



ECS SOUTHWEST, LLP

Geotechnical Engineering Report

Express Oil – Seguin

TX 46 near Best Drive
Seguin, Guadalupe County, Texas

ECS Project No. 20:2586

April 21, 2026





April 21, 2026

Mr. Tyler Hendon
Express Oil Change, LLC
1880 Southpark Drive
Birmingham, Alabama 35244

ECS Project No. 20:2586

Reference: Geotechnical Engineering Report
Express Oil - Seguin
TX 46 near Best Drive
Seguin, Guadalupe County, Texas

Dear Mr. Hendon:

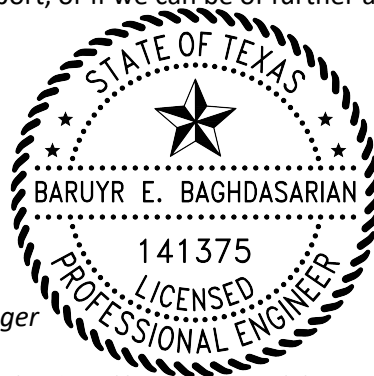
ECS Southwest, LLP (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to Express Oil Change, LLC (Client) during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions presented for this report. Should you have questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Southwest, LLP


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EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal geotechnical recommendations are summarized. Information gleaned from the Executive Summary should not be utilized in lieu of reading the geotechnical report in its entirety.

- The predominant geotechnical and geological considerations that need to be addressed at the site are the expansive clays.
- Groundwater was not encountered in the borings. For specific subsurface information refer to the Boring Logs in Appendix B.
- We estimate the existing Potential Vertical Rise (PVR) to be up to about than 1½ inches at this site. Therefore, mitigation of expansive soil-related movements is recommended. We understand the oil pits will be at least 6 feet in depth which will result in a PVR of about 1 inch within the oil pit footprint.
- The planned structure can be supported by a shallow foundation system.
- Rigid concrete and/or flexible asphalt pavements can be used at this site.
- It is recommended that ECS conduct a geotechnical review of the project plans (prior to issuance for construction) to check to see that ECS' geotechnical recommendations have been properly interpreted and implemented.
- To avoid misinterpretation of our recommendations, ECS should be retained to perform quality control testing and documentation during construction of the earthwork and foundation for the project.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for earthwork and the design and construction of the foundations, floor slabs, below grade walls, and pavements for the planned development to be located off TX 46 near Best Drive in Seguin, Texas. The recommendations developed for this report are based on project information supplied by the Client.

Our services were provided in general accordance with our Proposal No. 20:3823-GP, dated March 11, 2026, which includes our Terms and Conditions. Mr. Hendon with Express Oil Change, LLC authorized our services by signed authorization of our proposal on March 12, 2026.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items.

- A brief review and description of our field and laboratory test procedures and the results of the testing conducted.
- A review of surface topographical features and site conditions.
- A review of area and site geologic conditions.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Final soil exploration for the boring logs
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills and identification of potentially inadequate soils and/or soils exhibiting excessive moisture at the time of sampling.
- Recommendations for foundation design and construction.
- Recommendations for below grade wall design and construction.
- Recommendations for pavement design and construction.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The project site is located near the intersection of TX 46 and Best Drive in Seguin, Texas. The site is approximately a 62,600 square foot undeveloped lot and is approximately 350 feet northwest of the intersection. The site is currently covered with grass with a localized area of trees. The site location is outlined in RED in the figure below and on the Site Location Diagram included in Appendix A.



Site Location

After a review of Google Earth Pro historical aerial imagery indicates that the site was used for agricultural purposes up to about December 2018. The site appears to have remained unused and undeveloped since then.

A review of Google Earth Pro topographic indicates that the site appears to slope downward in a southwest direction from approximate elevations EL 547 feet MSL to EL 544 feet MSL.

2.2 PROPOSED CONSTRUCTION

Based on the discussion outlined above, a geotechnical study is required for the proposed Express Oil building and related structures, pavements, and utilities. The table below provides a summary of the project characteristics of the planned development including proposed buildings and related infrastructure.

SUBJECT	DESIGN INFORMATION / ASSUMPTIONS
Building Footprint	Approximately 6,800 square feet
Number of Stories	Single-story with below grade oil pits
Building Construction Type	Metal structure
Max. Design Column Loads	Anticipated 25 kips
Max. Design Wall Loads	Anticipated 2.5 kips per linear foot (klf)
Max. Design Floor Loads	Anticipated 125 psf
Finished Floor Elevation	Anticipated within 2 feet of existing grades

If ECS' understanding of the project is not correct, especially if the structural loads are different, please contact ECS so that we may review these changes and revise our recommendations as appropriate.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

The field exploration was planned with the objective of characterizing the project site in general geotechnical and geological terms and to evaluate subsequent field and laboratory data to assist in the determination of geotechnical recommendations.

Our scope of work included drilling a total of ten (10) borings ranging in depths of approximately 5 to 20 feet below the existing site grades. A truck-mounted drill rig with continuous flight augers was utilized to drill the borings. Our borings were located with a handheld GPS unit, and their approximate locations are shown on the Boring Location Diagram in Appendix A. The ground surface elevations noted in this report were obtained from Google Earth Pro.

Representative soil samples were obtained by means of the Shelby tube sampling procedure in accordance with ASTM Specification D-1587. In the Shelby tube sampling procedure, a thin-walled, steel seamless tube with sharp cutting edges is pushed hydraulically into the soil, and a relatively undisturbed sample is obtained. Samples were removed from samplers in the field, visually classified, and appropriately sealed in sample containers to preserve their in-situ moisture contents. Samples of cohesive soil were tested with a calibrated hand "pocket" penetrometer. In this test, the unconfined compressive strength of a soil sample is estimated to be a maximum of 4.5 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a small diameter, calibrated, spring-loaded cylinder.

Representative soil samples were obtained by the split-barrel sampling procedure in accordance with ASTM Specifications D-1586. In the split-barrel sampling procedure, a 2-inch O.D., split-barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through a 12-inch interval is termed the Standard Penetration Test (SPT) value and is indicated for each sample on the boring logs. In the Shelby tube sampling procedure, a thin walled, steel, seamless tube with sharp cutting edges is pushed hydraulically into the soil, and a relatively undisturbed sample is obtained.

Field logs of the soils encountered in the borings were maintained by the drill crew. After recovery, each geotechnical soil sample was removed from the sampler and visually classified. Representative portions of each soil sample were then wrapped in plastic and transported to our laboratory for further visual examination and laboratory testing. After completion of the drilling operations, the boreholes were backfilled with auger cuttings to the existing ground surface.

3.1 SUBSURFACE CHARACTERIZATION

Based on our review of the Geologic Atlas of Texas, Seguin Sheet, the project site is underlain by the Fluvial Terrace Deposits (Qt). The Fluvial Terrace Deposits consists of three or more layers, which may correspond to the coastal Pleistocene units. Those units being gravel, sand, silt, and clay in various proportions with gravel be more prominent in the older, higher terraces. Gravels along the Guadalupe River are siliceous coarse, while those gravels along the Colorado River are mostly limestone, chert, quartz, and various igneous and metamorphic rocks from the Llano region and Edwards Plateau. The sands are mostly quartz.

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil strata. Please refer to the boring logs in Appendix B.

STRATUM	APPROXIMATE RANGE OF DEPTH (FEET)	MATERIAL DESCRIPTION	N ⁽¹⁾ RANGE	pp ⁽²⁾ RANGE
I	0 to 6	(CL) LEAN CLAY WITH SAND, dark brown	8 to 14	4.50+
II	0 to 6	(CL) LEAN CLAY WITH SAND, brown	10 to 22	4.50+
III ⁽³⁾	4½ to 8½	(CL) LEAN CLAY WITH SAND, (CL) SANDY LEAN CLAY, light brown	9 to 23	---
IV	6½ to 20	(CL) SANDY LEAN CLAY, tan	21 to 55	---

Notes: (1) Standard Penetration Test (SPT) Value, blows per foot.
(2) Pocket Penetrometer (PP), tons per square foot.
(3) Only encountered in Borings B-01 and B-02.

A graphical presentation of the subsurface conditions is shown on the Generalized Subsurface Profile included in Appendix A.

3.2 GROUNDWATER OBSERVATIONS

Groundwater level observations were made in the borings during drilling operations. In auger rotary drilling operations, water is not introduced into the borehole, and the groundwater position can often be found out by observing water flowing into the excavation. Furthermore, visual observation of soil samples retrieved can often be used in evaluating the groundwater conditions.

Groundwater was not observed during or upon completion of drilling the borings at the site. Upon completion of field operations, the boreholes were backfilled with soil cuttings generated during our field operations.

Water levels in open excavations may require several hours to several days to stabilize depending on the permeability of the soils and that groundwater levels at the site may be subject to seasonal conditions, recent rainfall, drought, or temperature effects. Clays are generally not conducive to the presence of groundwater; however, gravels, sands and silts, and open fractures and solution features; where present, can store and transmit “perched” groundwater flow or seepage.

The groundwater conditions at this site are expected to be significantly influenced by surface water runoff and rainfall and should be evaluated just prior to construction. Specifically, rainfall that enters the site, either directly from overland flow or adjacent properties, begins to percolate through surficial soils and within granular seams and fissures. This groundwater flow continues downhill with the water table

occasionally surfacing to form wet springs and intermittent streams. In low-lying areas and areas adjacent to existing creeks or ponds, shallow groundwater tables can be present continuously.

3.3 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples in general accordance with the following standards:

LABORATORY TEST	TEST STANDARD
Moisture Content	ASTM D2216
Sieve Analyses	ASTM D1140
Atterberg Limits	ASTM D4318

The samples were classified on the basis of texture and plasticity in general accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The USCS classification symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

Samples not tested in the laboratory are planned to be stored for a period of 60 days subsequent to submittal of this report and discarded after this period, unless we receive alternate instructions regarding their disposition.

4.0 DESIGN RECOMMENDATIONS

The following recommendations have been developed based on the previously described project characteristics and subsurface conditions. If there are changes to the project characteristics or if different subsurface conditions are encountered during construction, ECS should be consulted so that the recommendations of this report can be reviewed.

Site grading information was not available during the preparation of this report; however, we have considered final grades will be within 2 feet of the existing grades. If the finished ground surface elevations deviate from this grade, the recommendations provided below should be evaluated by our office.

4.1 POTENTIAL VERTICAL RISE

Structural damage and/or cosmetic/operational distress can be caused by volume changes in clay soils. The expansive clays found at this site are capable of swelling and shrinking in volume dependent on potentially changing soil water conditions during or after construction. Clays can shrink when they lose water and swell (increase in volume) when they gain water. The potential of expansive clays to shrink and swell is related to; amongst other things, the Plasticity Index (PI). Clays with a higher PI generally have a greater potential for soil volume changes due to moisture content variations.

We have estimated potential heave for this site utilizing the TxDOT PVR method (Tex-124-E). The Tex-124-E method provides an estimate of Potential Vertical Rise (PVR) using the liquid limits, plasticity indices, grain size analyses, and water contents of the soils. The PVR is estimated in the seasonally active zone, which was estimated to be about 15 feet at this site.

Estimated PVR values are based upon anticipated typical changes in soil moisture content from a dry to wet condition; however, soil movements in the field depend on the actual changes in moisture content. Thus, actual soil movements could be less than that calculated if little soil moisture variations occur or could exceed the estimated values if actual soil moisture content changes are greater than anticipated. These conditions can occur as the result of excessive droughts, flooding, “perched” groundwater infiltration, poor surface-drainage, excessive irrigation adjacent to building foundation, and/or leaking irrigation lines or plumbing.

We estimate the existing PVR at the site to be up to about 1½ inches. We understand the building will have oil pits approximately 6 feet below grade under the oil change portion of the building. The estimated PVR will be about less than 1 inch base on the oil pits bearing approximately 6 feet below final grade. ECS recommends the PVR for the proposed areas not associated with the oil changing pits that are within the building pad to be improved to approximately 1 inch. Subgrade improvements for building pad area to reduce the PVR to about 1 inch are provided in Section 4.2.

In this general area, it is common for structural and geotechnical engineers to consider a PVR of approximately 1 inch to be within desirable tolerances for a building founded on properly designed slab-on-grade foundation systems. However, this movement does not take into consideration the movement criteria required or perceived by the facility owner or occupants. These “operational” performance criteria may be, and often are, more restrictive than the structural criteria or tolerances.

A grade-supported foundation or floor slab movements that approach 1 inch may cause doors to stick, cracks in sheetrock or brittle floor covering, cracks in exterior finishes and other forms of cosmetic distress. Measures can and should be taken during the design and construction of the facility to help limit the extent and severity of these types of distress. However, these magnitudes of movement typically do not cause “structural distress.”

Where movement sensitive flatwork is planned to be constructed adjacent to the building, consideration should be given to reducing the PVR value in the flatwork areas to reduce differential movements and associated door jamming, tripping hazards, etc. Doweling the flatwork to the building foundation at common openings can further help reduce the potential for differential movements and trip hazards.

4.2 SUBGRADE IMPROVEMENTS

For building slabs that will be supported on grade, or pavements and flatwork sensitive to movements, we recommend subgrade improvements. In order to achieve a uniform PVR and minimize the risk associated with future movements, we recommend the subgrade in the building area be improved to reduce the PVR to about 1 inch as recommended in the sections below.

Please note the building area is defined as the area directly beneath and at least 5 feet (horizontal) beyond the perimeter of the proposed building and appurtenances. Appurtenances are those items attached to the structure, typically including, but not limited to, the sidewalks, porches, ramps, stoops, etc.

4.2.1 Over-Excavate and Replace with Select Fill

To reduce the PVR to about 1 inch at this site, the planned building pad area can be prepared as recommended below:

- Prior to placement of the foundation system and/or fill, over-excavate at least 2 feet below the existing grades in the building area.
- After over-excavating at least 2 feet, place and compact on-site soils or select fill to the bottom of the building and oil pit pads. *Please note additional select fill will be required if existing grades are to be raised.*
- To provide a more consistent slab support and create a more weather resistant work surface, the final 6 inches of the building and oil pit slabs could be constructed with flexible base (optional).

4.2.2 Perimeter Conditions

The upper 18 inches of soil placed along the exterior of the structure should consist of clayey soils placed and compacted in accordance with this report. The purpose of this clay backfill is to reduce the opportunity for surface or subsurface water infiltration beneath the structure. This clay layer may be replaced with asphalt or concrete pavement that extends to the edge of the structure foundation. Additionally, where penetrations into the structure such as utility trenches occur, a clay plug (or a synthetic alternative) should be placed at the building lines to reduce the opportunity for infiltrating water, regardless of the selected building pad materials.

Positive drainage away from the structures should also be provided. Soil areas within 10 feet of the buildings should slope at a minimum of 5 percent away from the structure. Adjacent pavements and concrete hardscape should slope at 1½ to 2 percent away from the structure. Roof leaders and downspouts should discharge onto paved surfaces sloping away from the structure or into a closed pipe system which outfalls to the street gutter pan or directly to the storm drain system.

Additionally, irrigation of lawn and landscaped areas should be moderate, with approximately no excessive wetting or drying of soils around the perimeter of the structures allowed. Trees and bushes/shrubs planted near the perimeter of the structures can withdraw large amounts of water from the soils and should be planted at least one-half their anticipated mature height away from the buildings. Where flatwork is placed against or near the structure, a positive seal should be installed and adequately maintained to reduce water intrusion.

Routine maintenance is required in an effort to ensure that the recommendations contained in this report are followed and maintained. Greater potential movements could occur with extreme wetting or drying of the soils due to poor drainage, ponding of water, plumbing leaks, lack of irrigation, and/or lack of routine maintenance, etc.

4.3 SHALLOW FOUNDATIONS

A shallow foundation system may be used to support the loads of the proposed building provided the subgrade should be prepared in accordance with Section 5.0 "Site Construction Recommendations" of this report, including reducing the existing PVR as recommended in Section 4.2. The shallow foundation system should consist of a grade supported floor slab with continuous/spread footings or a mat foundation. Recommendations for these types of foundation system are provided in the following sections.

4.3.1 Footing Foundations

Shallow footings consisting of spread and/or continuous footings may be used to support the structures. The design parameters for spread/continuous footings are presented in the following table.

FOOTING FOUNDATIONS		
Design Parameter	Spread Footing	Continuous Footing
Net Allowable Bearing Pressure ⁽¹⁾	2,000 psf	1,500 psf
Acceptable Bearing Soil Material	Select Fill and/or On-Site Soil	
Minimum Width	24 inches	18 inches
Minimum Footing Embedment Depth	24 inches below finished grades (exterior footings) 18 inches below finished grades (interior footings)	
Ultimate passive pressure (triangular distribution) ^(2, 3)	245 psf/ft	
Ultimate coefficient of sliding ⁽³⁾	0.34	
Estimated Total Settlement	Less than 1- inch	
Estimated Differential Settlement	Less than ½ to ¾ inches between footings	Less than ½ to ¾ inches over 40 feet in length

Notes:

- (1) The net allowable bearing pressure is the pressure more than the minimum surrounding overburden pressure at the footing base elevation. No footing should be founded within a 45-degree plane from the base of the adjacent footing or excavation. The minimum factor of safety (FS) used in this is 3.0.
- (2) The side of the excavation for footings must be nearly vertical, and concrete should be placed against these vertical faces. The upper 1-foot of the passive earth pressure should be neglected. In addition, the passive pressure should be ignored if the material in front of the wall will be excavated at any time in the future.
- (3) A minimum factor of safety of 1.5 is recommended against sliding.

4.3.2 Slab-on-Grade Floors

The design of a grade-supported floor slab should take into consideration the interaction between the slab and the supporting soils in resisting moments and shears induced by applied loads. Several design methods use the modulus of subgrade reaction, k_1 , to account for soil properties in design. The k_1 -value presented in the following table can be used for the design of flat, grade-supported floor slabs for this project. The k_1 -value assumes that soil materials have been properly placed and compacted beneath the slab and that site drainage is good. Adequate construction joints and reinforcement should be provided to reduce the potential for cracking of the floor slabs due to differential movement.

SELECT FILL TYPE	k ₁ -VALUE (PCI)
Minimum 12 inches of Select Fill	100
Minimum 12 inches Select Fill with 6 Inches Compacted TxDOT Item 247 Type A, Grade 1-2 Base	150

Where moisture sensitive floor coverings or equipment will be installed, we recommend that at least a 10-mil vapor retarder be used beneath the slab. The vapor retarder should conform to ASTM E1745, Class C or better and should have a maximum water vapor permeance of 0.044 when tested in accordance with ASTM E96. Consideration to specifying a thicker, more durable vapor retarder should also be made where anticipated construction traffic dictates. If a vapor retarder is considered to provide moisture protection, special attention should be given to the surface curing of the slabs to reduce uneven drying of the slabs and associated cracking and/or slab curling. Please refer to the latest edition of ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials and ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs for additional guidance on this issue.

4.3.3 Mat Foundations

A mat foundation can be considered to support the proposed buildings oil pits. We understand the oil pits will be at least 6 feet below final grades. Based on this bearing elevation the resulting PVR is estimated to be about 1 inch. Therefore, subgrade improvements to reduce the PVR is not required in the oil pit areas.

A mat foundation bearing 6 to 8 feet below existing grade should be designed using a maximum bearing pressure of 2,000 pounds per square foot (psf). Mat foundations designed on compacted native soil or select fill are estimated to have approximately 1 inch total and ½ inch differential (over a 40-foot distance) post-construction settlement. For resistance to lateral loads, a coefficient of friction of 0.34 between the base of the foundation elements and the underlying soils is recommended. In addition, footings cast directly against excavation sidewalls may be designed to resist lateral forces acting on the foundation. The passive resistance should be considered to be equivalent to a fluid weight of 245 pounds per cubic foot.

The design of grade-supported mat foundation should take into consideration the interaction between the slab and the supporting soils in resisting moments and shears induced by applied loads. Several design methods use the modulus of subgrade reaction, k, to account for soil properties in design. The k-value presented in the following table can be used for the design of flat, grade-supported slabs for this project. The k-value assumes that soil materials have been properly placed and compacted beneath the slab and that site drainage is good. Sufficient construction joints and reinforcement should be provided to reduce the potential for cracking of the slabs due to differential movement.

SUBGRADE TYPE	K-VALUE, PCI
Compacted Native Soils	75
12 Inches Compacted Select Fill	100
Minimum 12 inches Select Fill with 6 Inches Compacted TxDOT Item 247 Type A, Grade 1-2 Base	125

Where moisture sensitive floor coverings or equipment are planned to be installed, we recommend that at least a 10-mil vapor retarder be used beneath the slab. The vapor retarder should conform to ASTM E1745, Class C or better and should have a maximum water vapor permeance of 0.044 when tested in accordance with ASTM E96. Consideration to specifying a thicker, more durable vapor retarder should also be made where anticipated construction traffic dictates. Please refer to the latest edition of ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials and ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs for additional guidance on this issue.

4.4 SEISMIC DESIGN CONSIDERATIONS

Seismic Site Classification: ASCE site classification for seismic design is based on the upper 100 feet of a soil profile. The seismic site class, risk category, location, and ground motion parameters (obtained from ASCE Hazard Tool at <https://www.ascehazardtool.com>) are present in Appendix D.

4.5 PAVEMENT SECTIONS

ECS has prepared the following recommendations for the design and construction of both flexible and rigid pavement systems for use on the subject project. The “AASHTO Guide for Design of Pavement Structures” published by the American Association of State Highway and Transportation Officials was used to develop the pavement thickness recommendations in this report. This method of design considers pavement performance, traffic, roadbed soil, pavement materials, environment, drainage, and reliability. Each of these items is incorporated into the design methodology.

We have based our analysis on the following ESAL information and pavement-related subgrade design parameters, which are considered to be typical for the area. **A CBR (California Bearing Ratio) value of 2.5 percent was selected for design purposes.** The CBR value was estimated based on ECS’s knowledge and experience with similar soils and projects in this area.

DESIGN CONSIDERATIONS	FLEXIBLE PAVEMENTS	RIGID PAVEMENT
Reliability	70	70
Initial Serviceability Index	4.2	4.5
Terminal Serviceability Index	2.0	2.0
Standard Deviation	0.45	0.35

Based on the design parameters listed above, we developed recommendations for “light-duty,” “moderate-duty” and “heavy-duty” pavement sections. “Light-duty” pavements are intended for general parking areas with passenger vehicles only and have an approximate capacity of 20,000 ESAL. “Moderate-duty” pavements are intended for areas subject to channelized traffic and fire lanes and have an approximate capacity of 80,000 ESAL. “Heavy-duty” pavements are intended for areas subject to heavier vehicles with extensive turning, starting, and stopping, such as pavement aprons associated with trash enclosures, and have an approximate capacity of 250,000 ESAL. If the owner or other members of the design team feel that the ESAL values used for design are not appropriate, ECS should be notified in writing, so new information can be reviewed, and if necessary, the pavement recommendations revised accordingly.

The minimum recommended thickness for both hot mixed asphalt concrete (HMAC) and reinforced Portland cement concrete (PCC) pavement sections are presented in the table below for the described “light,” “moderate” and “heavy” traffic conditions.

RECOMMENDED PAVEMENT SECTION OPTIONS										
Component	Light-Duty 20,000 ESALs				Moderate-Duty 80,000 ESALs				Heavy-Duty 250,000 ESALs	
	Rigid (in)		Asphalt (in)		Rigid (in)		Asphalt (in)		Rigid (in)	
Portland Cement Reinforced Concrete (PCC)	5.0	5.0	---	---	6.0	5.5	---	---	7.0	6.5
Hot Mixed Asphalt Concrete (HMAC)	---	---	2.0	2.0	---	---	3.0	3.0	---	---
Crushed Limestone Base (CLB)	---	---	9.0	6.0	---	---	9.0	6.0	---	---
Compacted Subgrade	6.0	---	6.0	---	6.0	---	6.0	---	6.0	---
Lime-Treated Subgrade	---	6.0	---	6.0	---	6.0	---	6.0	---	6.0

4.5.1 Pavement Materials

Recommendations regarding material requirements for the various pavement sections are summarized below:

Portland Cement Concrete - Concrete used for paving should have a minimum compressive strength of 3,500 psi at 28-days. The air content at the point of placement should range from 2 to 4 percent. The concrete pavements should be reinforced and jointed per current ACI recommendations, and the recommendations provided in Section 4.5.2.

Hot Mix Asphalt Concrete (HMAC) Surface Course - The asphalt concrete surface course should be plant-mixed, hot-laid Type D (Fine Graded Surface) or Type C (Coarse Graded Surface Course) meeting the specifications requirements of TxDOT Item 340 and specific criteria for the job mix formula. The mix should be compacted to between 92 and 97 percent of the maximum theoretical density as established by Tex-227-F.

Crushed Limestone Base Course - Crushed limestone base should be placed in maximum 6-inch compacted lifts. The base materials should be compacted to at least 98 percent of the maximum dry density as established by TxDOT Tex-113-E. Flexible base materials should be moisture conditioned to between -2 and +3 percentage points of the optimum moisture content during compaction. Flexible base materials should meet the requirements specified in 2014 TxDOT Standard Specification Item 247, Type A, Grade 1-2.

Lime Treatment of Subgrade – Lime treatment of the subgrade soils, if utilized, should be in accordance with the TxDOT Standard Specifications, Item 260. A sufficient quantity of hydrated lime should be mixed with the subgrade soils to result with a soil-lime mixture with pH of at least 12.4 when tested in accordance with TxDOT test method Tex-121-E. For preliminary estimating

purposes, we recommend that 8 percent lime by dry weight be used for treatment. **For construction purposes, we recommend that the optimum lime content of the subgrade soils be determined by laboratory testing; and additionally, that the subgrade soils be tested for the presence of water-soluble sulfates which can be detrimental to effective lime treatment.** Lime-treated subgrade soils should be compacted to at least 95 percent of the maximum dry density and should be moisture conditioned to between optimum and plus +3 percentage points of the optimum moisture content as determined by Standard Proctor (ASTM D698).

4.5.2 Rigid Pavement Considerations

Joints are typically placed in rigid pavements to control cracking, to facilitate construction, and to isolate a section of pavement from a structure or an adjacent pavement section. Joints used to control cracking are typically known as contraction or control joints as they are intended to control cracking that arises out of the shrinkage of concrete as it cures. Construction joints are used to provide clean breaks between pavement sections that result from the construction process. Isolation joints (or expansion joints) are used to separate the pavement from other structures or pavements and typically include the use of compressible materials in the joint as opposed to contraction or construction joints. Contraction joints should be spaced approximately no greater than 15 feet between the nearest parallel joints with joint depths of at least $\frac{1}{4}$ of the slab thickness. Contraction and construction joints should be approximately no wider than $\frac{1}{8}$ of an inch whereas isolation joints may be up to 1 inch wide.

Steel reinforcement is commonly used where subgrade conditions are not likely to provide uniform support to the concrete pavement. Generally, sites with expansive soils present are often unable to provide such support to rigid pavement sections. Therefore, reinforcing steel can be used to span between construction and isolation (expansion) joints and should consist of at-minimum No. 3 bars spaced 18 inches on-center each way. The rebar should be Grade 60 steel.

As with steel reinforcement, in situations where the subgrade may not provide uniform support to the pavement, dowels are commonly used to transfer loads across joints. Smooth dowels can be used for this purpose and should be utilized as recommended in the following table.

Dowel Design Information				
Slab Thickness, In.	Dowel Diameter, In.	Min. Dowel Embedment Each Side, In.	Min. Dowel Length, In.	Dowel Spacing On-Centers, In
5.0	$\frac{3}{8}$	5	12	12
6.0 and 5.5	$\frac{3}{4}$	6	14	12
7.0 and 6.5	$\frac{7}{8}$	6	14	12

The joint and reinforcing design of a rigid pavement system is largely a function of geometry for the pavement area. The proper length of concrete panels (defined as the distance between discontinuous pavement sections, e.g., between construction or isolation joints, or a combination of the two) and the location of contraction, construction, and isolation (expansion) joints are not included as a function of the above concrete pavement guidelines. Rather, these features should be established based on the geometry and construction sequencing of the pavement. Actual joint spacing should be based on actual pavement areas and final panel lengths so that joints are evenly spaced. Joints should be designed to form approximately square panels where geometrically feasible.

The values provided herein are guidelines and the recommendations selected by the project Civil Engineer and guidelines not provided or mentioned herein should not exceed the American Concrete Institute (ACI) 330R recommendations.

4.5.3 Pavement Drainage, Subdrainage, and Trenching

Longitudinal cracks and apparent distress due to expansive soils may appear in the pavement after construction and the introduction of landscape irrigation. These cracks and distress are not pavement failures with respect to traffic support, although they may be aesthetically undesirable. In addition, without regular maintenance, the cracks can allow additional moisture intrusion and rapid degradation of the pavement section. The pavement sections are primarily designed to support the traffic and cannot resist the forces generated by swelling soils.

Positive drainage should be provided on and around pavement areas to avoid ponding of water. Irrigation of lawn and landscaped areas adjacent to the pavements should be moderate, with approximately no excessive wetting or drying of soils. If landscaped islands are provided, they should be designed to restrict excess water from migrating to the pavement subgrade by using self-contained beds, vertical moisture barriers, and/or edge drains. Curbs should extend through the flexible base course and at least 4 inches into the underlying subgrade. Good perimeter surface drainage guiding surface water away from the pavement area is also recommended.

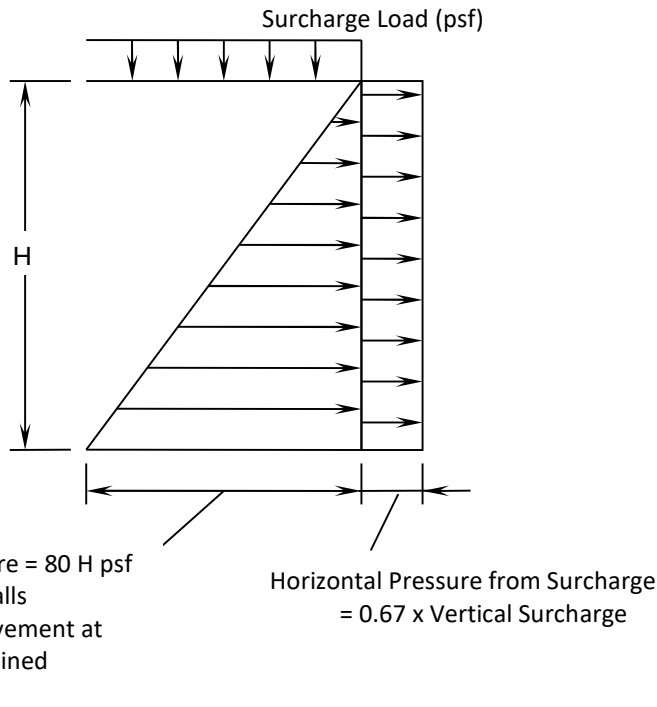
4.6 BELOW GRADE WALLS

We recommend that the oil pit walls be designed to withstand at-rest lateral earth pressures and surcharge loads from adjacent building foundations. These recommendations apply to a “drained” condition which is where there is drainage material behind below-grade walls that averts hydrostatic water pressures on the back of the below-grade wall.

To accomplish a drained condition, drainage materials such as free-draining gravel, geocomposite drainage panels, weep holes, and an under-slab drainage system should be used.

We recommend that walls that are restrained from movement at the top be designed for a linearly increasing lateral earth pressure. The following Figure depicts our recommended at-rest lateral earth pressure condition for a “drained below-grade wall” with a restrained wall top:

This diagram is not appropriate for the design of Support of Excavation or temporary shoring systems.



Surcharge loads imposed within a 45-degree slope from the base of the restrained wall should be considered in the below-grade wall design. These surcharge loads should be based on an at-rest pressure coefficient, k_0 , of 0.67. Care should be used to avoid the operation of heavy equipment to compact the wall backfill since it may overload and damage the wall; in addition, such loads are not typically considered in the design of below-grade walls.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

In a dry and undisturbed state, the upper 1-foot of the majority of the soil at the site should provide good subgrade support for fill placement and construction operations. However, when wet, this soil will degrade quickly with disturbance from contractor operations. Therefore, good site drainage should be maintained during earthwork operations, which should help maintain the integrity of the soil.

The surface of the site should be kept properly graded in order to enhance drainage of the surface water away from the proposed structures during the construction phase. We recommend that an attempt be made to enhance the natural drainage without interrupting its pattern, where possible. The soils at the site are moisture and disturbance sensitive and contain fines which are considered moderately erodible.

Therefore, the contractor should carefully plan his operation to limit exposure of the subgrade to weather and construction equipment traffic and provide and maintain good site drainage during earthwork operations. All erosion and sedimentation shall be controlled in accordance with sound engineering practice and current jurisdictional requirements.

5.1.1 Stripping and Grubbing

After the buildings and existing structures that are not of the planned development have been removed, the subgrade preparation should consist of stripping away an additional vegetation, root mat, topsoil, and soft or yielding materials from the 5-foot expanded building, structures, and pavement limits. In grassy areas of the site may have about 6 inches of topsoil. Deeper topsoil or organic laden soils may be present. The root balls in large trees may extend deep and will require additional localized stripping depth to completely remove the organics.

Existing utilities that will not be incorporated into the new design should be abandoned and can either be removed and backfilled, or if they remain in place should be filled with flowable fill.

5.1.2 Proof Rolling

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 25 tons [e.g., fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying any localized yielding materials.

Where proofrolling identifies areas that are unstable or “pumping” subgrade those areas should be repaired prior to the placement of any subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

If the area is deemed too small for a piece of equipment to traverse the excavated area it should be thoroughly probed by the Geotechnical Engineer or authorized representative.

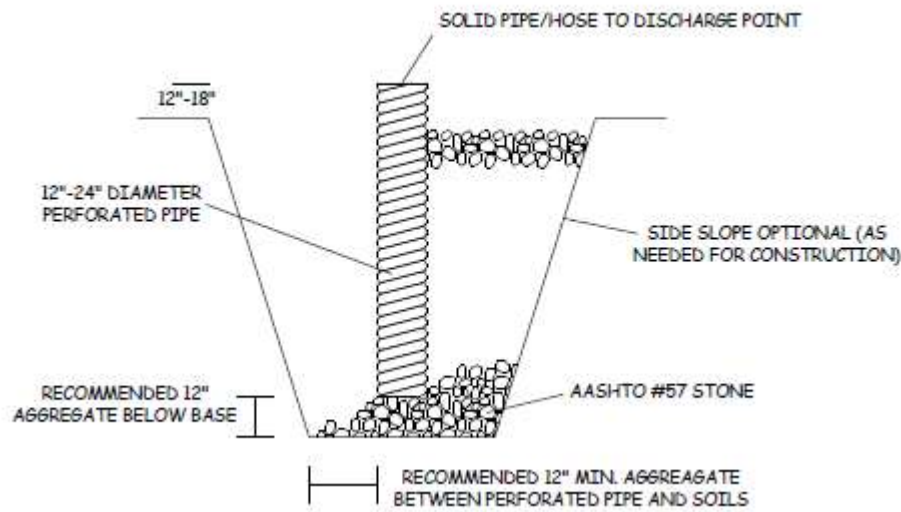
5.1.3 Site Temporary Dewatering

The contractor should make their own assessment of temporary dewatering needs based upon the limited subsurface groundwater information presented in this report. Soil sampling is not continuous, and soil and groundwater conditions may vary between sampling intervals (typically 5 feet). If the contractor believes additional subsurface information is needed to assess dewatering needs, they should obtain such information at their own expense. ECS makes no warranties or guarantees regarding the adequacy of the provided information to establish dewatering requirements; such recommendations are beyond our scope of services.

Dewatering systems are an important component of many construction projects. Dewatering systems should be selected, designed, and maintained by a qualified and experienced (specialty or other) contractor familiar with the succinct geotechnical and other aspects of the project. The failure to properly design and maintain a dewatering system for a given project can result in delayed construction, unnecessary foundation subgrade undercuts, detrimental phenomena such as “running sand” conditions, internal erosion (i.e., “piping”), the migration of “fines” down-gradient towards the dewatering system, localized settlement of nearby infrastructure, foundation, slabs-on-grade, pavements, etc. Water

discharged from site dewatering systems should be discharged in accordance with local, state, and federal requirements.

Strategies for Addressing Perched Groundwater: The typical primary strategy for addressing perched groundwater seeping into excavations is pumping from trenches (or French drains) and sump pits with sump pumps. A typical drain (in a sump pit or along a French drain) is depicted below. The inlet of the sump pump is placed at the bottom of the corrugated pipe, and the discharge end of the sump is directed to an appropriate stormwater drain.



Sump Pit/Pump Diagram

A typical French drain consists of an 18- to 24-inch wide by 18- to 24-inch-deep bed of AASHTO #57 (or similar open-graded aggregate) aggregate wrapped in a medium-duty, non-woven geotextile and (sometimes) containing a 6-inch diameter, Schedule 40 PVC perforated or slotted pipe. Actual dimensions should be identified as necessary by ECS during construction. After the installation has been completed, the geotextile should be wrapped over the top of the aggregate and pipe followed by placement of backfill. The top of the drain should be positioned at least 18 inches below the design subgrade elevations. Drains should not be routed within the expanded building limits.

Pumping wells or a vacuum system could also be used to address perched groundwater. These techniques are often only effective during the initial depletion of the perched water quantity and may quickly be ineffective at addressing accumulation of water from rain, snow, etc.

5.1.4 Excavation Safety

All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. 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 local, state, and federal safety regulations. ECS is providing this information

solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

5.2 EARTHWORK OPERATIONS

The following sections describe existing fill, soil reusability, and requirements for fill placement and utility installation.

5.2.1 New Fill

New fill should be benched (stepped) into the existing site slopes where the existing slopes are 6H:1V or steeper. For slopes less steep, the subgrade should be scarified prior to the placement of the first lift of soil to ensure a proper bond between existing and new fill. These subgrades should be compacted as outlined below.

All fill should be uniformly undercut, scarified, and/or reworked to receive an adequate amount of water to ensure uniform moisture contents and compaction. Soil moisture levels should be preserved (by various methods that can include covering with plastic, watering, etc.) until new fill, pavements, or slabs are placed. If the soil becomes desiccated, the material should be removed and replaced, or these materials should be scarified, moisture conditioned and recompacted.

The table below should be used as a summary for the compaction criteria outlined in this report.

Depth Below Finished Grades	Material Type	Compaction Standard (ASTM D-698, Standard)	
		Compaction	Moisture Content
Varies	Select Fill / Flex Base	98%	-2 to +3
Varies	Lime Treated Material	95%	0 to +3
Civil Subgrades to 10 feet	General Fill - Clayey	95%	0 to +4
	General Fill - Granular	95%	-2 to +2
10+ feet All Areas	General Fill	100%	-2 to +2

5.2.2 Backfill Settlement

Special care should be exercised to "tie in" the backfill with adjacent undisturbed, firm, natural soils by providing deep benches into the firm natural soil during placement of each fill lift. Loose materials and "slope wash" that may accumulate in the wall excavation during construction should be completely removed prior to placement of the backfill materials.

Some post-construction settlement of the backfill surface should be anticipated. This is typically on the order of one percent (1%) of the backfill height, even if satisfactory compaction of the backfill materials is achieved. This will lead to potential differential settlement.

Therefore, it is recommended that special consideration be given to the design of foundation elements, floor slabs, and pavements that may extend over this backfill because of the potential for differential settlements introduced by this condition.

5.2.3 Earthwork Testing

Field density and moisture tests should be performed on each lift to verify that adequate compaction is achieved. Please use the following table as a guide for the minimum compaction testing requirements.

Location	Testing Frequency ⁽¹⁾	Maximum Lift Thickness ⁽²⁾
Building Pad	1 test every 2,500 sf	4 inches to 8 inches
Private Pavements	1 test every 5,000 sf	
Utility Backfill	1 test every 150 lf	

Notes:

- (1) No less than two tests minimum per lift
- (2) 4 inches for hand guided jumping jack or plate tampers, 8 inches for large self-propelled compaction equipment.

Certain jurisdictional requirements may require testing in addition to that noted previously. Therefore, these recommendations should be reviewed, and the more stringent specifications should be followed.

5.2.4 Material Specifications

Material Name	Plasticity Requirement	Soil Gradation Requirement	Maximum Particle Size
General Fill	PI of 30 or less	Any	6 inches
Select Fill	PI of 15 or less	40% to 70% Passing 200	
Flexible Base ¹	TxDOT Item 247, Type A, B, C or D, Grade 1-2.		
Natural Free Draining	ASTM C33 No. 57 or No. 67		

Notes:

- (1) Flexible base used for pavements should meet the requirements of Pavement Materials section.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick “mud mat” of “lean” concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. Footing subgrades should be evaluated with a DCP prior to the placement of concrete. to confirm the bearing soils are what was anticipated.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally acceptable for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Any loose or yielding materials encountered should be removed and replaced with acceptable material.

Utility Backfilling: The granular bedding material (often AASHTO #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer's project drawings and specifications. We recommend that the bedding materials be placed up to the spring line of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the project requirements.

Excavation Safety: All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. 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 local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by the Client. If this information is untrue or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings and tests performed at the locations as indicated on the Boring Location Diagram and other information referenced in this report. This report does not reflect variations which may occur between the borings. In the performance of the subsurface exploration, specific information is obtained at specific locations at specific times. However, it is a well-known fact that variations in subsurface conditions exist on many sites between boring locations and such situations as groundwater levels vary from time to time. The nature and extent of variations may not become evident until the course of construction. If variations

then appear evident, after performing on-site observations during the construction period and noting characteristics and variations, a reevaluation of the recommendations for this report can be necessary.

Appendix A - Drawings and Reports

Site Location Diagram Boring
Location Diagram
Subsurface Cross-Section
Geologic Survey Map

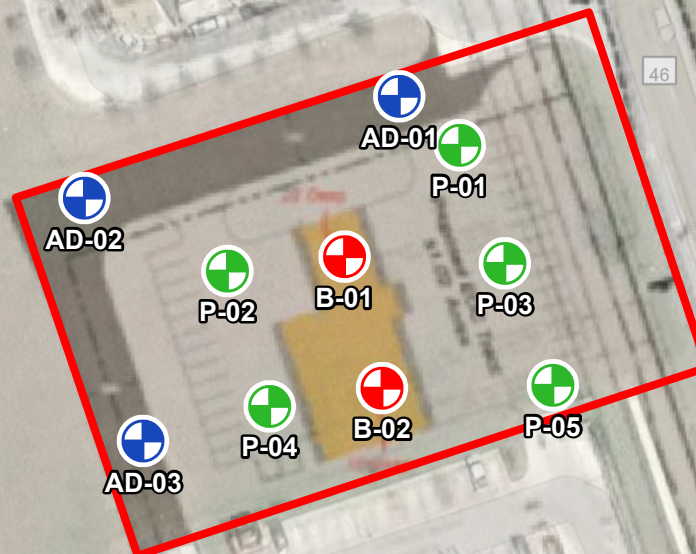
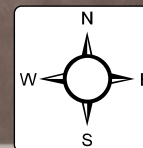


SITE LOCATION DIAGRAM

Express Oil - Seguin

TX 46 and Best Drive, Seguin, Texas
Express Oil Change, LLC

ENGINEER BEB2
SCALE 1" = 500'
PROJECT NO. 20:2586
SHEET 1 of 1
DATE 4/3/2026



Legend



Approximate Boring Locations



Approximate Boring Locations



Approximate Boring Locations



BORING LOCATION DIAGRAM

Express Oil - Seguin

TX 46 and Best Drive, Seguin, Texas
Express Oil Change, LLC

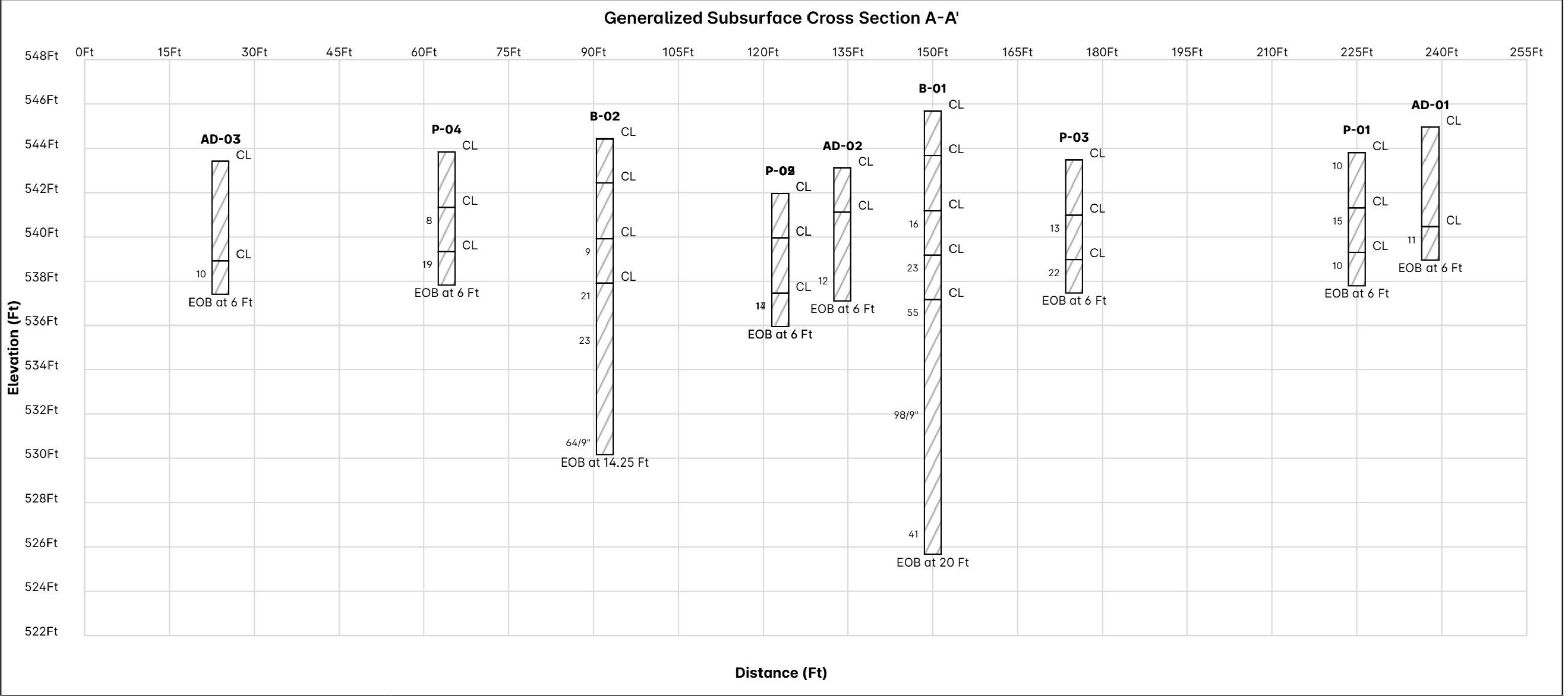
ENGINEER
BEB2

SCALE
1" = 100'

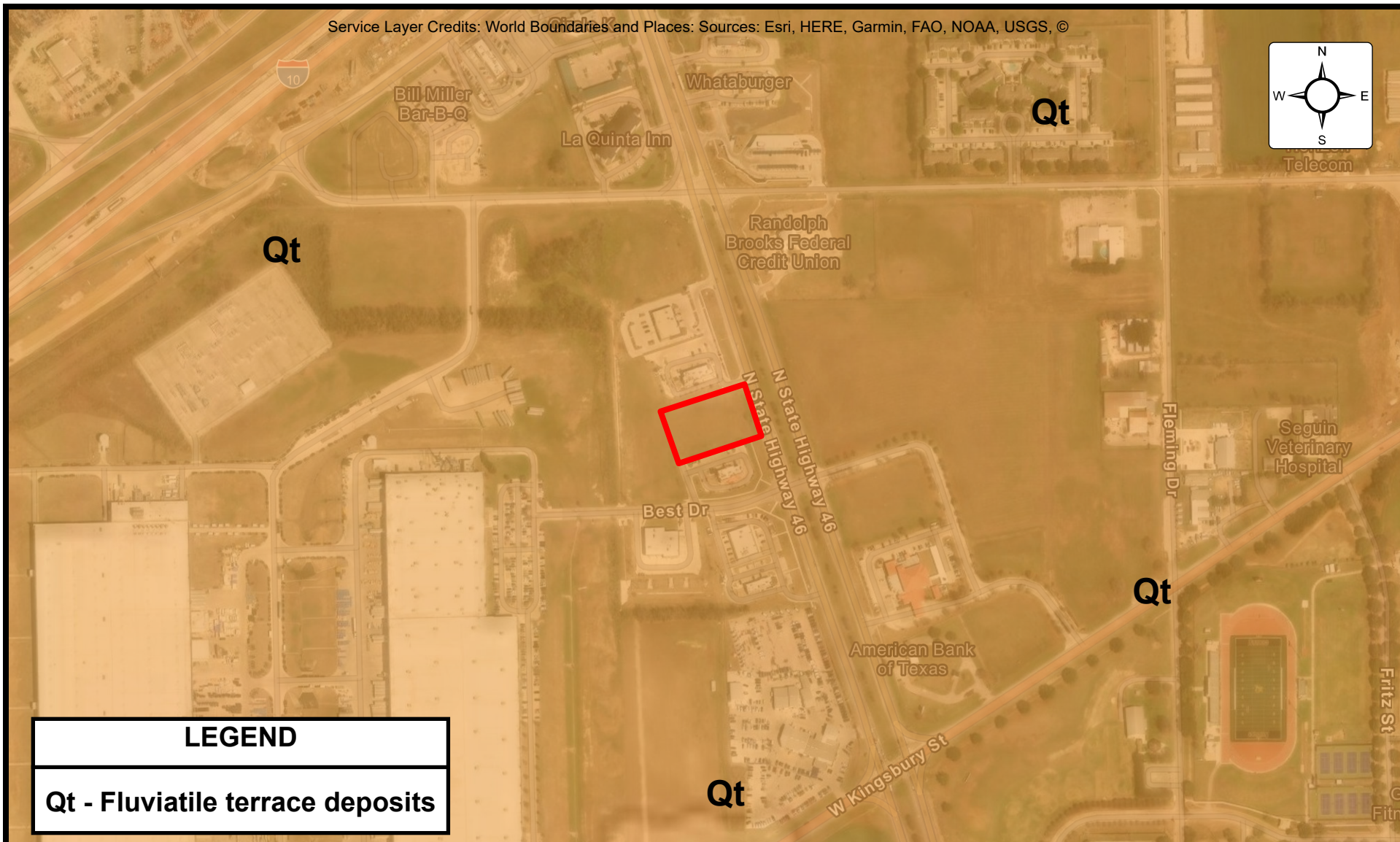
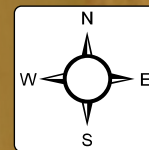
PROJECT NO.
20:2586

SHEET
1 of 1

DATE
4/3/2026



Service Layer Credits: World Boundaries and Places: Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, ©



LEGEND

Qt - Fluvial terrace deposits



GEOLOGIC SURVEY MAP

Express Oil - Seguin

TX 46 and Best Drive, Seguin, Texas
Express Oil Change, LLC

ENGINEER
BEB2

SCALE
1" = 500'

PROJECT NO.
20:2586

SHEET
1 of 1

DATE
4/3/2026

Appendix B - Field Operations

Reference Notes

Boring Logs



REFERENCE NOTES FOR BORING LOGS

MATERIAL^{1,2}

	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

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

PARTICLE SIZE IDENTIFICATION

DESIGNATION	PARTICLE SIZES
Boulders	12 inches (300 mm) or larger
Cobbles	3 inches to 12 inches (75 mm to 300 mm)
Gravel: Coarse	¾ inch to 3 inches (19 mm to 75 mm)
Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand: Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSION STRENGTH, QP ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective (ex: "Silty")	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS⁶

	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

FILL AND ROCK

FILL	POSSIBLE FILL	PROBABLE FILL	ROCK

¹Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-17 Note 14.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-17.

CLIENT: Express Oil Change, LLC					PROJECT NO.: 20:2586		BORING NO.: AD-01		SHEET: 1 OF 1										
PROJECT NAME: Express Oil - Seguin					DRILLER/CONTRACTOR: Ideal Drilling														
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155									LOSS OF CIRCULATION										
LATITUDE: 29.578800			LONGITUDE: -97.991768		STRUCTURE:		SURFACE ELEVATION: 544.95		BOTTOM OF CASING										
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec % 0 20 40 60 80 100 RQD % 0 10 20 30 40 50 SPT 0 10 20 30 40 50		LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	
5	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - dark brown, hard, with calcareous deposits.		540 539		3-4-7 (11)	11				18.3	4.5+				
	S-2	ST	24	24										19.0	4.5+				
	S-3	SS	18	18	(CL) LEAN CLAY WITH SAND - brown, stiff, with calcareous deposits.									17.8					
					END OF BORING at 6.0 FT														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																			
WL (First Encountered): DRY					BORING STARTED: 04/02/2026					CAVE IN DEPTH: Not Observed									
WL (Completion): DRY					BORING COMPLETED: 04/02/2026					HAMMER TYPE: Automatic									
WL (Seasonal High Water):					EQUIPMENT:		LOGGED BY:		DRILLING METHOD:										
WL (Stabilized):					Truck		Melissa Payares		Solid Stem Auger (0'-6')										
GEOTECHNICAL BOREHOLE LOG																			

CLIENT: Express Oil Change, LLC					PROJECT NO.: 20:2586		BORING NO.: AD-02		SHEET: 1 OF 1										
PROJECT NAME: Express Oil - Seguin					DRILLER/CONTRACTOR: Ideal Drilling														
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155									LOSS OF CIRCULATION										
LATITUDE: 29.578659			LONGITUDE: -97.992290		STRUCTURE:		SURFACE ELEVATION: 543.11		BOTTOM OF CASING										
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec % 0 20 40 60 80 100 RQD % 0 10 20 30 40 50 SPT 0 10 20 30 40 50		LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	
	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - dark brown, hard.									13.0	4.5+				
	S-2	ST	24	24	(CL) LEAN CLAY WITH SAND - brown, stiff to hard, with calcareous deposits.		540								10.8	4.5+			
5	S-3	SS	18	18			537	4-6-6 (12)	12						13.0				
					END OF BORING at 6.0 FT														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																			
WL (First Encountered): DRY					BORING STARTED: 04/02/2026					CAVE IN DEPTH: Not Observed									
WL (Completion): DRY					BORING COMPLETED: 04/02/2026					HAMMER TYPE: Automatic									
WL (Seasonal High Water):					EQUIPMENT:		LOGGED BY:		DRILLING METHOD:										
WL (Stabilized):					Truck		Melissa Payares		Solid Stem Auger (0'-6')										
GEOTECHNICAL BOREHOLE LOG																			

CLIENT: Express Oil Change, LLC					PROJECT NO.: 20:2586		BORING NO.: AD-03		SHEET: 1 OF 1										
PROJECT NAME: Express Oil - Seguin					DRILLER/CONTRACTOR: Ideal Drilling														
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155									LOSS OF CIRCULATION										
LATITUDE: 29.578311			LONGITUDE: -97.992196		STRUCTURE:		SURFACE ELEVATION: 543.41		BOTTOM OF CASING										
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec % 0 20 40 60 80 100 RQD % 0 10 20 30 40 50 SPT 10		LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	
	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - dark brown to brown, hard, with calcareous deposits.		540		4-4-6 (10)	10					13.4	4.5+			
	S-2	ST	24	24											12.0	4.5+			
5	S-3	SS	18	18											6.6				
					(CL) LEAN CLAY WITH SAND - brown, stiff, with calcareous deposits.														
					END OF BORING at 6.0 FT														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																			
WL (First Encountered):					DRY	BORING STARTED:					04/02/2026		CAVE IN DEPTH:					Not Observed	
WL (Completion):					DRY	BORING COMPLETED:					04/02/2026		HAMMER TYPE:					Automatic	
WL (Seasonal High Water):						EQUIPMENT:					LOGGED BY:		DRILLING METHOD:						
WL (Stabilized):						Truck					Melissa Payares		Solid Stem Auger (0'-6')						
GEOTECHNICAL BOREHOLE LOG																			

CLIENT: Express Oil Change, LLC				PROJECT NO.: 20:2586				BORING NO.: B-01				SHEET: 1 OF 1																																																																																																																																																																		
PROJECT NAME: Express Oil - Seguin				DRILLER/CONTRACTOR: Ideal Drilling																																																																																																																																																																										
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155										LOSS OF CIRCULATION																																																																																																																																																																				
LATITUDE: 29.578572				LONGITUDE: -97.991864				STRUCTURE:				SURFACE ELEVATION: 545.67				BOTTOM OF CASING																																																																																																																																																														
<table><tr><td rowspan="2">DEPTH (FT)</td><td rowspan="2">SAMPLE NUMBER</td><td rowspan="2">SAMPLE TYPE</td><td rowspan="2">SAMPLE DISTANCE</td><td rowspan="2">SAMPLE RECOVERY (IN)</td><td rowspan="2">DESCRIPTION OF MATERIAL</td><td rowspan="2">STRATIGRAPHY</td><td rowspan="2">ELEVATION (FT)</td><td rowspan="2">WATER LEVELS</td><td rowspan="2">BLOWS/6" (TCP/MC/SPT N-VALUE)</td><td colspan="5">0 Rec % RQD % 100</td><td rowspan="2">LIQUID LIMIT</td><td rowspan="2">PLASTICITY INDEX</td><td rowspan="2">MOISTURE CONTENT (%)</td><td rowspan="2">QP (TSF)</td><td rowspan="2">FINES CONTENT</td><td rowspan="2">DRY UNIT WEIGHT (PCF)</td><td rowspan="2">COMPRESSIVE STR. (TSF)</td></tr><tr><td colspan="5">0 20 40 60 80 100</td></tr><tr><td rowspan="5">5</td><td>S-1</td><td>ST</td><td>24</td><td>24</td><td>(CL) LEAN CLAY WITH SAND - dark brown, hard.</td><td rowspan="7"></td><td>545</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>47</td><td>24</td><td>15.5</td><td>4.5+</td><td>77.3</td><td rowspan="7"></td><td rowspan="7"></td></tr><tr><td>S-2</td><td>ST</td><td>24</td><td>24</td><td>(CL) LEAN CLAY WITH SAND - brown, hard.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>15.1</td><td>4.5+</td></tr><tr><td>S-3</td><td>SS</td><td>18</td><td>18</td><td>(CL) LEAN CLAY WITH SAND - light brown, very stiff, with calcareous deposits.</td><td>7-8-8 (16)</td><td>16</td><td></td><td></td><td></td><td></td><td>28</td><td>8</td><td>11.4</td><td>75.3</td></tr><tr><td>S-4</td><td>SS</td><td>18</td><td>18</td><td>(CL) SANDY LEAN CLAY - light brown, very stiff, with calcareous deposits.</td><td>7-8-15 (23)</td><td>28</td><td></td><td></td><td></td><td></td><td></td><td></td><td>9.1</td></tr><tr><td>S-5</td><td>SS</td><td>18</td><td>18</td><td>(CL) SANDY LEAN CLAY - tan, hard to very hard.</td><td>29-30-25 (55)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>11.1</td></tr><tr><td rowspan="3">15</td><td>S-6</td><td>SS</td><td>9</td><td>9</td><td></td><td>48-50/3" (98/9")</td><td></td><td></td><td></td><td></td><td></td><td>98/9"</td><td></td><td>7.4</td></tr><tr><td>S-7</td><td>SS</td><td>18</td><td>18</td><td></td><td>40-13-28 (41)</td><td></td><td></td><td></td><td></td><td></td><td>41</td><td></td><td>3.7</td></tr><tr><td colspan="5">END OF BORING at 20.0 FT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																		DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	0 Rec % RQD % 100					LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	0 20 40 60 80 100					5	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - dark brown, hard.		545								47	24	15.5	4.5+	77.3			S-2	ST	24	24	(CL) LEAN CLAY WITH SAND - brown, hard.											15.1	4.5+	S-3	SS	18	18	(CL) LEAN CLAY WITH SAND - light brown, very stiff, with calcareous deposits.	7-8-8 (16)	16					28	8	11.4	75.3	S-4	SS	18	18	(CL) SANDY LEAN CLAY - light brown, very stiff, with calcareous deposits.	7-8-15 (23)	28							9.1	S-5	SS	18	18	(CL) SANDY LEAN CLAY - tan, hard to very hard.	29-30-25 (55)								11.1	15	S-6	SS	9	9		48-50/3" (98/9")						98/9"		7.4	S-7	SS	18	18		40-13-28 (41)						41		3.7	END OF BORING at 20.0 FT																		
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	0 Rec % RQD % 100					LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)											QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)																																																																																																																																															
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GEOTECHNICAL BOREHOLE LOG																																																																																																																																																																														

CLIENT: Express Oil Change, LLC				PROJECT NO.: 20:2586				BORING NO.: B-02				SHEET: 1 OF 1																																																																																																																													
PROJECT NAME: Express Oil - Seguin				DRILLER/CONTRACTOR: Ideal Drilling																																																																																																																																					
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155										LOSS OF CIRCULATION																																																																																																																															
LATITUDE: 29.578384				LONGITUDE: -97.991805				STRUCTURE:				SURFACE ELEVATION: 544.42				BOTTOM OF CASING																																																																																																																									
<table><tr><td rowspan="2">DEPTH (FT)</td><td rowspan="2">SAMPLE NUMBER</td><td rowspan="2">SAMPLE TYPE</td><td rowspan="2">SAMPLE DISTANCE</td><td rowspan="2">SAMPLE RECOVERY (IN)</td><td rowspan="2">DESCRIPTION OF MATERIAL</td><td rowspan="2">STRATIGRAPHY</td><td rowspan="2">ELEVATION (FT)</td><td rowspan="2">WATER LEVELS</td><td rowspan="2">BLOWS/6" (TCP/MC/SPT N-VALUE)</td><td colspan="5">Rec %  RQD % </td><td rowspan="2">LIQUID LIMIT</td><td rowspan="2">PLASTICITY INDEX</td><td rowspan="2">MOISTURE CONTENT (%)</td><td rowspan="2">QP (TSF)</td><td rowspan="2">FINES CONTENT</td><td rowspan="2">DRY UNIT WEIGHT (PCF)</td><td rowspan="2">COMPRESSIVE STR. (TSF)</td></tr><tr><td colspan="5">0 20 40 60 80 100</td></tr><tr><td rowspan="6">5</td><td>S-1</td><td>ST</td><td>24</td><td>24</td><td>(CL) LEAN CLAY WITH SAND - dark brown, hard, with calcareous deposits.</td><td rowspan="6"></td><td rowspan="6">540</td><td rowspan="6"></td><td rowspan="6"></td><td colspan="5">0 10 20 30 40 50</td><td rowspan="6"></td><td rowspan="6"></td><td rowspan="6">15.4</td><td rowspan="6">4.5+</td><td rowspan="6"></td><td rowspan="6"></td><td rowspan="6"></td></tr><tr><td>S-2</td><td>ST</td><td>24</td><td>24</td><td>(CL) LEAN CLAY WITH SAND - brown with light brown -seams, hard, with calcareous deposits.</td><td colspan="5">SPT </td><td rowspan="6">47</td><td rowspan="6">27</td><td rowspan="6">14.6</td><td rowspan="6">4.5+</td><td rowspan="6">64.3</td></tr><tr><td>S-3</td><td>SS</td><td>18</td><td>18</td><td>(CL) LEAN CLAY WITH SAND - light brown, stiff, with calcareous deposits.</td><td colspan="5">6-5-4 (9) </td><td rowspan="6">30</td><td rowspan="6">12</td><td rowspan="6">10.9</td><td rowspan="6">67.3</td></tr><tr><td>S-4</td><td>SS</td><td>18</td><td>18</td><td>(CL) SANDY LEAN CLAY - tan, very stiff to very hard.</td><td colspan="5">5-7-14 (21) </td><td rowspan="6">11.8</td></tr><tr><td>S-5</td><td>SS</td><td>18</td><td>18</td><td></td><td colspan="5">10-9-14 (23) </td><td rowspan="6">8.9</td></tr><tr><td>S-6</td><td>SS</td><td>9</td><td>9</td><td></td><td colspan="5">14-50/3" (64/9") </td></tr><tr><td colspan="10">END OF BORING at 14.3 FT</td></tr></table>																		DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec %  RQD % 					LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	0 20 40 60 80 100					5	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - dark brown, hard, with calcareous deposits.		540			0 10 20 30 40 50							15.4	4.5+				S-2	ST	24	24	(CL) LEAN CLAY WITH SAND - brown with light brown -seams, hard, with calcareous deposits.	SPT 					47	27	14.6	4.5+	64.3	S-3	SS	18	18	(CL) LEAN CLAY WITH SAND - light brown, stiff, with calcareous deposits.	6-5-4 (9) 					30	12	10.9	67.3	S-4	SS	18	18	(CL) SANDY LEAN CLAY - tan, very stiff to very hard.	5-7-14 (21) 					11.8	S-5	SS	18	18		10-9-14 (23) 					8.9	S-6	SS	9	9		14-50/3" (64/9") 					END OF BORING at 14.3 FT									
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec %  RQD % 					LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)											QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)																																																																																																										
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CLIENT: Express Oil Change, LLC				PROJECT NO.: 20:2586		BORING NO.: P-01		SHEET: 1 OF 1										
PROJECT NAME: Express Oil - Seguin				DRILLER/CONTRACTOR: Ideal Drilling														
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155								LOSS OF CIRCULATION										
LATITUDE: 29.578731		LONGITUDE: -97.991674		STRUCTURE:		SURFACE ELEVATION: 543.8		BOTTOM OF CASING										
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec % RQD % SPT	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	
5	S-1	SS	18	18	(CL) LEAN CLAY WITH SAND - dark brown, stiff.		540 538		5-5-5 (10)	10			15.4					
	S-2	SS	18	18	(CL) LEAN CLAY WITH SAND - brown, stiff, with calcareous deposits.				3-5-10 (15)	15			14.4					
	S-3	SS	18	18	(CL) LEAN CLAY WITH SAND - dark brown to brown, stiff, with calcareous deposits.				5-3-7 (10)	10			13.2					
					END OF BORING at 6.0 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																		
WL (First Encountered):				DRY		BORING STARTED:				04/02/2026		CAVE IN DEPTH:				Not Observed		
WL (Completion):				DRY		BORING COMPLETED:				04/02/2026		HAMMER TYPE:				Automatic		
WL (Seasonal High Water):						EQUIPMENT:		LOGGED BY:		DRILLING METHOD:								
WL (Stabilized):						Truck		Melissa Payares		Solid Stem Auger (0'-6')								
GEOTECHNICAL BOREHOLE LOG																		

CLIENT: Express Oil Change, LLC				PROJECT NO.: 20:2586		BORING NO.: P-02		SHEET: 1 OF 1											
PROJECT NAME: Express Oil - Seguin				DRILLER/CONTRACTOR: Ideal Drilling															
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155								LOSS OF CIRCULATION											
LATITUDE: 29.578554		LONGITUDE: -97.992056		STRUCTURE:		SURFACE ELEVATION: 543.86		BOTTOM OF CASING											
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	0 20 40 60 80 100 Rec % ■ RQD % ■		LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	
									0 10 20 30 40 50 SPT ⊗										
	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - brown, hard, with calcareous deposits.									15.6	4.5+				
	S-2	ST	24	24	(CL) LEAN CLAY WITH SAND - dark brown, hard.		540								16.2	4.5+			
5	S-3	SS	18	18	(CL) LEAN CLAY WITH SAND - brown, very stiff, with calcareous deposits.		538		6-8-9 (17)	17 ⊗				11.8					
					END OF BORING at 6.0 FT														
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▽ WL (First Encountered):				DRY		BORING STARTED:				04/02/2026		CAVE IN DEPTH:					Not Observed		
▼ WL (Completion):				DRY		BORING COMPLETED:				04/02/2026		HAMMER TYPE:					Automatic		
▽ WL (Seasonal High Water):						EQUIPMENT:		LOGGED BY:		DRILLING METHOD:									
▽ WL (Stabilized):						Truck		Melissa Payares		Solid Stem Auger (0'-6')									
GEOTECHNICAL BOREHOLE LOG																			

CLIENT: Express Oil Change, LLC				PROJECT NO.: 20:2586		BORING NO.: P-03		SHEET: 1 OF 1											
PROJECT NAME: Express Oil - Seguin				DRILLER/CONTRACTOR: Ideal Drilling															
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155								LOSS OF CIRCULATION											
LATITUDE: 29.578561		LONGITUDE: -97.991601		STRUCTURE:		SURFACE ELEVATION: 543.47		BOTTOM OF CASING											
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec % RQD % SPT		LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)	
5	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - brown, hard, with calcareous deposits.		540 537		5-7-6 (13) 6-9-13 (22)	18 22				16.3	4.5+				
	S-2	SS	18	18	(CL) LEAN CLAY WITH SAND - dark brown, hard.									14.5					
	S-3	SS	18	18	(CL) LEAN CLAY WITH SAND - dark brown, very stiff, with calcareous deposits.									14.7					
					END OF BORING at 6.0 FT														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																			
 WL (First Encountered):					DRY	BORING STARTED:					04/02/2026		CAVE IN DEPTH:					Not Observed	
 WL (Completion):					DRY	BORING COMPLETED:					04/02/2026		HAMMER TYPE:					Automatic	
 WL (Seasonal High Water):						EQUIPMENT:			LOGGED BY:			DRILLING METHOD:							
 WL (Stabilized):						Truck			Melissa Payares			Solid Stem Auger (0'-6')							
GEOTECHNICAL BOREHOLE LOG																			

CLIENT: Express Oil Change, LLC					PROJECT NO.: 20:2586		BORING NO.: P-04		SHEET: 1 OF 1									
PROJECT NAME: Express Oil - Seguin					DRILLER/CONTRACTOR: Ideal Drilling													
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155									LOSS OF CIRCULATION									
LATITUDE: 29.578360			LONGITUDE: -97.991989		STRUCTURE:		SURFACE ELEVATION: 543.83		BOTTOM OF CASING									
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec % RQD % SPT		LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)
5	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - brown, hard, with calcareous deposits.		540 538		4-5-3 (8) 6-7-12 (19)	8 19				13.8	4.5+			
	S-2	SS	18	18	(CL) LEAN CLAY WITH SAND - dark brown, firm.									9.9				
	S-3	SS	18	18	(CL) LEAN CLAY WITH SAND - brown, very stiff, with calcareous deposits.									12.5				
					END OF BORING at 6.0 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																		
 WL (First Encountered):					DRY		BORING STARTED:			04/02/2026		CAVE IN DEPTH:				Not Observed		
 WL (Completion):					DRY		BORING COMPLETED:			04/02/2026		HAMMER TYPE:				Automatic		
 WL (Seasonal High Water):							EQUIPMENT:		LOGGED BY:		DRILLING METHOD:							
 WL (Stabilized):							Truck		Melissa Payares		Solid Stem Auger (0'-6')							
GEOTECHNICAL BOREHOLE LOG																		

CLIENT: Express Oil Change, LLC					PROJECT NO.: 20:2586		BORING NO.: P-05		SHEET: 1 OF 1									
PROJECT NAME: Express Oil - Seguin					DRILLER/CONTRACTOR: Ideal Drilling													
SITE LOCATION: TX 46 and Best Drive, Seguin, Texas, 78155									LOSS OF CIRCULATION									
LATITUDE: 29.578386			LONGITUDE: -97.991525		STRUCTURE:		SURFACE ELEVATION: 541.96		BOTTOM OF CASING									
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	0 20 40 60 80 100 Rec % ■ RQD % ■ 0 10 20 30 40 50 SPT ⊗		LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)	QP (TSF)	FINES CONTENT	DRY UNIT WEIGHT (PCF)	COMPRESSIVE STR. (TSF)
	S-1	ST	24	24	(CL) LEAN CLAY WITH SAND - brown, hard, with calcareous deposits.		540								13.6	4.5+		
	S-2	ST	24	24	(CL) LEAN CLAY WITH SAND - dark brown to brown, stiff to hard, with calcareous deposits.										13.8	4.5+		
5	S-3	SS	18	18				6-6-8 (14)	14 ⊗						9.3			
					END OF BORING at 6.0 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																		
▽ WL (First Encountered): DRY					BORING STARTED: 04/02/2026					CAVE IN DEPTH: Not Observed								
▼ WL (Completion): DRY					BORING COMPLETED: 04/02/2026					HAMMER TYPE: Automatic								
▽ WL (Seasonal High Water):					EQUIPMENT:		LOGGED BY:		DRILLING METHOD:									
▽ WL (Stabilized):					Truck		Melissa Payares		Solid Stem Auger (0'-6')									
GEOTECHNICAL BOREHOLE LOG																		

Appendix C - Laboratory Testing

Laboratory Testing Summary

Grain Size Analysis/Analyses

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
AD-01	S-1	0.0-2.0	18.3										
AD-01	S-2	2.0-4.0	19.0										
AD-01	S-3	4.5-6.0	17.8										
AD-02	S-1	0.0-2.0	13.0										
AD-02	S-2	2.0-4.0	10.8										
AD-02	S-3	4.5-6.0	13.0										
AD-03	S-1	0.0-2.0	13.4										
AD-03	S-2	2.0-4.0	12.0										
AD-03	S-3	4.5-6.0	6.6										
B-01	S-1	0.0-2.0	15.5	CL	47	23	24	77.3					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Express Oil - Seguin
Client:

Project No.: 20:2586
Date Reported: 4/17/2026



Office / Lab

Address

Office Number / Fax

ECS Southwest LLP - San Antonio

431 Isom Road
Suite 114
San Antonio, TX 78216

(210)528-1430
(214)483-9684

Tested by	Checked by	Approved by	Date Received
TBatungbacal			

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-01	S-2	2.0-4.0	15.1										
B-01	S-3	4.5-6.0	11.4	CL	28	20	8	75.3					
B-01	S-4	6.5-8.0	9.1										
B-01	S-5	8.5-10.0	11.1										
B-01	S-6	13.5-14.3	7.4										
B-01	S-7	18.5-20.0	3.7										
B-02	S-1	0.0-2.0	15.4										
B-02	S-2	2.0-4.0	14.6	CL	47	20	27	64.3					
B-02	S-3	4.5-6.0	16.6										
B-02	S-4	6.5-8.0	10.9	CL	30	18	12	67.3					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Express Oil - Seguin
Client:

Project No.: 20:2586
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Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-02	S-5	8.5-10.0	11.8										
B-02	S-6	13.5-14.3	8.9										
P-01	S-1	0.0-1.5	15.4										
P-01	S-2	2.5-4.0	14.4										
P-01	S-3	4.5-6.0	13.2										
P-02	S-1	0.0-2.0	15.6										
P-02	S-2	2.0-4.0	16.2										
P-02	S-3	4.5-6.0	11.8										
P-03	S-1	0.0-2.0	16.3										
P-03	S-2	2.5-4.0	14.5										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Express Oil - Seguin
Client:

Project No.: 20:2586
Date Reported: 4/17/2026



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Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
P-03	S-3	4.5-6.0	14.7										
P-04	S-1	0.0-2.0	13.8										
P-04	S-2	2.5-4.0	9.9										
P-04	S-3	4.5-6.0	12.5										
P-05	S-1	0.0-2.0	13.6										
P-05	S-2	2.0-4.0	13.8										
P-05	S-3	4.5-6.0	9.3										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Express Oil - Seguin
Client:

Project No.: 20:2586
Date Reported: 4/17/2026



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Address

Office Number / Fax

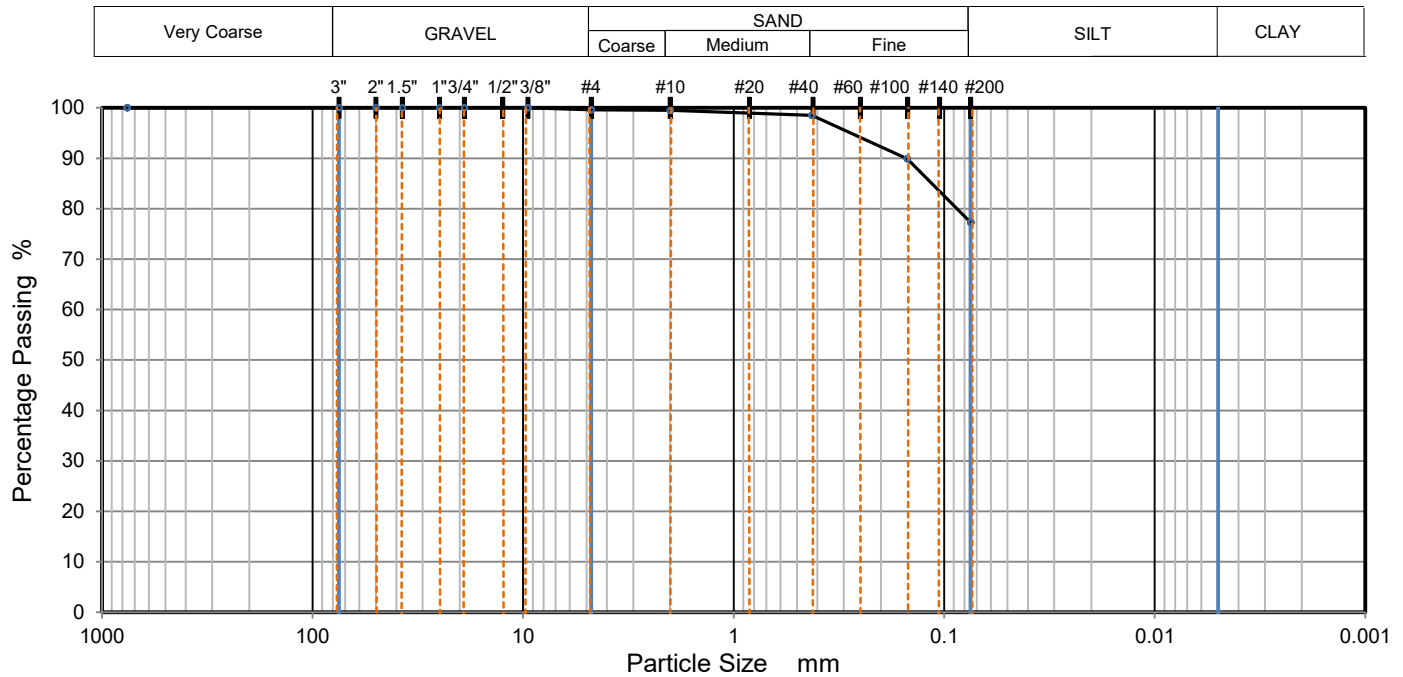
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(214)483-9684

Tested by	Checked by	Approved by	Date Received
TBatungbacal			

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	100.0		
3/8"	100.0		
#4	99.6		
#10	99.5		
#40	98.5		
#100	89.9		
#200	77.3		

Dry Mass of sample, g

269.9

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.4
Coarse Sand, #4 to #10 sieve	0.1
Medium Sand, #10 to #40	1.0
Fine Sand, #40 to #200	21.2
Fines <#200	77.3

USCS	CL	Liquid Limit	47	D90	0.152	D50		D10	
AASHTO	A-7-6	Plastic Limit	23	D85	0.115	D30		Cu	
USCS Group Name	Lean clay with sand	Plasticity Index	24	D60		D15		Cc	

Project: Express Oil - Seguin
 Client:
 Sample Description:
 Sample Source: B-01

Project No.: 20:2586
 Depth (ft): 0.0 - 2.0
 Sample No.: S-1
 Date Reported: 4/17/2026



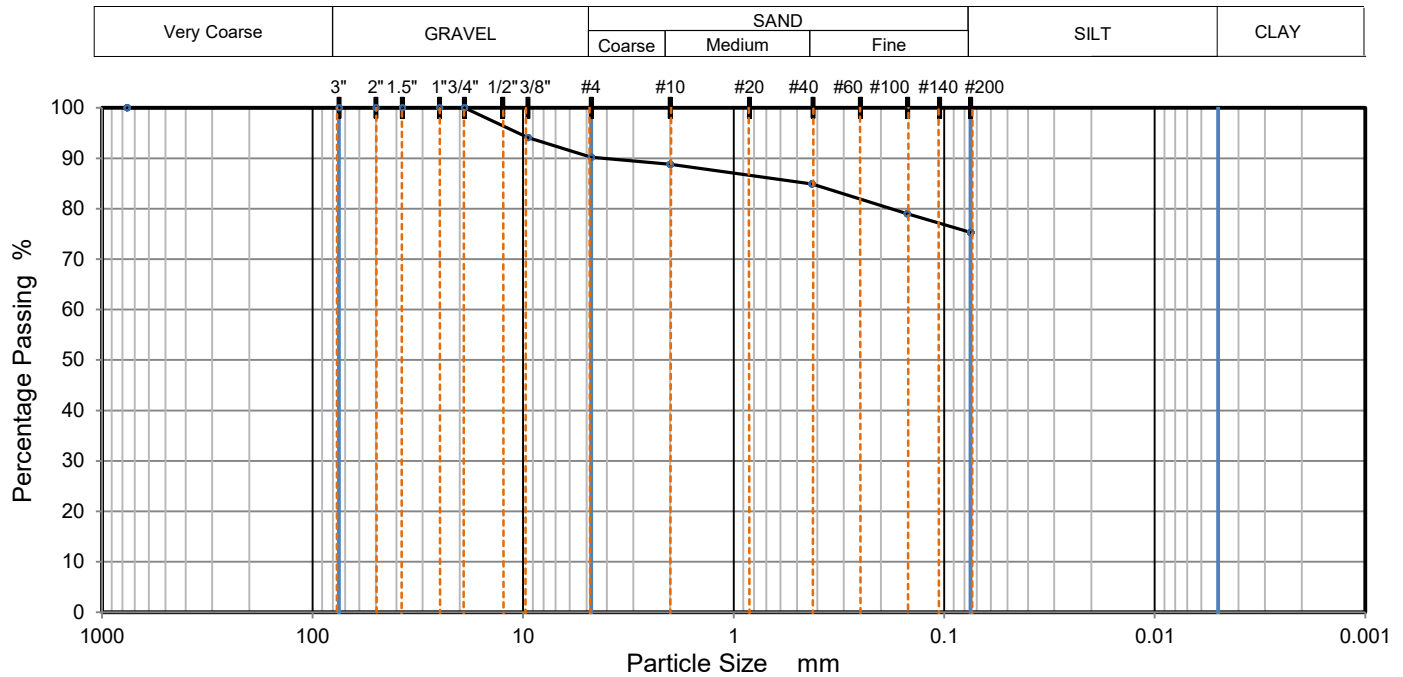
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	100.0		
3/8"	94.1		
#4	90.2		
#10	88.8		
#40	84.9		
#100	79.0		
#200	75.3		

Dry Mass of sample, g

277.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	9.8
Coarse Sand, #4 to #10 sieve	1.4
Medium Sand, #10 to #40	3.9
Fine Sand, #40 to #200	9.6
Fines <#200	75.3

USCS	CL	Liquid Limit	28	D90	4.198	D50		D10	
AASHTO	A-4	Plastic Limit	20	D85	0.442	D30		Cu	
USCS Group Name	Lean clay with sand	Plasticity Index	8	D60		D15		Cc	

Project: Express Oil - Seguin
 Client:
 Sample Description:
 Sample Source: B-01

Project No.: 20:2586
 Depth (ft): 4.5 - 6.0
 Sample No.: S-3
 Date Reported: 4/17/2026



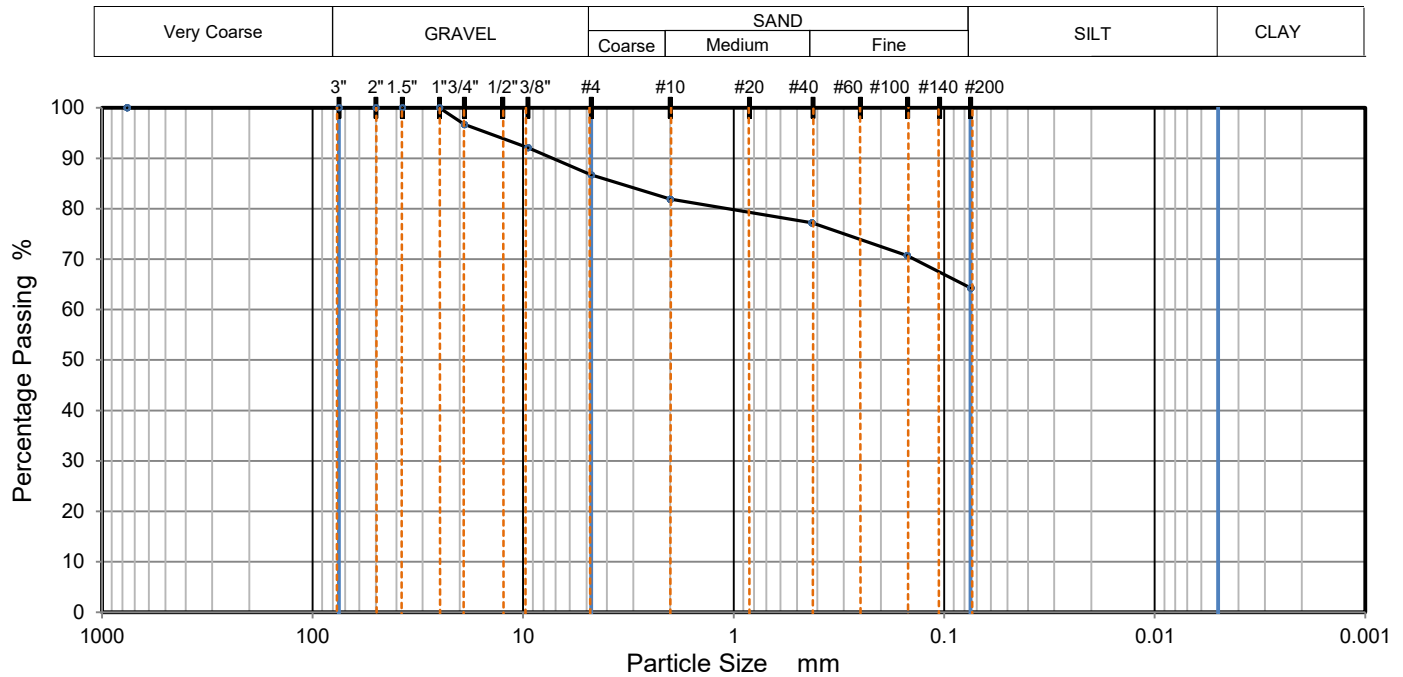
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	96.7		
3/8"	92.1		
#4	86.7		
#10	81.9		
#40	77.2		
#100	70.7		
#200	64.3		

Dry Mass of sample, g

272.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	13.3
Coarse Sand, #4 to #10 sieve	4.8
Medium Sand, #10 to #40	4.7
Fine Sand, #40 to #200	12.9
Fines <#200	64.3

USCS	CL	Liquid Limit	47	D90	7.255	D50		D10	
AASHTO	A-7-6	Plastic Limit	20	D85	3.497	D30		Cu	
USCS Group Name	Sandy lean clay	Plasticity Index	27	D60		D15		Cc	

Project: Express Oil - Seguin
 Client:
 Sample Description:
 Sample Source: B-02

Project No.: 20:2586
 Depth (ft): 2.0 - 4.0
 Sample No.: S-2
 Date Reported: 4/17/2026



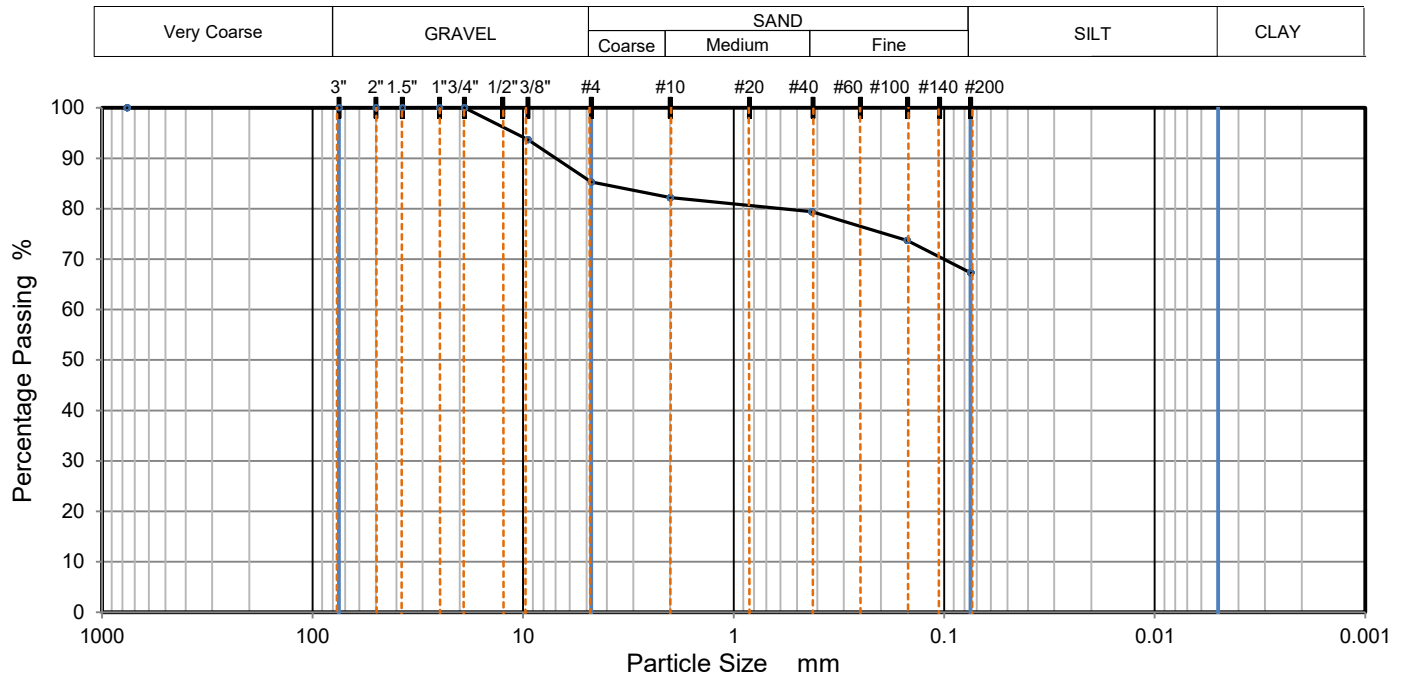
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Tested by	Checked by	Approved by	Date Received	Remarks
TBatungbacal				

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
2"	100.0		
1 1/2"	100.0		
1"	100.0		
3/4"	100.0		
3/8"	93.7		
#4	85.3		
#10	82.2		
#40	79.4		
#100	73.7		
#200	67.3		

Dry Mass of sample, g

289.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	14.7
Coarse Sand, #4 to #10 sieve	3.1
Medium Sand, #10 to #40	2.8
Fine Sand, #40 to #200	12.1
Fines <#200	67.3

USCS	CL	Liquid Limit	30	D90	7.000	D50		D10	
AASHTO	A-6	Plastic Limit	18	D85	4.369	D30		Cu	
USCS Group Name	Sandy lean clay	Plasticity Index	12	D60		D15		Cc	

Project: Express Oil - Seguin
 Client:
 Sample Description:
 Sample Source: B-02

Project No.: 20:2586
 Depth (ft): 6.5 - 8.0
 Sample No.: S-4
 Date Reported: 4/17/2026



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Tested by	Checked by	Approved by	Date Received	Remarks
TBatungbacal				

Appendix D - Seismic Considerations

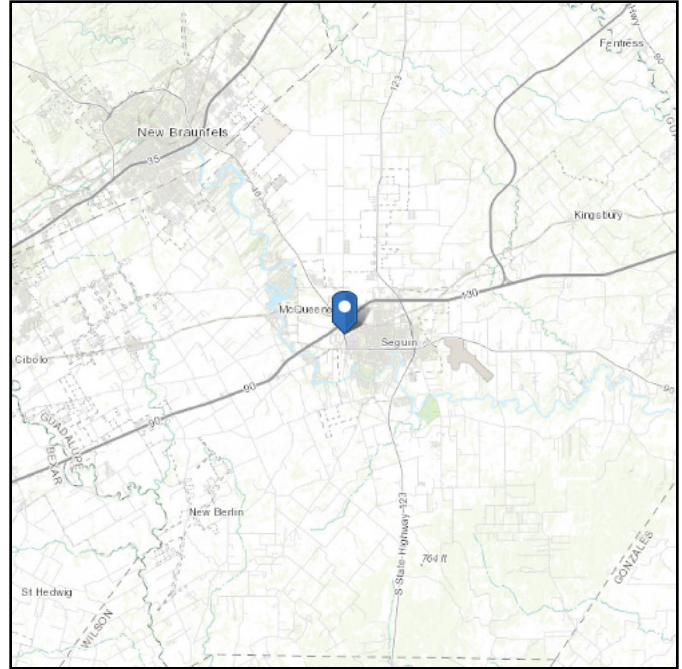
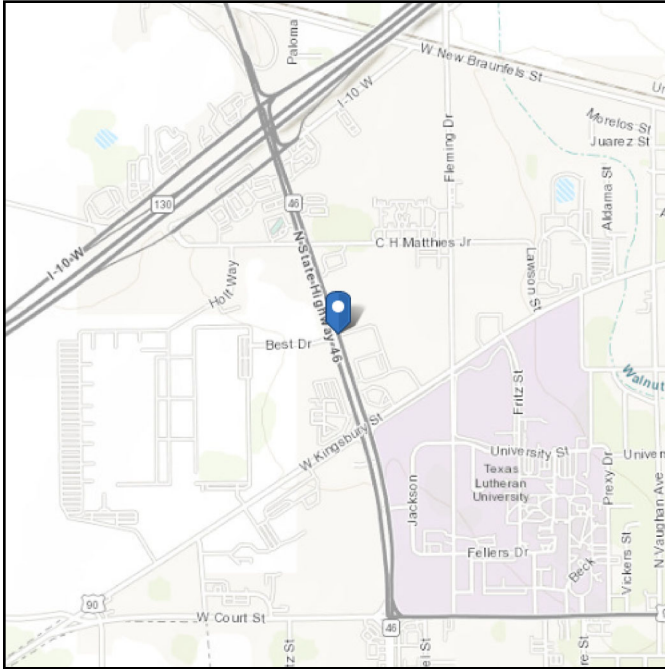
ASCE 7-22 Hazard Report

ASCE Hazards Report

Address:
TX-46 & Best Dr
Seguin, Texas
78155

Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: DE

Latitude: 29.577993
Longitude: -97.990694
Elevation: 0 ft (NAVD 88)

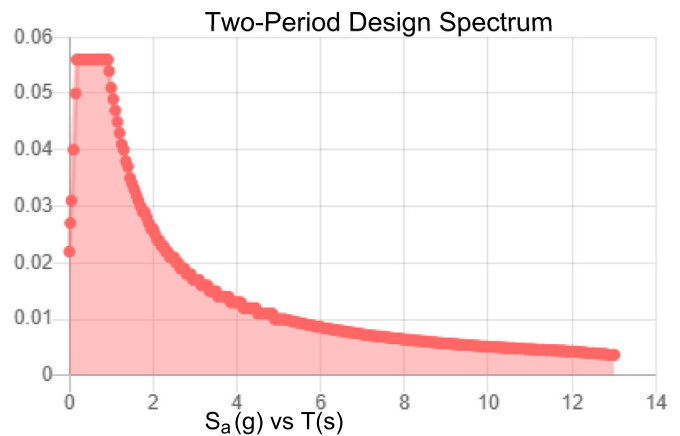
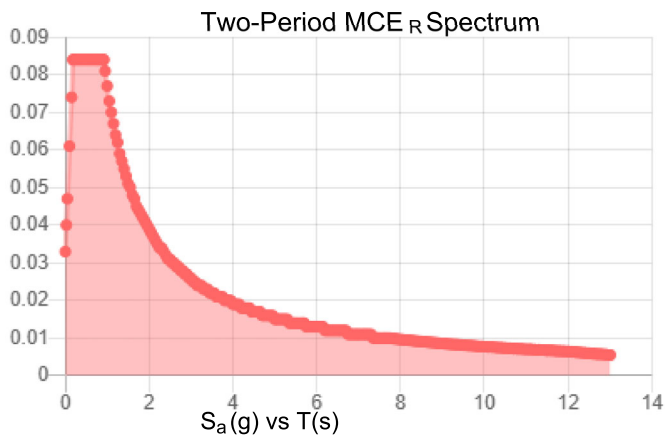
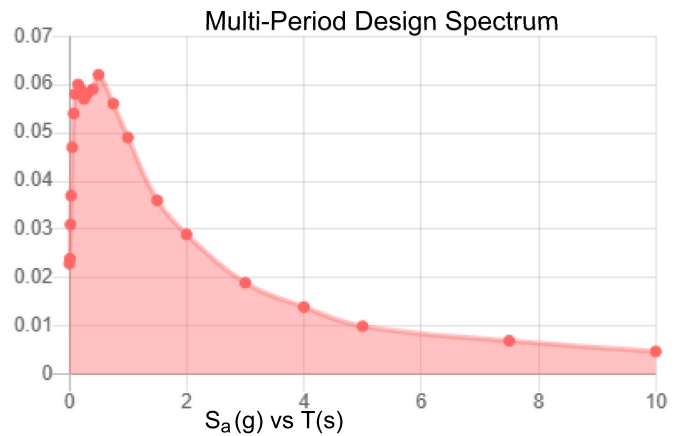
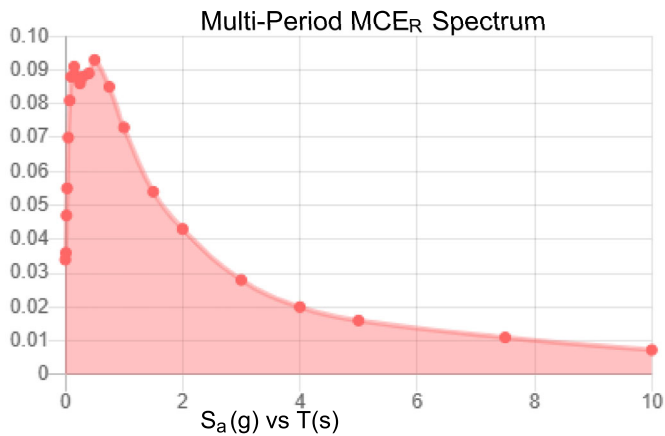


Site Soil Class: DE

Results:

PGA _M :	0.031	T _L :	12
S _{MS} :	0.084	S _S :	0.06
S _{M1} :	0.077	S ₁ :	0.033
S _{DS} :	0.056	V _{S30} :	185
S _{D1} :	0.051		

Seismic Design Category: A



MCE_R Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Sun Apr 19 2026

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

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