REPORT

SOILS INVESTIGATION

PROPOSED COMMERCIAL DEVELOPMENT AT

1225 BRAZOS STREET

ALVIN, TX

FOR:

TIMBER GROUP, LLC

Lab Job No: 24-104

Report No.: 2402/1004

COASTAL TESTING LABORATORIES, INC.
1217/1221 GEORGIA AVE. • 713-477-0121 • FAX 713-477-2277 • P.O. BOX 148 • DEER PARK, TEXAS 77536

March 4, 2024

Timber Group, LLC.
Attn: Chad Baker
327 Twin Timbers Lane
Kemah, TX 77576

Reference: Soils Investigation

Lab. Job No.: 24-104
Report No.: 2402/1004

Dear Mr. Baker:

We are pleased to transmit the results of our soils investigation performed for the proposed commercial development at 1225 Brazos Street, Alvin, TX 77511.

The soils encountered in the exploration borings possess adequate strength to support the structure of shallow foundations. A description is presented in the text of this report.

In addition to our soils engineering capabilities, we can also provide complete concrete and asphalt testing and supervision services and Phase 1 & Phase 2 environmental studies. We would be pleased to work with you during the construction phase of this project.

We appreciate the opportunity to assist you in performing this study. If we can be of further assistance for this study or others, please contact us.

Yours very truly,
COASTAL TESTING LABORATORIES, INC.
Firm Reg: # 4132

Mohammed S. Ali, P.E.
Chief Engineer
P. E#. Lic. #74229

MSA/lr

STATE OF TEXAS
MOHAMMED S. ALI
74229
LICENSED
PROFESSIONAL ENGINEER

PREFACE

The recommendations presented in this report were formulated on the basis of the soil conditions encountered in the exploration borings, laboratory tests on soil samples obtained from this boring, engineering analysis and interpretation and judgement of the data derived.

Soil conditions other than those encountered in the exploration boring may exist at the site. Although our field technicians visually survey the site for surface expressions indicative of variable soil conditions (fill, borrow or drainage areas, faulting, etc.). Coastal Testing Laboratories, Inc. can not assume responsibility for the results of soil conditions inconsistent with those encountered.

The reproduction of this report or any part thereof, in plans or other documents supplied to persons other than the owner, should bear language indicating that the information contained therein is for general design purposes only and not for bidding purposes, unless so indicated, and that the owner and Coastal Testing Laboratories, Inc. are not liable to such persons for any representation made therein.

Coastal Testing Laboratories, Inc. makes no warranty or representation, either expressed or implied, and none is included or intended in our proposals, contracts or reports, except that our services are performed, within the limits set by our clients, with the usual thoroughness and competence of the engineering profession.

SCOPE AND PURPOSE

In this report we present the results of the soils investigation performed at the site of the proposed commercial development. The purpose of this study was to evaluate the surface and sub-surface soils as related to the design of the foundation system. In particular, it was desirable to evaluate the feasibility of slab-on-grade and suitable type of foundation support for the structure and to provide an allowable soil bearing pressure(s) for design of the recommended foundation type.

SITE CONDITIONS

SURFACE CONDITIONS

The surface soils were firm at the time of our investigation and presented no significant problems in moving the drill rig. However, under to inclement weather conditions, the surface soils are likely to become saturated and experience a reduction in shear strength. Therefore, to facilitate construction, the site should be shaped to provide adequate drainage.

SUB-SURFACE CONDITIONS

In accordance with the authorized scope of work, the sub-surface soil conditions were explored by drilling five (5) borings to a depth of 15', beneath the existing ground surface. The locations of the field explorations are shown on Plate 1. The Boring Logs are presented on Plates 2-6 and a detailed description of the soils is included.

The soils encountered in the borings are typical for this Deltaic Region. Generally, they are geologically recent surface soils composed of combinations of dark gray sand, silt and clay. These Recent soils are underlain by the older geologic formation. This formation typically is multi-colored and consists of silty and sandy clays, clays and clayey silts in color combinations of light gray, tan and red. These cohesive soils frequently are interbedded with layers and lenses of fine to medium sand and silty sand. Typically, these sand layers below a depth of 10 to 15 feet are saturated with water.

The older soils generally possess good to excellent strength properties but vary both horizontally and vertically and thus are not uniform. The compressibility characteristics are good, tending to be over consolidated in the upper portions and approaching normal consolidation with depth.

Sensitivity to moisture (expansive potential) of the surface and near surface soils was evaluated by performing Atterberg Limits Tests on selected samples. The Plasticity Index (PI) obtained for the soils in the top five feet are between 17 and 49. Any soil with a PI greater than 20 is considered expansive.

Ground water, if encountered, is shown on the boring logs; however, water levels will fluctuate seasonally.

DISCUSSIONS AND RECOMMENDATIONS

General Requirements

We understand that the proposed commercial development will be a one to two story structures and will impose light loads on the soils.

Utilizing the results of the laboratory tests, engineering analyses were performed. The results of these analyses and the observations of our field personnel form the basis of our recommendations.

Based on the soil conditions encountered in the borings, the site possesses suitable soils to support the proposed structure.

SITE PREPARATION

All surface vegetation should be stripped from the areas to be developed and wasted or stockpiled and used for "top dressing". If the exposed soils (at finished grade) are wet, they should be scarified and allowed to dry. The area should then be proof rolled with a rubber-tired vehicle such as a partially loaded dump truck to detect any soft areas. Soft areas should be excavated and backfilled with compacted suitable materials compacted to approximate the surrounding soils. Hole resulting from excavation of stumps or other buried debris should be handled in the same manner. The subgrade should then be compacted to 95% of standard Proctor (ASTM D-698). Site preparation as described must be carried out prior to any fill placement above the existing ground.

STRUCTURE AND SLAB SUPPORT

Structure Support

Based on the soil conditions encountered in the borings, the structures can be supported on drilled and belled belled foundations or a shallow foundation system. Shallow foundations constructed on a hillside, high fill or next to a body of water must be checked for the possibility of foundation distress caused by possible erosion or landslide triggered by heavy rains/high water table.

Drilled and Belled Foundations

The structural loads may be supported on drilled and belled (under-reamed) type footings. We recommend the piers be supported on the soils shown at a depth of 12 feet. The soils at this depth should be very stiff clays. The allowable soil bearing pressure for sizing pier bells is 4000 lbs. per square foot. This pressure is for sustained loads and contains an applied safety factor of 3. It may be increased by 20 percent for short-term loads such as wind.

Ground water was encountered below the proposed foundation depth; therefore, we do not anticipate that there will be a problem during drilling of the shafts. However, the shafts should be poured as they are drilled and not be allowed to remain open for extended periods of time.

During drilling of the foundation piers, it is essential that the installation procedures be carefully inspected by an experienced person to assure that the bells are sized correctly and the bottoms are cleaned and on undisturbed soil. Failure to provide complete inspection services may result in improper foundations.

To minimize movement of grade beams as a result of soils expansion, the bottom of the beams are recommended to be isolated from the natural soils by at least 6 inch thick void boxes. A less effective alternate is isolation by 3.0 of non-expansive select fill having a Plasticity Index between 7 and 20. The structural engineers often question the merit of using void boxes; the decision to use them should be made by the design structural engineer/architect. Backfill against the outside face of grade beams is recommended to be select fill material.

It is our opinion that if founded in accordance with these recommendations, differential and total settlement will be negligible. Should soil conditions other than described herein be encountered, this office should be notified immediately.

Drilled Foundation Slab Support

The upper soils at this site are expansive. Consequently, they will exert non-uniform uplift pressures and varying degrees of support for a slab placed upon them. These changes will relate directly to the changes in moisture content of the supporting soils. An increase in moisture results in an increase in volume and conversely, a decrease in moisture results in a shrinkage or decrease in volume. There is some evidence to indicate that the maximum change in volume occurs in seven-year cycles. We cannot confirm this theory, but we do know that several years can transpire before adverse effects from expansive soils become obvious.

There are several methods of handling expansive soils so that floor slabs are minimally affected. Best method is that the slabs be designed as structural slabs and isolated from the expansive soils by void boxes and supported by piers. A less effective alternate is to separate the slab from the natural soils by at least 3.5' of non-expansive select fill.

Another alternative exists which is much less expensive and, we believe, provides an acceptable slab performance. The slab may be designed as a rigid slab-on-grade and not tied with the piers. It is intended that the slab be allowed to move vertically in response to volume changes of the soil. A post-tensioned slab may also be used in this manner.

Shallow Foundation System

Based on the soil conditions encountered in the borings, a slab-on-grade type foundation system is feasible to support the light loaded structures on this site.

The allowable bearing pressure is presented below:

Grade Beam Depth (Ft) (Below Existing Grade)	**Soil Type**	**Allowable Bearing Pressures (PSF)**
1.0	Clayey Soils	1100
1.5	Clayey Soils	1300

This bearing pressure is for sustained loads and contains an applied safety factor of 3.0. This pressure may be increased by 20 percent for short-term loads such as wind.

The analysis of the field and laboratory data indicates that the following soil parameters may be utilized for design:

1. Depth to Constant Soil Suction: Approx. 9 feet
2. Magnitude of Constant Soil Suction: pF = 3.4
3. Design Plasticity Index: 40
4. Estimated Cation Exchange Capacity: 33
5. Clay Content: Estimated 50 % of Soil Passing #200
6. Thornthwaite Moisture Index: +17
7. Estimated Moisture Velocity: 0.7 In. /Month
8. Allowable Bearing Capacity: See Text
9. Estimated Total Settlement: See Text
10. Estimated Potential Vertical Rise: 1.0"
11. Edge Moisture Variation Distance: (PTI 3)
    Center Lift: 7.0'
    Edge Lift: 4.8'
12. Differential Swell:
    Center Lift: 0.9"
    Edge Lift: 0.45"
13. Climatic Rating (Cw) = 25

14. Principal Clay Mineral: Montmorillonite
15. Support Index: 0.82

The above parameters were calculated based on the stratigraphy of existing soils encountered during our investigation.

With the recommended bearing pressure, total settlement will be less than one (1) inch. Differential settlement will result from variances in subsurface conditions, loading conditions and construction procedures such as cleanliness of the bearing area. It is estimated that the differential settlement will be roughly one-half (1/2) the total settlement.

The estimated moisture variation distance and the differential soil movement do not consider environmental effects, which may change existing conditions beyond the control of Coastal Testing Laboratories, Inc. These conditions include but are not limited to location of shrub beds and trees around the structure and site grading of the lot. Avoid removing large existing trees from the site, plant new trees far enough from the structures. The grading should promote drainage away from the structure.

Disturbance of grade beam bearing area should be minimized during excavation operations. Any soft areas should be over excavated to firm soil and loose material in the trench should be removed before concrete placement.

DETENTION POND

A detention pond is also proposed in this area. The subsoils are fat clays. We recommend that the side slopes be no steeper than 1 Vertical on 3 Horizontal slopes.

EXPANSIVE CLAYS

The high plasticity clays at this site experience significant volume changes with changes in moisture content. During hot, dry periods the soil loses moisture and shrinks. Conversely, during extended wet weather cycles, the soil gains moisture and swells. This seasonal movement can exert considerable stresses on structures supported by these soils.

Under normal conditions, water evaporates from the surface of the soil and is replaced by water drawn by capillary action from below. When a floor slab and vapor barrier is placed on the surface, this evaporation is effectively cut off. Moisture continues to be drawn upward until a balanced condition is developed. During this process the added moisture causes the soil to swell, forcing the slab upward. Since evaporation takes place around the perimeter of the slab, the soil near the edge of the slab does not swell as much as the soil under the center portion of the slab. This condition causes differential movement and cracking of the slab.

Several preventive measures are available to reduce the effects of volume changes in these soils. One is to use deeper grade beams to provide a barrier to evaporation of water from below the slab. Another is to place a paved strip around the perimeter of the building. This strip acts as a buffer zone, with most of the differential movement taking place in the area. A minimum width of 5 feet is normally recommended. Residences or other structures may use a mulch bed around the perimeter to help keep moisture from evaporating. Lime stabilization at a 5-foot-wide strip outside the building line will also help prevent moisture loss.

Other steps to prevent the effects of moisture changes are to extend roof drain down spouts to 5' from the slab; to provide a good sprinkler system around the slab to avoid excessive drying, and to further increase the non-expansive fill under the slab.

Trees can also contribute to the soil shrink/swell movement in highly plastic soils. During extended periods of dry weather, trees remove water from the soil and cause shrinkage. This shrinkage causes movement of the soil downward and toward the tree and can seriously damage nearby structures. This condition can normally be neutralized by removing the trees or by placing the structure on foundation bearing below the affected soil.

Drainage

Site grading should promote positive drainage away from the building site during and after construction (sand should not be used as fill for site grading). Ponding should not be allowed near the foundation soils. Also, the building subgrade should be sealed against water intrusion along trenched and conduits created for utility access under the building.

The upper part of utility excavation should be backfilled with properly compacted clayey soil to reduce and control infiltration of water. A clay plug should be provided in the trench on the exterior of the building to prevent water from gaining access along the trench to the subgrade beneath the structure.

Where paving and flatwork abuts the structure, care should be taken that the joint is properly sealed and maintained. Roof drains should discharge on pavement or away from the foundations.

Vegetation

Tree roots remove moisture from the soil. When trees are removed from a construction site, a zone of desiccated soil is left underneath which would gain moisture for many years. If the soil is expansive this will result in expansion. The process has been known to last for as long as 20 years. In such a situation a foundation for the structure must be designed for the anticipated heave. Alternately, the construction on the site should be postponed for several years to allow moisture stabilization.

New trees should not be planted closer than half the canopy diameter of a mature tree. Alternately, root barriers must be placed near the exterior grade beams.

If sprinkler systems are used they must be installed all around the structure for uniformity.

Additional Fill Soils and Placement

All fill soil should be a sandy material with a Liquid Limit below 40 and a Plasticity Index between 7 and 20. To provide proper support for the foundation, it is essential that the fill be properly compacted. The fill should be placed in maximum lifts of eight inches, measured loose, and compacted to a minimum of 95 percent of the optimum density as obtained by the Standard Proctor Test, ASTM D-698.

The slab should be bedded on a layer of sand approximately two inches in thickness. A layer of six-millimeter plastic sheeting should be used below the sand to prevent moisture migration.

GENERAL

Reasonable variations from the subsurface information presented in this report are assumed. If conditions encountered during construction are significantly different than those represented in this report, Coastal Testing Laboratories, Inc. should be notified immediately.

A Ground Fault Study is not part of this investigation.

The following Plates are attached at the end of the text and complete this report.

Plate 1	Boring Locations Plan
Plates 2-6	Boring Logs/Tests Results
Plate 7	Key to Soil Sample

SITE INVESTIGATION

Exploration borings were drilled to evaluate the subsurface soil conditions at the locations shown on Plate 1. These borings were performed with a truck mounted, power-driven auger-drilling rig. Cohesive soils were sampled by pushing thin-wall steel core barrels (Shelby Tubes) into natural soil at the bottom of each boring as the drilling progressed (ASTM D-1587). The penetration resistance of each soil sample was evaluated in the field with a field Penetrometer.

Where encountered, cohesionless soils are sampled by means of a split spoon sampler using the Standard Penetration Test procedure (ASTM D-1596). In this method of sampling, the sampler is driven into the soil by means of a 140 lb. hammer dropping thirty inches. The number of such blows required to drive the sampler twelve inches after being seated six inches in the soil is recorded as the penetration resistance in blows per foot. This number is modified in the office to include the effect of overburden as proposed by Bazaara[1]. The modified number is presented in the Logs as N, the penetration resistance in blows per foot. Samples are taken of the contents of the split spoon sampler in each case for further examination in the laboratory.

Samples were taken at intermittent depths from all formations pertinent to the design of the floor system and structural foundations.

---

[1]Bazaraa A. R. (1967) "Use of Standard Penetration Test for Estimating Settlements of Shallow Foundations on Sand" Phd. Thesis, Univ. of Illinois, Urbana, 379 pp.

LABORATORY TESTING

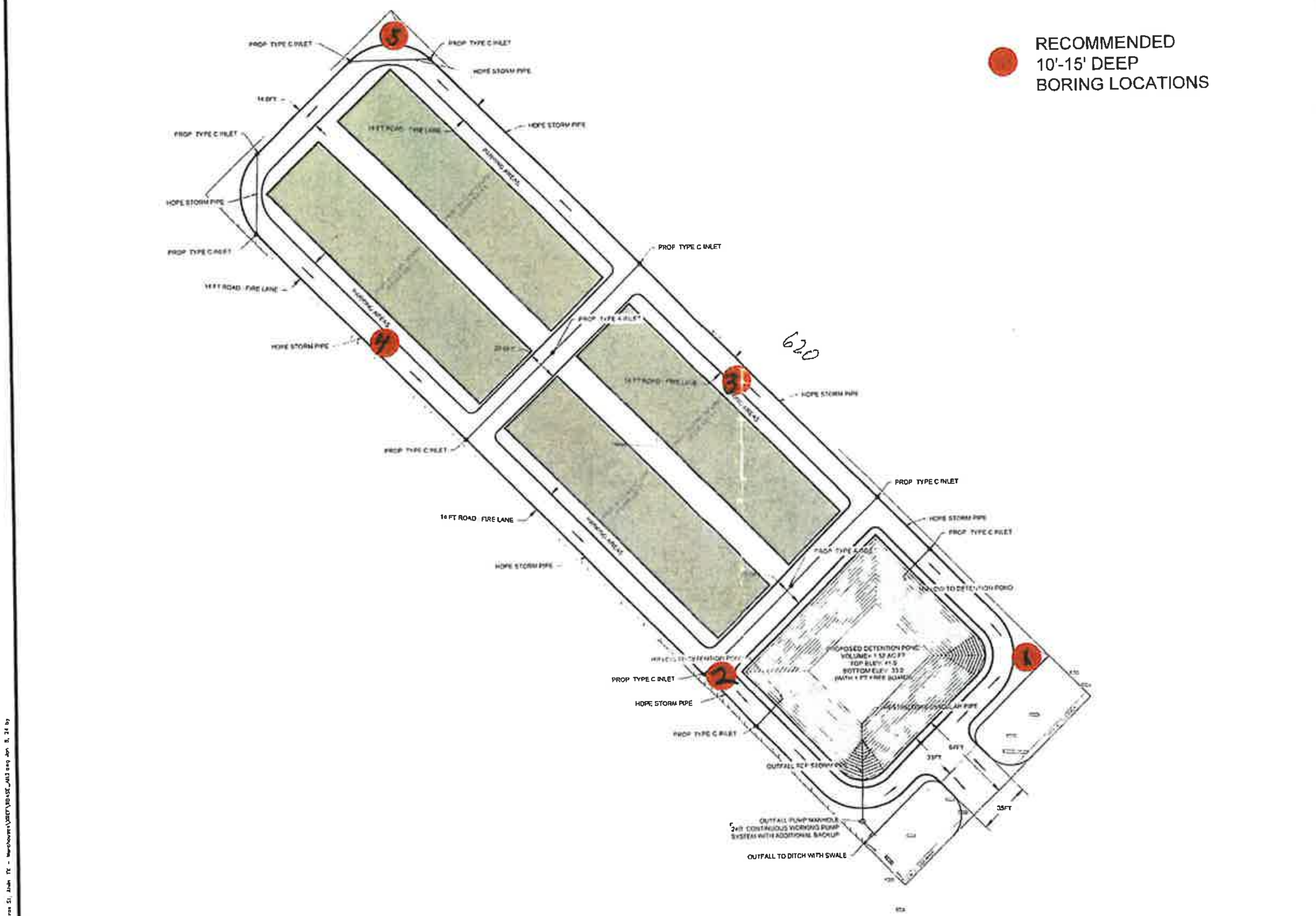
Subsequent to the completion of the borings, the samples were returned to our laboratory for visual and textural examination, soil classification (ASTM D-2487) and testing.

All samples were tested to determine their natural moisture content (ASTM D-2216). Additional tests on selected samples include Sieve Analysis (ASTM D-6913), Atterberg Limits (ASTM D-4318) and Unconfined Compression and Density (ASTM D-2166).

The soil samples will be retained in our storage facility for thirty days unless otherwise advised.

The results of the laboratory tests were incorporated into an engineering analysis. The evaluation of these results and observations made in the field form the basis for recommendations contained herein.

* Borings by Coastal Testing Laboratories, Inc.
NOT TO SCALE



CHAD BAKER WAREHOUSE COMMERCIAL DEVELOPMENT
1225 Brazos St, Alvin, TX

OVERALL SITE PLAN AND DETENTION POND LAYOUT (ALTERNATIVE LAYOUT-1)

Civil And Structural Engineering (C.A.S.E.)
TBPE FIRM REG No. 11002

MONTH YEAR	DRAWN BY	XXX
	CHECKED BY	XXX
FOR REVIEW PURPOSES ONLY	JOB NO	02222023
	SCALE	
	SHEET	OF 02

LOG OF BORING NO. 1

Job No:24-104 Report No: 2402/1004 Date: 02/26/24 Driller:P. Stephens
Complete at: 15' Boring Method: 4" Auger, 3" Shelby Tube
Water Encountered: None Water at Completion: None
Location: 1225 Brazos Street, Alvin, TX 77511

Ft.		ST	MC	LL	PI	Dd	GS	TV	HP	Q_u	Stratum Description
	A		9.6						1.5		Gray Clay (CH)
	A		24.2						1.0		
5'	A		20.5	53	34				1.5		
	A		22.9			100.5			2.0	0.71	
	A		27.6	65	44				2.0		
10'											Gray Brown and Red @ 10'
	A		21.4						3.0		
15'											

A = Shelby Tube
B = Bag Sample
D = Rock Core
E = No Recovery
MC = Moisture Content
LL = Liquid Limit
Dd = Dry Density pcf

ST = Standard Penetration Test
HP = Hand Penetrometer tsf
TV = Torvane Shear Strength tsf
GS = % Finer #200 Sieve
Qu = Unconfined Compression tsf
PI = Plasticity Index
SLS = Slickensided

R = red
G = gray
T = tan
w.= with
v.= very
dg = dark gray

sa = sand
si = silt
cl = clay
io = iron ore
org = organics
cly = clayey

lt = light tan
fn = ferrous nodules
cn = calcareous nodules
cs = calcium sulfate
lg = light gray

LOG OF BORING NO. 2

Job No:24-104 Report No: 2402/1004 Date: 02/26/24 Driller:P. Stephens
Complete at: 15' Boring Method: 4" Auger, 3" Shelby Tube
Water Encountered: None Water at Completion: None
Location: 1225 Brazos Street, Alvin, TX 77511

Ft.		ST	MC	LL	PI	Dd	GS	TV	HP	Qu	Stratum Description
	A		20.5	48	27				1.0		Gray and Brown Silty Clay (CL)
	A		16.8						2.5		
5'	A		19.5						2.5		
	A		33.4			100.7			2.5		Gray Brown and Red Clay (CH)
	A		21.6						2.0		
10'											
	A		25.3						3.0		
15'											

A = Shelby Tube
B = Bag Sample
D = Rock Core
E = No Recovery
MC = Moisture Content
LL = Liquid Limit
Dd = Dry Density pcf

ST = Standard Penetration Test
HP = Hand Penetrometer tsf
TV = Torvane Shear Strength tsf
GS = % Finer #200 Sieve
Qu = Unconfined Compression tsf
PI = Plasticity Index
SLS = Slickensided

R = red
G = gray
T = tan
w.= with
v.= very
dg = dark gray

sa = sand
si = silt
cl = clay
io = iron ore
org = organics
cly = clayey

lt = light tan
fn = ferrous nodules
cn = calcareous nodules
cs = calcium sulfate
lg = light gray

LOG OF BORING NO. 3

Job No:24-104 Report No: 2402/1004 Date: 02/26/24 Driller:P. Stephens
Complete at: 15' Boring Method: 4" Auger, 3" Shelby Tube
Water Encountered: 13' Water at Completion: 11'
Location: 1225 Brazos Street, Alvin, TX 77511

Ft.		ST	MC	LL	PI	Dd	GS	TV	HP	Qu	Stratum Description
	A		26.1	48	29				1.0		Dark Gray and Brown
	A		21.7						1.5		
5'	A		19.9			105.4			1.5	1.54	
	A		21.1	58	38				2.5		Gray Brown and Red Clay (CH)
	A		20.6						3.5		
10'											
	A		29.3						2.0		
15'											

A = Shelby Tube
B = Bag Sample
D = Rock Core
E = No Recovery
MC = Moisture Content
LL = Liquid Limit
Dd = Dry Density pcf

ST = Standard Penetration Test
HP = Hand Penetrometer tsf
TV = Torvane Shear Strength tsf
GS = % Finer #200 Sieve
Qu = Unconfined Compression tsf
PI = Plasticity Index
SLS = Slickensided

R = red
G = gray
T = tan
w. = with
v. = very
dg = dark gray

sa = sand
si = silt
cl = clay
io = iron ore
org = organics
cly = clayey

lt = light tan
fn = ferrous nodules
cn = calcareous nodules
cs = calcium sulfate
lg = light gray

LOG OF BORING NO. 4

Job No:24-104 Report No: 2402/1004 Date: 02/26/24 Driller:P. Stephens
Complete at: 15' Boring Method: 4" Auger, 3" Shelby Tube
Water Encountered: None Water at Completion: 8'
Location: 1225 Brazos Street, Alvin, TX 77511

Ft.		ST	MC	LL	PI	Dd	GS	TV	HP	Qu	Stratum Description
	A		24.1						1.0		Gray Clay (CH)
	A		20.9	51	32				2.0		
5'	A		22.9						2.0		
	A		19.8	61	40				2.0		
	A		23.8			110.5			2.0	1.83	Gray Brown and Red Clay (CH)
10'											
	A		27.7						2.5		
15'											

A = Shelby Tube
B = Bag Sample
D = Rock Core
E = No Recovery
MC = Moisture Content
LL = Liquid Limit
Dd = Dry Density pcf

ST = Standard Penetration Test
HP = Hand Penetrometer tsf
TV = Torvane Shear Strength tsf
GS = % Finer #200 Sieve
Qu = Unconfined Compression tsf
PI = Plasticity Index
SLS = Slickensided

R = red
G = gray
T = tan
w.= with
v.= very
dg = dark gray

sa = sand
si = silt
cl = clay
io = iron ore
org = organics
cly = clayey

lt = light tan
fn = ferrous nodules
cn = calcareous nodules
cs = calcium sulfate
lg = light gray

LOG OF BORING NO. 5

Job No:24-104 Report No: 2402/1004 Date: 02/26/24 Driller:P. Stephens
Complete at: 15' Boring Method: 4" Auger, 3" Shelby Tube
Water Encountered: None Water at Completion: None
Location: 1225 Brazos Street, Alvin, TX 77511

Ft.	Sample	ST	MC	LL	PI	Dd	GS	TV	HP	Qu	Stratum Description
	A		31.6						0.5		Dark Gray Clay (CH)
	A		35.0						1.0		
5'	A		29.2	71	47				1.0		
	A		33.5						1.5		Gray Brown and Red @ 8'
	A		30.6			104.7			2.5		
10'											
	A		30.2						3.0		
15'											

A = Shelby Tube
B = Bag Sample
D = Rock Core
E = No Recovery
MC = Moisture Content
LL = Liquid Limit
Dd = Dry Density pcf

ST = Standard Penetration Test
HP = Hand Penetrometer tsf
TV = Torvane Shear Strength tsf
GS = % Finer #200 Sieve
Qu = Unconfined Compression tsf
PI = Plasticity Index
SLS = Slickensided

R = red
G = gray
T = tan
w.= with
v.= very

sa = sand
si = silt
cl = clay
io = iron ore
org = organics

lt = light tan
fn = ferrous nodules
cn = calcareous nodules
cs = calcium sulfate
lg = light gray

KEY TO SOIL DESCRIPTIONS
USED IN LABORATORY LOGS

COLOR

In color description of sample, the predominate color is stated first.

CONSISTENCY OF COHESIVE SOILS

Field Identification	Laboratory Identification
Very soft - Tall core will slump	0 - 0.25 tsf
Soft - Core can be pinched	0.25 - 0.50 tsf
Firm - Easily imprinted with fingers	0.50 - 1.00 tsf
Stiff - Can be imprinted with fingers	1.00 - 2.00 tsf
Very stiff - Can be imprinted very slightly with fingers	2.00 - 4.00 tsf
Hard - Can not be imprinted with fingers	Over 4.00 tsf

RELATIVE DENSITY OF COHESIONLESS SOILS

Classification by Standard Penetration Resistance:

Loose - 0 - 10 blows/ft	Dense - 30 - 50 blows/ft
Med.Dense - 10 - 30 blows/ft	Very Dense - 50 and above blows/ft

SOIL STRUCTURE

SLS = Slickensided - Cut by old fracture planes which are slick and glossy.

FRC = Fractured - Containing cracks, filled with various materials.

VVD = Varved - Composed of thin laminae of varying color and soil types.

INB = Interbedded - Composed of alternate layers of different soil types.

CLC OR CN = Calcareous - Contains deposits of calcium carbonate.