Intertek - PSI
5021-A W. WT Harris Blvd.
Charlotte, North Carolina 28269
Phone: (704) 598-2234
Fax: (704) 598-2236

July 6, 2021

Taco Bell Corporation
1 Glen Bell Way
Irvine, California 92618

Attn: Mr. Chad Gornall
Associate Construction Manager
email: Chad.Gornall@yum.com

Re: **Report of Geotechnical Engineering Services**
Proposed Taco Bell # 314703
109 Tuckaseege Road
Mount Holly, North Carolina 28215
PSI Report No.: 05111012

Dear Mr. Gornall:

Professional Service Industries (PSI), an Intertek Company, is pleased to transmit our Geotechnical Engineering Services Report for the proposed Taco Bell # 314703 project located at 109 Tuckaseege Road in Mount Holly, North Carolina. This report includes the results of field and laboratory testing, and recommendations for foundation and pavement design, as well as general site development.

PSI appreciates the opportunity to perform this Geotechnical Study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if PSI may be of further service, please contact our office at 704-598-2234.

PSI also has great interest in providing materials testing and inspection services during the construction of this project. If you will advise us of the appropriate time to discuss these engineering services, we will be pleased to meet with you at your convenience.

Very truly yours,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Andrew O. Steege
Senior Geologist

Lloyd T. Lasher, Jr.
Principal Consultant

NORTH CAROLINA PROFESSIONAL SEAL 039142 ENGINEER CALEB SEAN SARUSE 7/6/2021

Caleb S. Saruse, P.E.
Department Manager

TABLE OF CONTENTS

1 PROJECT INFORMATION

1.1 PROPOSAL AND PROJECT AUTHORIZATION

This report presents our findings and recommendations of a geotechnical exploration and assessment performed by Professional Service Industries (PSI) for the proposed Taco Bell # 314703 project located at 109 Tuckaseege Road in Mount Holly, North Carolina. These services were performed in general accordance with the Project Agreement for Architectural/Engineering/Consultant Services between Taco Bell Corporation and PSI, and dated May 14, 2021. Authorization to proceed was given to PSI on June 16, 2021.

1.2 PROJECT DESCRIPTION

Taco Bell provided PSI with an undated drawing titled “Site Sketch”. Based on this, it is understood that a new Taco Bell restaurant will be constructed on the subject property. Based on the current layout of the site, the building will be situated in the north portion of the approximately 0.56-acre property, and paved parking (total of 17 parking stalls provided) will be located in the central portion of the site. Two entrances will be constructed to the site, in the northwest and southeast site areas connecting to Tuckaseege Road and Spring Street, respectively. A drive-thru aisle will be constructed to the north and east of the proposed building.

The new building will have a footprint of about 1,900 square feet (approximately 27 feet by 71 feet). We were not provided with specific building or structural loading information at the time of this report. However, based on previous Taco Bell projects, we anticipate the building will be a single story, wood frame structure with full brick façade and a truss roof system supported on an exterior perimeter foundation. The trusses span the transverse (short) direction of the building. At the front of the building, columns, which support beams and headers, are concealed within longitudinal exterior walls. This report is based on maximum structural loads on longitudinal (side) bearing walls being about 3 kips per linear foot (klf). The floor slab is expected to carry a maximum design live load of 100 pounds per square foot (psf).

Based on previous Taco Bell projects, we understand that two types of pavements may be used: Flexible Asphalt Concrete (AC) surfaced pavement; and Rigid Portland Cement (PC) Concrete pavement. It is anticipated that the parking lot will be divided into two areas: 1) driving lanes, and 2) parking stalls. The driving lanes will be subjected to estimated daily traffic of 1,000 cars and five 20,000 - 25,000 pounds single axle load from trucks. The parking stalls will experience as many as 50 cars per day. Parking stall pavements will only be used in areas that will not receive truck traffic. This report is based on a twenty-year design period to determine minimum pavement thickness and subgrade preparation requirements.

Existing topographic and proposed grading information was not provided. A partially brick, partially segmental block retaining wall about 1 to 4 feet high was observed at the southwest corner of the site (adjacent to the intersection of Tuckaseege Road and Spring Street). The provided site plan indicates this wall will be removed and a new wall about 120 feet long will be constructed along the south edge of the site. Additional information regarding this wall was not provided but we anticipate its maximum height will not exceed about four feet. Across the remaining site area, the ground surface generally has a gradual downward slope to the east and relief is estimated to be about 5 feet. This report is based on maximum cut and fill depths associated with the remaining proposed construction areas being on the order of 3 feet. No below ground construction is planned to our knowledge.

The information presented in this section was used in the evaluation. Estimated loads and corresponding foundation sizes have a direct effect on the recommendations, including the type of foundation, the allowable soil bearing capacity, and the estimated potential settlement. In addition, estimated subgrade elevations and cut/fill quantities can have a direct effect on the provided recommendations. If any of the noted information is incorrect or has changed, please inform PSI so that we may amend the recommendations presented in this report, if appropriate. If PSI is not retained to perform this function, PSI cannot be responsible for the impact of the changes on the performance of the project.

1.3 PURPOSE AND SCOPE OF WORK

The purpose of this study was to obtain information regarding the general subsurface conditions within the proposed construction area, to assess the engineering characteristics of the subsurface materials, and to provide general design recommendations regarding the geotechnical aspects of the proposed construction. To accomplish this, PSI performed a site reconnaissance, drilled eight soil test borings within the areas of proposed site improvements, conducted laboratory classification testing and prepared this report summarizing the findings, as well as our conclusions and recommendations.

The scope of our geotechnical services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, groundwater, or air, on or below or around this site. Any statement in this report or on the boring logs regarding odors, colors, unusual or suspicious items, or conditions are strictly for the information of our client.

PSI did not provide nor was it requested to provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSI’s control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

2 EXPLORATION PROCEDURES

2.1 FIELD SERVICES

PSI advanced eight soil test borings (Borings B-1 through B-8) within the proposed site at the approximate requested locations to depths of about 20 feet below grade. Borings B-1 and B-2 were drilled within the proposed building footprint area, borings B-3, B-4 and B-6 were drilled within proposed pavement areas, boring B-5 was located within the proposed dumpster enclosure area, and borings B-7 and B-8 were located along the proposed retaining wall area. The approximate boring locations are shown on the "Boring Location Plan" (Figure 2) included in the Appendix. Horizontal and vertical survey control was not performed for the test boring locations prior to our field exploration program. The borings were located based upon estimated distances and relationships to obvious landmarks, and the site plan provided by the client. The boring locations are considered accurate to the degree implied by these methods.

Soil test borings were advanced at this site by RDL Drilling, a subcontractor hired by PSI, utilizing a Mobile B-47 truck-mounted drilling rig using hollow-stem, continuous-flight augers. All boring and sampling operations were conducted in general compliance with ASTM D 1586. At regular intervals, soil samples were obtained with a standard 2-inch O.D. split-barrel sampler.

A manual (rope and cathead) hammer was used for the standard penetration testing, which typically has a lower efficiency than an automatic trip hammer. Typically, the manual cathead-and-rope hammer yields higher standard penetration test resistances (N-values) than an automatic hammer. The N-values reported on the logs, and the consistency descriptions on the boring logs are based on the field-recorded values.

The recovered soil samples were visually classified in the field by the driller, then transported to our laboratory for testing and additional classification. A "Boring Log" was prepared for each boring and the "Logs" are included in the Appendix of the report. The logs were prepared using the observations made in the field, as well as the classifications in the laboratory and the laboratory test results. Strata descriptions, presented on the logs, were based on visual-manual evaluations by our geologist and include the classifications in general accordance with the Unified Soil Classification System (USCS). The "Soil Classification Chart", included in the Appendix, illustrates the USCS legend depicted on the logs. Existing topographic information was not provided to us. Therefore, ground surface elevations are not presented on the boring logs or referenced in this report.

Groundwater levels were measured in the boreholes at the time of boring and upon completion, when encountered. The results of the groundwater readings, when encountered; are included on the soil test boring logs. The borings were backfilled immediately upon completion, using the soil cuttings, for safety considerations. Therefore, delayed groundwater readings are not available.

2.2 LABORATORY TESTING

A geologist visually-manually classified the soil samples in the laboratory in general accordance with the Unified Soil Classification System (USCS) (ASTM D2487 and D2488). Percent finer than the No. 200 sieve (ASTM D1140), Atterberg limits tests (ASTM D4318), and natural water content determinations (ASTM D2216) were conducted on representative samples recovered from the test boring locations. The laboratory test results are presented in Section 3.3.5 and/or are shown on the individual boring logs.

3 SITE AND SUBSURFACE CONDITIONS

3.1 SITE DESCRIPTION

The proposed Taco Bell # 314703 site is located at the northeast quadrant of the intersection of Tuckaseege Road and Spring Street in Mount Holly, North Carolina. An existing Walgreen's pharmacy bounds the site to the north. The site has a physical address of 109 Tuckaseege Road. The site location is depicted on the "Site Vicinity Map" (Figure 1) included in the Appendix.

PSI performed a review of historical aerial photographs of the site available on Google Earth. Based on this, at the time of the earliest available photo (1993) the site area appears as developed with a building in its southwest portion, asphalt pavement in its northeast portion, and the east site area being grass-covered. It appears the building was demolished and removed around 2018.

At the time of our reconnaissance (June 2021) the building was gone, and a thin layer of gravel or bare soil was observed in its former area. The asphalt pavement and a concrete sidewalk to the north of the former building were still in-place and both were generally in poor condition. However, it also appeared that additional asphalt pavement in good condition had been installed recently at the site entrance off Tuckaseege Road. Most of the eastern site area was covered with high grass and weeds; however, the east edge of the site (along with the adjacent property to the east) was mowed.

The west side of the site, and the western portion of the south side of the site, are about 2 to 4 feet higher in elevation than the adjacent roadways (Tuckaseege Road and Spring Street, respectively). A partially brick, partially segmental block retaining wall about 1 to 4 feet high was observed at the southwest corner of the site, adjacent to the corner of the two streets. The provided site plan indicates this wall will be removed by NCDOT. The ground surface across the remainder of the site generally appeared to have a gradual downward slope from west to east. Total relief across the site estimated to be on the order of 5 feet. Buried utility lines were noted within the north, west and south edges of the site. At the time of our field work, the ground surface was firm and our equipment (a truck-mounted drill rig) experienced no apparent difficulty moving across the site.

3.2 SITE GEOLOGY

The project site is located within Gaston County, North Carolina, and lies within the Charlotte Belt of the Piedmont Physiographic Province of the eastern United States. This province is characterized by broad, gently rolling ridges formed on the stronger bedrock of the area. Between these ridges, lowlands and drainage areas are formed on the less resistant bedrock. The Piedmont is a complex assemblage of igneous (volcanic and plutonic) and sedimentary rocks that were generally formed during the Late Proterozoic Era and the Early Cambrian Period (approximately 550 to 900 million years ago). During and subsequent to formation these rocks were subjected to several major tectonic events, including plate collisions, folding, faulting, and igneous intrusions, that resulted in the uplift and metamorphism of the preexisting rocks. The tectonic activity generally stopped about 200 to 250 million years ago and erosional forces have formed the current ground surface. Review of the Geologic Map of the Charlotte 1° by 2° Quadrangle, North Carolina and South Carolina (USGS, by Goldsmith, Milton and Horton, 1988) indicates the site is underlain by metamorphosed quartz diorite of late Proterozoic to early Cambrian age.

Residual soils are the result of in-place physical and chemical weathering of the parent bedrock. In this area residual soils generally consist of an upper layer of fine-grained SILT or CLAY underlain by Sandy SILT or Silty SAND. The sand content generally increases with depth. Separating the residual soil from the underlying parent bedrock is typically a transition zone of high consistency material referred to as partially weathered rock. Partially weathered rock is defines as residual material with standard penetration resistance (ASTM D1586) in excess of 50 blows per 6-inches penetration.

The weathering processes that produced the residual soils and partially weathered rock were extremely variable, due to such factors as rock type and mineralogy, past groundwater conditions, and the tectonic history of the specific area (resulting in localized fractures, joints and faults within the bedrock). Differential weathering of the parent bedrock has resulted in highly variable subsurface conditions, and can include abrupt changes in soil type and consistency over relatively short horizontal and vertical distances. Furthermore, depths to rock can also be highly variable; and suspended boulders, discontinuous rock layers/lenses, or rock pinnacles can be present within the residual soils and transitional zones of soft weathered rock.

Previously placed fill material was encountered in two of the borings, and existing fill materials are often encountered on previously graded sites such as this. The suitability of existing fill can vary significantly across the site. It is not uncommon to encounter buried debris and unsuitable materials on previously developed sites.

As requested, PSI conducted a review of readily available literature for information regarding karst activity within the site area. Caves, internal drainage, lack of surface streams, and topographic features such as sinkholes characterize karst terrain. These features are the result of dissolution of soluble bedrock, such as limestone or dolomite, by groundwater and/or infiltration of surface water. As groundwater enters fractures or bedding planes in soluble bedrock, it slowly dissolves the rock and enlarges the fractures. This results in the formation of solution channels, underground streams or ravines, and caves. Based on our review of geologic maps for the site area as well as our understanding of Piedmont geology, no soluble bedrock (such as limestone or dolomite) is known to occur within this region. Therefore, no potential for karst features underlying the site is anticipated.

3.3 SUBSURFACE CONDITIONS

General subsurface conditions encountered during the subsurface exploration are described below. For more detailed soil descriptions and stratifications at the boring locations, the “Boring Logs” should be reviewed. The “Boring Logs” represent our interpretation of the subsurface conditions based on a review of the field logs and an engineering examination of the samples. The horizontal stratification lines designating the interface between various strata represent approximate boundaries. Transition between different strata in the field may be gradual in both the horizontal and vertical directions. Groundwater, or lack thereof, encountered in the borings and noted on the “Boring Logs” represents conditions only at the time of the exploration.

3.3.1 SURFACE

Initially five of the eight borings encountered a layer of topsoil approximately 1 to 3 inches thick. However, deeper pockets of topsoil may be present in other areas of the site. The term topsoil, as used in this report, is a general designation given to the surface horizon of soil which appears to have an elevated organic content. No laboratory testing was performed on the topsoil to determine its suitability for supporting plant life, or ability to satisfy a particular specification.

Boring B-8 initially encountered a topsoil and gravel mix extending to a depth of about 8 inches below the existing ground surface. Asphalt pavement approximately 1 inch thick was encountered at the ground surface at the remaining two borings (B-2 and B-4). About 4 inches of gravel was observed beneath the asphalt layer at B-4, while at B-2 no appreciable gravel layer was noted beneath the asphalt.

3.3.2 FILL

Apparent previously-placed fill material was encountered beneath the topsoil or topsoil/gravel mix at borings B-6 and B-8 to depths of about 4 and 3 feet below the existing ground surface, respectively. At B-6 the fill material consisted of firm Sandy SILT (ML) and loose Silty SAND (SM), and contained organic material (topsoil and roots). A Standard Penetration Test resistance (N-value) of 6 blows per foot (bpf) was recorded in the fill at B-6, suggesting poor compaction. At B-8 the fill material consisted of very dense Silty SAND (SM) with gravel and rock fragments. An N-value of 58 bpf was recorded in the fill at B-8. However, the N-value at B-8 was likely magnified by the rock fragments and gravel within the fill at that location.

3.3.3 RESIDUUM

Residual soils were encountered beneath the apparent fill at borings B-6 and B-8 and underlying the topsoil or pavement layer in all remaining test borings performed at the site. At six of the borings (all but B-5 and B-8) the shallow sampled residual soils initially consisted of stiff to very stiff Elastic SILT (MH) or hard Fat CLAY (CH). These MH and CH residual soils extended to approximately 3 feet below existing ground surface in both of the borings performed within the proposed building footprint and to depths ranging from about 3 to 6 feet below existing ground surface in other areas of the site. N-values recorded in the MH/CH soil layer ranged from 11 to 31 bpf.

Additional residual soils encountered underlying the near-surface MH/CH layer at borings B-1 through B-4, B-6 and B-7, beneath the topsoil layer at B-5, and beneath the apparent fill at B-8, consisted of stiff to very stiff Sandy SILT (ML), loose to medium dense Silty SAND (SM), and medium dense Clayey SAND (SC). The N-values recorded in the ML, SM and SC soils ranged from 8 to 30 bpf but were typically in the 10 to 20 bpf range. All of the borings were terminated in the residual soils at a depth of about 20 feet below the existing ground surface without encountering partially weathered rock or auger refusal material.

3.3.4 GROUNDWATER INFORMATION

The borings were checked for groundwater at the time of drilling and upon completion. The borings were backfilled immediately upon completion, using the soil cuttings, for safety considerations. Therefore, delayed groundwater levels are not available. Groundwater was not readily apparent in any of the borings.

Subsurface water levels within this region tend to fluctuate with seasonal and climatic changes, as well as with some types of construction operations. Generally, the highest groundwater levels occur in late winter and early spring; and the lowest levels in late summer and early fall. Therefore, water may be encountered during construction at depths not indicated during this study.

Additionally, perched groundwater conditions can develop over low permeability soil or weathered rock following periods of heavy or prolonged precipitation. Groundwater may be encountered during construction at depths not indicated during this exploration.

3.3.5 LABORATORY TEST RESULTS

The results of the laboratory testing program are summarized in the following table.

Sample Location	Sample Depth (ft)	Moisture Content (%)	Percent Fines (%)	ATTERBERG LIMITS			USCS Soil Classification
				LL	PL	PI	
B-1	1 – 2 ½	21.9	65.0	54	29	25	CH*
B-4	1 – 2 ½	32.8	91.9	79	39	40	MH*
B-6	1 – 2 ½	15.3	--	--	--	--	--
B-7	1 – 2 ½	19.5	60.9	56	31	25	MH*

*Typically not recommended for direct support of foundations, slabs or pavements.

4 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

4.1 GEOTECHNICAL ASSESSMENT

The following geotechnical design recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered. If there are any changes in these project criteria, including building location on the site or the construction of earth retaining structures are required, a review should be made by PSI to determine if modifications to the recommendations are warranted.

Once final design plans and specifications are available, a general review by PSI is recommended as a means to check that the evaluations made in preparation of this report are correct and that earthwork and foundation recommendations are properly interpreted and implemented.

Based on the results of the fieldwork, laboratory evaluation and engineering analyses, we have identified the following potential constraints to the development of this site; the presence of high plasticity soils (MH and CH), and the presence of previously-placed fill soils. However, we believe with proper planning and execution, the site can be adapted for the proposed structure and associated improvements.

4.1.1 HIGH PLASTICITY SOILS

Elastic SILT (MH) and Fat CLAY (CH) residuum comprised the near-surface residual soils in most of the borings. These soils generally exhibit moderately high to highly plastic properties and are typically susceptible to changes in volume with even slight changes in moisture content (i.e. shrink/swell behavior). As a result, MH and CH soils are not recommended for direct support of foundations, slabs or pavements. We recommend a minimum 2-foot thick buffer between these soils and slabs or foundations, and a minimum 1-foot buffer between these soils and pavements, curbs and sidewalks. The buffers should consist of low-plasticity structural fill, placed and compacted as described in Section 4.2. In the case of foundations, they may be deepened to extend beneath these soils when encountered in footing excavations or they may bear in these materials provided the foundations are not less than 4 feet below final finished grade.

Based on the borings, residual MH or CH soils are anticipated to depths of approximately 3 feet below current grade in the building area. Depending on proposed grades, these soils may be encountered in foundation excavations and will require removal and replacement with suitable, low-plasticity structural fill, as described in the previous paragraph. Across the remaining site area, the extent of MH and CH soils requiring undercutting and removal will be dependent on site observations during grading. However, the project budget should include a contingency for the removal and replacement of any near-surface MH and CH soils to provide the buffers described above. In addition, MH and CH soils are not recommended for reuse as structural fill.

Representative soil samples selected for laboratory testing generally had in-situ moisture contents below their plastic limit. These soils are in a relatively dry state and would be expected to exhibit swelling potential upon hydration, depending upon the soil composition and mineralogy. Please note it was beyond PSI's scope to perform shrink/swell testing on this project, so this assessment has been made on the basis of the Atterberg limits test results, and our experience.

Additionally, MH and CH soils are moisture sensitive and will likely become unstable due to the presence of excess moisture and normal construction equipment traffic operating over them. Accordingly, construction traffic should be kept to a minimum on the exposed soils to reduce the potential for creating an unstable subgrade.

4.1.2 PREVIOUSLY PLACED FILL MATERIAL

Apparent previously-placed fill material was encountered beneath the topsoil or topsoil/gravel mix at borings B-6 and B-8 to depths of about 4 and 3 feet below the existing ground surface, respectively. At B-6 the fill material consisted of firm Sandy SILT (ML) and loose Silty SAND (SM), and contained organic material (topsoil and roots). A Standard Penetration Test resistance (N-value) of 6 blows per foot (bpf) was recorded in the fill at B-6, suggesting poor compaction. At B-8 the fill material consisted of very dense Silty SAND (SM) with gravel and rock fragments. An N-value of 58 bpf was recorded in the fill at B-8. However, the N-value at B-8 was likely magnified by the rock fragments and gravel within the fill at that location.

In the absence of deleterious materials, it is difficult to differentiate previously placed fill and on-site soils that may have been moved during previous grading activities. Although previously placed fill was not readily apparent at other locations, it may exist based on the previous site development. The quality of man-made fills can vary significantly over short distances (i.e. between test locations) and with depth which makes it difficult, if not impossible, to accurately assess the engineering properties of existing fills. Fill can be composed of different soil types from various sources and can also contain debris, organics, topsoil, trash, etc. Furthermore, there is no specific correlation between N-values from Standard Penetration Tests (SPT) performed in soil borings and the degree of compaction of existing fill soils. As such, there is some risk in building over unmonitored and undocumented fill. Typical distress associated with building on uncontrolled fills may include but not be limited to excessive differential settlement over short distances, cracking of walls and floor slabs, bird baths in pavements, damage and distress to site utilities, etc. The decay of organic material in fill soils can increase these detrimental effects.

The engineering properties of fill depend primarily on its composition, density and moisture content. The best method for evaluating a previously graded and developed site, such as this one, is through full-time fill placement monitoring and documentation by an experienced engineering technician. PSI was not provided with field test data related to the fill placement and that documentation is expected not to exist. A subsurface exploration, performed after fill is placed, is limited in evaluating whether the fill materials were compacted in a controlled manner, regardless of the number of borings or amount of laboratory testing performed. Furthermore, there is not a direct correlation between standard penetration test resistances and percent fill compaction.

Due to the presence of undocumented, topsoil laden fill within the northeast site area (area of B-6), the potential exists for compromised performance of pavements in that area, as well as additional poorly compacted zones or deleterious materials in the fill between the boring locations. Therefore, we recommend the previously placed fill materials in the northeast site area (area of B-6) be completely undercut and removed from proposed development areas. Following this over-excavation, the fill material should be replaced with suitable, non-plastic structural fill, placed and compacted as described in Section 4.2 of this report.

If the owner is willing to accept the risk of poor pavement performance, then a portion of the materials may remain. At a minimum we recommend that the existing fill be removed to a depth of at least 1 foot below existing or finished grade, whichever is greater. Once the over-excavated area has been examined by the Geotechnical Engineer, to confirm suitable removals, the remaining fill soils at the bottom of the over-excavation should scarified to a depth of about 12 inches and compacted to 95% of the materials standard Proctor maximum dry density (per ASTM D698). Drying of the fill soil at the base of the over-excavation may be necessary prior to recompaction. Following compaction of the fill soils left in-place, the over-excavated fill material should be replaced with suitable structural fill, placed and compacted as described in Section 4.2 of this report.

Additional fill removal and replacement across other areas of the site (such as the area of B-8) will be determined by the recommended proofroll evaluation discussed in Section 4.2. In any event, the owner should be prepared for selective fill removal and replacement based on proofroll results and observation of excavations for foundations and utility installation during construction.

Based on the borings, some of the undercut fill soils may be suitable for reuse as structural fill provided they meet the conditions described in Section 4.2 and are free of debris, deleterious or organic materials. However, we caution that moisture conditioning (drying) of the existing fill soils may be required prior to reuse. The organic laden fill material encountered in the northeast site area (B-6) is not considered suitable for reuse as structural fill.

4.2 SITE PREPARATION AND EARTHWORK

Site clearing, stripping and grubbing operations should only be performed in dry weather conditions.

At the time of our site visit, the previous building, including foundations and slab, appeared to have been entirely removed. However, any remaining remnants of the previous construction including foundations, floor slabs, pavements, and utilities, as well as wet soils, topsoil, organics, debris, and other unsuitable materials, should be stripped from an area extending at least 10 feet beyond the outline of the proposed construction. Any existing below-grade construction encountered during site grading or construction should be examined by the Geotechnical Engineer to determine if these materials will require removal. Removal of the existing fill soils in the northeast pavement areas (area of B-6), as discussed in Section 4.1.2, and near-surface, high plasticity MH and CH soils, as discussed in Section 4.1.1, will also be required. Depressions or low areas resulting from stripping and removal of foundations, utility lines, buried banks and other subsurface appurtenances should be backfilled with compacted structural fill in accordance with the recommendations presented in this report. If a firm other than PSI provides soil compaction testing during backfilling, those compaction test reports should be provided to PSI to confirm that the excavations were properly backfilled and compacted.

Based on our project understanding and the minimal grading anticipated, the need for undercutting of shallow elastic residual MH and CH soils is anticipated over much of the site. Actual extents and depths of required undercut will be dependent upon final site grades and will be determined in the field by PSI personnel during grading operations. Areas receiving more than 2 foot of fill in the building area and 1 foot of fill in pavement areas may not require undercutting for slabs and pavements. We do not recommend that the on-site Elastic SILT (MH) and Fat CLAY (CH) soils be reused as structural fill.

After stripping, removal of unsuitable surface soils, and rough excavation grading, we recommend that areas to provide support for the floor slabs, pavements, and/or structural fill be evaluated for the presence of soft, surficial soils and/or plastic soils by proofrolling and inspection by the Geotechnical Engineer. We caution that the subgrade soils exposed after stripping contain sufficient silt and clay to render them both moisture sensitive and frost susceptible. Due to their moisture sensitivity, proper site drainage should be maintained during earthwork operations to reduce accumulation of moisture and wet weather delays. These soils will likely become unstable due to the presence of excess moisture and normal construction equipment traffic operating over them. Accordingly, construction traffic should be kept to a minimum on the exposed soils to reduce the potential for creating an unstable subgrade. If the surface soils become softened/unstable during wet weather or freeze cycles, these soils should be removed before additional fill is placed.

The proofroll should be performed using a loaded tandem axle dump truck, or similar rubber-tired equipment, weighing between 15 and 20 tons. The vehicle should make at least four passes over each location, with the last two passes perpendicular to the first two. Areas that wave, rut, or deflect significantly and continue to do so after several passes of the proofroller should be undercut to firmer soils as recommended by the Geotechnical Engineer. Undercut areas should be backfilled in thin lifts with approved, compacted fill materials. Proofroll operations should be monitored carefully by PSI's Project Geotechnical Engineer.

Drying soils for re-use as structural fill is often considered a routine aspect of typical grading operations and is not considered a pay item. Based on the in-situ moistures of the site soils, some drying should be expected prior to their use as fill. If unit prices for earthwork operations are established, they should be examined closely before the contract is executed. If undercutting is a pay item, then undercut volumes should be determined by field measurement. Methods such as counting trucks should not be used for determination of undercut volume, as they are less accurate.

Recommended criteria for soil fill characteristics (both on-site and imported materials) and compaction procedures are listed below. The project design documents should incorporate the following recommendations to address proper placement and compaction of project fill materials. Earthwork operations should not begin until representative samples are collected and tested. The maximum dry density and optimum moisture content should be determined at the onset of construction.

EARTH FILL MATERIALS

- Imported or on-site fill material satisfactory for structural fill should include clean soil material with USCS classifications of (SP, SW, SM, and some SC, CL or ML). The fill material should have a Standard Proctor (ASTM D698) Maximum Dry Density of at least 100 pcf, a maximum Liquid Limit of 50 and a Plasticity Index of 20 or less. Fat CLAY (CH) and Elastic SILT (MH) soils should generally not be used as structural fill.

- Organic content or other foreign matter (debris) should be no greater than 3 percent by weight, and no large roots (greater than ¼ inch in diameter) should be allowed. Organic materials should not be intentionally mixed into structural fill.

- Material utilized as fill should not contain rocks greater that 3 inches in diameter or greater than 30 percent retained on the ¾-inch sieve.

COMPACTION RECOMMENDATIONS

- Maximum loose lift thickness – 8 inches, mass fill. Loose lifts of 4 to 6 inches in trenches and other confined spaces where hand operated equipment is used.
- Compaction requirements – 95 percent of the maximum dry density and 98 percent within the upper 12 inches as determined by the standard Proctor (ASTM D698) compaction test.
- Soil moisture content at time of compaction – within ±3 percent of the optimum moisture content.

TEST CRITERIA TO EVALUATE FILL AND COMPACTION

- One standard Proctor compaction test and one Atterberg limits test for each soil type used as project fill. Gradation tests may be necessary and should be performed at the Geotechnical Engineer's discretion.
- One density test every 2,500 square feet for each lift or two tests per lift, whichever is greater (for preliminary planning only; the test frequency should be determined by our engineering staff).
- Trench fill areas – one density test every 75 linear feet at vertical intervals of 2 feet or less.

It will be important to maintain positive site drainage throughout construction. Storm water runoff should be diverted around the building and pavement areas. The site should be graded at all times such that water is not allowed to pond. The surface should be sealed with a smooth drum roller to enhance drainage if precipitation is expected. Subgrades damaged by construction equipment should be repaired immediately to avoid further degradation in adjacent areas and to help prevent water ponding.

Should there be a significant time lag or period of inclement weather between site grading and the fine grading of the slab prior to the placement of stone or concrete, the Geotechnical Engineer of Record or qualified representative should assess the condition of the prepared subgrade. The subgrade may require scarification and re-compaction or other remedial measures to provide a firm and unyielding subgrade prior to final slab construction.

4.3 SEISMIC CONSIDERATIONS

The project site is located within a municipality that employs the 2015 International Building Code® (IBC). As part of this Code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event, as well as the properties of the soils that underlie the site. As part of the procedure to evaluate seismic forces, the Code 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 Site Class for this project, we first interpreted the results of soil test borings drilled within the project site and estimated appropriate soil properties below the base of the borings to a depth of 100 feet, as permitted by the Code. The estimated soil properties were based upon our experience with subsurface conditions in the general site area.

Based upon the SPT N-values recorded during the field exploration, the subsurface conditions within the site are consistent with the characteristics of a ***Site Class "D"*** as defined in Table 1613.5.2 of the Code.

The associated IBC (2015) probabilistic ground acceleration values and site coefficients for the general site area were obtained from the USGS U.S. Seismic Design Maps Web Application (http://geohazards.usgs.gov/designmaps/us/application.php) and are presented in the table below:

Ground Motion Values for Site Class "D"*

Period (sec)	Mapped MCE Spectral Response Acceleration** (g)		Site Coefficients		Adjusted MCE Spectral Response Acceleration (g)		Design Spectral Response Acceleration (g)	
0.2	S_s	0.234	F_a	1.6	SM_s	0.374	SD_s	0.25
1.0	S_1	0.101	F_v	2.396	SM_1	0.242	SD_1	0.161

**2% Probability of Exceedance in 50 years for Latitude 35.28835 and Longitude -81.01861*
***At B-C interface (i.e. top of bedrock).*
MCE = Maximum Considered Earthquake

The Site Coefficients, F_a and F_v presented in the above table were obtained also from the noted USGS webpage, as a function of the site classification and mapped spectral response acceleration at the short (S_s) and 1-second (S_1) periods, but can also be interpolated from IBC Tables 1613.5.3(1) and 1613.5.3(2).

4.4 FOUNDATION RECOMMENDATIONS

Based on the subsurface exploration performed at the site and the recommended site preparation, the following recommendations are provided to support the proposed structure at the site.

SHALLOW FOUNDATIONS

Based on the results of the geotechnical exploration, we recommend that the proposed structure be supported on conventional shallow spread and wall footings. We recommend that footings be designed for a maximum net allowable soil bearing capacity of 2,000 psf. This recommendation assumes that the building foundations will bear in suitable bearing natural undisturbed soil and/or new structural fill placed and compacted in accordance with the recommendations of this report. We recommend continuous wall and column footings with minimum widths of at least 18 inches and 24 inches, respectively, regardless of the actual resulting bearing pressure. The recommended allowable soil bearing capacity may be increased by one-third for short term wind and/or seismic loads.

All foundation excavations should be evaluated for the presence of organic-laden and/or poorly compacted fill soils as well as high plasticity soils. If high plasticity soils (MH or CH) are found within 2 feet of the bearing level for foundations, these soils will have to be removed and replaced with low-plastic soils to a depth of at least 2 feet below the footing bottom. The replacement material should be low plasticity silt, clay, non-excavatable flowable fill, or lean concrete. Number 57 stone should not be used as backfill beneath foundations because of the tendency of water to accumulate in open-graded aggregate.

All foundations should bear at a minimum depth of 18 inches below the lowest adjacent final ground surface for frost penetration, and protective embedment. PSI recommends that the foundations be designed in accordance with the 2015 International Building Code.

We estimate that footings with width no larger than 3 feet, designed and constructed in accordance with the recommendations herein will experience post-construction total settlements generally less than 1-inch with differential settlement along a 40-foot long portion of a continuous footing, or similarly spaced column footings generally less than ½-inch. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the tolerance of the proposed structure to the predicted total and differential settlements should be confirmed by the structural engineer.

The base adhesion/frictional resistance and the passive soil resistance will resist the horizontal loads on shallow foundations. For a footing cast against natural soil or properly compacted fill, the adhesion/frictional resistance and the passive soil resistance values for both transient and sustained loading conditions are given herein. For sustained and transient loading conditions, a frictional coefficient of 0.35 and an allowable passive resistance of 225 psf per foot depth is recommended. Passive resistance from the upper two feet of soil should be neglected unless the area adjacent to the footing is paved. Also, the passive resistance of any un-compacted fill material should be neglected.

The uplift resistance of a shallow foundation formed in an open excavation will be limited to the weight of the foundation concrete and the soil above it. For design purposes, the ultimate uplift resistance should be based on effective unit weights of 110 and 150 pcf for soil and concrete, respectively. This value should then be reduced by an appropriate factor of safety to arrive at the allowable uplift load. If there is a chance of submergence, the buoyant unit weights should be used.

Foundation concrete should be placed as soon as possible after excavation. If foundation excavations must be left open overnight, or exposed to inclement weather, the base of the excavation should be protected with a “mud mat” consisting of a couple of inches of lean concrete. Footing excavations should be protected from surface water run-off and freezing. If water is allowed to accumulate within a footing excavation and soften the bearing soils, or if the bearing soils are allowed to freeze, the deficient soils should be removed from the excavation prior to concrete placement.

Footing excavations should be evaluated by the Geotechnical Engineer of Record, or his representative to determine that soils capable of supporting the recommended design bearing pressures are present at and immediately below the bearing level after excavation and prior to placement of reinforcing steel in the footing excavations. We recommend that the bearing soils at the bottom of and below the footing excavations be verified with a dynamic cone penetrometer to assess the suitability of the soils. A hand auger should be used to advance a borehole for this evaluation to a depth equal to at least the foundation width or 3 feet, whichever is greater.

If unsuitable bearing soils are encountered, these materials should be removed. The foundations can then be established at the new, lower bearing elevation, or the unsuitable material can be replaced with properly compacted fill, non-excavatable flowable fill, or lean concrete. If compacted structural fill is used as backfill, the undercut excavations to remove unsuitable materials should be centered beneath the footing and widened 1/2 foot in each direction for each foot of undercut depth, measured from the outside edge of the new foundation. If lean concrete or non-excavatable flowable fill is used as backfill, the foundation excavation need not be widened. Open graded stone, such as No. 57 stone, should not be used to backfill foundation excavations.

4.5 FLOOR SLAB RECOMMENDATIONS

Floor slabs may be supported on subgrades prepared in accordance with the SITE PREPARATION AND EARTHWORK section (paragraph 4.2) of this report. Depending upon grading, we anticipate that potentially expansive Elastic SILT (MH) and Fat CLAY (CH) residual soils will have to be removed and replaced with low plastic structural fill to a depth of 2 feet in slab areas. Additional undercutting may not be required in areas receiving more than 2 feet of new fill.

Where concrete slabs are designed as beams on an elastic foundation, the soils that will comprise the subgrade soils should be assumed to have a modulus of subgrade reaction (k) of 125 pounds per cubic inch (pci). This value is estimated based on the expected results of a plate load test using a nominal 12-inch square plate and should be adjusted for the size and geometry of the proposed slab.

In order to provide uniform support beneath any proposed floor slab-on-grade, we recommend that floor slabs be underlain by a minimum of 4 inches of compacted aggregate base course material. The estimated modulus of subgrade reaction after the addition of 4 inches of aggregate subbase material is 150 pci.

The aggregate base course material should be compacted to at least 98 percent of its standard Proctor maximum dry density. Open-graded crushed stone, such as No. 57 stone, may also be used; however, it is our experience that open graded crushed stone can collect water during periods of rain and cause saturation and softening of the subgrade soils prior to placement of the floor slab concrete. Therefore, construction sequencing/timing, and the season in which the stone is placed, should be taken into consideration.

The crushed rock base course is intended to provide a capillary break to limit migration of moisture through the slab. If additional protection against moisture vapor is desired or moisture sensitive floor coverings are proposed, a vapor retarding membrane may also be incorporated into the design; however, there are no specific conditions that mandate its use. Factors such as cost, special considerations for construction, and the floor coverings suggest that decisions on the use of vapor retarding membranes be made by the architect and owner. Based on the subsurface materials and the intended use of the structure, we recommend the use of a vapor retarding membrane. Vapor retarders, if used, should be installed in accordance with ACI 302.1, Chapter 3.

The precautions listed below should be closely followed for construction of slabs-on-grade. These details will not prevent the amount of slab movement but are intended to reduce potential damage should some settlement of the supporting subgrade take place.

- Cracking of slabs-on-grade is normal and should be expected. Cracking can occur not only as a result of heaving or compression of the supporting soil, but also as a result of concrete curing stresses. The occurrence of concrete shrinkage cracks, and problems associated with concrete curing may be reduced and/or controlled by limiting the water to cement ratio of the concrete, proper concrete placement, finishing, and curing, and by the placement of crack control joints at frequent intervals, particularly, where re-entrant slab corners occur. The American Concrete Institute (ACI) recommends a maximum panel size (in feet) equal to approximately three times the thickness of the slab (in inches) in both directions. For example, joints are recommended at a maximum spacing of 12 feet assuming a four-inch thick slab. We also recommend that control joints be scored three feet in from and parallel to all foundation walls. Using fiber reinforcement in the concrete can also control shrinkage cracking.

- Some increase in moisture content is inevitable as a result of development and associated landscaping; however, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices.

- All backfill in areas supporting slabs should be moisture conditioned and compacted as described earlier in this report. Backfill in all interior and exterior utility line trenches should be carefully compacted.

- Exterior slabs should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.

4.6 PAVEMENT DESIGN GUIDELINES AND PARAMETERS

4.6.1 PAVEMENT SUBGRADE PREPARATION

Following the stripping of deleterious materials, we recommend the proposed pavement subgrade be prepared and compacted in accordance with the recommendations provided in Section 4.2 "SITE PREPARATION AND EARTHWORK" of this report. Depending upon grading, we anticipate that potentially expansive Elastic SILT (MH) and Fat CLAY (CH) residual soils will have to be removed and replaced with low plastic structural fill to a depth of at least 1 foot in some pavement areas. Additional undercutting may not be required in areas receiving more than 1 foot of new fill.

We recommend proofrolling and re-compacting the upper six inches of subgrade immediately prior to placement of the ABC base course. The exposed pavement subgrade should also be evaluated by a representative of PSI immediately prior to placing ABC. If low consistency soils are encountered which cannot be adequately compacted in place, such soils should be removed and replaced with well-compacted soil fill or crushed stone materials.

Based upon the findings of our borings and the assumed grading, we anticipate residual SM or ML soils, or newly placed structural fill soils will be present at the subgrade elevation. A California Bearing Ratio (CBR) value of about 5 can be reasonably assumed for the residual ML mor SM soil or structural fill at compaction levels of about 98 percent of the standard Proctor maximum dry density within about 3 percent of optimum moisture.

Site grading is generally accomplished early in the construction phase. Subsequently as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, and rainfall. As a result, the pavement subgrade may not be suitable for pavement construction and corrective action will be required. The subgrade should be carefully evaluated at the time of pavement construction and subgrade areas should be reworked, moisture conditioned, and property compacted to the recommendations in this report immediately prior to paving.

Prevention of infiltration of water into the subgrade is essential for the successful long-term performance of any pavement. Both the subgrade and the pavement surface should be sloped to promote surface drainage away from the pavement structure.

4.6.2 FLEXIBLE PAVEMENT RECOMMENDATIONS

Specific traffic loading information was not provided at the time of this report. However, based on previous Taco Bell projects we anticipate that two types of pavements may be used: Flexible Asphalt Concrete (AC) surfaced pavement; and Rigid Portland Cement (PC) Concrete pavement. It is anticipated that the parking lot will be divided into two areas: 1) driving lanes, and 2) parking stalls. The driving lanes will be subjected to estimated daily traffic of 1,000 cars and five 20,000 - 25,000 pounds single axle load from trucks. The parking stalls will experience as many as 50 cars per day. Parking stall pavements will only be used in areas that will not receive truck traffic. This report is based on a twenty-year design period to determine minimum pavement thickness and subgrade preparation requirements.

A conservative California Bearing Ratio (CBR) value of 5 was assumed for the on-site low plasticity SILTS (ML), or newly placed structural fill, at compaction levels of 98 percent of the standard Proctor maximum dry density within about 3 percent of optimum moisture.

Based on our experience with similar facilities and subgrade conditions which are typical for this region, we recommend the following preliminary minimum pavement sections. Once detailed traffic information is available, actual pavement section calculations should be performed to develop the design sections.

PAVEMENT SECTION	MINIMUM MATERIAL THICKNESS (inches)			TOTAL PAVEMENT SECTION (inches)
	Graded Aggregate Base	Asphalt Course INTERMEDIATE (I-19.0B)	Asphalt Course SURFACE (S-9.5B)	
Parking Stalls	6	--	3	9
Driving Lanes	8	2 ½	1 ½	12

Notes: 1) Parking Stall Areas calculated based on traffic loading of 25,000 ESALS or less. Parking stalls only with no through traffic.

2) Driving Lanes calculated based on traffic loading of 100,000 ESALS or less.

Actual pavement section thickness should be provided by the design civil engineer based upon anticipated traffic loads, volume, and the owner's design life requirements. The above sections represent minimum thickness representative of typical, local construction practices, and as such periodic maintenance should be anticipated.

4.6.3 RIGID PAVEMENT RECOMMENDATIONS

The use of concrete for paving has become more prevalent in recent years due to the long-term maintenance cost benefits of concrete compared to asphaltic pavements. Proper finishing of concrete pavements requires the use of appropriate construction joints to reduce the potential for cracking. Construction joints should be designed in accordance with current Portland Cement Association guidelines. Joints should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils. The concrete should have a minimum compressive strength of 4,000 psi at 28 days. The concrete should also be designed with 5 ± 1 percent entrained air to improve workability and durability. All pavement materials and construction procedures should conform to NCDOT or appropriate city, county requirements.

Large front-loading trash dump trucks frequently impose concentrated front-wheel loads on pavements during loading. This type of loading typically results in rutting of the pavement and ultimately, pavement failures. Therefore, we recommend that the pavement in trash pickup areas consist of a minimum 6-inch graded aggregate base overlain by a minimum 6-inch thick, rigid pavement.

RIGID (CONCRETE) PAVEMENT	PARKING STALLS	DRIVING LANES
Portland Cement Concrete (4,000 psi)	5 inches	6 inches
Graded Aggregate Base (ABC)	4 inches	6 inches

4.7 PRELIMINARY RETAINING WALL DISCUSSION

The provided site plan indicates an existing retaining wall will be removed and a new wall about 120 feet long will be constructed along the south edge of the site. Additional information regarding this wall was not provided but we anticipate its maximum height will not exceed about four feet. The following preliminary soil parameters are provided to assist with the design of relatively short (less than 5 feet), conventional gravity walls. Depending on the proposed wall type, other soil parameters and recommendations may be required by the wall designer.

Assuming retaining wall foundations bear on Engineered Fill or properly compacted residual silty sand (SM) or sandy silt (ML) soils, a preliminary allowable soil bearing capacity of 2,000 psf can be used for design of wall foundations up to 5 feet in width. The recommendations provided in Section 4.4 should also be followed for retaining wall foundations. As project plans progress, the proposed walls should be evaluated for appropriate factors of safety against overturning, sliding and global stability. Wall settlement should also be evaluated for walls which will retain new fill.

Retaining walls must be capable of resisting the lateral earth pressures that will be imposed on them. Shear strength testing was not performed on the soils sampled during this exploration. However, based on the material types and our experience, the earth pressure coefficients detailed below are recommended.

Walls that will be laterally restrained and not free to deflect or rotate should be designed using the “at-rest” (Ko) earth pressure condition. Walls that are not restrained (retaining walls) and can tolerate the required movement can be designed using the “active” (Ka) earth pressure condition. A third condition, the "passive state" (Kp) represents the maximum possible pressure when a structure is pushed against the soil and is used in wall foundation design to help resist "active" or "at-rest" pressures. The earth pressure coefficients used in the design will depend upon the type of backfill used and the type of wall proposed.

Imported No. 57 stone or approved free draining granular soil typically is suitable for use as backfill within the “active” zone of retaining walls. Soils with Plasticity Index values greater than 10 (PI>10) should not be used for backfill behind the walls within the “active” zone. Additionally, soils with high mica content should not be considered for use as backfill behind the walls within the “active” zone. The “active” zone is typically modeled by an area extending rearward one foot from the base of the wall footing and then extending upward toward the ground surface at an inclination of 45 degrees.

Based on the results of our geotechnical exploration, we recommend the following lateral earth pressure coefficients be used for design purposes:

Lateral Earth Pressure Parameters

Material Group Symbol	Internal Friction Angle ϕ	Moist Unit Weight, γ (pcf)	Earth Pressure Coefficients		
			Active (K_a)	At-Rest (K_o)	Passive (K_p)
Free draining granular soil – Medium dense or greater	30	120	0.3	0.5	3.0
No. 57 Stone	36	110	0.26	0.41	3.85

Passive earth pressure of the soil adjacent to the footing, as well as soil friction at the footing base, may be used to resist sliding. Because significant wall movements are required to develop the "passive" earth pressure, the total calculated "passive" pressure may be reduced by one-half to two-thirds for design purposes. A coefficient of 0.30 could be reasonably assumed for evaluating allowable frictional resistance to sliding at the foundation (concrete)-soil contact. The design bearing pressure for the retaining wall foundations should correspond to the value provided earlier in this report.

The recommended earth pressure coefficients assume horizontal backfill, no external loading and that constantly functioning drainage systems are installed between walls and soil backfill to prevent the build-up of hydrostatic pressures and lateral stresses in excess of those stated.

Even though shallow groundwater may not be encountered, wall drainage is very important because of the potential for infiltration of surface water and water from other sources (leaks, irrigation, etc.). In addition, damp proofing should be applied to the outside of below grade walls. If a sufficient drainage system is not installed, the lateral earth pressures should be computed using the buoyant weight of the soil and the hydrostatic pressure due to the water must be added to the earth pressure to estimate the lateral earth pressure for design.

Special care should be taken while compacting the backfill behind retaining walls. Over-compaction of backfill behind retaining walls may result in the buildup of excessive lateral pressures, and potential structural distress. To avoid over-compaction of the backfill behind walls, we recommend that the backfill within 5 feet of the wall be compacted with small hand operated equipment to at least 95 percent of the maximum dry density of the standard Proctor as determined by ASTM D698. Heavy compactors and large pieces of construction equipment should not operate within 5 feet of the embedded wall to avoid the buildup of excessive lateral pressures unless the walls have been designed to accommodate these forces.

5 CONSTRUCTION CONSIDERATIONS

5.1 GROUNDWATER

Based on the results of the boring explorations, it appears that groundwater will not significantly impact the proposed construction. However, groundwater levels within this region tend to fluctuate with seasonal and climatic changes, and confined pockets of perched water often occur above the groundwater table. Generally, the highest groundwater levels occur in late winter and early spring; and the lowest levels in late summer and early fall. Therefore, water may be encountered during construction at depths not indicated during this study.

If groundwater is encountered, we recommend that the groundwater table be lowered and maintained at a depth of at least 2 feet below bearing levels and excavation bottoms during construction. Adequate control of groundwater could likely be accomplished by means of pumping from gravel-lined, cased sumps. However, the contractor should be responsible for selecting the most optimal dewatering method. If a sheet pile wall is installed to cut-off the groundwater seepage into the excavation, sump and pump technique can be employed to dewater the excavation pit. Furthermore, we recommend that the Contractor determine the actual groundwater levels at the time of construction to determine the groundwater impact on the construction procedures. The contractor should be prepared to promptly remove surface water from the general construction area by similar methods. If groundwater is encountered during trenching or foundation installation, PSI should be notified so that we might determine whether there is a need for underslab drainage, perimeter drains, or other recommendations for temporary or permanent dewatering.

5.2 EXCAVATION AND SAFETY

Based on the data available from the borings, anticipated excavations during site grading should encounter very stiff to hard and medium dense soils that can generally be removed by conventional earthmoving equipment such as pans, scrapers, and backhoes.

In evaluating grading considerations, please keep in mind that subsurface conditions, particularly the level and location of bedrock (boulder or massive form) vary erratically in the Piedmont Geologic Province of which Mecklenburg County and this site are parts. If large boulders or massive rock is encountered during the grading operations between boring locations, blasting may be necessary to facilitate removal. In addition, confined excavations such as utility trenches are more likely to require rock excavation techniques than large open cuts. All excavations should be sloped or shored in accordance with applicable OSHA regulations.

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its “Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P”. This document was issued to better allow for the safety of workers entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavations or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the Contractor could be liable for substantial penalties.

The Contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The Contractor's “responsible person”, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the Contractor’s safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in all local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the Contractor’s or other parties' compliance with local, state, and federal safety or other regulations. Groundwater control is critical to excavation safety and is described above.

6 REPORT LIMITATIONS

The recommendations submitted are based on the available subsurface information obtained by PSI and design details furnished by **Taco Bell Corporation** for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, we will not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

PSI warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area at the date of this report. No other warranties are implied or expressed.

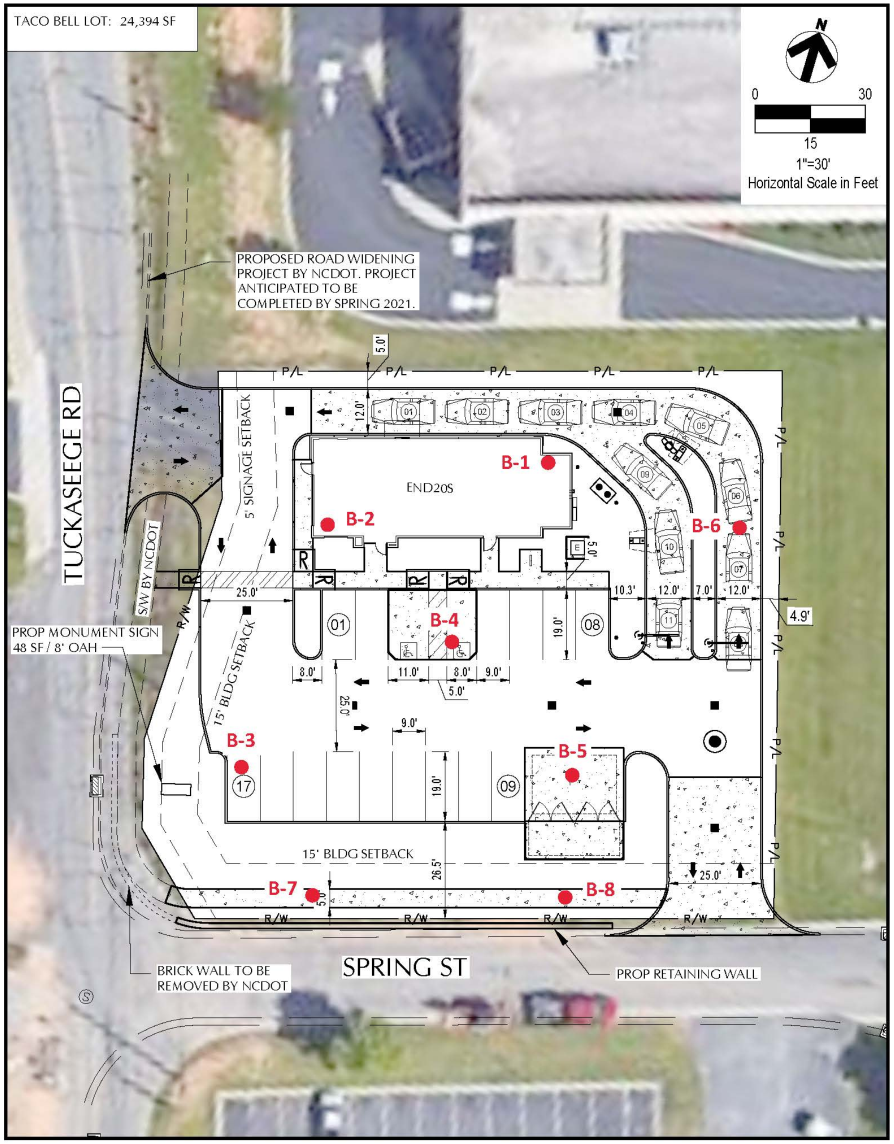
After the plans and specifications are more complete, PSI should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of **Taco Bell Corporation** and their consultants for the specific application to the **Proposed Taco Bell # 314703 located at 109 Tuckaseege Road in Mount Holly, North Carolina**.

APPENDICES

SITE VICINITY MAP

Project Name: **Taco Bell #314703** **109 Tuckaseege Road** **Mount Holly, North Carolina**	**2019 Base Aerial Obtained From Google Earth**	
Project No.: 05111012 / **Date:** June 2021	**Figure 1** **Site Vicinity Map**	intertek psi

BORING LOCATION PLAN



Legend

● Approximate Boring Location

Project Name: Taco Bell #314703 109 Tuckaseege Road Mount Holly, North Carolina		Base Drawing "Site Sketch" provided by Taco Bell, undated	
Project No.: 05111012	**Date:** June, 2021	**Figure 2** **Boring Location Plan**	intertek psi

GENERAL NOTES AND
SOIL CLASSIFICATION CHART

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
R.C.: Diamond Bit Core Sampler
H.A.: Hand Auger
P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
RC: Rock Core
TC: Texas Cone
BS: Bulk Sample
PM: Pressuremeter
CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N_{60}: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q_u: Unconfined compressive strength, TSF
Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL),%
DD: Dry unit weight, pcf
▼, ▽, ▼: Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

Q_U - TSF	N - Blows/foot	Consistency
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

Description	Criteria
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term	% Dry Weight
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

Description	Criteria
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided:	Fracture planes appear polished or glossy, sometimes striated

Description	Criteria
Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed:	Inclusion of small pockets of different soils
Layer:	Inclusion greater than 3 inches thick (75 mm)
Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

Q_U - TSF	Consistency
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

Description	Criteria
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

Component	Size Range
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

Rock Mass Description	RQD Value
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

BORING LOGS

BORING B-1

DATE STARTED:	6/24/21	DRILL COMPANY:	RLD
DATE COMPLETED:	6/24/21	DRILLER: Brewer	LOGGED BY: Steege
COMPLETION DEPTH	20.0 ft	DRILL RIG:	
BENCHMARK:	N/A	DRILLING METHOD:	Hollow Stem Auger
ELEVATION:	N/A	SAMPLING METHOD:	2-in SS, Standard
LATITUDE:		HAMMER TYPE:	Automatic
LONGITUDE:		EFFICIENCY	N/A
STATION: N/A	OFFSET: N/A	REVIEWED BY:	AOS

Water

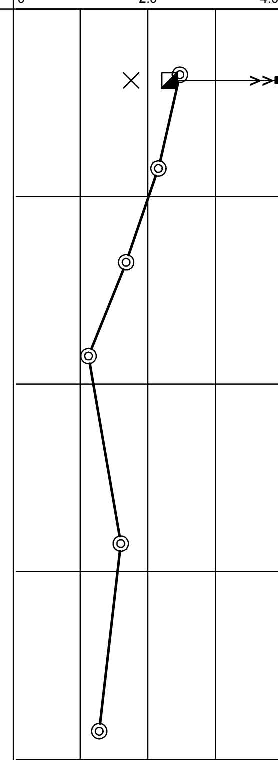
While Drilling	None
Upon Completion	Dry
Delay	N/A

BORING LOCATION: See Boring Location Plan

REMARKS: Borehole backfilled with the auger cuttings upon completion.

Elevation (feet)	Depth, (feet)	Sample No.	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0		**TOPSOIL** (3 inches)				
		1	**RESIDUUM** - Hard, Red/Brown, Sandy Fat CLAY - Moist	CH	9-14-17 N=31	22	LL = 54 PL = 29 Fines = 65.0%
	5	2	Medium Dense, Brown/Red, Silty SAND with Clay - Moist	SM	8-12-15 N=27		
		3			6-10-11 N=21		
	10	4	Stiff, Red, SILT with Fine Sand - Moist	ML	4-7-7 N=14		
	15	5	Medium Dense, Brown/Gray, Silty SAND - Moist	SM	8-10-10 N=20		
		6			5-7-9 N=16		
	20		Boring terminated at 20 feet.				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0



Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111012
PROJECT: Taco Bell # 314703
LOCATION: 109 Tuckaseege Road, Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-2

DATE STARTED:	6/24/21	**DRILL COMPANY:**	RLD
DATE COMPLETED:	6/24/21	**DRILLER:** Brewer	**LOGGED BY:** Steege
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS, Standard
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AOS

Water

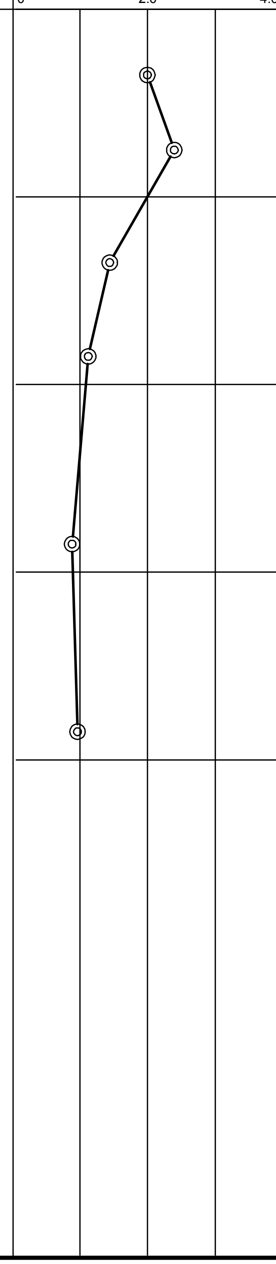
While Drilling	None
Upon Completion	Dry
Delay	N/A

BORING LOCATION:
See Boring Location Plan

REMARKS: Borehole backfilled with the auger cuttings upon completion.

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					**ASPHALT** (1 inch)				
				1		**RESIDUUM** - Very Stiff, Red/Brown, Sandy Elastic SILT - Moist	MH	6-11-14 N=25		
				2		Medium Dense, Red/Tan, Silty SAND with Clay - Moist	SM	10-14-16 N=30		
	5			3				6-9-9 N=18		
				4		Medium Dense, Pink/Brown/Gray, Silty SAND - Moist	SM	5-7-7 N=14		
	10									
	15			5				5-5-6 N=11		
	20			6				5-6-6 N=12		
						Boring terminated at 20 feet.				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0



intertek psi

Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111012
PROJECT: Taco Bell # 314703
LOCATION: 109 Tuckaseege Road
Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-3

DATE STARTED:	6/24/21
DATE COMPLETED:	6/24/21
COMPLETION DEPTH	20.0 ft
BENCHMARK:	N/A
ELEVATION:	N/A
LATITUDE:	
LONGITUDE:	
STATION:	N/A
OFFSET:	N/A
DRILL COMPANY:	RLD
DRILLER:	Brewer
LOGGED BY:	Steege
DRILL RIG:	
DRILLING METHOD:	Hollow Stem Auger
SAMPLING METHOD:	2-in SS, Standard
HAMMER TYPE:	Automatic
EFFICIENCY	N/A
REVIEWED BY:	AOS

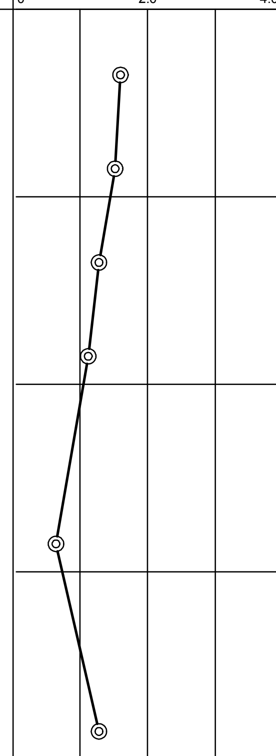
REMARKS: Borehole backfilled with the auger cuttings upon completion.

Water	
While Drilling	None
Upon Completion	Dry
Delay	N/A

BORING LOCATION: See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					**TOPSOIL** (1 inch)				
				1		**RESIDUUM** - Very Stiff, Red/Tan, Sandy Elastic SILT - Moist	MH	6-8-12 N=20		
				2		Medium Dense, Brown/Red, Silty SAND with Clay - Moist	SM	9-9-10 N=19		
	5			3				6-8-8 N=16		
				4		Medium Dense and Loose, Tan/Gray, Silty SAND - Moist	SM	5-7-7 N=14		
	10			5				5-3-5 N=8		
	15			6				7-8-8 N=16		
	20					Boring terminated at 20 feet.				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture PL LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0



intertek psi

Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.:	05111012
PROJECT:	Taco Bell # 314703
LOCATION:	109 Tuckaseege Road
	Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-4

DATE STARTED: 6/24/21 | DRILL COMPANY: RLD
DATE COMPLETED: 6/24/21 | DRILLER: Brewer | LOGGED BY: Steege
COMPLETION DEPTH 20.0 ft | DRILL RIG:
BENCHMARK: N/A | DRILLING METHOD: Hollow Stem Auger
ELEVATION: N/A | SAMPLING METHOD: 2-in SS, Standard
LATITUDE: | HAMMER TYPE: Automatic
LONGITUDE: | EFFICIENCY N/A
STATION: N/A OFFSET: N/A | REVIEWED BY: AOS

Water
- While Drilling: None
- Upon Completion: Dry
- Delay: N/A

BORING LOCATION: See Boring Location Plan

REMARKS: Borehole backfilled with the auger cuttings upon completion.

Depth, (feet)	Sample No.	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
0		**ASPHALT** (1 inch)				
		GRAVEL (4 inches)				
	1	**RESIDUUM** - Stiff to Very Stiff, Red/Brown, Elastic SILT - Moist	MH	3-4-7 N=11	33	LL = 79 PL = 39 Fines = 91.9%
5	2			6-8-11 N=19		
	3	Very Stiff, Red, SILT with Fine Sand, Clay - Moist	ML	4-6-10 N=16		
10	4	Medium Dense, Brown/Tan, Silty SAND with Clay - Moist	SM	6-9-9 N=18		
15	5	Medium Dense, Brown/Gray, Silty SAND - Moist	SM	4-5-6 N=11		
20	6			5-6-8 N=14		
		Boring terminated at 20 feet.				

STANDARD PENETRATION TEST DATA: N in blows/ft; Moisture; PL; LL (0, 25, 50). STRENGTH, tsf: Qu; Qp (0, 2.0, 4.0).

Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111012
PROJECT: Taco Bell # 314703
LOCATION: 109 Tuckaseegee Road, Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED:	6/24/21	**DRILL COMPANY:**	RLD
DATE COMPLETED:	6/24/21	**DRILLER:** Brewer	**LOGGED BY:** Steege
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS, Standard
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AOS

REMARKS: Borehole backfilled with the auger cuttings upon completion.

BORING B-5

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▽	Delay	N/A

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL 0 25 50 STRENGTH, tsf ▲ Qu ✳ Qp 0 2.0 4.0	Additional Remarks
	0					**TOPSOIL** (2 inches)					
				1		**RESIDUUM** - Medium Dense, Brown, Clayey SAND - Moist	SC	6-8-8 N=16			
				2		Medium Dense, Tan/Red, Silty SAND with Clay - Moist	SM	7-9-12 N=21			
	5			3				7-8-11 N=19			
				4		Medium Dense, Brown/Gray, Silty SAND - Moist		6-8-9 N=17			
	10										
				5			SM	5-6-8 N=14			
	15										
				6				7-12-14 N=26			
	20					Boring terminated at 20 feet.					

intertek psi

Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111012
PROJECT: Taco Bell # 314703
LOCATION: 109 Tuckaseege Road
Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-6

DATE STARTED:	6/24/21	**DRILL COMPANY:**	RLD
DATE COMPLETED:	6/24/21	**DRILLER:** Brewer	**LOGGED BY:** Steege
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS, Standard
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AOS

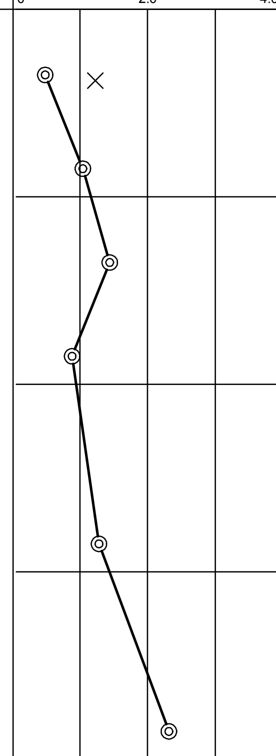
REMARKS: Borehole backfilled with the auger cuttings upon completion.

Water		
▽	While Drilling	None
▼	Upon Completion	Dry
▽	Delay	N/A

BORING LOCATION: See Boring Location Plan

Elevation (feet)	Depth, (feet)	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0				**TOPSOIL** (3 inches)				
		SS	1		**FILL** - Firm, Brown, Sandy SILT and Loose Silty SAND with roots and topsoil - Moist	ML-SM	5-3-3 N=6	15	
	5	SS	2		**RESIDUUM** - Stiff, Brown/Red, Sandy Elastic SILT - Moist	MH	4-5-8 N=13		
		SS	3		Very Stiff and Stiff, Brown/Red, SILT with Fine Sand - Moist	ML	5-8-10 N=18		
	10	SS	4				3-5-6 N=11		
	15	SS	5				5-8-8 N=16		
		SS	6		Medium Dense, Gray/Brown, Silty SAND - Moist	SM	8-13-16 N=29		
	20				Boring terminated at 20 feet.				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0



Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111012
PROJECT: Taco Bell # 314703
LOCATION: 109 Tuckaseege Road, Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-7

DATE STARTED:	6/24/21	**DRILL COMPANY:**	RLD
DATE COMPLETED:	6/24/21	**DRILLER:** Brewer	**LOGGED BY:** Steege
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS, Standard
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AOS

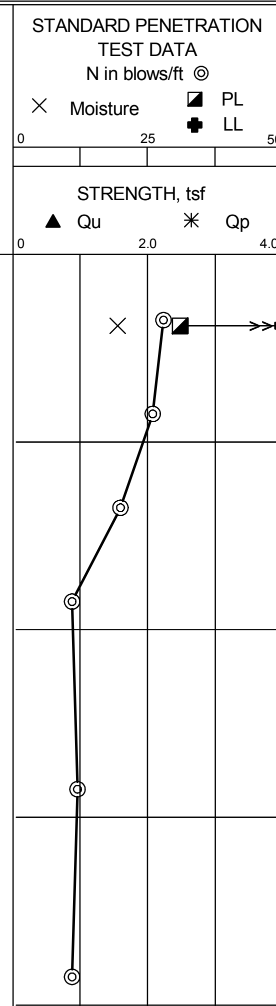
Water

While Drilling	None
Upon Completion	Dry
Delay	N/A

BORING LOCATION:
See Boring Location Plan

REMARKS: Borehole backfilled with the auger cuttings upon completion.

Elevation (feet)	Depth, (feet)	Sample No.	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0		**TOPSOIL** (1 inch)				
		1	**RESIDUUM** - Very Stiff, Red/Tan, Sandy Elastic SILT - Moist	MH	8-12-16 N=28	20	LL = 56 PL = 31 Fines = 60.9%
		2	Medium Dense, Red/Tan, Silty SAND with Clay - Moist	SM	8-11-15 N=26		
	5	3			6-8-12 N=20		
		4	Medium Dense, Pink/Brown/Gray, Silty SAND - Moist	SM	4-5-6 N=11		
	10						
		5			5-6-6 N=12		
	15						
		6			4-5-6 N=11		
	20		Boring terminated at 20 feet.				



intertek psi
Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111012
PROJECT: Taco Bell # 314703
LOCATION: 109 Tuckaseege Road
Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-8

DATE STARTED:	6/24/21	**DRILL COMPANY:**	RLD
DATE COMPLETED:	6/24/21	**DRILLER:** Brewer	**LOGGED BY:** Steege
COMPLETION DEPTH	20.0 ft	**DRILL RIG:**	
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS, Standard
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	AOS

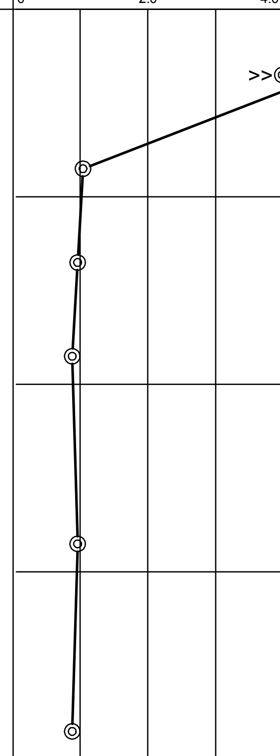
REMARKS: Borehole backfilled with the auger cuttings upon completion.

Water	
▽ While Drilling	None
▼ Upon Completion	Dry
▽ Delay	N/A

BORING LOCATION:
See Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					**TOPSOIL AND GRAVEL MIX** (8 inches)				
				1		**FILL** - Very Dense, Brown and Gray, Silty SAND and Gravel, Rock Fragments - Moist	SM	17-27-31 N=58		
				2		**RESIDUUM** - Medium Dense, Brown/Red, Silty SAND with Clay - Moist	SM	5-5-8 N=13		
	5			3				5-6-6 N=12		
				4		Medium Dense, Brown/Gray, Silty SAND - Moist	SM	4-5-6 N=11		
	10									
				5				4-5-7 N=12		
	15									
				6				5-6-5 N=11		
	20					Boring terminated at 20 feet.				

STANDARD PENETRATION TEST DATA
N in blows/ft ◎
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0



Professional Service Industries, Inc.
5021-A West W.T. Harris Boulevard
Charlotte, NC 28269
Telephone: (704) 598-2234

PROJECT NO.: 05111012
PROJECT: Taco Bell # 314703
LOCATION: 109 Tuckaseege Road
Mount Holly, NC

The stratification lines represent approximate boundaries. The transition may be gradual.