GeoScience

GEOTECHNICAL INVESTIGATION

Proposed "Mixed-Use Development"
E Broadway St & N Craig Rd intersection
Prosper, Texas

Project No. 22-DG3520

Prepared for:

PROSPER TEXAS CAPITAL LLC
McKinney, Texas

Prepared by:

GEOSCIENCE ENGINEERS, LLC
Dallas, Texas

December 2022

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GeoScience

Project No. 22-DG3520

December 28, 2022

Prosper Texas Capital LLC
1305 Hoyt Dr
McKinney, TX 75071

Geotechnical Investigation
Proposed "Mixed-Use Development"
E Broadway St & N Craig Rd intersection
Prosper, Texas

Geoscience Engineers, LLC. is pleased to submit this geotechnical investigation for the above referenced project located in Prosper, Texas. This report briefly describes the procedures employed in our subsurface exploration and presents the results of our investigation.

Our Construction Materials Testing Division can provide the materials testing services that will be required during the construction phase of this project. We will be pleased to discuss a scope of work and submit a proposal for these services upon request.

We appreciate the opportunity to be of assistance on this project. Please feel free to contact us if you have any questions or if we can be of further service.

Respectfully,

Geoscience Engineers, LLC
Firm Reg # F-11285

Alireza Noorzadi
Project Manager

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Project Engineer

STATE OF TEXAS
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INTRODUCTION

Project Description

This report presents the results of the geotechnical investigation performed at the site of the referenced project located in Prosper, Texas. Based on the information provided, construction will consist of multi-use buildings buildings along with associated pavement. Information regarding structural loads was not available at the time of this investigation; however, we anticipate the loads will be light. It is expected that the finished floor elevation of the proposed structure will be above surrounding ground surface. At the time of this investigation, site plan, grading plan and other information regarding the referenced project were not provided.

Site Description

The site of the referenced project is located at E Broadway St & N Craig Rd intersection, in the city of Prosper, Texas. Based on historic aerial photographs the site was developed with rough cut street. We highly recommend that all the existing structures, foundation and driveway must be cleared off the site prior to onset of any new construction activity. The general location and orientation of the site is shown in the **Illustrations** section of this report.

Purposes and Scope of Work

The principal purposes of this investigation were to evaluate the general soil conditions at the referenced site and develop recommendations for the design and construction of the proposed residential building. The principal purposes of this investigation were:

1). Developing subsurface soil and rock stratigraphy at the boring locations.

2). Evaluating soil swell potential and alternatives to reduce the soil movement.

3). Providing recommendations for foundation design parameters; and

4). Providing site preparation recommendations.

Report Format

The first sections of this report describe the field and laboratory phases of the study. The remaining sections present our engineering analyses and geotechnical parameters for the type of foundation system proposed for use at this site. Boring logs and laboratory test results are presented in the **Illustrations** section of this report.

FIELD INVESTIGATION

The field investigation of this study involved drilling and sampling a total of six (6) test borings to a depth of 12 to 15 feet due to hard stratum encountered below ground surface in area accessible to the drill rig. The approximate locations of the borings are shown on the Boring Location Plan Plate A. Logs of the borings with descriptions of the soils sampled are presented on Plates 1 to 6 Soil strata boundaries shown on the boring logs are approximate.

The borings were advanced using continuous flight auger techniques. Undisturbed surface cohesive soil samples were obtained using a 3-inch diameter thin-walled tube sampler pushed into the soil. The un-drained compressive strength of cohesive soils was estimated in the field using a calibrated pocket penetrometer.

To evaluate the relative density and consistency of harder formations, Texas Department of Transportation Cone Penetrometer tests were performed at selected locations. The actual test consists of driving a three-inch diameter cone with a 170-pound hammer freely falling 24 inches. In relatively soft materials, the penetrometer cone is driven one foot and the number of blows required for each six-inch penetration is tabulated at respective test depths, as blows per six inches on the boring log. In hard materials, the penetrometer cone is driven with the resulting penetrations, in inches, accurately recorded for the first and second 50 blows for a total of 100 blows. The penetration for the total 100 blows is recorded at the respective testing depths on the boring log

All soil samples were extruded from the samplers in the field, visually classified and wrapped in plastic bags to prevent loss of moisture or disturbance during transfer to the laboratory. The borings were drilled using dry auger procedures to observe water level at the time of the exploration. Water level observations are recorded on the boring logs.

LABORATORY TESTING

Engineering properties of the foundation soils were evaluated in the laboratory by tests performed on representative soil samples. A series of moisture content was performed to develop soil moisture profiles and to aid in evaluating the uniformity of soil conditions at this location. Liquid and Plastic limit tests (Atterberg limits) and free swell test were performed on selected soil samples to confirm visual classification and evaluate soil volume change potentials. All tests were performed using ASTM procedures by experienced technicians working under the direction of an engineer.

Review

Descriptions of strata made in the field were modified in accordance with laboratory tests results and visual examination in the laboratory. All recovered soil samples were examined, classified and described in accordance with ASTM D 2487, ASTM D 2488 and Unified Soil Classification procedures. Classifications of the soils and finalized descriptions of soil strata are shown on the attached boring logs.

GENERAL SUBSURFACE CONDITIONS

Localized Subsurface Stratigraphy

Based on our interpretation of the borings drilled for this investigation, the subsurface stratigraphy encountered at the location of test borings are:

Test boring B-1:

Depth (ft)	Stratigraphy
0 – 1	Dark brown CLAY (CH) with rock and debris - POSSIBLE FILL
1 – 2	Dark brown CLAY (CH) with calcareous nodules
2 - 5	Tan CALCAREOUS CLAY (CH) with limestone fragments
5 - 9	Tan weathered LIMESTONE with calcareous clay seams
9 - 15	Gray LIMESTONE

Test boring B-2:

Depth (ft)	Stratigraphy
0 – 2	Gray CLAY (CH) with calcareous nodules
2 – 4	Tan CALCAREOUS CLAY (CH) with limestone fragments
4 – 7.5	Tan weathered LIMESTONE with calcareous clay seams
7.5 – 12.5	Gray LIMESTONE

Test boring B-3:

Depth (ft)	Stratigraphy
0 – 3.5	Tan and brown CLAY (CH) with calcareous clay nodules
3.5 – 7.5	Tan weathered LIMESTONE with calcareous clay seams
7.5 – 12.5	Gray LIMESTONE

Test boring B-4:

Depth (ft)	Stratigraphy
0 – 2	Gray CLAY (CH) with calcareous nodules
2 – 3.5	Tan CALCAREOUS CLAY (CH) with limestone fragments
3.5 – 7	Tan weathered LIMESTONE with calcareous clay seams
7 – 12	Gray LIMESTONE

Test boring B-5:

Depth (ft)	Stratigraphy
0 – 1	Gray CLAY (CH) with calcareous nodules
1 – 3	Tan CALCAREOUS CLAY (CL) with limestone fragments
3 – 7	Tan weathered LIMESTONE with calcareous clay seams
7 – 12	Gray LIMESTONE

Test boring B-6:

Depth (ft)	Stratigraphy
0 – 1	Gray CLAY (CH) with rock and debris - POSSIBLE FILL
1 – 3	Tan and brown CALCAREOUS CLAY (CL) with limestone fragments
3 – 6	Tan weathered LIMESTONE with calcareous clay seams

Detailed descriptions of the subsurface stratigraphy encountered at the locations of the test borings drilled for this study are included in the **Illustrations** section of this report.

Subsurface Water Conditions

The borings were advanced using auger drilling method in order to observe groundwater seepage levels. No groundwater seepage was encountered in any of the test borings drilled at the time of this investigation. However, it should be noted future construction activities may alter the surface and subsurface drainage characteristics of the site, due to presence if high moisture content perched water may present atop of limestone. Therefore, the depth to groundwater should be verified during construction. If there is a noticeable change from the conditions reported herein, this office should be notified immediately to review the effect that it may have on the design recommendations. Based upon short-term observations, it is not possible to accurately predict the magnitude of subsurface water fluctuations that might occur.

ANALYSIS AND RECOMMENDATIONS

Construction Consultation and Monitoring

We recommend that *GeoScience* be given an opportunity to review the final design drawings and specifications to ensure that the recommendations provided in this report have been properly interpreted. Wide variations in soil conditions are known to exist between the boring locations. Furthermore, unanticipated variations in subsurface conditions may become evident during construction. During the excavation and foundation phases of the project, we recommend that a reputable Geotechnical Engineering firm be retained to provide construction surveillance services in order to 1) observe compliance with the geotechnical design concepts, specifications, and recommendations, and 2) observe subsurface conditions during construction to verify that the subsurface conditions are as anticipated, based on the borings drilled for this investigation.

Soil Movement

The near surface clay soils encountered at this site exhibited Plasticity Indices ranging between 20 and 42. These type soils are considered as *moderate to extremely highly expansive* in nature and capable of significant vertical movement as changes occur in moisture conditions. The magnitude of the moisture induced vertical movement was calculated using the Department of Transportation (method 124-E) in conjunction with current moisture content is on the order of 2 to 3.5 inches, if dry conditions exist during the period of construction, then the PVR will be higher than 3.5 inches, which is considered to be outside the design tolerable limits as such modifications to the subgrade soils are required to reduce the soil movement.

Considerably more movement will occur in areas where water ponding is allowed to occur during and/or after construction -or- fill soils other than select fill soils are planned for use. Site grading may also increase or decrease the potential for the movement.

The PVR can vary with prolonged wet as such we recommend that moisture content for the upper 7 feet or to the top of the limestone, whichever is encountered first, of the soils within the building pad and PVR should be evaluated prior to the construction. In order to reduce the effect of the settlement of the soils we recommend the fill soils and subgrade soils should be improved by adopting one of the following methods:

- *Rework/Moisture conditioning the fill and subgrade soils:*

To reduce the PVR to approximately one inch and to avoid settlement of fill soils, remove the subgrade soils to the top of limestone below finished grade and stockpile. The exposed surface should be watered to bind the reciving fill soils. The previously removed soils should be placed back in 6 to 8 inches loose lifts and mixed thoroughly to form a homogenous consistent soil and each lift should be compacted (as per ASTM D-698) to:

- 93 to 98 percent of the maximum dry density with the minimum moisture content of 4 points of optimum for soils with proctor PI more than 30

- 92 to 97 percent of the maximum dry density with a minimum moisture content of 4 points of optimum for soils with proctor PI higher than 30

- 94 to 98 percent of the maximum dry density with a minimum moisture content of 2 points of optimum for soils with proctor PI between 20 and 30

We recommend the improvements extend an additional 5 feet beyond the perimeter of the building pad and all the areas sensitive to the soil swell potential. Field density tests should be taken at the rate of at least one test per each 2,500 square feet or minimum of three tests per lift whichever is greater, in the area of all compacted fill. For areas where hand tamping is required, the testing frequency should be increased to approximately one test per lift, per 100 linear feet of area.

We recommend that during moisture conditioning the swell tests should be performed to ensure that the percent swell tested on the sample is less than 1%. Fulltime improvement testing will be required and a certification from the testing laboratory should be obtained to ensure that the swell potential of the soils has been adequately reduced for the design of the slab foundation.

The upper one foot of the soils should consist of select fill soils –or- flex base materials -or- onsite soils stabilized will lime.

In the event that select fill soil is planned to be used as a cap, then it should be placed in 6 to 8 inches loose lifts and compacted between 95 and 100 percent of the maximum dry density as per ASTM D 698 with moisture contents within three points of optimum moisture as per ASTM D 698. We recommend select fill soils not be extended beyond the building line; however, the perimeter outside the grade beam should be capped with high plasticity index clay soils in order to retard any water seepage underneath the foundation.

If the flex base is used as a cap atop of moisture conditioned soils, then the flex base should be placed in 6 to 8 inches loose lifts compacted to a minimum of 98 percent of maximum dry density as per ASTM D-698 and the moisture content should be between -2 to +3 percent points above optimum.

In the event that lime stabilization to the existing subgrade is planned as a cap, then it should be stabilized with a minimum of 36 pounds per square yard of lime for 6-inch-thick soil (lime series test is required).

Field density tests should be taken at the rate of at least one test per each 2,500 square feet, per lift, in the area of all compacted fill. For areas where hand tamping is required, the testing frequency should be increased to approximately one test per lift, per 100 linear feet of area.

Construction of the building slab should start shortly upon completion of the improvement process. After completion of the improvement if the construction is delayed then we recommend covering the moisture conditioned pad with an impermeable moisture barrier and 6 inches of soils should be spread on top of impermeable barrier until the time of construction to keep the moisture from evaporating.

FOUNDATION DESIGN CRITERIA

The foundation recommendations provided in the report are based on the soil information obtained from the test borings drilled for this site. During construction if the soils at the other location of building are found to be different than encountered at the location of the test borings then additional drilling of the test borings will be required.

A. Straight Shaft Pier Foundation

The structural loads can be supported by auger excavated straight-sided, cast-in-place, reinforced concrete piers. The piers should be founded at least 2 feet within gray limestone encountered at a depth of 7 to 9 feet or 5 feet within tan weathered limestone encountered at a depth of 3 to 5 feet. It should be noted that the depth to gray and tan weathered limestone may vary in other areas of the site.

The net allowable end bearing capacity and skin friction are as following:

Bearing Stratum	Minimum Embedded Depth (ft)	Net Allowable Bearing Capacity (psf)	Skin Friction (psf)	
			Compression	Tension
Gray Limestone	2	35,000	3,000	3,000
Tan weathered	5	15,000	2,500	2,500

The skin friction component should only be applied to the portion of the shaft located in the pier-bearing stratum below the recommended minimum penetration. We recommend that our firm should monitor the pier drilling operation in order to assure that the pier has been installed within limestone stratum.

Soil Induced Uplift Loads

The drilled shafts will be subjected to uplift loads due to heaving in the overlying clay soils. We recommend the uplift pressure can be approximated by assuming a uniform uplift of 1,800 psf over the shaft perimeter of 10 feet of pier or top of the tan limestone, whichever comes first. The uplift can be neglected the depth of select fill if placed to reduce the soil swell potential and can be reduced to 1,000 psf for the reworked/moisture conditioned soils. To resist the net tensile load, the shaft must contain sufficient continuous vertical reinforcement to the full depth of the pier.

Foundation piers designed and constructed in accordance with the information provided in this report will have a factor of safety in excess of 2.5 against shear type failure and will experience minimal settlement (less than one inch).

Pier Installation

The construction of all piers should be observed by experienced geotechnical personnel during construction to ensure compliance with design assumptions and to verify: (1) the bearing stratum; (2) the minimum penetration; (3) the removal of all smear zones and cuttings; (4) that groundwater seepage, if encountered, is correctly handled; and (5) that the shafts are vertical and within the acceptable tolerance levels.

Reinforcing steel and concrete should be placed immediately after the excavation has been completed and observed. In no event should a pier excavation be allowed to remain open for more than 8 hours. Concrete should be placed in such a manner as to prevent segregation of the aggregates. Subsurface conditions at the time our boring were advanced indicate that temporary casing will be required.

It should be noted that prior to the placement of concrete the water from the pier hole should be removed using a pump.

B. Shallow Footings

The foundation of the proposed building can be supported by spread footings. The spread footings should be installed at a minimum depth of 3 feet from the finished grade elevation installed within the re-worked soils or density-controlled flex base material.

The spread footings can be designed using a net allowable bearing pressure of 3,000 psf for flex base (a minimum of 2.5 feet of flex base is required below the installation depth of the footings, which is highly recommended). The placement of flex base should be performed as per the procedure outlined on page 7 of this report. the flex base should be a minimum of 1.5 feet beyond the footing line).

A net allowable bearing capacity of 1,500 psf can be used for re-worked soils however, we recommend the bottom of the spread footings should be compacted with jumping jack to minimum of 95 percent of maximum dry density prior to the placement of the concrete. These values include a factor of safety of 2.5 with respect to the un-drained shear strength of the foundation soils.

The bottom of the spread footings should be free of any loose and/or soft materials prior to concrete placement. A geotechnical engineer should evaluate each foundation excavation to ensure that the foundation bears within hard stratum.

Grade Beam and Floor Slab:

Grade beams should be structurally connected into the top of the piers or spread footings. The soils vertical movement should be reduced to more tolerable limits by reworking the fill and subgrade soils as per the procedures outlined in the previous sections of this report. The exterior grade beam depth should be 2.5 feet in depth and 15 inches in width and interior can be a minimum of 2 feet in depth and 12 inches in width.

In conjunction with drilled shafts or spread footing, a ground- supported slab may be considered for use at this site, providing the risk of some post-construction movement is acceptable.

Building Pad Preparation

Prior to the placement of fill soils, all existing vegetation, and loose soils (if any) should be removed until hard stratum is encountered. After removal of all above mentioned items, the soils swell movement should be reduced by moisture conditioning method as per the procedures outlined in previous sections of this report.

Additional fill soil if required should consist of select fill soil which should be placed and compacted as per the procedure outline on page 6 and 7 of this report.

PAVEMENT RECOMMENDATION

General

We have assumed that light passenger vehicle and heavier fire truck traffic will be most predominant. Based on assumed loading conditions, we have developed the following Portland Cement concrete pavement.

	Minimum Thickness (inches)
Street	
Portland Cement Concrete	6
Lime Stabilized Subgrade Soils	6
Compacted Subgrade Soils/Re-work of Fill*	6/24*

*Where fill soils are encountered

Prior to the placement of any fill in the pavement area, we recommend that all the existing vegetation, loose soils, trees and tree roots should be removed and disposed of off-site until hard stratum is encountered.

Due to the presence of the fill soils at this site, long-term settlement can occur. In order to reduce the settlement of the fill sols, the entire fill soils should be reworked. In the event re-working of the entire fill soils are not economical then a minimum of 2 feet of the fill should be re-worked; however, long-term pavement maintenance plan should be implemented.

For re-work of the fill soils, where encountered, we recommend that fill soils should be excavated and stockpiled, the exposed surface should be proof rolled then after passing the proof rolling scarified to a depth of 6 inches water as required and compacted between 95 and 100 percent of maximum dry density as per ASTM D 698 with the minimum moisture content between optimum and 4 points above optimum. The excavated fill soils can be placed back provided no objectionable material is present within the soils in 6 to 8 inches loose soils and compacted to the above specification.

In areas where fill soils are not present, after the removal of all the vegetation, the exposed surface should be proof rolled with heavy equipment. The exposed subgrade should be scarified to a depth of 6 inches water as required and compacted to 95 and 100 percent of maximum dry density as defined by ASTM D 698 (Standard Proctor Test), at moisture content between optimum and 4 points above optimum.

The upper six inches of subgrade soils should then be stabilized with lime. We estimate approximately 8 percent of hydrated lime (36 lbs/yard for 6-inch-thick-soil) will be required to stabilize the subgrade soils (to reduce the plasticity index to 15 or less). It should be noted that after the final grade is complete, the actual amount of lime required should be calculated by lime series test in the laboratory.

The lime stabilized soils should be compacted to a minimum of 95 percent of maximum dry density with the moisture content between optimum and 4 points above optimum. Field density tests should be taken at the rate of one test per every 2,500 square feet.

In lieu of lime stabilization to the subgrade soils, six inches of the flex base material can be used below the concrete pavement.

In the event lime stabilization or placement of flex base are not economically feasible then the thickness of concrete can be increased by an inch or city standards.

Some differential movement in the pavement is anticipated over time due to the swelling of the subgrade clays at this site. Design of the concrete pavement should specify a minimum 28-day concrete compressive strength of 3,600 psi for all the pavement and for city right of way with 4 percent to 6 percent entrained air. The concrete should be placed within one and one-half hours of batching. During hot weather, the concrete placement should follow ACI 311 Hot Weather concreting and in no case should the concrete temperature be allowed to exceed 95°F. To avoid excessive heat periods, consideration should be given to limiting concrete placement to a time of day that will minimize large differences in the ambient and concrete temperature.

Past experience indicates that pavements with sealed joints on 15 to 20-foot spacings, cut to a depth of at least one-quarter of the pavement thickness, generally exhibit less uncontrolled post-construction cracking than pavements with wider spacings. As a minimum, expansion joints should be used wherever the pavement abut a structural element subject to a different magnitude of movement, e.g., light poles, retaining walls, existing pavement, building walls, or manholes. After construction, the construction and expansion joints should be inspected periodically and resealed, if necessary. The pavement should be reinforced using at least No. 3 bars, 18 inches on center.

Select Fill

"Select fill," as referred to in this report, should consist of clayey sands free of organic materials with a Plasticity Index between 6 and 16, a Liquid Limit of 38 or less, and between 15 and 45 percent passing a No. 200 sieve.

Flex base

TxDOT 247 Type D Grade 1-2.

SITE GRADING and DRAINAGE

All grading should provide positive drainage away from the proposed structures and should prevent water from collecting or discharging near the foundations. Water must not be permitted to pond adjacent to the structures during or after construction.

Surface drainage gradients should be designed to divert surface water away from the buildings and edges of pavements and towards suitable collection and discharge facilities. Unpaved areas and permeable surfaces should be provided with steeper gradients than paved areas. Pavement drainage gradients within 5 feet of buildings should be constructed with a minimum slope of 1/4 inch per foot to prevent negative drainage gradients (ponding water conditions) from developing due to differential upward pavement movements. Sidewalk drainage gradients should be along maximum slopes allowed by local codes.

Roofs should be provided with gutters and downspouts to prevent the discharge of rainwater directly onto the ground adjacent to the building foundations. Downspouts should not discharge into any landscaped bed near the foundations. Roof downspouts and surface drain outlets should discharge into erosion-resistant areas, such as paving or rock riprap. Recessed landscaped areas filled with pervious sandy loam or organic soil should not be used near the foundation. Landscaped beds should be elevated above a compacted and well-graded clay surface. Sealed planters are preferred. All trees should be a minimum of one-half their mature height away from the building or pavement edges to reduce potential moisture losses. Water permitted to pond in planters, open areas, or areas with unsealed joints next to structures can result in on-grade slab or pavement movements, which exceed those, indicated in this report.

Exterior sidewalks and pavements will be subject to some post construction movement as indicated in this report. These potential movements should be considered during preparation of the grading plan. Flat grades should be avoided. Where concrete pavement is used, joints should be sealed to prevent the infiltration of water. Some post-construction movement of pavement and flatwork may occur. Particular attention should be given to joints around the building. These joints should be periodically inspected and resealed where necessary.

LANDSCAPING

Trees will remove water from the soil and, as a result, may cause the soil to shrink; therefore, in areas where pavement is planned, trees should either:

a). not be planted closer than the mature tree height from the building.

b). have a controlled irrigation system, or

c). be planted in containers.

Excess water ponding on or beside roadways, sidewalks and structural slabs may cause an unacceptable heave to these structures. To reduce this potential heave, good surface drainage should be established, and sprinkler systems should be designed and operated to minimize saturation of soil adjacent to these structures. Sprinkler mains next to buildings are not recommended.

Bedding soils for plants may collect and direct water underneath the buildings and pavements; therefore, care should be taken to ensure that water entering the bedding soils drains away from these structures. If positive drainage away from these structures cannot be achieved, an impermeable synthetic membrane should be considered to reduce the risk of water migrating beneath the buildings and pavements. An 18-inch-deep vertical water barrier along the pavement edge fronting landscaped areas may be desirable to help prevent irrigation water from having ready access to the soils beneath the pavement. Special attention should be given to provide good drainage from plantings inside the building courtyards and planter boxes.

The completed landscaping should be carefully inspected to verify that plantings properly drain. Soil in plantings may settle, which will tend to pond water, or plantings may block entrances to surface drains. Therefore, maintaining positive drainage from landscape irrigation will be an ongoing concern.

CLOSURE

It should be noted that some variations in soil and moisture conditions may exist between different parts of the site. Statements in this report as to subsurface variations over given areas are intended as estimations only, based upon the data obtained from specific borings location.

The results, conclusions, and recommendations contained in this report are directed at, and intended to be utilized within the scope of work outlined in this report. The report is not intended for use in any other manner. *Geoscience Engineers, LLC*. makes no claim or representation concerning any activity or condition falling outside the specified purposes for which this report is directed; said purposes being specifically limited to the scope of work as defined herein. Inquiries regarding scope of work, activities and/or conditions not specifically outlined herein, should be directed to *Geoscience Engineers, LLC*.

ILLUSTRATIONS

Approximate Boring Location

BORING LOCATION PLAN

Proposed "Mixed-Use Development"
E Broadway St & N Craig Rd intersection
Prosper, Texas

Project No.: 22-DG3520

Plate A

LOG OF BORING NO. B-1

GeoScience Incorporated

Proposed "Dog Daycare"
North of 1743 Commerce Dr.
Mansfield, Texas

Project No. 22-DG3492

Location: See Location Plan
Surface Elevation: Unknown
Drilling Method: CFA
Date Boring Drilled: 12/02/2022
Completion Depth: 20
Groundwater Information:
Seepage Encountered During Drilling: None
Upon Completion: Dry

DEPTH (ft.)	SOIL & ROCK SYMBOL	SAMPLE TYPE	P: HAND PEN., TSF T: THD, BLOWS/FT. N: SPT, BLOWS/FT.	STRATUM DEPTH (FT.)	DESCRIPTION OF STRATUM	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNIT DRY WEIGHT (PCF)	UNCONFINED STRENGTH (TSF)	% PASSING NO. 200 SIEVE	SOIL SUCTION TEST (TOTAL CM. OF WATER)
0			P2.25		Dark brown CLAY(CH) with silty sand seams	30						76	
			P4.5+			18	63	23	40				
5			P4.5+	6.0		17							
			P4.5+		Tan and gray SHALY CLAY (CH)	16							
			P4.5+			15	66	24	42				
10													
			P4.5+		-with bentonite seams below 13'	31				90	1.5	81	
15													
			P3.5	20.0		33							
20													
25													
30													

TUBE SAMPLE	AUGER SAMPLE	SPLIT-SPOON	ROCK CORE	THD CONE PEN.	NO RECOVERY

REMARKS:

LOG OF BORING NO. B-2

Proposed "Dog Daycare"
North of 1743 Commerce Dr.
Mansfield, Texas

Project No. 22-DG3492

Location: See Location Plan
Surface Elevation: Unknown
Drilling Method: CFA
Date Boring Drilled: 12/02/2022
Completion Depth: 20
Groundwater Information:
Seepage Encountered During Drilling: None
Upon Completion: Dry

DEPTH (ft.)	SOIL & ROCK SYMBOL	SAMPLE TYPE	P: HAND PEN., TSF T: THD, BLOWS/FT. N: SPT, BLOWS/FT.	STRATUM DEPTH (FT.)	DESCRIPTION OF STRATUM	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNIT DRY WEIGHT (PCF)	UNCONFINED STRENGTH (TSF)	% PASSING NO. 200 SIEVE	SOIL SUCTION TEST (TOTAL CM. OF WATER)
0		Tube	P2.0		Dark brown CLAY(CH) with silty sand seams	30	70	25	45				
		Tube	P2.25			29				91	1.5	83	
5		Tube	P4.5+	5.0		20							
		Tube			Tan and gray SHALY CLAY (CH)								
		Tube	P4.5+			20							
		Tube	P4.5+			19							
10													
		Tube	P4.5+		-with bentonite seams below 13'	34	92	30	62				
15													
		Tube	P4.5+	20.0		29							
20													
25													
30													

TUBE SAMPLE	AUGER SAMPLE	SPLIT-SPOON	ROCK CORE	THD CONE PEN.	NO RECOVERY

REMARKS:

LOG OF BORING NO. B-3

Proposed "Dog Daycare"
North of 1743 Commerce Dr.
Mansfield, Texas

Project No. 22-DG3492

GeoScience Incorporated

Location: See Location Plan
Surface Elevation: Unknown
Drilling Method: CFA
Date Boring Drilled: 12/02/2022
Completion Depth: 20
Groundwater Information:
Seepage Encountered During Drilling: None
Upon Completion: Dry

DEPTH (ft.)	SOIL & ROCK SYMBOL	SAMPLE TYPE	P: HAND PEN., TSF T: THD, BLOWS/FT. N: SPT, BLOWS/FT.	STRATUM DEPTH (FT.)	DESCRIPTION OF STRATUM	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNIT DRY WEIGHT (PCF)	UNCONFINED STRENGTH (TSF)	% PASSING NO. 200 SIEVE	SOIL SUCTION TEST (TOTAL CM. OF WATER)
0			P1.5		Dark brown CLAY(CH) with silty sand seams	32							
			P1.75			30						79	
5			P4.5+			21							
			P4.5+	8.0	-tan below 7'	18	68	24	44				
			P4.5+		Tan and gray SHALY CLAY (CH)	19							
10													
			P4.25		-with bentonite seams below 13'	37							
15													
			P4.5	20.0		27	85	28	57	91	1.6	96	
20													
25													
30													

TUBE SAMPLE	AUGER SAMPLE	SPLIT-SPOON	ROCK CORE	THD CONE PEN.	NO RECOVERY

REMARKS:

LOG OF BORING NO. B-4

Proposed "Dog Daycare"
North of 1743 Commerce Dr.
Mansfield, Texas

Project No. 22-DG3492

Location: See Location Plan
Surface Elevation: Unknown
Drilling Method: CFA
Date Boring Drilled: 12/02/2022
Completion Depth: 5
Groundwater Information:
Seepage Encountered During Drilling: None
Upon Completion: Dry

DEPTH (ft.)	SOIL & ROCK SYMBOL	SAMPLE TYPE	P: HAND PEN., TSF T: THD, BLOWS/FT. N: SPT, BLOWS/FT.	STRATUM DEPTH (FT.)	DESCRIPTION OF STRATUM	WATER CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNIT DRY WEIGHT (PCF)	UNCONFINED STRENGTH (TSF)	% PASSING NO. 200 SIEVE	SOIL SUCTION TEST (TOTAL CM. OF WATER)
0			P2.5		Dark brown CLAY(CH) with silty sand seams	28							
			P3.0			26				96	1.7	74	
5			P4.5+	5.0		18	64	23	41				
10													
15													
20													
25													
30													

TUBE SAMPLE	AUGER SAMPLE	SPLIT-SPOON	ROCK CORE	THD CONE PEN.	NO RECOVERY

REMARKS:

GEOLOGY INFORMATION