GEOTECHNICAL ENGINEERING REPORT

Proposed Goodwin 69 Acre Tract
Goodwin Lane and Orion Drive
New Braunfels, Texas

PSI Project No. 0312-2340-R1

PREPARED FOR:

Aspen Grove Realty
6324 McCommas Boulevard
Dallas, Texas 75214

August 10, 2021

BY:

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August 10, 2021

Aspen Grove Realty
6324 McCommas Boulevard
Dallas, Texas 75214

Attn: Mr. Richard Byrd

RE: GEOTECHNICAL ENGINEERING REPORT
PROPOSED GOODWIN 69 ACRE TRACT
GOODWIN LANE AND ORION DRIVE
NEW BRAUNFELS, TEXAS
PSI Project No. 0312-2340-R1

Dear Mr. Byrd:

Professional Service Industries, Inc. (PSI), an Intertek company, is pleased to submit this Geotechnical Engineering Report for the proposed Goodwin 69 Acre Tract. This report includes the results from the field and laboratory investigation along with recommendations for use in preparation of the appropriate design and construction documents for this project.

PSI appreciates the opportunity to provide this Geotechnical Engineering Report and looks forward to continuing participation during the design and construction phases of this project. PSI also has great interest in providing materials testing and inspection services during the construction of this project and will be glad to meet with you to further discuss how we can be of assistance as the project advances.

If there are questions pertaining to this report, or if PSI may be of further service, please contact us at your convenience.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.
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8/10/21

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1.0 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

Professional Service Industries, Inc. (PSI), an Intertek company, has partially completed a field exploration and geotechnical evaluation for the proposed Goodwin 69 Acre Tract project. Mr. Richard Byrd, representing Aspen Grove Realty, authorized PSI's services on May 21, 2021, by signing PSI Proposal No. 334337. PSI's proposal contained a proposed scope of work, fee, and PSI's General Conditions.

1.2 PROJECT DESCRIPTION

Based on information provided by the Client, PSI's review of a site plan entitled "Goodwin 69 Acre Tract, Conceptual Master Plan – Option D", dated April 22, 2021, a summary of our understanding of the proposed project is provided below in the following Project Description table.

TABLE 1.1: PROJECT DESCRIPTION

Project Items	Residential Subdivision Approx. 7,400 linear feet of streets
Existing Grade Change within Project Site Area	± 15 Feet (Google Earth Pro)
Pavement for Parking and Drives	Flexible Asphalt (HMAC) or Rigid Concrete Pavement

The geotechnical recommendations presented in this report are based on the available project information, structure locations, and the subsurface materials encountered during the field investigation. If the information presented above is incorrect, please inform PSI so that the recommendations presented in this report can be amended, as necessary. PSI will not be responsible for the implementation of provided recommendations if not notified of changes in the project.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of this study is to evaluate the subsurface conditions at the site and develop geotechnical engineering recommendations and guidelines for use in preparing the design and other related construction documents for the proposed project. The scope of services included drilling soil borings, performing laboratory testing, and preparing this geotechnical engineering report.

This report briefly outlines the available project information, describes the site and subsurface conditions, and presents the following:

- General site development and subgrade preparation recommendations.
- Estimated potential soil movements associated with collapsing, shrinking and swelling soils and methods to reduce these movements.
- Recommendations for site excavation, fill compaction, and the use of on-site and imported fill material under pavements.

- Recommendations for the design of flexible asphaltic and rigid concrete pavement systems for the proposed subdivision streets per the City of New Braunfels requirements.

The scope of services for this geotechnical exploration did not include an environmental, mold nor detailed seismic/fault assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on or below, or around this site. Statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes. The report also does not include a detailed settlement analysis or slope stability analysis.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 SITE DESCRIPTION

The following table provides a generalized description of the existing site conditions based on visual observations during the field activities, as well as other available information.

TABLE 2.1: SITE DESCRIPTION

Site Location	Northwest of the intersection of Goodwin Lane and Orion Drive in New Braunfels, Texas Approximate GPS Coordinates: Latitude: 29.7510°; Longitude: -98.0790°
Site History	Undeveloped. Historically used as farmland.
Existing Site Ground Cover	Grass and Exposed Soil
Other Site Features	Slopes slightly downward to the southeast
Description of Adjacent Property	Generally surrounded by farmland with a new residential subdivision being developed to the north
Ground Surface Soil Support Capability	Firm Enough for Field Equipment During Dry Periods

2.2 FIELD EXPLORATION

Field exploration for the project consists of drilling a total of 21 borings. The boring design element, approximate depths and drilling footage are provided in the following table.

TABLE 2.2: FIELD EXPLORATION SUMMARY

Design Element	Borings	Boring Depth (ft)	Drilling Footage (feet)
Residential Streets	15	10	150
Residential Streets	6	20	120
TOTAL:	**21**	**---**	**270**

The boring locations were selected by PSI personnel and located in the field using a recreational-grade GPS system. Elevations of the ground surface at the boring locations were not provided and should be surveyed by others prior to construction, if required. We have estimated ground surface elevations at the boring locations from Google Earth. The references to elevations of various subsurface strata are based on depths below existing grade at the time of drilling. The approximate boring locations are depicted on the Boring Location Plan provided in the Appendix.

TABLE 2.3: FIELD EXPLORATION DESCRIPTION

Drilling Equipment	Truck-Mounted Drilling Rig
Drilling Method	Continuous-Flight Augers
Drilling Procedure	Applicable ASTM and PSI Safety Manual
Field Testing	Hand Penetrometer, Standard Penetration Test (ASTM D1586)
Sampling Procedure	ASTM D1587/1586
Sampling Frequency	Continuously to a Depth of 10 feet and at 5-foot Intervals Thereafter
Frequency of Groundwater Level Measurements	During and After Drilling
Boring Backfill Procedures	Soil Cuttings

During field activities, the encountered subsurface conditions were observed, logged, and visually classified (in general accordance with ASTM D2487). Field notes were maintained to summarize soil types and descriptions, water levels, changes in subsurface conditions, and drilling conditions.

2.3 LABORATORY TESTING PROGRAM

PSI supplemented the field exploration with a laboratory testing program to determine additional engineering characteristics of the subsurface soils encountered. The laboratory testing program included:

TABLE 2.4: LABORATORY TESTING PROGRAM

Laboratory Test	Procedure Specification
Visual Classification	ASTM D2488
Moisture Content	ASTM D2216
Atterberg Limits	ASTM D4318
Material Finer than No. 200 Sieve	ASTM D1140
California Bearing Ratio	ASTM D1883

The laboratory testing program was conducted in general accordance with applicable ASTM Test Methods. The results of the laboratory tests are provided on the Boring Logs in the Appendix. Portions of samples not altered or consumed by laboratory testing will be discarded 60 days from the date shown on the report.

2.4 SITE GEOLOGY

As shown on the Geologic Atlas of Texas, San Antonio Sheet, the site is mapped as being located over the **Leona Formation (Qle).** The Leona Formation consists of deposits of gravel, sand, silt and clay.

2.5 SUBSURFACE CONDITIONS

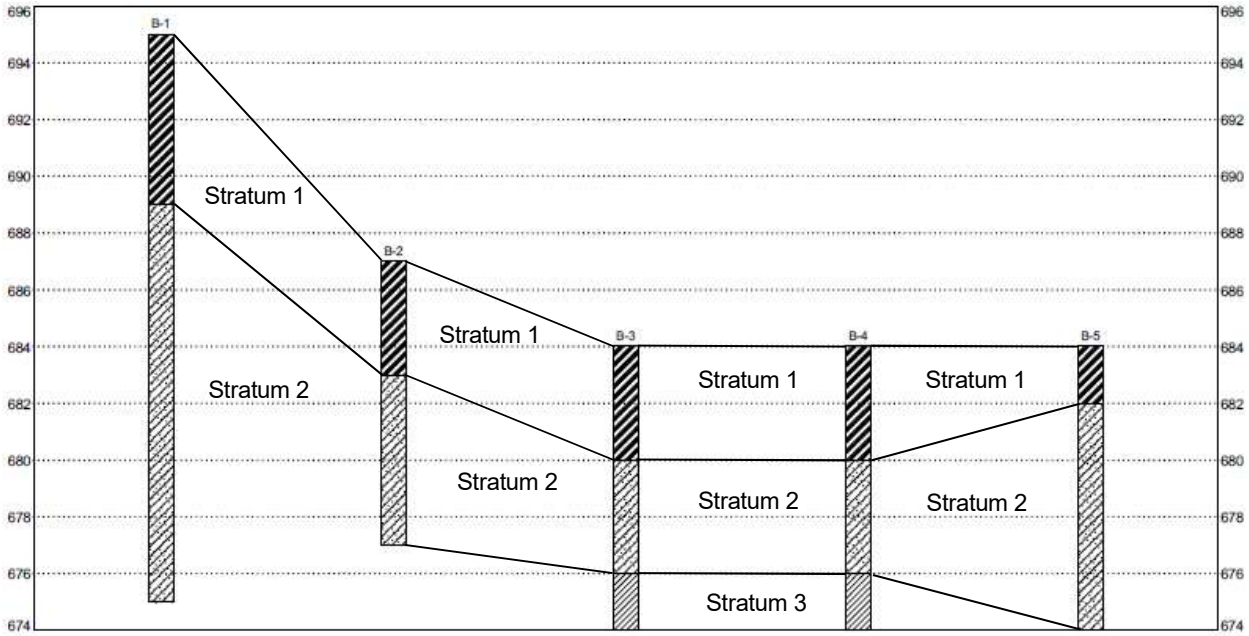
The results of the field exploration and laboratory testing have been used to develop a generalized subsurface profile of the project site. The following subsurface descriptions highlight the major subsurface stratification features and material characteristics.

TABLE 2.5: GENERALIZED SUBSURFACE PROFILE TABLE

Stratum	Top (ft)	Bot. (ft)	Soil Type	LL (%)	PI	-200 Sieve (%)
1	0	2-6	Dark Brown Fat Clay / Fat Clay With Sand	61-84	24-55	66-95
2	2-6	8-20	Light Brown / Brown / Gray Clayey Sand With Gravel / Sandy Lean Clay With Gravel	39-68	25-39	16-61
3	8	20	Brown Lean Clay	44-49	29-31	83-87

Where: LL= Liquid limit (%)
PI = Plasticity Index
-#200 Sieve = % Passing the #200 Sieve

FIGURE 2.1: GENERALIZED SUBSURFACE PROFILE



The boring logs included in the Appendix should be reviewed for specific information at individual boring locations. The boring logs include soil descriptions, stratifications, locations of the samples, and field and laboratory test data. The descriptions provided on the logs only represent the conditions at the specific boring location; the stratifications represent the approximate boundaries between subsurface materials. The actual transitions between strata may be more gradual and less distinct. Variations will occur and should be expected across the site.

2.5.1 GROUNDWATER INFORMATION

Water level measurements were performed during drilling and after completion of drilling. Specific information concerning groundwater is noted on each boring log presented in the Appendix of this report. Groundwater was not encountered during the field investigation of this site. Groundwater levels fluctuate seasonally as a function of rainfall, proximity to creeks, rivers and lakes, the infiltration rate of the soil,

seasonal and climatic variations and land usage. If a detailed water level evaluation is required, observation wells or piezometers should be installed at the site to monitor water levels.

The groundwater levels presented in this report were measured at the time of PSI field activities. The contractor should be prepared to control groundwater, if encountered, during construction.

3.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

3.1 GEOTECHNICAL DISCUSSION

Based upon the information obtained from the soil borings and laboratory testing, the clay soils encountered at this site within the seasonally active zone have a moderate to high potential for expansion. PSI recommends the expansive potential, i.e. Potential Vertical Movement (PVM) of these soils be mitigated to reduce the potential for foundation movements and foundation distress.

An improved building pad should be constructed under soil-supported floor slab and foundation elements due to the presence of expansive foundation soils. Several methods are available to reduce the shrink/swell movement. PSI typically recommends excavating a portion of the clay soils and, after scarifying and moisture conditioning the exposed subgrade, replacing the excavated soil with compacted reconditioned fill and finally compacted select fill materials to the bottom of the floor slab. Some of the on-site soils may be suitable for use as either reconditioned fill and/or select fill but should be tested and approved prior to use.

The following design recommendations have been developed based on the previously described project characteristics and subsurface conditions encountered. If there are changes in the project criteria, PSI should be retained to determine if modifications of the recommendations will be required. The findings of such a review is typically presented in a supplemental report. Once final design plans and specifications are available, a general review by PSI is recommended to verify that the earthwork and foundation recommendations are properly interpreted and implemented within the construction documents.

3.2 POTENTIAL VERTICAL MOVEMENT OF EXPANSIVE SOILS (PVM)

The soils encountered at the soil boring locations exhibit a moderate to high potential for volumetric changes, due to fluctuations in soil moisture content. PSI has conducted laboratory testing on the soils to estimate the expansive soil potential with soil moisture variations. These soil moisture variations are based on historical climate change data. Determining the soil potential for shrinking and swelling, combined with historical climate variation, aids the engineer in quantifying the soil movement potential of the soils supporting the floor slab and shallow foundations based on climate variations. The Texas Department of Transportation (TxDOT) test method TEX-124-E, was utilized to estimate the Potential Vertical Movement (PVM).

3.2.1 SHRINK/SWELL MOVEMENT (PVM) ESTIMATE

Based on laboratory testing results and our analyses, the potential vertical movement was estimated to be approximately **2 - 3½ inches.**

It is not possible to accurately quantify actual soil moisture changes and resulting shrink/swell movements. The PVM and referenced structural movements values provided should be considered approximate values based on industry standard practice and experience. Extreme soil moisture variations could occur due to unusual drought severity, leaking water or sewer lines, perched groundwater infiltration, or seasonal springs. Also, soil transpiration from trees located adjacent to or previously underneath the building, downspouts directing roof discharge under the foundation, poor drainage or irrigation line breaks could lead to excessive movements.

Therefore, because of these unknown factors, the shrink/swell potential of soils can often be significantly underestimated using the previously mentioned methods of evaluating PVM. The unknown factors previously

mentioned cannot be determined at the time of the geotechnical study. Therefore, estimated shrink/swell movements are calculated only in consideration of historical climate data related to soil moisture variations from climate changes. Movements exceeding those estimated should be anticipated and regular maintenance should be provided to address these issues throughout the life of the structure.

3.2.2 Design PVM Considerations

Grade-supported floor slabs, foundations and adjacent flatwork should be expected to undergo some vertical movements, including differential movement, due to the action of expansive soils and possible soil settlement. In this general area, most Owners, Architects, Structural and Geotechnical Engineers consider a value of 1-inch to be within acceptable movement tolerances for grade supported floor slabs or foundations. PSI used this generally accepted tolerance for movement to develop the recommendations presented in this report.

The amount of structural movement associated with a PVM magnitude of 1 inch may not be considered acceptable for "operational" or "aesthetic" performance criteria which often occur at less movement than the magnitude of the PVM which is based on "structural" considerations. Cracking in the foundation and walls and sticking doors, which requires periodic maintenance, will likely occur for foundations designed using an allowable 1-inch PVM. This should be understood by the Owner and Design Team.

PSI recommends that the Owner discuss allowable movement tolerances with the structural engineer, architect, and other pertinent members of the Design Team prior to commencement of the final design to make certain that appropriate movement tolerances are developed and used for this project. If other design PVM values are desired, PSI should be contacted to review and revise the recommendations presented in this report as necessary to meet the project requirements.

3.2.3 PVM Reduction Recommendations

The PVM may be reduced to desired levels by removing the upper soils to the recommended minimum over-excavation depth, proof-rolling and compacting the exposed subgrade, placement and compaction of reconditioned removed soils or imported select fill up to the bottom of the select fill and finally compaction of the select fill to the bottom of the floor slab.

Table 3.1: Reconditioning Method

Application	Flexible or Rigid Pavement
Site Stripping Removal	Upper 6 inches of organics and deleterious material including debris to expose clean subgrade
Foundation Improvement Method	Remove and replace existing soils with reconditioned soil and select fill
Improved Site Condition PVM	Approximately 1 or 2 inches
Minimum Over-Excavation (Assumes FFE within 2 feet of highest existing grade)	**3 feet for 2" PVM** **6 feet for 1" PVM**
Reconditioned Fill Thickness (min.)	**1 foot for 2" PVM** **3 feet for 1" PVM**
Reconditioned Fill	On site or imported materials having: Allowable PI from 12 to 35 Percent Passing No. 200 Sieve > 50%

	Max Particle Size < 3”
Select Fill Thickness (min.)	**3 feet for 2” PVM** **3 feet for 1” PVM**
Select Fill Material (Other low plasticity materials may be used pending review and approval from PSI)	Pit Run - Free of organics, trash, or other deleterious material. Liquid Limit <40% Plasticity Index 7 to 20 Max Particle Size < 3” Percent Material Passing 200 Sieve > 35%
Select Fill Material Alternative	TxDOT Item 247 (Crushed Limestone Material) Type A or B Grade 1-2 or 3

4.0 PAVEMENT DESIGN RECOMMENDATIONS

4.1 PAVEMENT DESIGN PARAMETERS

PSI understands that flexible and rigid pavements will be considered for this project. Therefore, pavement design recommendations for several levels of traffic loading were developed based on assumptions of potential traffic, drive paths or patterns and anticipated soil support characteristics of pavement subgrades. PSI utilized the "AASHTO Guide for Design of Pavement Structures" published by the American Association of State Highway and Transportation Officials to evaluate 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. PSI is available to provide laboratory testing and engineering evaluation to refine the site-specific design parameters and sections, upon request.

For this analysis, PSI has used a client provided traffic load of 100,000 18-kip Equivalent Single Axle Loads (ESAL) applied to the pavement over its design life. Based on this information and the results of laboratory testing, PSI has provided recommended pavement sections for flexible and rigid pavements constructed on stable and properly prepared/compacted subgrades. Flexible pavement options with and without geogrid options are also provided for consideration. Details regarding the basis for this design are presented in the table below.

TABLE 4.1: PAVEMENT DESIGN PARAMETERS AND ASSUMPTIONS (RIGID AND FLEXIBLE)

Reliability, percent	70
Initial Serviceability Index, Flexible Pavement	4.2
Terminal Serviceability Index, Rigid Pavement	2.0
Traffic Load	100,000 equivalent single axle loads (ESALs)
Standard Deviation, Flexible Pavement	0.45
Standard Deviation, Rigid Pavement	0.35
Concrete Compressive Strength	4,000 psi
Subgrade California Bearing Ratio (CBR)	2.0
Subgrade Modulus of Subgrade Reaction, k in pci	75

Pavements supported on expansive soils will be subjected to PVM estimated and presented previously in this report. These potential soil movements typically occur to some degree during the life of the pavement. Consequently, pavements can be expected to crack and require periodic maintenance to reduce damage to the pavement structure.

During the paving life, maintenance to seal surface cracks within concrete or asphalt paving and to reseal joints within concrete pavement should be undertaken to achieve the desired paving life. Perimeter drainage should be controlled to prevent or retard influx of surface water from areas surrounding the paving. Water penetration leads to paving degradation. Water penetration into base or subgrade materials, sometimes due to irrigation or surface water infiltration leads to pre-mature paving degradation. Curbs should be used in conjunction with asphalt paving to reduce potential for infiltration of moisture into the base course. Curbs

should extend the full depth of the base course and should extend at least 3 inches into the underlying clayey subgrade.

Material specifications, construction considerations, and thickness section recommendations are presented in following sections.

The presented recommended pavement sections are based on the field and laboratory test results for the project, local pavement design practice, design assumptions presented herein and previous experience with similar projects. The project Civil Engineer should verify that the ESAL and other design values are appropriate for the expected traffic and design life of the project. PSI should be notified in writing if the assumptions or design parameters are incorrect or require modification.

4.2 Pavement Section Recommendations

PSI anticipated that the roadways and parking areas will be used primarily by passenger vehicles and delivery vehicles. PSI is providing parking and drive area sections based on experience with similar facilities constructed on similar soil conditions for the design traffic loading anticipated.

4.2.1 Flexible Pavement

Recommendations for flexible asphaltic concrete pavement for roadways and parking areas are provided below.

Figure 4.1: Option 1 Flexible Pavement Typical Section

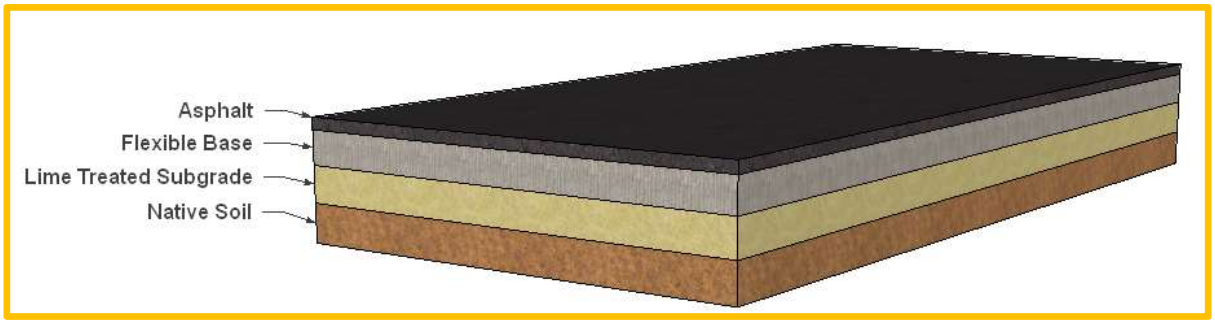


FIGURE 4.2: OPTION 2 FLEXIBLE PAVEMENT TYPICAL SECTION

FIGURE 4.3: OPTION 3 FLEXIBLE PAVEMENT TYPICAL SECTION

TABLE 4.2: FLEXIBLE PAVEMENT SECTION OPTIONS

Material	Option 1	Option 2	Option 3
Hot Mix Asphaltic Concrete	3”	3”	3”
Flexible Base	7”	9”	11”
Lime Stabilized Subgrade	8”	No	No
Geogrid	No	Yes	No
Compacted Subgrade	—	8”	8”

4.2.2 RIGID PAVEMENT

Recommendations for rigid concrete pavement for roadways and parking areas are provided below.

FIGURE 4.4: OPTION 1 RIGID PAVEMENT TYPICAL SECTION

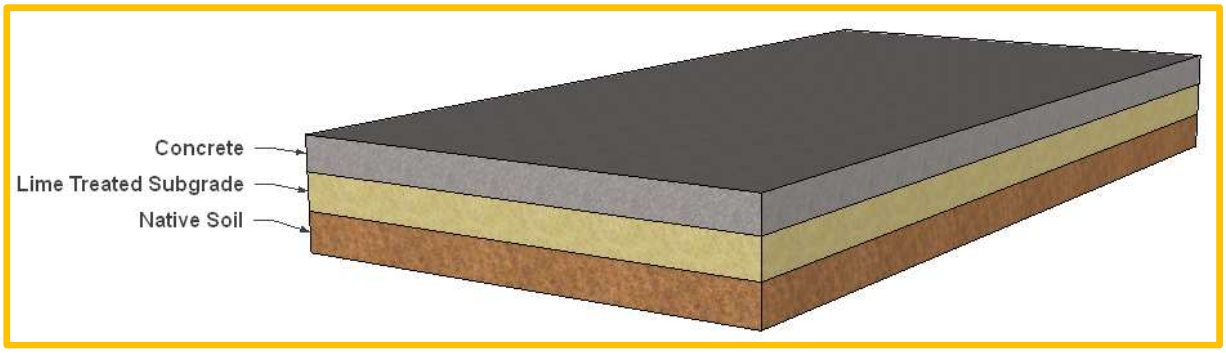


FIGURE 4.5: OPTION 2 RIGID PAVEMENT TYPICAL SECTION

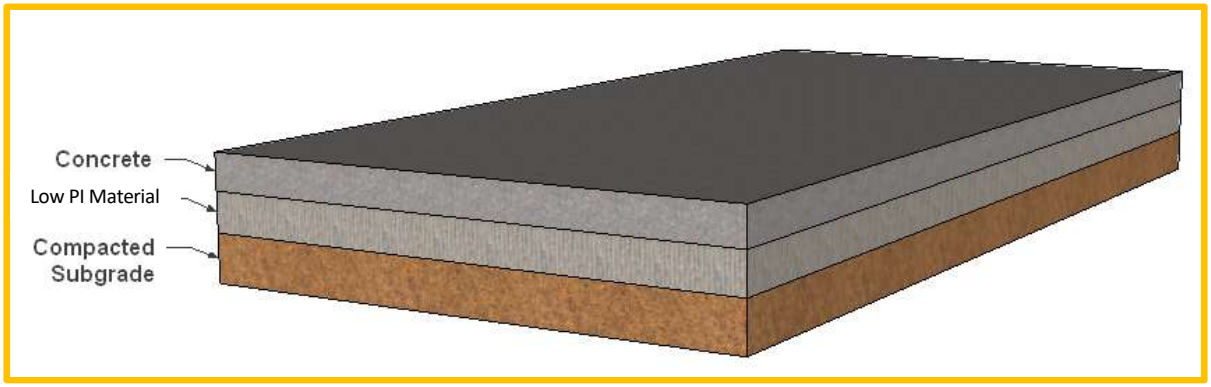


TABLE 4.3: RIGID PAVEMENT SECTION OPTIONS

Material	Option 1	Option 2
Portland Cement Concrete	6”	6”
Low PI Material (PI<25)	–	6”
Lime Stabilized Subgrade	6”	--
Compacted Subgrade	--	8”

4.2.3 GENERAL PAVEMENT DESIGN AND CONSTRUCTION RECOMMENDATIONS

TABLE 4.4: PAVEMENT DESIGN AND CONSTRUCTION RECOMMENDATIONS

Minimum Undercut Depth	6 inches or as needed to remove roots
Reuse Excavated Soils	Free of roots and debris and meet material requirements of intended use
Undercut Extent	2 feet beyond the paving limits
Exposed Subgrade Treatment	Proof-roll subgrade with rubber-tired 20-ton (loaded) construction equipment Alternate Equipment can be used with Geotechnical Engineer Approval

Proof-Rolled Pumping and Rutting Areas	Excavate to firmer materials and replace with compacted general or select fill under direction of a representative of the Geotechnical Engineer
General Fill	Materials free of roots, debris, and other deleterious materials with a maximum rock size of 4 inches with a CBR greater than 3
Minimum General Fill Thickness	As required to achieve grade
Maximum General Fill Loose Lift Thickness	9 Inches
Lime Stabilization	Performed in general accordance with TxDOT Item 260. Subgrade soils stabilized with lime should achieve a pH of 12.4 or greater. Sulfate testing should be conducted before placement of lime.
Low PI Material (Other low plasticity materials may be used pending review and approval from PSI)	On-Site or Imported Free of organics, trash, or other deleterious material Plasticity Index 10 to 25 Max Particle Size < 3”
Geogrid	Geogrid should meet TxDOT Item DMS – 6240 and be pulled and punched. The subgrade should be leveled and smoothed prior to geogrid placement on compacted ~~subgrade.~~
~~Flexible Base~~	~~TxDOT Item 247, Type A, Grade 1-2~~
~~Maximum Flexible Base Loose Lift Thickness~~	~~9 Inch~~es
Hot Mix Asphaltic Concrete	TxDOT Item 340, Type C or D
Concrete Minimum Recommended Strength	4,000 psi (avg. 28-day comp. strength)
Concrete Min. Reinforcement	No. 3 bars, 18 inches on-center, each way Located in top half of concrete section Minimum 2 inches cover
Concrete Construction Joint Min. Reinforcement	¾-inch diameter dowels 14 inches long Spaced 12 inches on-center along the joint
Contraction Joint Spacing (In General Accordance with ACI 330)	Maximum joint spacing should be less than 30 times the thickness of the concrete pavement or 15 feet, whichever is smaller.

TABLE 4.5: COMPACTION AND TESTING RECOMMENDATIONS FOR PAVEMENT AREAS

Location	Material	Density Test Method	Soil Type	Percent Compaction	Optimum Moisture Content	Testing Frequency
Pavement Areas	Subgrade, General Fill Soil, Low PI Material	ASTM D698	PI ≥ 25	94% to 98%	0 to +4%	1 per 10,000 SF; min. 3 tests
			PI < 25	≥ 95%	0 to +4%	
	Flexible Base Material	ASTM D1557	Item 247	≥ 95%	±3%	1 per 5,000 SF; min. 3 per lift
		TEX-113-E	Item 247	≥ 100%	±2%	

5.0 CONSTRUCTION CONSIDERATIONS

Having a Geotechnical Engineer retained to review the earthwork recommendations in the Contract Documents and be an active participant in team meetings near the time of construction can often result in project cost savings. Therefore, PSI recommends that an AASHTO accredited 3rd party laboratory with qualified professional engineers who specialize in geotechnical engineering be retained to provide observation and testing of construction activities involved in the foundations, earthwork, pavements and related activities of this project. As the Geotechnical Engineer of Record (GER), PSI's services can be retained as the 3rd party laboratory. PSI's participation would be advantageous to the project flow and value engineering during construction since we are most familiar with the existing soil conditions at the site.

The geotechnical engineer often does not have available all design information at the time of writing the original report since the report is done very early in the design process. The GER can be of great benefit immediately prior to construction since definitive information regarding the location of the building, surrounding flatwork, pavements, planned landscaping, and drainage features is available at that time. The GER can then write Supplement letters to the original geotechnical report often resulting in less risk and significant project cost savings.

PSI cannot accept responsibility for conditions which deviate from those described in this report, nor for the performance of the foundations or pavements if not engaged to also provide construction observation and materials testing for this project. The PSI geotechnical engineer of record should also be engaged by the Design Team during construction, even if periodic on-call testing is contracted with PSI Construction Services.

5.1 INITIAL SITE PREPARATION CONSIDERATIONS

5.1.1 SUBGRADE PREPARATION FOR SITE WORK OUTSIDE BUILDING PAD AND PAVEMENT AREAS

Grade adjustments outside of the building pad and pavement areas can be made using select or general fill materials. The clean excavated onsite soils may also be reused in areas not sensitive to movement.

TABLE 5.1: SUBGRADE PREPARATION FOR NON-STRUCTURAL - GENERAL FILL

Minimum Undercut Depth	6 inches or as needed to remove roots, organic and/or deleterious materials
Exposed Subgrade Treatment	Proof-roll subgrade with rubber-tired, 20-ton (loaded) construction equipment Alternate Equipment can be used with Geotechnical Engineer Approval
Proof-Rolled Pumping and Rutting Areas	Excavate to firmer materials and replace with compacted general or select fill under direction of a representative of the Geotechnical Engineer
General Fill Type	Clean material free of roots, debris and other deleterious material with a maximum particle size of 4 inches
Maximum General Fill Loose Lift Thickness	8 inches

TABLE 5.2: FILL COMPACTION RECOMMENDATIONS OUTSIDE OF BUILDING AND PAVEMENT AREAS

Location	Material	Test Method for Density Determination	Plasticity Index	Percent Compaction	Optimum Moisture Content	Testing Frequency
Outside of Structure / Pavement Areas	General Fill	ASTM D698	PI ≥ 25	94% to 98%	0 to +4%	1 per 10,000 SF; min. 3 per lift
			PI < 25	≥ 95%	0 to +4%	

5.1.2 EXISTING SITE CONDITIONS

The following table outlines construction considerations in consideration of demolition of existing structures, demolition of existing paving, procedures for abandoning old utility lines and removing trees.

TABLE 5.3: CONSIDERATIONS FOR DEMOLITION, ABANDONING UTILITIES AND TREE REMOVAL

Existing Structures	
Foundations of former structures located below new structure	Impact of foundation of former structures should be evaluated on a case by case basis
Foundations for former structures located below new paving	Cut off at least 3 feet below finished paving grade
Abandoned Utilities	
Utilities of former structures located within new footprint of proposed structure	Remove pipe, bedding and backfill and then replace with select fill placed using controlled compaction
Utilities of former structures located outside of footprint of proposed structure	Abandon in place using a grout plug
Tree Removal	
Trees located within proposed building footprint; roadways, parking, and sidewalk areas; and within 15 feet of building area	Remove root system for full vertical and lateral extent and extend removal for at least 3 feet beyond presence of root fragments and replace void with compacted general fill or flowable fill

5.2 MOISTURE SENSITIVE SOILS/WEATHER RELATED CONCERNS

Soils are sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils which become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork, foundation, and construction activities during dry weather.

5.3 EXCAVATION OBSERVATIONS

Excavations should be observed by a representative of PSI prior to continuing construction activities in those areas. PSI needs to assess the encountered materials and confirm that site conditions are consistent with those discussed in this report. This is especially important to identify the condition and acceptability of the exposed subgrades under foundations and other structures that are sensitive to movement. Soft or loose soil zones encountered at the bottom of the excavations should be removed to the level of competent soils as

directed by the Geotechnical Engineer or their representative. Cavities formed as a result of excavation of soft or loose soil zones should be backfilled with compacted select fill or lean concrete.

After opening, excavations should be observed, and concrete should be placed as quickly as possible to avoid exposure to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. Excavations left open for more than 48 hours should be protected to reduce evaporation or entry of moisture.

5.4 DRAINAGE CONSIDERATIONS

Water should not be allowed to collect in or adjacent to foundation excavations, on foundation surfaces, or on prepared subgrades within the construction area during or after construction. Proper drainage around grade supported sidewalks and flatwork is important to reduce potential movements. Excavated areas should be sloped toward one corner to facilitate removal of collected rainwater, groundwater, or surface runoff. Providing rapid, positive drainage away from the building reduces moisture variations within the underlying soils and will aid in reducing the magnitude of potential movements.

5.5 EXCAVATIONS AND TRENCHES

Excavation equipment capabilities and field conditions may vary. Geologic processes are erratic and large variations can occur in small vertical and/or lateral distances. Details regarding “means and methods” to accomplish the work (such as excavation equipment and technique selection) are the sole responsibility of the project contractor. The comments contained in this report are based on small diameter borehole observations. The performance of large excavations may differ as a result of the differences in excavation sizes.

The Occupational Safety and Health Administration (OSHA) Safety and Health Standards (29 CFR Part 1926, Revised October 1989), require that excavations be constructed in accordance with the current OSHA guidelines. Furthermore, the State of Texas requires that detailed plans and specifications meeting OSHA standards be prepared for trench and excavation retention systems used during construction. PSI understands that these regulations are being strictly enforced, and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

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

PSI is providing this information as a service to the client. PSI does not assume responsibility for construction site safety or the contractor's or other parties’ compliance with local, State, and Federal safety or other regulations. A trench safety plan was beyond the scope of our services for this project.

6.0 REPORT LIMITATIONS

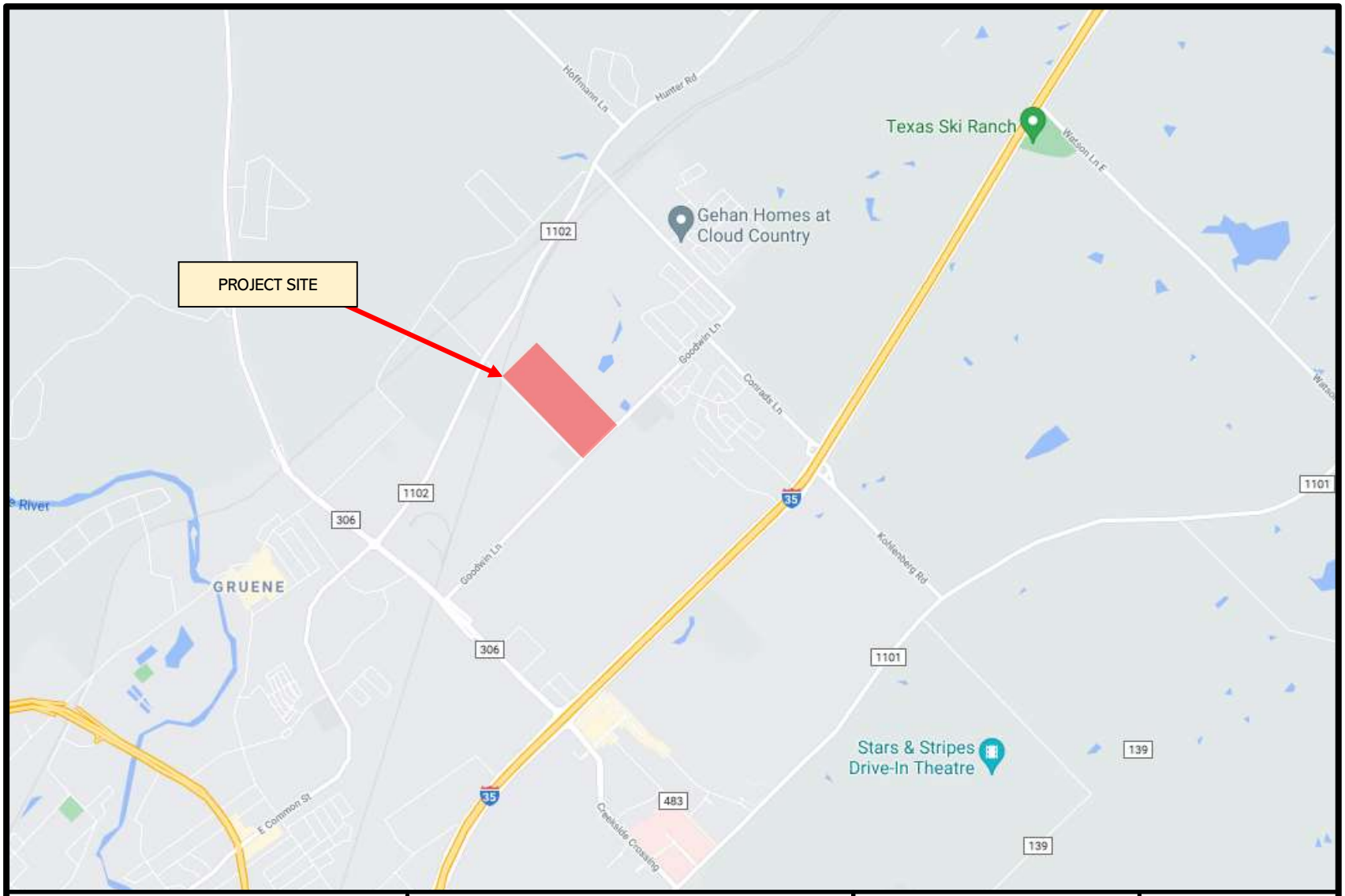
The recommendations submitted in this report are based on the available subsurface information obtained by PSI and design details furnished by the client for the proposed project. If there are revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report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

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional Geotechnical Engineering practices in the local area. No other warranties are implied or expressed. This report may not be copied without the expressed written permission of PSI.

After the plans and specifications are more complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that the engineering recommendations have been properly incorporated in the design documents. At this time, it may be necessary to submit supplementary recommendations. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project.

This report has been prepared for the exclusive use of Aspen Grove Realty for specific application to the proposed Goodwin 69 Acre Tract to be constructed at Goodwin Lane and Orion Drive in New Braunfels, Texas.

APPENDIX



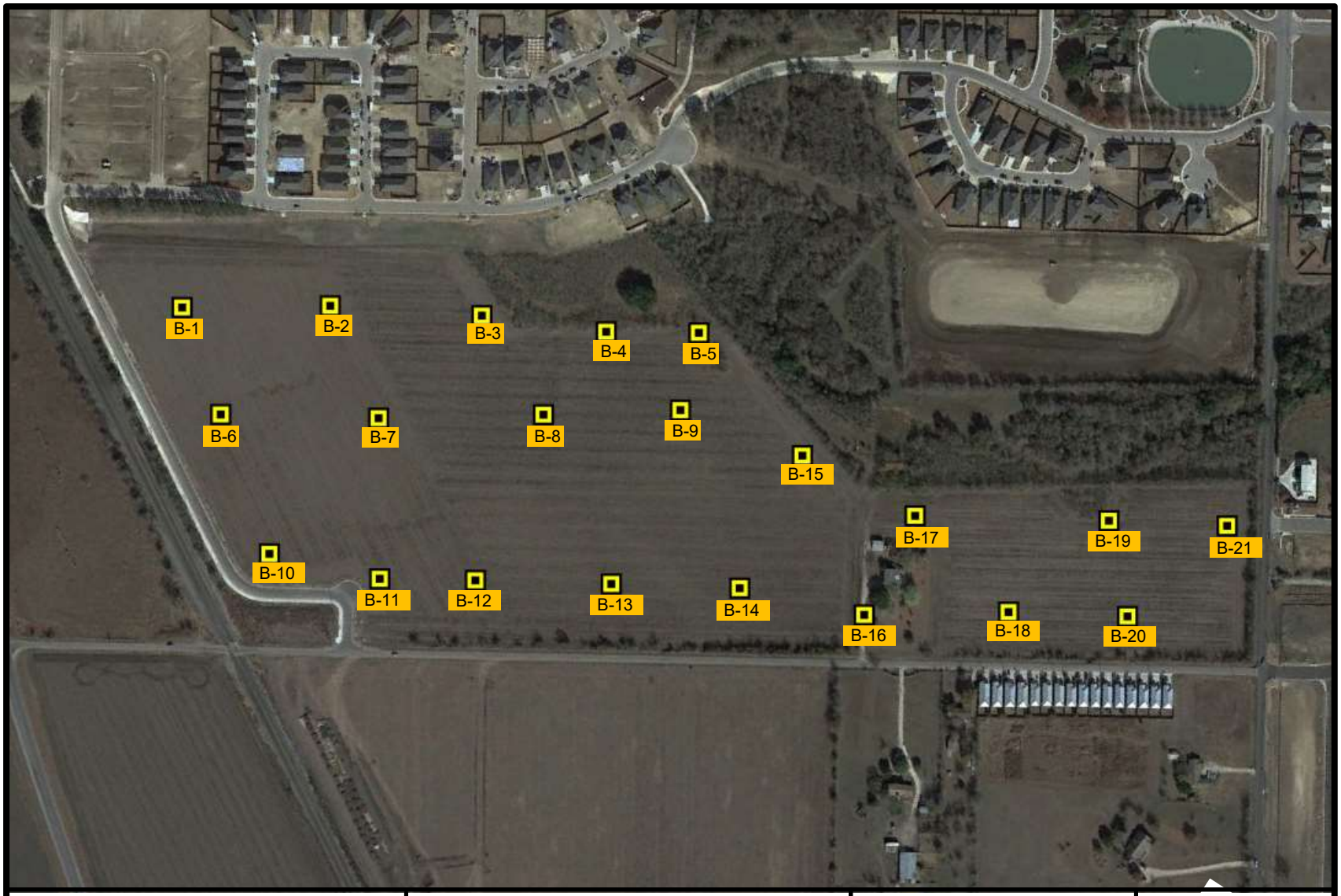
intertek psi
3 Burwood Lane, San Antonio, Texas
(210) 342-9377 FAX (210) 342-9401

Site Vicinity Map

Proposed Goodwin 69 Acre Tract
Goodwin Lane and Orion Drive, New Braunfels, Texas
PSI Project No.: 0312-2340-R1

NOT TO SCALE

N



intertek psi
3 Burwood Lane, San Antonio, Texas
(210) 342-9377 FAX (210) 342-9401

Boring Location Plan

Proposed Goodwin 69 Acre Tract
Goodwin Lane and Orion Drive, New Braunfels, Texas
PSI Project No.: 0312-2340-R1

NOT TO SCALE

N

BORING LOGS

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-1

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 / PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 695.00												
				FAT CLAY (CH), dark brown, firm to hard	22			8								
					25		87				62	26	36			
5					26											
				CLAYEY SAND WITH GRAVEL (SC), light brown, medium dense to very dense	17			22								
					13			56								
10																
					10		46	70/10			45	20	25			
15																
					13			74								
20				Boring terminated at an approximate depth of 20 feet.												
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 20.0 Feet
DATE: 6/22/21-6/22/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-2

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 687.00												
				FAT CLAY (CH), dark brown, stiff	22			9								
					25			10								
5				CLAYEY SAND WITH GRAVEL (SC), brown to light brown, medium dense to dense	22			11								
				- light brown below 6.5 feet	8		25	41			53	21	32			
					10			35								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-3

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 / PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 684.00												
				FAT CLAY (CH), dark brown, firm to very stiff	23			6								
					21											
5				CLAYEY SAND WITH GRAVEL (SC), gray, dense to very dense	5		21	68			64	25	39			
					8			39								
				LEAN CLAY (CL), brown, hard	11			33								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-4

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 684.00												
				FAT CLAY (CH), dark brown, stiff to hard	21			10								
					20											
5				CLAYEY SAND WITH GRAVEL (SC), gray, dense to very dense	7			61								
					5			43								
				LEAN CLAY (CL), brown, hard	13		87	40			44	15	29			
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-5

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 684.00												
				FAT CLAY WITH SAND (CH), dark brown, stiff	21		79	11			61	25	36			
				CLAYEY SAND WITH GRAVEL (SC), gray, medium dense to very dense	6			50								
5				- gray and brown below 4.5 feet	9			22								
					7			62								
				- gray below 8.5 feet	3			50/4								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-6

LOCATION: See Boring Location Plan

DEPTH, FT.	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
	Elevation: 695.00											
	FAT CLAY (CH), dark brown, stiff	23			9							
		25			8							
5	FAT CLAY WITH SAND (CH), brown, stiff	22		71	10			71	28	43		
	SANDY LEAN CLAY WITH GRAVEL (CL), brown, very stiff	16			29							
	LEAN CLAY (CL), brown, very stiff, trace Gravel	16			26							
10	Boring terminated at an approximate depth of 10 feet.											
15												
20												
25												

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL WC LL
20 40 60

COMPLETION DEPTH: 10.0 Feet
DATE: 6/22/21-6/22/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-7

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL 20 WC 40 LL 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 689.00												
				FAT CLAY (CH), dark brown, stiff to very stiff	21			10								
					24			9								
5					25			16								
				CLAYEY SAND WITH GRAVEL (SC), brown, dense	9		28	37			61	24	37			
					13			39								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-8

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 684.00											
				FAT CLAY WITH SAND (CH), dark brown, stiff to hard	25			8							
					28		84	9			75	25	50		
5				- brown, few Gravel below 4 feet	24										
				CLAYEY SAND WITH GRAVEL (CL), light brown, dense	10			42							
				LEAN CLAY WITH SAND (CL), brown, very stiff	14			20							
10															
					15		83	30			49	19	30		
15															
					17			29							
20				Boring terminated at an approximate depth of 20 feet.											
25															

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL WC LL
20 40 60

COMPLETION DEPTH: 20.0 Feet
DATE: 6/23/21-6/23/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-9

LOCATION: See Boring Location Plan

DEPTH, FT.	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
	Elevation: 686.00											
	FAT CLAY (CH), dark brown, stiff	19			8							
	CLAYEY SAND WITH GRAVEL (SC), gray, dense	6		16	46			67	33	34		
5	SANDY LEAN CLAY WITH GRAVEL (CL), brown and light brown, very stiff	11			29							
	CLAYEY SAND WITH GRAVEL (SC), light brown, very dense	10			60							
		8			50/4							
10	Boring terminated at an approximate depth of 10 feet.											
15												
20												
25												

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL 20 WC 40 LL 60

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-10

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 / PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 695.00												
				FAT CLAY WITH SAND (CH), dark brown, stiff	16			8								
					26		84	14			70	29	41			
5				- brown below 4.5 feet	23			12								
				FAT CLAY WITH GRAVEL (CH), brown, very stiff	19			20								
				FAT CLAY (CH), brown, very stiff, trace calcareous deposits	16			28								
10																
				SANDY FAT CLAY WITH GRAVEL (CH), brown, hard	15		61	77/11			55	26	29			
15																
					11			86/10								
20				Boring terminated at an approximate depth of 20 feet.												
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 20.0 Feet
DATE: 6/22/21-6/22/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-11

LOCATION: See Boring Location Plan

DEPTH, FT.	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
	Elevation: 693.00											
	FAT CLAY (CH), dark brown, stiff	22			11							
	CLAYEY SAND WITH GRAVEL (SC), light brown, medium dense to very dense	16			26							
	- brown below 4 feet											
5		11		49	22			45	20	25		
		17			56							
	LEAN CLAY (CL), brown, very stiff, trace calcareous deposits	15			28							
10	Boring terminated at an approximate depth of 10 feet.											
15												
20												
25												

HAND PEN (TSF) ● UNC CMP (TSF)
2.0 4.0 6.0
PL WC LL
20 40 60

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-12

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 692.00												
				FAT CLAY (CH), dark brown, stiff	25			9								
				SANDY LEAN CLAY WITH GRAVEL (CL), brown, very stiff to hard	10			28								
5				- light brown below 4 feet	12		57	19			45	15	30			
					10			64								
				LEAN CLAY (CL), brown, very stiff	13			25								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-13

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 693.00												
				FAT CLAY (CH), dark brown, stiff to very stiff	22			9								
					13			24								
5				FAT CLAY WITH SAND (CH), brown, very stiff to hard	16			29								
					20		84	23			58	20	38			
					10			46								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-14

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 691.00												
				SANDY FAT CLAY (CH), dark brown, stiff to hard	21			8								
					18			17								
5					18		66	34			66	27	39			
				- brown below 6.5 feet	18			25								
				FAT CLAY WITH SAND (CH), brown, hard	19			36								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 6/23/21-6/23/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-15

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 / PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 687.00												
				FAT CLAY (CH), dark brown, firm to stiff	26			7								
					30		89	12			54	30	24			
5					29											
				CLAYEY SAND WITH GRAVEL (SC), light brown, dense	15			43								
				FAT CLAY (CH), brown, very stiff	15			27								
10																
				LEAN CLAY (CL), brown, very stiff, few Gravel	15		86	25			48	17	31			
15																
					20			28								
20				Boring terminated at an approximate depth of 20 feet.												
25																

COMPLETION DEPTH: 20.0 Feet
DATE: 6/23/21-6/23/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-16

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 / PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 689.00												
				FAT CLAY (CH), dark brown, firm to stiff	29			8								
				- gray and brown below 2.5 feet	28	3	87	7			73	21	52			
5					28			9								
				SANDY FAT CLAY WITH GRAVEL (CH), reddish brown, very stiff to hard	14	15	62	32			54	17	37			
					18			33								
10																
					18			25								
15																
					13			33								
20				Boring terminated at an approximate depth of 20 feet.												
25																

COMPLETION DEPTH: 20.0 Feet
DATE: 7/22/21-7/22/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-17

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 687.00											
				FAT CLAY (CH), dark brown, firm	27			7							
				CLAYEY GRAVEL WITH SAND (GC), brown, medium dense to dense	21			36							
5					9	44	31	29			68	19	49		
				FAT CLAY (CH), reddish brown, very stiff, calcareous nodules	11			24							
					18			26							
10				Boring terminated at an approximate depth of 10 feet.											
15															
20															
25															

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL WC LL
20 40 60

COMPLETION DEPTH: 10.0 Feet
DATE: 7/22/21-7/22/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-18

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 / PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 684.00												
				FAT CLAY (CH), dark brown, stiff to very stiff	27	1	95	11			84	32	52			
					25			23								
5				FAT CLAY WITH GRAVEL (CH), reddish brown, very stiff to hard	18			20								
					8			46								
					7			45								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

COMPLETION DEPTH: 10.0 Feet
DATE: 7/22/21-7/22/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-19

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 682.00												
				FAT CLAY (CH), dark brown, very stiff to hard, few Gravel	24	7	88	12			76	21	55			
					25			11								
5					22			32								
				CLAYEY GRAVEL WITH SAND (GC), reddish brown, dense to very dense	4	48	24	66			39	13	26			
					7			37								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 7/22/21-7/22/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-20

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 681.00												
				FAT CLAY (CH), dark brown, stiff	27			8								
					27	1	93	10			76	28	48			
5				- brown below 4.5 feet	29			13								
				CLAYEY GRAVEL WITH SAND (GC), reddish brown, medium dense to dense	25			26								
					25			31								
10																
					8	32	44	41			52	15	37			
15																
					12			50								
20				Boring terminated at an approximate depth of 20 feet.												
25																

COMPLETION DEPTH: 20.0 Feet
DATE: 7/22/21-7/22/21

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

Goodwin 69 Acre Tract
New Braunfels, Texas
Project No. 0312-2340

BORING B-21

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	HAND PEN (TSF) / UNC CMP (TSF) 2.0 4.0 6.0 PL WC LL 20 40 60	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation: 681.00												
				FAT CLAY (CH), dark brown, stiff	29			8								
					26			11								
5				GRAVELLY FAT CLAY (CH), brown, very stiff to hard	20	28	60	34			69	25	44			
				- reddish brown below 6.5 feet	15			27								
					17			28								
10				Boring terminated at an approximate depth of 10 feet.												
15																
20																
25																

GEO TESTS 0312-2340.GPJ RBENNETT GW.GDT 8/9/21

COMPLETION DEPTH: 10.0 Feet
DATE: 7/22/21-7/22/21

intertek psi

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

KEY TO TERMS AND SYMBOLS USED ON LOGS

ROCK CLASSIFICATION

RECOVERY

DESCRIPTION OF RECOVERY	% CORE RECOVERY
Incompetent	< 40
Competent	40 TO 70
Fairly Continuous	70 TO 90
Continuous	90 TO 100

ROCK QUALITY DESIGNATION (RQD)

DESCRIPTION OF ROCK QUALITY	RQD
Very Poor (VPo)	0 TO 25
Poor (Po)	25 TO 50
Fair (F)	50 TO 75
Good (Gd)	75 TO 90
Excellent (ExInt)	90 TO 100

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	N-VALUE (Blows/Foot)	SHEAR STRENGTH (tsf)	HAND PEN VALUE (tsf)
Very Soft	0 TO 2	0 TO 0.125	0 TO 0.25
Soft	2 TO 4	0.125 TO 0.25	0.25 TO 0.5
Firm	4 TO 8	0.25 TO 0.5	0.5 TO 1.0
Stiff	8 TO 15	0.5 TO 1.0	1.0 TO 2.0
Very Stiff	15 TO 30	1.0 TO 2.0	2.0 TO 4.0
Hard	>30	>2.0 OR 2.0+	>4.0 OR 4.0+

SOIL DENSITY OR CONSISTENCY

DENSITY (GRANULAR)	CONSISTENCY (COHESIVE)	THD (BLOWS/FT)	FIELD IDENTIFICATION
Very Loose (VLo)	Very Soft (VSo)	0 TO 8	Core (height twice diameter) sags under own weight
Loose (Lo)	Soft (So)	8 TO 20	Core can be pinched or imprinted easily with finger
Slightly Compact (SlCmpt)	Stiff (St)	20 TO 40	Core can be imprinted with considerable pressure
Compact (Cmpt)	Very Stiff (VSt)	40 TO 80	Core can only be imprinted slightly with fingers
Dense (De)	Hard (H)	80 TO 5"/100	Core cannot be imprinted with fingers but can be penetrated with pencil
Very Dense (VDe)	Very Hard (VH)	5"/100 to 0"/100	Core cannot be penetrated with pencil

DEGREE OF PLASTICITY OF COHESIVE SOILS

DEGREE OF PLASTICITY	PLASTICITY INDEX (PI)	SWELL POTENTIAL
None or Slight	0 to 4	None
Low	4 to 20	Low
Medium	20 to 30	Medium
High	30 to 40	High
Very High	>40	Very High

BEDROCK HARDNESS

MORHS' SCALE	CHARACTERISTICS	EXAMPLES	APPROXIMATE THD PEN TEST	
5.5 to 10	Rock will scratch knife	Sandstone, Chert, Schist, Granite, Gneiss, some Limestone	Very Hard (VH)	0" to 2"/100
3 to 5.5	Rock can be scratched with knife blade	Siltstone, Shale, Iron Deposits, most Limestone	Hard (H)	1" to 5"/100
1 to 3	Rock can be scratched with fingernail	Gypsum, Calcite, Evaporites, Chalk, some Shale	Soft (So)	4" to 6"/100

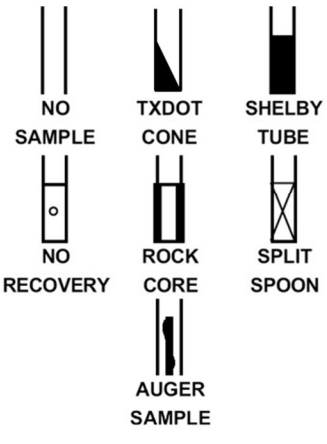
MOISTURE CONDITION OF COHESIVE SOILS

DESCRIPTION	CONDITION
Absence of moisture, dusty, dry to touch	DRY
Damp but no visible water	MOIST
Visible free water	WET

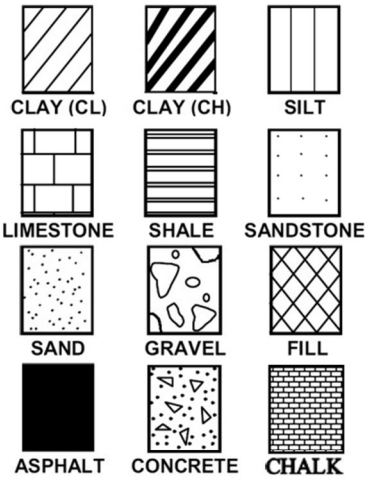
RELATIVE DENSITY FOR GRANULAR SOILS

APPARENT DESNITY	SPT (BLOWS/FT)	CALIFORNIA SAMPLER (BLOWS/FT)	MODIFIED CA. SMAPLER (BLOWS/FT)	RELATIVE DENSITY (%)
Very Loose	0 to 4	0 to 5	0 to 4	0 to 15
Loose	4 to 10	5 to 15	5 to 12	15 to 35
Medium Dense	10 to 30	15 to 40	12 to 35	35 to 65
Dense	30 to 50	40 to 70	35 to 60	65 to 85
Very Dense	>50	>70	>60	85 to 100

SAMPLER TYPES



SOIL TYPES



ABBREVIATIONS

PL – Plastic Limit
LL – Liquid Limit
WC – Percent Moisture

Q_P – Hand Penetrometer
Q_U – Unconfined Compression Test
UU – Unconsolidated Undrained Triaxial

Note: Plot Indicates Shear Strength as Obtained By Above Tests

WATER SEEPAGE

WATER LEVEL AT END OF DRILLING

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

6"	3"	3/4"	4	10	40	200

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

A COMPLETE BUILDING SOLUTION

Everything you need from start to finish – Assurance, Testing, Inspection, and Certification

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Assuring site and subsurface conditions meet the criteria for purchase, development and construction.

Building Systems Consulting

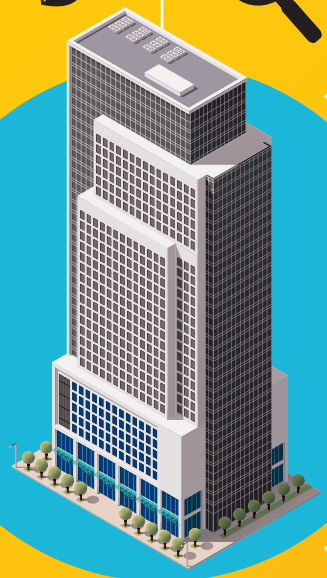
Industry professionals provide a variety of acoustic, fire, AV, roofing system and enclosure consulting services to ensure proper design and installation of a building's critical systems.

Decommissioning & Due Diligence

Supporting the redevelopment and transfer of property assets via environmental and property assessments and engineering services.

Building Product & Construction Materials Testing

Providing testing for virtually all types of building products, construction materials, and systems for safety, retail, code, and performance purposes.



Property Management Support Services

Providing a variety of building systems testing, inspection, and consulting services to optimize the value and life of the property asset.

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The ETL and Warnock Hersey Marks show a product or system's conformance to code and ensures the on-going verification of compliance.

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Design and construction professionals provide solutions to reduce the potential for premature building failure, increase a building's energy efficiency, and expected life cycle.

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Assessing a building or facility for a variety of sources (air, asbestos, lead, mold) to minimize the risk of factors adverse to human health.

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As a leader in providing comprehensive solutions to industries around the globe, Intertek-PSI prides itself on bringing the expertise and services necessary for our clients to meet all of their needs across their entire operation. **Our Assurance, Testing, Inspection, and Certification (A.T.I.C.)** suite of services ensures that whatever your needs may be – assurance, testing, inspection, certification, or all of the above, that those needs will be met by Intertek-PSI.

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