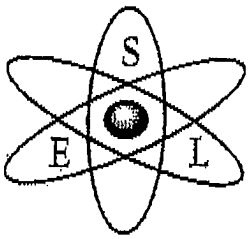

SCIENCE ENGINEERING, LTD.

GEOTECHNICAL, ENVIRONMENTAL, MATERIALS TESTING

GEOTECHNICAL INVESTIGATION

FOR

NEW METAL BUILDING FOR JEFFERSON COUNTY

IN

BEAUMONT, TEXAS

REPORT NUMBER: 07351

REPORTED TO:

JEFFERSON COUNTY ENGINEERS
1149 PEARL STREET, 5TH FLOOR
BEAUMONT, TEXAS 77707

DECEMBER 2007

PREPARED BY:
SCIENCE ENGINEERING, LTD.

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GEOTECHNICAL INVESTIGATION
New Metal Building
Beaumont, Texas

INTRODUCTION

The study reported herein is an investigation of subsurface conditions for the proposed metal building near the county jail in Beaumont, Texas.

AUTHORIZATION

This investigation was authorized by Mr. Ronald Westphel, by telephone on November 28, 2007.

SUBSURFACE EXPLORATION

The subsurface exploration at the site was accomplished by means of two (2) undisturbed sample core boring drilled to a depths vary from fifteen to twenty (15-20) feet below existing ground surface. Approximate locations of the borings were flagged in the company of Mr. Ronald Westphel and are shown on the attached boring plan.

SUBSURFACE INVESTIGATION

The subsurface investigation consisted of drilling three-inch nominal diameter core borings. Undisturbed samples of the cohesive soils were obtained from the borings by means of thin-wall, seamless steel Shelby tube samplers, in accordance with the ASTM D-1587 method. The shear strength of the cohesive soil samples was estimated by hand pentrometer in the field.

All undisturbed samples were extracted mechanically from the core barrels in the field, classified, wrapped in aluminum foil, and sealed in air-tight plastic bags to prevent moisture loss and disturbance. The samples were transported to our laboratory for testing and further study.

LABORATORY INVESTIGATIONS

All samples from borings were examined and classified in the laboratory by a soil engineer, according to procedures outlined in ASTM D-2488. Laboratory tests were performed on selected soil samples in order to evaluate the engineering properties of the soil in accordance with the indicated standard procedures.

LABORATORY TESTS	STANDARD TESTS
Atterberg Limits (L.L., P. L., P.I.)	ASTM D-4318
Soil Moisture Content	ASTM D-2216
Unconfined Compressive Strength	ASTM D-2166
Soils Classification	ASTM D-2487

Undrained shear strength of selective cohesive soils was determined by unconfined compression tests. Water content and dry unit weight of the foundation soils were determined as routine parts of the unconfined compression tests. Atterberg limits tests were performed on the appropriate cohesive samples. The results of these tests are shown on attached boring logs.

SUBSURFACE CONDITIONS

Specific types and depths of subsurface strata encountered on the site are shown on the attached boring logs. Review of the boring logs indicates that generalized stratography is approximately as follows:

Stratum No.	Average Depth, feet	Description of Strata
I	0.0 - 3.0	Tan and Gray CLAYEY SAND (SC)
II	3.0 - 10.0	Red, Tan and Gray CLAY (CH) with ferrious nodules and sand seams
III	10.0 - 20.0	Tan and Gray SANDY CLAY (CL) with sand seams

The near surface soils are "CH" type soils when classified by the unified soils classification system. This type soil normally exhibits high swell potential during seasonal moisture variations.

Hydrostatic water was encountered at the time of drilling, as shown on the attached boring log.

CONSTRUCTION VARIATIONS

The information contained in this report summarizes conditions found on the date that the borings were drilled. The depth to the static water table may be expected to vary with the environmental variations, such as frequency and magnitude of precipitation and the time of year that construction begins.

DESIGN ANALYSIS AND RECOMMENDATIONS

Information available to this office indicates that the proposed construction at the site will consist of a metal building.

FOUNDATION TYPES & DEPTHS

From analysis of the boring logs and laboratory tests results, it is recommended that the structural loads be transmitted to the foundation soils by the use of drilled and underreamed type footings, which extend to a depth of nine (9) feet below existing ground surface to be located in Tan and Gray Clay. Utilizing a minimum factor of safety of three for dead load, or a minimum factor of two for total load, the allowable bearing capacity of the foundation soils for circular type footings is given as follows: **2,600** Pounds per square foot (PSF) for dead load, plus long term live loads and **3,900** PSF for total load. Whichever is critical should be used. The allowable loads given can be increased by thirty percent (30%) for wind or temporary lateral loading.

Due to the presence of sand seams at the recommended depth, we suggest that the bell to shaft ratio for the footings be limited to two to one (2:1).

There is potential for upward movement of the plastic clays in contact with the sides of the piers; the pier shafts should be well reinforced throughout their length resist tensional force.

STRUCTURE FOUNDATION

Each footing excavation should be inspected by the project's Engineer, Architect or Owner's representative prior to placing concrete to insure that (a) the footing has been constructed at the correct depth and the correct formation established by previously mentioned criteria, (b) the footing is concentric with the pier shaft or column, and (c) excessive cuttings, build-up or any soft-compressible material(s) have been removed from the bottom of the excavation.

Placement of concrete should be accomplished as soon as possible to prevent changes in the state of stress and the caving of the foundation soils. No footings should be poured without the prior approval of the projects' Engineer, Architect or Owner's representative.

FOUNDATION SETTLEMENT

A detailed settlement analysis was not within the scope of this study. It is anticipated that the footings designed, using the recommended allowable bearing pressures, will experience small settlements that will be well within the tolerable limit for the proposed structure.

FLOOR SLABS AND GRADE BEAMS

Review of the Atterberg Limits determinations indicates that the surface soils are "CH" type soils, with high plasticity, which may exhibit high expansion during seasonal wetting and drying cycles. We believe that conventional "slab-on-fill" construction may be used for the interior portion of the structures built at the site. Select fill, a minimum of eighteen (18) inches thickness, should be used to bring the structure to grade.

Prior to placement of any select fill, strip site sufficiently to remove all existing top soil vegetation and roots larger than one-half inch in diameter to a depth of approximately twelve (12) inches. Then, scarify the subgrade; add moisture if necessary and compact to 95% of the maximum dry density as determined by ASTM D-698 (Standard Proctor). The moisture content at the time of compaction of subgrade soils should be within +1 to +3% of the proctor optimum value.

Select fill should then be placed, under laboratory control, in no greater than eight-inch (8") loose layers, and compacted to a minimum of 95% of the maximum dry unit weight, as obtained in the laboratory by means ASTM D-698 procedure. Moisture content of ±2% optimum should be maintained during placement of the select fill material. A vapor barrier consisting of six (6) mil Polyethylene shall be placed between the select fill and concrete slab.

The material used as select fill should consist of a non-active sandy clay or clayey sand type substance, having a Liquid Limit of 36 or less and Plasticity Index (P.I.) varying from 8 to 20.

SITE PREPARATION

In order to remedy construction problems, which may develop if attempts are made to work the surface materials following prolonged periods of rainfall which are common to this area, it is recommended that prior to starting any work at the site that proper construction drainage is to be provided to maintain a relatively dry construction site.

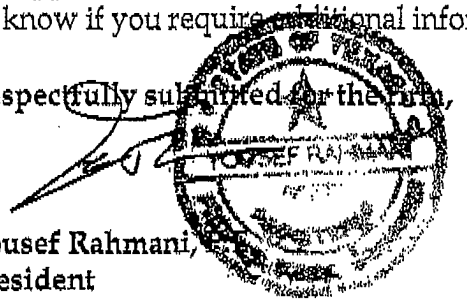
LIMITATIONS

The conclusions and recommendations given in this report are based on the analysis of the data collected for this project. Additive conclusions or recommendations made from this data by others are their responsibility.

Our study is based on the data obtained from soil borings made at the locations shown on boring plan. The nature and extent of variations between borings may become evident during construction. We should be requested to observe exposed conditions. After making these observations, and noting the engineering significance of variations, we will advise you of any changes in recommendations believed appropriate.

We appreciate this opportunity to provide our services to this project. Please let us know if you require additional information. Thank you.

Respectfully submitted for the firm,



Yousef Rahmani,
President

Attachments: Boring Plan
Boring Logs 1 and 2
Geotechnical Symbols Chart

Copies: 2 - Client
1 - SEL File 07351

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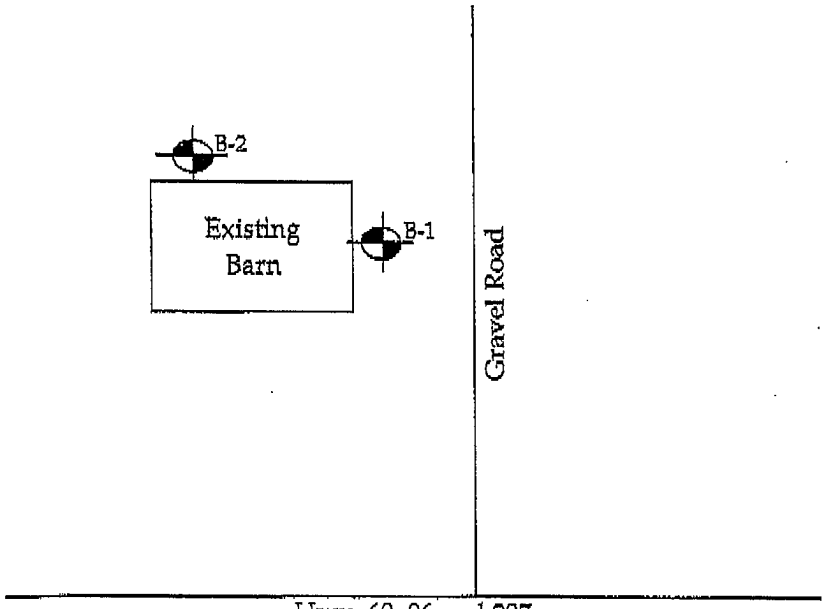
Report Number 07351



Proposed Metal Building
Beaumont, Texas

BORING PLAN

December 2007

NOT TO SCALE

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GEOTECHNICAL, ENVIRONMENTAL, MATERIALS TESTING

LOG OF BORING

Project: Proposed Metal Building
Beaumont, Texas

Boring Number: B-1
Location: See Boring Plan
Dry Auger: 0 to 20 Feet

Project No: 07351
Date of Report: 12/04/2007
Date of Boring: 11/28/2007
Authorization: Mr. Ronald Westphel

DEPTH, FEET	SYMBOL	SAMPLE	BLOWS PER FOOT	STRATUM DESCRIPTION	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	SHEAR STRENGTH: POCKET PENETROMETER (TSF)	SHEAR STRENGTH: UNCONFINED COMPRESSIVE STRENGTH (TSF)
				Gray CLAYEY SAND; Fill								
				SC								
				Gray CLAYEY SILT								
				ML	20	102	25	19	6		0.35	0.37
				Gray very soft CLAY with sand seams								
5											0.12	
							48	22	26		0.25	
				tan and gray clay								
				CH	23	103	47	22	25		0.50	0.60
10				Tan and Gray SANDY CLAY								
					22	104	38	20	18		0.65	0.60
											0.65	
15												
				CL	22	106	48	22	26		0.50	0.66
20				Bottom at 20 feet								

1. Water was encountered at 13 feet during drilling.
2. Water level was at 11' - 0" after 10 minutes.

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GEOTECHNICAL, ENVIRONMENTAL, MATERIALS TESTING

LOG OF BORING

Project: Proposed Metal Building
Beaumont, Texas
Boring Number: B-2
Location: See Boring Plan
Dry Auger: 0 to 20 Feet

Project No: 07351
Date of Report: 12/04/2007
Date of Boring: 11/28/2007
Authorization: Mr. Ronald Westphel

DEPTH, FEET	SYMBOL	SAMPLE	BLOWS PER FOOT	STRATUM DESCRIPTION	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	SHEAR STRENGTH: POCKET PENETROMETER (TSF)	SHEAR STRENGTH: UNCONFINED COMPRESSIVE STRENGTH (TSF)
				Tan CLAYEY SAND								
				SC			17	14	3			
				Red and Gray CLAY with ferrous nodules								
											1.00	
5					20	113	50	20	30		1.25	0.74
											1.65	
				tan and gray								
				CH	23	107	50	21	29		1.00	0.64
10				Tan and Gray SANDY CLAY								
				with sand seams								
				CL			46	23	23		0.50	
15				Bottom at 15 feet								

1. Water was encountered at 13 feet during drilling.
2. Water level was at 10' - 0" after 10 minutes.

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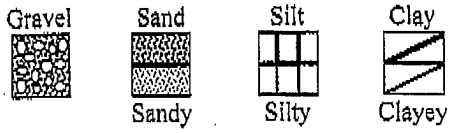
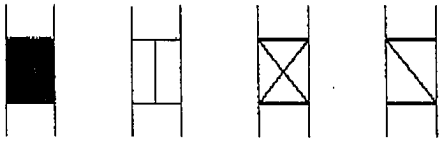
KEY TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPE



Predominant type shown heavy

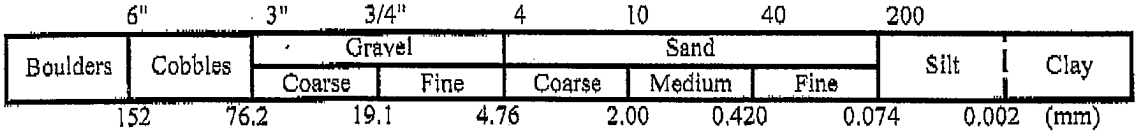
SAMPLE TYPE



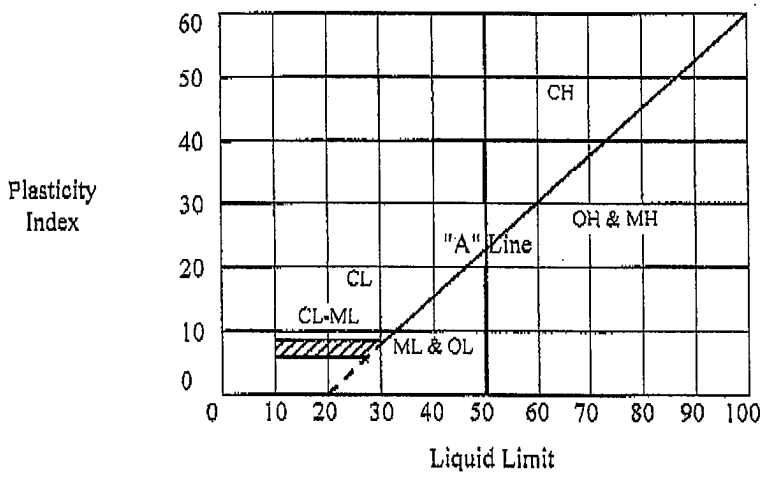
Un-Disturbed | Rock Core | Split Spoon | No Recovery

SOIL GRAIN SIZE

U.S. Standard Sieve



PLASTICITY CHART



CONSISTENCY OF COHESIVE SOILS

Penetration Resistance, blows per foot	Consistency	Cohesion TSF	Plasticity Index	Degree of Plasticity
0 - 2	Very Soft	0 - 0.125	0 - 5	None
2 - 4	Soft	0.125 - 0.25	5 - 10	Low
4 - 8	Firm	0.25 - 0.5	10 - 20	Moderate
8 - 15	Stiff	0.5 - 1.0	20 - 40	Plastic
15 -30	Very Stiff	1.0 - 2.0	> 40	Highly Plastic
> 30	Hard	> 2.0		

RELATIVE DENSITY OF COHESIONLESS SOILS

Penetration Resistance, blows per foot	Relative Density
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
> 50	Very Dense

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