

Sieve Size	Percent Passing
1 inch	100
#4	0

In moisture sensitive areas, a vapor barrier consisting of 15 mil polyethylene sheeting should be placed directly above the granular blanket. The contractor should take caution during concrete placement to avoid damaging the sheeting.

4.71 Special Grading Requirements

Recommendations in this section apply for the condition where a standard reinforced slab foundation is chosen without benefit of ground improvement.

Final grading should be such that the lowest soil-bearing element (the bottom of the service bay slab) be at the approximate existing grade at the time of this report (+/- one foot from the current existing site elevation).

TRC recommends that the existing fill materials within the building footprint area be over-excavated and replaced. Note that this material may be re-utilized provided that it meets the requirements of Section 4.4 for "Select Fill" and that it be placed with benefit of proper compaction and moisture control. Once the existing fill soils have been undercut and replaced, the "Stabilizing Layer" should be placed. The Stabilizing Layer should consist of 18 inches of well-compacted NC ABC (aggregate base course) stone place in 6-inch lifts. Two (2) layers of geogrid should be placed between the 6-inch lifts such that both layers of grid are placed with stone above and below. The Stabilizing Layer should extend a minimum of five feet beyond the building limits and the geogrid should consist of Tensar NX750 or Tensar TX150L. Additional import fill should then be placed over the stabilizing layer to bring the site up to final grade. Import fill should meet the requirements of Select Fill provided in Section 4.4 of this report.

Note that the above recommendations assume that total settlement at this site may be as much as 1.5 inches, but that differential settlement should be less than ¼-inch between exterior walls.

4.8 Estimated Foundation Movements

The potential for foundation movement will depend on the type of ground improvement system chosen and the specifications provided by the specialty contractor. In general, these systems are designed to limit total foundation movement to one (1) inch or less.

4.9 Oil Change (Lube) Pits

Pit walls should be designed as rigid walls using an earth pressure of 67 pounds per square foot per foot of depth. Backfill placed directly behind walls should be properly compacted and consist of a select material. Compaction requirements and composition of select fill are described in Section 4.4. A unit weight of 125 pounds per cubic foot can be assumed for the select fill compacted to a minimum of 95 percent of maximum laboratory dry density within plus or minus 2 percentage points of optimum moisture content (-2 to +2) as determined by Standard Proctor method (ASTM D 698). Walls subject to surcharge loads should be designed for an additional lateral pressure equal to 0.53 times the anticipated surcharge pressure.

The effects of hydrostatic pressure are not included in the foregoing earth pressure design value. Measures should be incorporated into the pit design to prevent any wash water from entering the underlying select fill and hydrostatic pressure build up.

To reduce the possibility of increases in lateral pressures due to over compaction, it is recommended that compaction of the select backfill adjacent to walls be accomplished using lightweight hand-controlled vibrating-plate compactors. Heavy compaction equipment should not be operated within 7 feet of the walls. It is also recommended that compaction of the backfill soils not exceed 100 percent Standard Proctor (ASTM D 698) maximum laboratory dry density to further limit lateral earth pressures.

4.10 Site Drainage and Landscaping

Adequate drainage should be provided at the site to minimize any increase in moisture content of the underlying soils. An important feature of the project is to provide positive drainage away from the structure. Ponding of water next to or below the structures should be avoided. Excessive soil movements (heave), greater than the 1 inch estimated in Section 4.8, may occur if water is permitted to stand (pond) next to or below the structure. This could result in cracking of floor slab, grade beams, interior partitions, and doors and windows out of square. A minimum slope of 1.5 percent for paved areas and 5 percent for unpaved areas should be provided, such that the ground surface slopes away from the building.

A well-designed site drainage plan is of utmost importance and surface drainage shall be provided during construction and maintained throughout the life of the structure. Drainage patterns approved at the time of finish grading should be maintained throughout the life of the building. Altered drainage patterns, landscaping, planters, and other improvements, as well as irrigation and variations in seasonal rainfall, all affect subsurface moisture conditions, which in turn could affect pavement, exterior flatwork, and structural performance. Consideration should be given to the design and location of gutter downspouts, planting areas, or other features, which may produce moisture concentration adjacent to or beneath the structure, pavement, and other exterior flatwork. It is desirable that paving and/or other exterior flatwork extend to the building line rather than have planting areas next to the structure. If plantings are desired, consideration should be given to the use of self-contained, watertight planters.

Rainwater collected by the gutter system should be transported by pipe to a storm drain or to a paved area. If downspouts discharge next to the structure onto flatwork or paved areas, the area should be watertight to eliminate infiltration next to the building.

Also, good drainage should be provided in paved areas since the at/and near surface soils are susceptible to pumping if they become saturated (wet). Pumping will contribute significantly to pavement failure.

Care should be taken to prevent the trench backfill for utilities from becoming a French drain and piping surface or subsurface water beneath structure. The use of a two-foot-wide clay or flowable fill plug shall be used adjacent to the structure within utility trenches to aid in preventing infiltration of water into the building pad.

Joints next to the structure shall be sealed with a flexible joint sealer to prevent infiltration of surface water. In general, the sealant used should remain plastic and flexible at normal service temperatures. Sealing joints will help minimize the infiltration of surface water into the underlying subgrade soils. Maintenance should include periodic inspection for open joints and cracks and resealing, as necessary.

4.11 Winter Construction

If construction of the project is accomplished during winter, steps should be taken to prevent the soils under the grade beams or floor slab from freezing. IN NO CASE should the slab on grade foundation, pavement or other exterior flatwork be placed on frozen or partially frozen materials, nor should frozen materials be placed. Frozen materials should be removed and replaced with approved on-site soils or imported select fill material as described Section 4.4.

5.0 Pavement Design Considerations

5.1 Pavement Subgrade Preparation

The pavement area should be prepared as previously recommended in Section 4.3. It is anticipated that the pavement subgrade will consist of lean and silty clay or silty sand. Prior to fill placement and/or construction of the pavement, the subgrade should be scarified to a minimum depth of 12 inches, its moisture content adjusted, and the subgrade then compacted as recommended in Section 4.4. Compaction of the subgrade should extend a minimum of 2 feet beyond the outer edges of pavement or curbs. Following compaction, the subgrade should be protected and maintained in a moist condition until the pavement is placed.

Compaction of weak or compressible areas can be aided by mixing a sufficient amount of hydrated lime with the existing lean and silty clays to achieve the required compaction. Alternatively, the observed unstable areas could be undercut and replaced with suitable fill. As an alternative to undercutting, a layer of geotextile, such as Mirafi HP 570 or approved equivalent, can be placed over weak areas. A geogrid, such as Tensar TriAx TX5, can be used as an alternative to Mirafi HP 570 geotextile. Geotextile or geogrid should be placed in combination with crushed aggregate in accordance with the manufacturer's guidelines. Final recommendations should be based on the observations by the geotechnical engineer at the time of construction.

Because paving and grading are typically performed by separate contractors, a time lapse generally occurs between the end of grading operations and the commencement of paving. Disturbance, desiccation, and/or wetting of the subgrade prior to completion of paving can result in deterioration of the previously compacted subgrade. A non-uniform subgrade can result in poor pavement performance and local failures relatively soon after pavements are constructed. Where applicable, we recommend that the pavement subgrade be proofrolled (see Section 4.3), and the moisture content and density of the top 12 inches of subgrade be checked within two days prior to commencement of actual paving operations. If any significant event, such as precipitation, occurs after proofrolling, the subgrade shall be reviewed by qualified personnel immediately prior to placing the pavement. The subgrade shall be in its finished form at the time of the final review.

A soils engineering technician working under the direction of a geotechnical engineer should observe compaction of the subgrade and perform soil density tests to confirm that the subgrade has been properly compacted in accordance with the recommendations presented herein. In addition, all paving materials and paving operations should meet applicable specifications of MDOT or the local governing agency.

Utility trench backfill that lies within paved and other flatwork areas must be properly compacted. Fill or backfill areas should be proofrolled to verify that soft or yielding subgrade areas have been properly compacted (refer to Section 4.3 for detailed proofrolling recommendations).

5.2 Pavement Design Considerations

Traffic loading information for the proposed pavement was not available at the time of this report submittal. It is anticipated that the parking stalls will be subject to automobile and light truck traffic only and that drives will be subject to both automobile and occasional medium to heavy truck traffic. If the anticipated traffic loading conditions are different than indicated herein, TRC should be contacted as it could impact the recommendations presented in the following sections.

Based on the results of the geotechnical exploration and the laboratory testing, either a rigid (concrete) or flexible (asphalt) pavement section could be used for this project provided the subgrade is prepared as discussed in Section 4.3. Flexible pavement utilizing asphalt components appropriate to the Site climate combines the strength and durability of several layer components to produce an appropriate and cost-effective combination of available construction materials. Concrete pavement has the advantage of the ability to "bridge" over isolated soft areas and it typically has a longer service life than asphalt pavement. Disadvantages of rigid pavement include a higher initial cost and more difficult patching of distressed areas than occurs with flexible pavement.

Based on the soil boring data, it is anticipated that the pavement subgrade will consist mostly of lean and silty clay or silty sand material. The subgrade may require some moisture control to facilitate compaction. ***A (plate) subgrade reaction modulus (K) for short-term loadings over small areas of 230 pci may be assumed for rigid pavement design for a properly densified subgrade. Subgrade soil with a CBR of 5 may be used for the design of flexible (asphalt) pavement design.*** This is recommended if the subgrade is compacted and prepared as previously discussed.

Regardless of the Structural Number required for ***flexible pavement*** design, a buildup that includes an aggregate base (NCDOT Section 520) will generally provide better performance than an asphalt-on-subgrade buildup. The aggregate base is less sensitive to moisture than the subgrade and it separates the pavement further from the subgrade. An aggregate base is recommended under all flexible pavements and particularly when the thickness of a full depth flexible design is very thin, approximately 5 inches or less. TRC recommends that a minimum 6-inch thick aggregate base course (or 8 inches for heavy duty pavement) material be used for new flexible pavement areas.

Compaction testing of the base course should be performed to full depth at a frequency of at least one (1) test per 5,000 square feet, or at least 2 tests, whichever is greater.

It is important to minimize moisture changes in the pavement subgrade. The pavement and adjacent areas should be well drained. Regular maintenance of all the pavement should be anticipated. This should include sealing of all cracks and joints to prevent water passing through to the subgrade and by maintaining proper surface drainage to avoid ponding of water on or near the pavement areas. Even with these precautions, some movements and related cracking may still occur, requiring additional maintenance.

All joints including sawed joints should be properly cleaned and sealed as soon as possible to avoid infiltration of water, small gravel, etc. Either cold-poured or hot-poured sealing material may be used. Backing should be provided to hold the isolation joint sealant in place. Manufacturers' instructions for mixing and installing the joint materials should be followed.

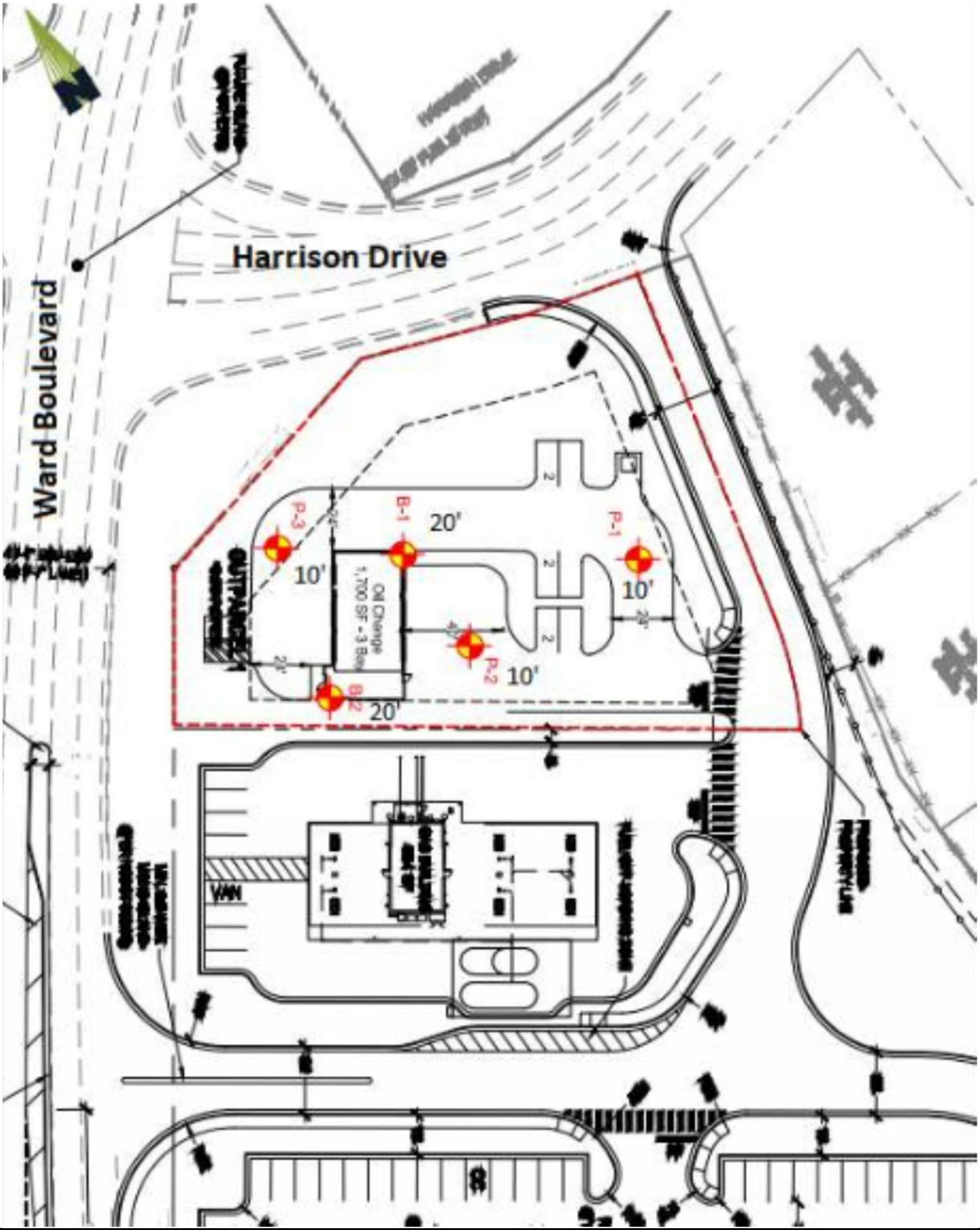
The final design of the pavement and steel reinforcement should be provided by the structural or civil designer. The information presented in this section is provided for general guidance.

6.0 Limitations

This work has been done in accordance with our authorized scope of work and in accordance with generally accepted practice in the fields of geotechnical and foundation engineering. This warranty is in lieu of all other warranties either expressed or implied. Our conclusions and recommendations are based on the data revealed by this investigation. We are not responsible for any conclusions or opinions drawn from the data included herein, other than those specifically stated, nor are the recommendations presented in this report intended for direct use as construction specifications. This

report is intended for use with regard to the specific project discussed herein and any changes in loads, structures, or locations should be brought to our attention so that we may determine how they may affect our conclusions. An attempt has been made to provide for normal contingencies but the possibility remains that unexpected conditions may be encountered during construction. If this should occur, or if additional or contradictory data are revealed in the future, we should be notified so that modifications to this report can be made, if necessary. If we do not review the relevant construction documents and witness the relevant construction operations, then we cannot be responsible for any problem, which may arise, from the misunderstanding or misinterpretation of this report or failure to comply with our recommendations.

Appendix A: Site/Boring Location Map



TRC Environmental Corp
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APPENDIX A

Site/Boring Location Map

Proposed Oil Change Facility
Wilson, NC

Appendix B: Boring Logs

Draper Aden Associates
Engineering • Surveying • Environmental Services

Client: **N3 Real Estate**			Project No.: **496842.0000.0000**
Project: **Proposed Strickland Brothers**			Driller: **J&L Drilling**
Location: **Wilson, North Carolina**			Method: **2-1/4" HSA w/ SPT**
Total Depth **20.0'**	Elev GS: '	Logged by: **J&L**	Completion Date: **June 9, 2022**

Elev.	Depth	DESCRIPTION (USCS)	Blow Counts / Recovery (%)	N Value	PP (tsf)	% Fines	% H_2O	LL	PI	REMARKS
	0	Approximately 1 inch of topsoil								
		FILL Sampled as: Silty SAND (SM), reddish brown and gray, fine grained to coarse grained, trace rock fragments, moist, dense	8-17-21 44	38						No water encountered at time of drilling.
		Silty SAND (SM), orange brown and gray, fine grained to coarse grained, moist, medium dense to loose	10-8-7 44	15						
	5	- brown, loose	3-4-6 56	10						
		Sandy Elastic SILT (MH), gray, fine grained to coarse grained, wet, soft	1-1-3 78	4						
	10									
		Clayey SAND (SC), gray with green and orange, mottled, fine grained to coarse grained, moist, medium stiff	4-4-4 67	8						
	15									16.5 feet BGS - Cave in
		- grayish green with reddish brown, moist, very stiff	4-7-11	18						
	20	Bottom of borehole at 20.0 feet. Target Depth								

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Total Depth **20.0'** / Elev GS: **'** / Logged by: **J&L**	Completion Date: **June 9, 2022**

Elev.	Depth	DESCRIPTION (USCS)	Blow Counts / Recovery (%)	N Value	PP (tsf)	% Fines	% H_2O	LL	PI	REMARKS
	0	Approximately 1 inch of topsoil								
		FILL Sampled as: Silty SAND (SM), reddish brown and gray, fine grained to coarse grained, trace rock fragments, moist, medium dense	9-8-9 67	17						
		Sandy CLAY (CL), brownish red, fine grained, moist, stiff	5-5-8 67	13						
	5	- gray, medium grained, soft	3-2-1 72	3						6 feet BGS - Water level upon completion.
		- light reddish brown and gray, mottled	1-2-2 61	4						
	10									
		Fat CLAY (CH), reddish brown with gray, mottled, moist, hard	10-17-19 94	36						
	15									15.3 feet BGS - Cave in.
		Sandy CLAY (CH), gray and reddish brown, mottled, moist, stiff	5-7-8 89	15						
	20	Bottom of borehole at 20.0 feet. Target Depth								

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Client: **N3 Real Estate**		Project No.: **496842.0000.0000**	
Project: **Proposed Strickland Brothers**		Driller: **J&L Drilling**	
Location: **Wilson, North Carolina**		Method: **2-1/4" HSA w/ SPT**	
Total Depth **10.0'**	Elev GS: **'**	Logged by: **J&L**	Completion Date: **June 9, 2022**

Elev.	Depth	DESCRIPTION (USCS)	Blow Counts / Recovery (%)	N Value	PP (tsf)	% Fines	% H_2O	LL	PI	REMARKS
	0	Approximated 1 inch of topsoil								
		FILL Sampled as: Silty SAND (SM), light brown, fine grained to medium grained, with rock fragments, moist, medium dense	9-13-10 56	23						No water encountered at time of drilling.
		Sandy Fat CLAY (CH), brown, moist, medium stiff to stiff	2-3-3 61	6						
	5		2-2-3 89	5						
(cave-in symbol)										7.5 feet BGS - Cave in.
		Clayey SAND (SC), light reddish brown with gray, mottled, fine grained to coarse grained, moist, medium dense	1-5-8 89	13						
	10	Bottom of borehole at 10.0 feet. Target Depth								

Client: **N3 Real Estate**			Project No.: **496842.0000.0000**
Project: **Proposed Strickland Brothers**			Driller: **J&L Drilling**
Location: **Wilson, North Carolina**			Method: **2-1/4" HSA w/ SPT**
Total Depth **10.0'**	Elev GS: '	Logged by: **J&L**	Completion Date: **June 9, 2022**

Elev.	Depth	DESCRIPTION (USCS)	Blow Counts / Recovery (%)	N Value	PP (tsf)	% Fines	% H_2O	LL	PI	REMARKS
		Approximately 1 inch of topsoil								
		FILL Sampled as: Silty SAND (SM), dark reddish brown, fine to medium grained, with rock fragments, damp, dense	17-20-12 78	32						No water encountered at time of drilling.
		Sandy SILT (ML), reddish brown and gray, fine grained, moist, stiff to medium stiff	2-5-8 44	13						
	5									
		- dark gray, organic odor, fine grained, medium stiff	3-3-2 44	5						7 feet BGS - Cave in.
		Clayey SAND (SC), white, gray, and reddish orande, moist, stiff, medium dense	2-5-7 33	12						
	10	Bottom of borehole at 10.0 feet. Target Depth								

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Client:	**N3 Real Estate**	Project No.:	**496842.0000.0000**
Project:	**Proposed Strickland Brothers**	Driller:	**J&L Drilling**
Location:	**Wilson, North Carolina**	Method:	**2-1/4" HSA w/ SPT**
Total Depth **5.0'**	Elev GS: ' / Logged by: **J&L**	Completion Date:	**June 9, 2022**

Elev.	Depth	DESCRIPTION (USCS)	Blow Counts / Recovery (%)	N Value	PP (tsf)	% Fines	% H_2O	LL	PI	REMARKS
		Approximate 1 inch of topsoil								
		FILL Sampled as: Silty SAND (SM), dark brown and black, fine grained to coarse grained, with rock fragments, moist, medium dense	11-11-12 33	23						No water encountered at time of drilling. Hole open to termination depth.
		No sample recovery. Bouncing spoon. Offset 5 feet northwest, auger refusal at 5 feet below ground surface.	50 0							
	5	Refusal at 5.0 feet. Bottom of borehole at 5.0 feet. Auger Refusal								