#### REMEDIAL GEOTECHNICAL EXPLORATION

on

MIDWAY ROAD RECONSTRUCTION
Beltline Road to Keller Springs Road
Addison, Texas
ALPHA Report No. 00988



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Prepared for:

GBW ENGINEERS, INC. 1919 Shiloh Road, Suite 530, LB 27 Garland, Texas 75042 Attention: Mr. Bruce R. Grantham, P.E. April 2, 2001

Prepared By:

ALPHA TESTING, INC. 2209 Wisconsin Road, Suite 100 Dallas, Texas 75229



2209 Wisconiin St., Suite 100 Dallas, Texas 75229 972/620-8911 - 972/263-4937 (Metro) FAX: 972/406-8023

April 2, 2001

GBW ENGINEERS, INC.

1919 Shiloh S. Road, Suite 530, LB 27 Garland, Texas 75042 Attention: Mr. Bruce R. Grantham, P.E.

Re: Remedial Geotechnical Exploration
MIDWAY ROAD RECONSTRUCTION
Beltline Road to Keller Springs Road
Addison, Texas
ALPHA Report No. 00988

Attached is the report of the remedial geotechnical exploration performed for the project referenced above. This study has been authorized by Mr. Bruce Grantham, P.E. on December 28, 2000 and performed in accordance with ALPHA Proposal No. GT 7371 dated June 27, 2000.

This report contains results of field explorations and laboratory testing and an engineering interpretation of these with respect to available project characteristics. The results and analyses have been used to develop recommendations for remedial design and reconstruction of a segment of Midway Road in Addison, Texas.

ALPHA TESTING, INC. appreciates the opportunity to be of service on this project. If we can be of further assistance, such as providing materials testing services during construction, please contact our office.

DAVID A. LEWIS 47040

Sincerely yours,

ALPHA\_TESTING, INC.

David A. Lewis, P.E.

Manager of Engineering Services

Jim L. Hillhouse, P.E.

President

DAL/JLH/dal Copies: (3) Client

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on

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#### 1.0 PURPOSE AND SCOPE

The purpose of this remedial geotechnical exploration is to evaluate some of the physical and engineering properties of subsurface materials at the subject study area with respect to design and reconstruction of a segment of Midway Road in Addison, Texas. The field exploration has been accomplished by securing subsurface samples (including concrete pavement) from widely spaced test borings performed along the study area. Engineering analyses have been performed from results of the field exploration and results of laboratory tests performed on representative samples. The analyses have been used to develop recommended pavement section options for the subject reconstructed roadway.

Also included is an evaluation of the site with respect to potential construction problems and recommendations concerning earthwork and quality control testing during construction. This information can be used to verify subsurface conditions and to aid in ascertaining all construction phases meet project specifications.

Recommendations provided in this report have been developed from information obtained in test borings depicting subsurface conditions only at the specific boring locations and at the particular time designated on the logs. Subsurface conditions at other locations may differ from those observed at the boring locations. The scope of work is not intended to fully define the variability of subsurface materials that may be present on the study area.

The nature and extent of variations between borings may not become evident until construction. If significant variations then appear evident, our office should be contacted to re-evaluate our recommendations after performing on-site observations and tests.

Professional services provided in this geotechnical exploration have been performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the soil, surface water or groundwater.

ALPHA TESTING, INC. is not responsible for conclusions, opinions or recommendations made by others based on this data. Information contained in this report is intended for exclusive use of the Client (and their design representatives) and design of the specific pavement outlined in Section 2.0. Recommendations presented in this report should not be used for design of any other pavements except those specifically described in this report. Further, subsurface conditions can change with passage of time. Recommendations contained herein are not considered applicable for an extended period of time after the completion date of this report. It is recommended our office be contacted for a review of the contents of this report for construction commencing more than two (2) years after completion of this report.

Recommendations provided in this report are based on our understanding of information provided by the Client about characteristics of the project. If the Client notes any deviation from the facts about project characteristics, our office should be contacted immediately since this may

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materially alter the recommendations. Further, ALPHA TESTING, INC. is not responsible for damages resulting from workmanship of designers or contractors and it is recommended that the owner retain qualified personnel to verify work is performed in accordance with plans and specifications.

#### 2.0 PROJECT CHARACTERISTICS

It is proposed to reconstruct a segment of Midway Road located between Beltline Road and Keller Springs Road in Addison, Texas. A site plan illustrating the general outline of the study area is provided as Figure 1, the Location Plan, in the Appendix of this report. At the time the field exploration was performed, the study area was developed with the existing concrete roadway.

Present plans provide for reconstruction of the existing pavement. The existing pavement has experienced some distress. The distress is generally in the form of depressed areas adjacent to the existing pavement joints and generally occur in the direction of traffic flow from the pavement joints. Joints in the pavement were noted to be unusually large (up to about ½" wide) and in some areas it appears surface water is entering the pavement subgrade through these wide joints. At the north end of the study area (north of Borings 21 and 22; north-bound lane) in particular, water was actually noted emerging from the joints immediately after passage of large trucks. In general, transverse cracking was noted across the pavement panel near their midpoint in areas where significant pavement distress was noted.

#### 3.0 FIELD EXPLORATION

Subsurface conditions along the study area have been explored by drilling 22 test borings in general accordance with ASTM D 420 to a depth of 10 ft using standard rotary drilling equipment. The approximate location of each test boring is shown on the Boring Location Plans, Figures 2-7, enclosed in the Appendix of this report. Some borings were drilled in distressed areas while others were drilled in non-distressed areas for comparison. Details of drilling and sampling operations are briefly summarized in Methods of Field Exploration, Section A-1 of the Appendix.

Soil and rock (shally limestone) types encountered during the field exploration are presented on Record of Subsurface Exploration sheets included in the Appendix of this report. The boring logs contain our Field Technician's and Engineer's interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are approximate and the actual transition between strata may be gradual.

Fill materials have been encountered at some boring locations as will be discussed in Section 5.0. There may be fill in other borings than noted or at other locations, but could not be readily identified. Composition of the fill has been evaluated based on samples retrieved from 6-inch maximum diameter boreholes. It is anticipated this fill was placed and compacted

during construction of the existing concrete roadway. However, since no records were made available of fill placement, compaction or uniformity, subsurface conditions immediately adjacent to test borings could be substantially different than conditions observed in test borings.

#### 4.0 LABORATORY TESTS

Selected samples of the subsurface materials have been tested in the laboratory to evaluate their engineering properties as a basis in providing recommendations for pavement design and earthwork construction. A brief description of testing procedures used in the laboratory can be found in Methods of Laboratory Testing, Section B-1 of the Appendix. Individual test results are presented either on Record of Subsurface Exploration sheets or on summary data sheets also enclosed in the Appendix.

#### 5.0 GENERAL SUBSURFACE CONDITIONS

In general, the existing concrete pavement is underlain by soils derived from the Austin Chalk formation. Within the 10-ft maximum depth explored during this study, subsurface materials consist generally of clay (CH) underlain by calcareous clay (CL) and deeper shally limestone. In the southern and central portions of the study area (Borings 1-16), the existing pavement sectiongenerally consists of about 8 inches of Portland cement concrete overlying lime treated subgrade soils. (It should be noted that lime treated subgrade soils were *not* encountered in all of these boring locations.) In the northern portion of the study area (Borings 17-22), the existing pavement section generally consists of 6.5 to 7 inches of Portland cement concrete overlying a clayey (CH/CL) subgrade. The letters in parenthesis represent the soils' classification according to the <u>Unified Soil Classification System (ASTM D 2488)</u>. More detailed stratigraphic information is presented on the Record of Subsurface Exploration Sheets attached to this report.

Most of the subsurface materials are relatively impermeable and are anticipated to have a slow response to water movement. Therefore, several days of observation will be required to evaluate actual groundwater levels within the depths explored. Also, the groundwater level at the study area is anticipated to fluctuate seasonally depending on the amount of rainfall, prevailing weather conditions and subsurface drainage characteristics.

During field explorations, free groundwater has been noted in Borings 1-4 on drilling tools and in open boreholes upon completion at depths of 4.5 to 8 ft. Free groundwater was not observed in the other borings during drilling or in the other open boreholes upon completion. In our opinion, the current groundwater level on the study area may be located below the bottom of the borings and water within the depths explored may be "perched" groundwater which has percolated downward through desiccation cracks in the clayey type soils. It is not uncommon to detect seasonal groundwater either from natural fractures within the clay matrix, near the soil/rock interface or from fractures in the rock, particularly after a wet season. If more detailed groundwater information is required, monitoring wells or piezometers can be installed.

Further details concerning subsurface materials and conditions encountered can be obtained from the Record of Subsurface Exploration sheets provided in the Appendix of this report.

#### 6.0 DESIGN RECOMMENDATIONS

The following design recommendations have been developed on the basis of the previously described Project Characteristics (Section 2.0) and Subsurface Conditions (Section 5.0). If project criteria should change, our office should conduct a review to determine if modifications to the recommendations are required. Further, it is recommended our office be provided with a copy of the final plans and specifications for review prior to construction.

#### 6.1 Pavement

Clay or calcareous clay encountered near the existing ground surface will probably constitute the subgrade for the new pavement. Therefore, it is recommended these materials be improved prior to construction of pavement. Due to the wide spacing of the borings, division of the study area into areas with similar subgrade conditions was not possible. Delineation of areas with similar subgrade conditions, if required, should be performed during construction after the subgrade material has been exposed. The specific type of improvement procedures required in given pavement areas will be dependent upon the type of subgrade material present after final subgrade elevation has been achieved.

Calculations used to determine the required pavement thickness are based only on the physical and engineering properties of the materials and conventional thickness determination procedures. Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations, reinforcing steel, joint design and environmental factors will significantly affect the service life and must be included in preparation of the construction drawings and specifications, but were not included in the scope of this study. Normal periodic maintenance will be required for all pavement to achieve the design life of the pavement system.

Please note, the recommended pavement section options provided below are considered the minimum necessary to provide satisfactory performance based on the expected traffic loading. In some cases, City minimum standards for pavement section construction may exceed those provided below.

The following design information has been provided by the Client:

- New pavement will consist of Portland-cement concrete and the design life is 30 years.
- Daily traffic based on 1999 information for the study area is about 51,000 vehicles per day.

- The projected daily traffic volume by Year 2020 will be up to about 60,000 vehicles per day.
- It is anticipated the new pavement will be subject to significant truck traffic.
- Truck traffic will be about 20 percent of the daily traffic volume. Therefore, the design traffic used for the new pavement is 15,118,000 18-kip equivalent axle load applications for a 30-year design life.

#### 6.1.1 Pavement Subgrade Preparation

Due to the relatively heavy truck traffic expected, it is recommended a non-erodable base material be provided immediately below the Portland-cement concrete pavement. The non-erodable base material could consist of either a crushed limestone base material or a cement treated permeable base. The non-erodable base should be supported on an improved subgrade consisting of either a re-compacted subgrade or a mechanically lime stabilized subgrade. It should be noted that a geotextile fabric (e.g., Marafi 180N or equivalent) should be provided between the improved subgrade soils and the cement treated permeable base to prevent fines from the improved soils from penetrating into the permeable base material. If a permeable base is used, the subgrade must be carefully graded (i.e., no birdbaths and minimum slope of 1.5 percent) to provide positive flow of percolated water through the permeable base to collection points at the extreme perimeter of the pavement. Collected water at the perimeter of the pavement should be drained to an appropriate receptacle.

If the subgrade soils are mechanically lime stabilized, it is recommended lime stabilization procedures extend at least 1 ft beyond the edge of the pavement to reduce effects of seasonal shrinking and swelling upon the extreme edges of pavement. The soil-lime mixture should be compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 0 to 4 percentage points above the mixture's optimum moisture content. In all areas where hydrated lime is used to stabilize subgrade soil, routine Atterberg-limit tests should be performed to verify the resulting plasticity index of the soil-lime mixture is at/or below 15.

Mechanical lime stabilization of the pavement subgrade soil will not prevent normal seasonal movement of the underlying untreated materials. Normal maintenance of pavement should be expected over the pavement design life.

#### 6.1.2 Pavement Sections Options

California Bearing Ratio (CBR) tests performed on composite samples from the test borings indicate the CBR value for the existing clay subgrade soils will be about 3 whereas the CBR value for the same material after mechanical lime

stabilization would increase to about 20. Using the above values and assuming normal traffic for a 30-year project life, the following pavement sections are recommended if load transfer between joints is through aggregate interlock:

#### Compacted Subgrade

Portland-cement concrete 11.5 inches

6 inches crushed limestone base material

6 inches compacted subgrade

OR

Portland-cement concrete 10.5 inches 6 inches cement treated permeable base

6 inches compacted subgrade

#### Lime Stabilized Subgrade

11 inches Portland-cement concrete

6 inches crushed limestone base material

6 inches lime stabilized subgrade

OR

10 inches Portland-cement concrete 6 inches cement treated permeable base 6 inches lime stabilized subgrade

If dowels are provided for load transfer at the joints in the new pavement, the following pavement section options are provided:

#### Compacted Subgrade

10 inches Portland-cement concrete

6 inches crushed limestone base material

6 inches compacted subgrade

OR

9 inches Portland-cement concrete

6 inches cement treated permeable base

6 inches compacted subgrade

#### Lime Stabilized Subgrade

9.5 inches Portland-cement concrete

6 inches crushed limestone base material

6 inches lime stabilized -subgrade

OR

9 inches Portland-cement concrete 6 inches cement treated permeable base

6 inches lime stabilized subgrade

#### 6.1.3 Pavement Specifications

Pavement should be specified, constructed and tested to meet the following requirements:

- 1. Portland-Cement Concrete: Texas SDHPT Item 360. Specify a minimum flexural strength of 650 lbs per sq inch at 28 days. Concrete should be designed with 5 ± 1 percent entrained air.
- 2. Crushed Limestone Base Material: Texas SDHPT Item 247, Type A or B, Grade 2 or better. The material should be compacted to a minimum 95 percent of standard Proctor maximum dry density (ASTM D 698) and within three percentage points of the material's optimum moisture content.
- 3. Cement Treated Permeable Base Material: Cement treated permeable base should have a minimum hydraulic conductivity of 3,000 feet per day after compaction. Permeable base material shall consist of coarse aggregate with no fine aggregate (sand, etc.) and shall be treated with 6 percent Portland cement by dry weight of the aggregate. The material should be compacted to a minimum 95 percent of standard Proctor maximum dry density (ASTM D 558) and within three percentage points of the material's optimum moisture content. The material supplier shall submit an acceptable mix design for approval.
- 4. Lime Stabilized Subgrade: Texas SDHPT Item 260. An estimated 3 and 8 percent of hydrated lime (by dry soil weight) should be applied to existing calcareous clay and clay soils, respectively, which have been scarified to a depth of 6 inches. The actual amount of lime required should be confirmed by additional laboratory tests prior to construction.

- a. The soil-lime mixture should be compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 0 to 4 percentage points above optimum moisture. The moisture content of the subgrade should be maintained until the pavement surface is placed.
- b. In all areas where hydrated lime is utilized to stabilize the subgrade soil, routine Atterberg-limit tests should be performed prior to completion of construction to assure the resulting plasticity index of the soil-lime mixture will be at/or below 15. Gradation, Atterberg-limits and density tests should be performed at a frequency of 1 test per 5000 sq ft of pavement.
- 5. Re-compacted Subgrade: On-site materials should be scarified to a depth of at least 6 inches and re-compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 1 percentage point below to 3 percentage points above the material's optimum moisture content. The moisture content of the subgrade should be maintained until the pavement surface is placed. Density tests should be performed at a frequency of 1 test per 5000 sq ft of pavement.

#### 7.0 GENERAL CONSTRUCTION PROCEDURES AND RECOMMENDATIONS

Variations in subsurface conditions could be encountered during construction. To permit correlation between test boring data and actual subsurface conditions encountered during construction, it is recommended a registered Geotechnical Engineer be retained to observe construction procedures and materials.

Some construction problems, particularly degree or magnitude, cannot be anticipated until the course of construction. The recommendations offered in the following paragraphs are intended, not to limit or preclude other conceivable solutions, but rather to provide our observations based on our experience and understanding of the project characteristics and subsurface conditions encountered in the borings.

#### 7.1 Site Preparation and Grading

All areas supporting pavement should be properly prepared.

After completion of the necessary stripping, clearing, and excavating and prior to placing any required fill, the exposed subgrade should be carefully inspected by probing and testing. Any undesirable material (organic material, wet, soft, or loose soil) still in place should be removed.

The exposed subgrade should be further inspected by proof-rolling with a heavy pneumatic tired roller, loaded dump truck or similar equipment weighing approximately 10 tons to check for pockets of soft or loose material hidden beneath a thin crust of possibly better soil.

Proof-rolling procedures should be observed by the project geotechnical engineer or his representative.

Any unsuitable materials exposed should be removed and replaced with well-compacted material as outlined in Section 7.2.

Slope stability analysis of embankments (natural or constructed) was not within the scope of this study. Trench excavations should be braced or cut at stable slopes in accordance with Occupational Safety and Health Administration (OSHA) requirements, Title 29, Items 1926.650-1926.653 and other applicable building codes.

#### 7.2 Fill Compaction

Calcareous or sandy materials with a plasticity index below 25 should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 1 percentage point below to 3 percentage points above the material's optimum moisture content.

Clay soils with a plasticity index equal to or greater than 25 should be compacted to a dry density between 95 and 100 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be within the range of 0 to 4 percentage points above optimum. Clay fill should be processed and the largest particle or clod should be less than 6 inches prior to compaction.

Limestone or other rock-like materials used as random fill should be compacted to at least 95 percent of standard Proctor maximum dry density. The compacted moisture content of limestone or other rock-like materials used as random fill is not considered crucial to proper performance. However, if the material's moisture content during placement is within 3 percentage points of optimum, the compactive effort required to achieve the minimum compaction criteria may be minimized. Individual rock pieces larger than 6 inches in dimension should not be used as fill. However, if rock fill is utilized within 1 ft below the bottom of the pavement, the maximum allowable size of individual rock pieces should be reduced to 3 inches.

**APPENDIX** 

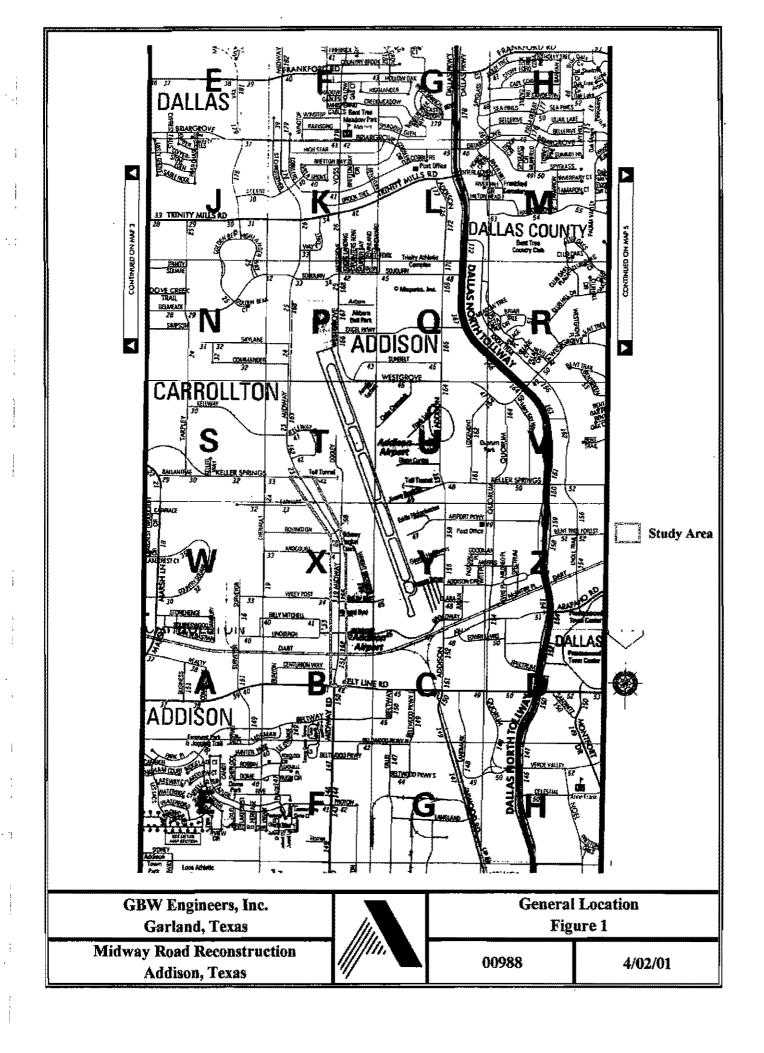
#### A-1 METHODS OF FIELD EXPLORATION

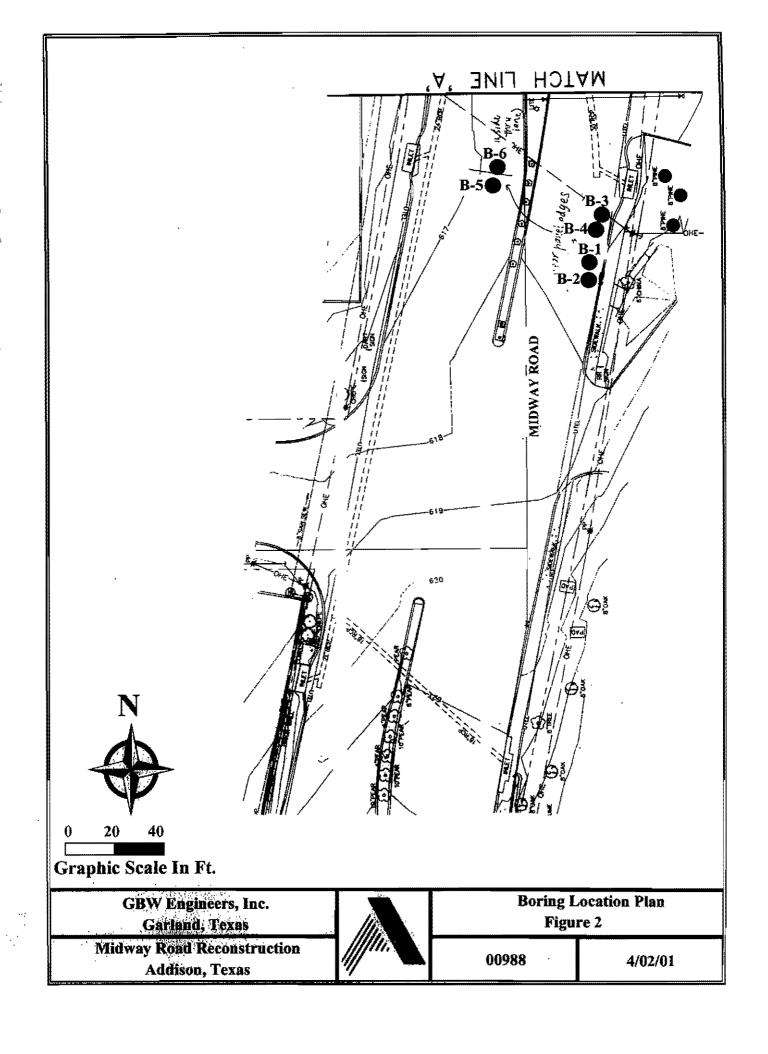
Using standard rotary drilling equipment, a total of 22 test borings have been performed for this geotechnical exploration at the approximate locations shown on the Boring Location Plans, Figures 2-7. The test boring locations have been staked by either pacing or taping and estimating right angles from landmarks which could be identified in the field and as shown on the site plans provided during this study. The location of test borings shown on the Boring Location Plan is considered accurate only to the degree implied by the method used to locate the borings. The surface elevations provided on the Record of Subsurface Exploration sheets have been obtained by plotting the boring locations on the site plans and interpolating the surface elevation. Surface elevations given on the boring logs are approximate.

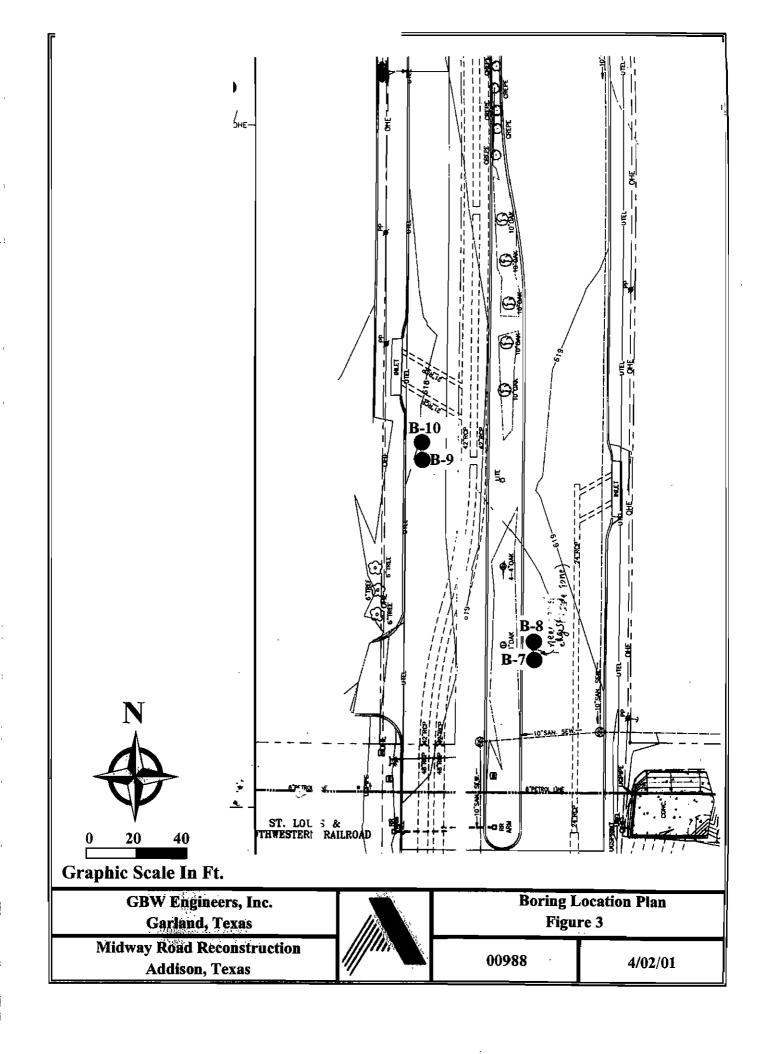
Relatively undisturbed samples of the cohesive subsurface materials have been obtained by hydraulically pressing 3-inch O.D. thin-wall sampling tubes into the underlying soils at selected depths (ASTM D 1587). These samples have been removed from the sampling tubes in the field and examined visually. One representative portion of each sample has been sealed in a plastic bag for use in future visual examinations and possible testing in the laboratory.

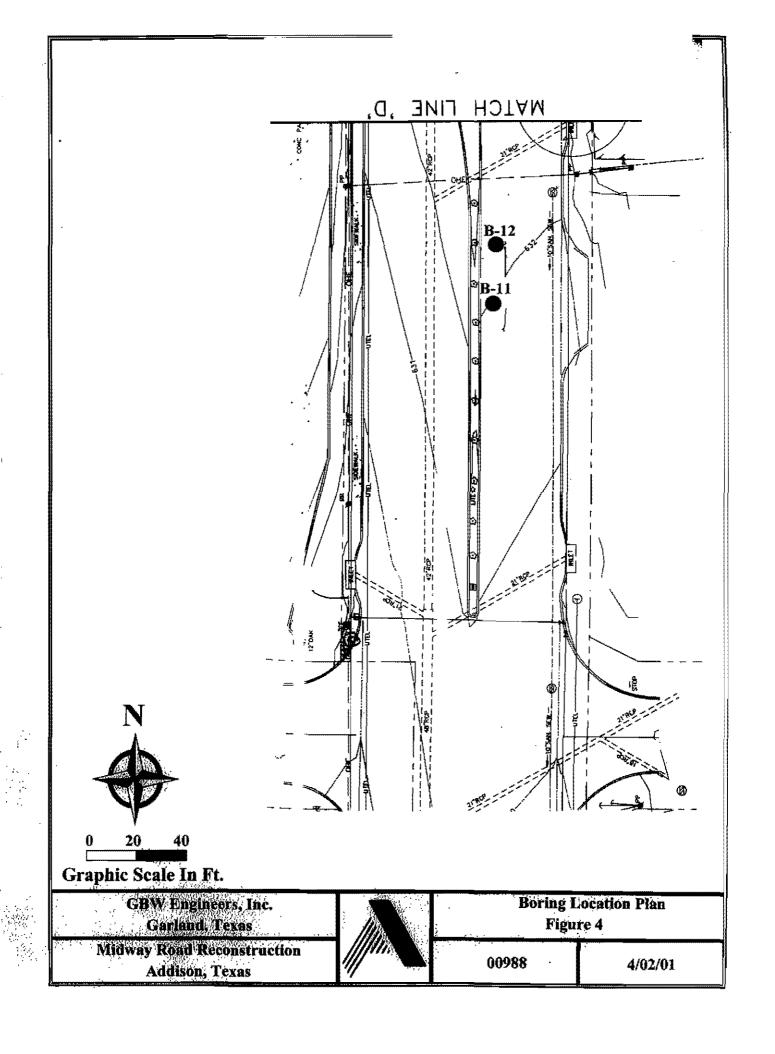
Modified Texas Cone Penetration (TCP) tests have also been completed in the field to determine the apparent in-place strength characteristics of the rock type materials. A 3-inch diameter steel cone driven by a 170-pound hammer dropped 24 inches is the basis for Texas State Department Transportation and Public strength correlations. Highways ALPHA TESTING, INC. has modified the procedure allowing the use of a 140-pound hammer dropping 30-inches for completion of the field test. Depending on the resistance (strength) of the materials, either the number of blows of the hammer required to provide 12 inches of penetration, or the inches of penetration of the cone due to 100 blows of the hammer are recorded on the field logs and are shown on the Record of Subsurface Exploration sheets as TCP (reference: Texas State Department of Highways and Public Transportation, Bridge Design Manual), using the modified procedure.

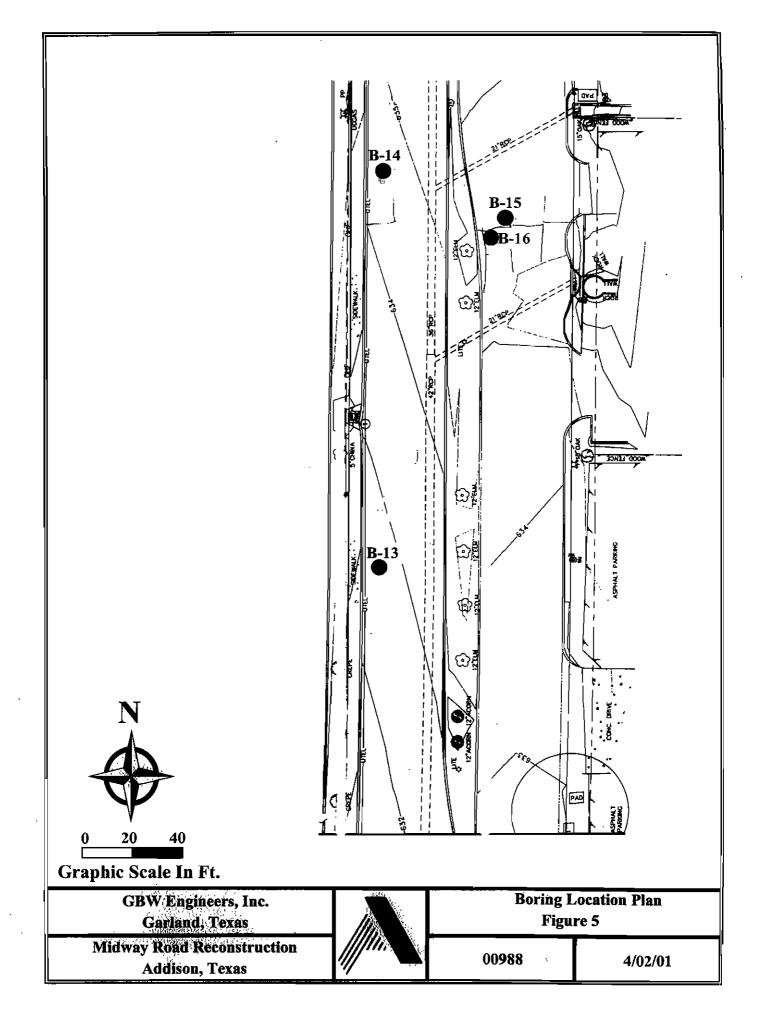
Logs of all borings have been included in the Appendix of this report. The logs show visual descriptions of all soil and rock (shaly limestone) strata encountered using the Unified Soil Classification System. Sampling information, pertinent field data, and field observations are also included. Soil and rock samples not consumed by testing will be retained in our laboratory for at least 30 days and then discarded unless the Client requests otherwise.

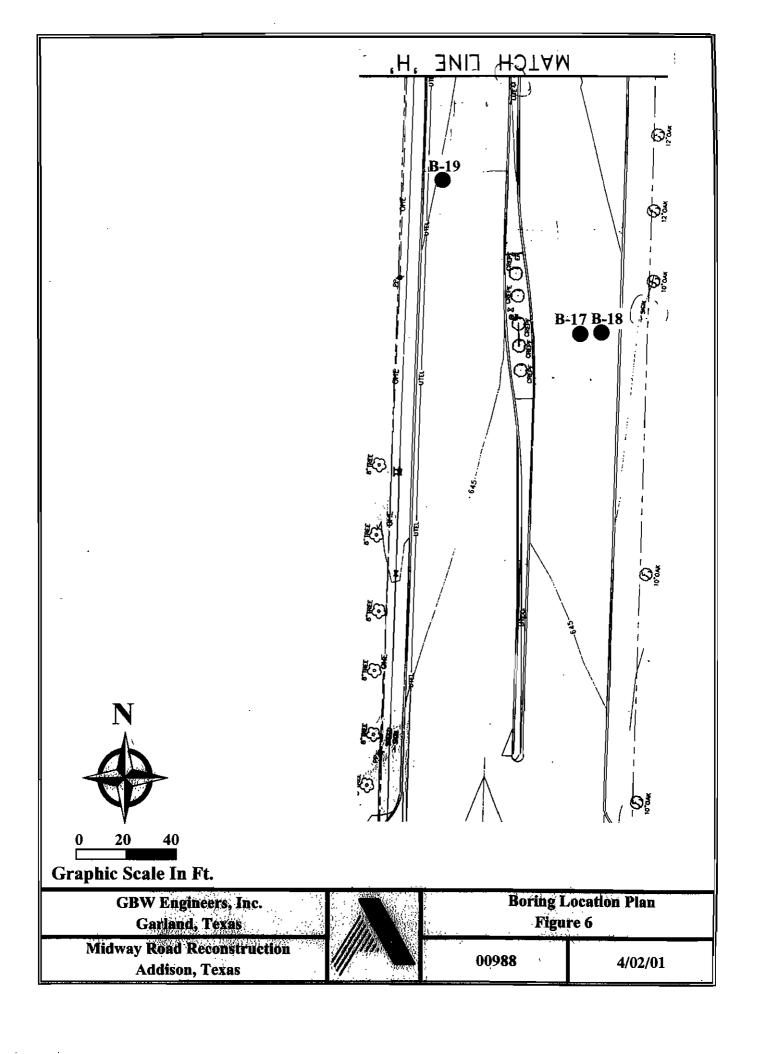












#### **B-1 METHODS OF LABORATORY TESTING**

Representative samples are inspected and classified by a qualified member of the Geotechnical Division and the boring logs are edited as necessary. To aid in classifying the subsurface materials and to determine the general engineering characteristics, natural moisture content tests (ASTM D 2216), Atterberg-limit tests (ASTM D 4318) and dry unit weight determinations are performed on selected samples. In addition, unconfined compression (ASTM D 2166) and pocket-penetrometer tests are conducted on selected soil samples to evaluate the soil shear strength. Results of all laboratory tests described above are provided on the accompanying Record of Subsurface Exploration sheets or on summary data sheets as noted.



2209 Wisconsin St., Sulte 100 Dallas, Texas 75229 972/620-8911 - 972/263-4937 (Metro)

FAX: 972/406-8023

Client: BGW ENGINEERS, INC.

Garland, Texas

Project: Midway Road Reconstruction

Addison, Texas

Our Report Number ::

00988

Date: 1/29/01

Composite Sample B-3 to B-16

Material Description:

(CH)

Classification: Sample Location:

ASTM-D-698-A

Dark Brown Clay

Soil Identification Number:

Composite

Maximum Dry Unit Weight:

91.0 pcf

**Optimum Moisture Content:** 

24.5 %

Liquid Limit:

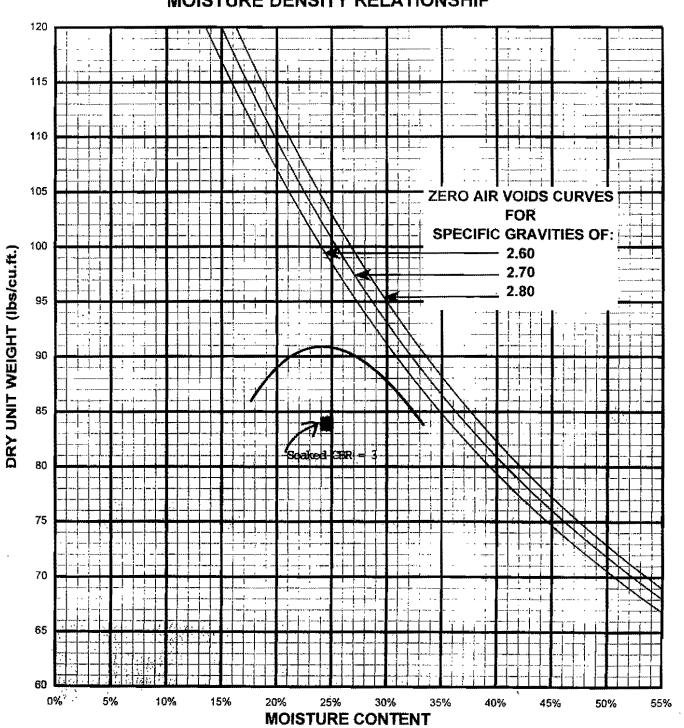
77

Plasticity Index:

Method of Test:

48

#### **MOISTURE DENSITY RELATIONSHIP**





2209 Wisconsin St., Sulte 100 Dallas, Texas 75229 972/620-8911 - 972/263-4937 (Metro) FAX: 972/406-8023

Client: GBW ENGINEERS, INC.

Garland, Texas

Project: Midway Road Reconstruction

Addison, Texas

Our Report Number.:

Material Description:

Classification: Sample Location: 00988

Date: 1/29/01

Dark Brown Clay

with 8 percent lime added

Composite Sample B-3 to B-16

Method of Test:

ASTM-D-698-A

Soil Identification Number: Maximum Dry Unit Weight:

Composite 84.5

Maximum Dry Unit Weight: Optimum Moisture Content:

84.5 pcf 32.0 %

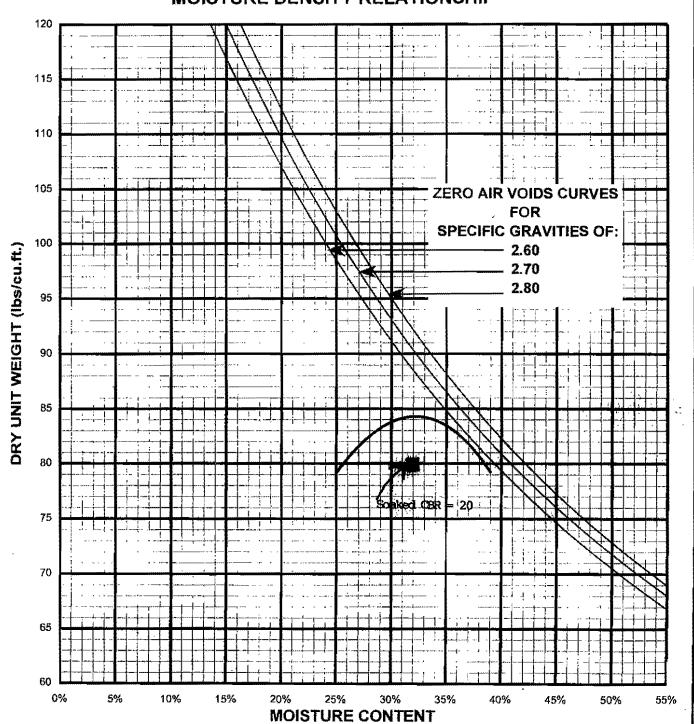
Liquid Limit:

32.0

Plasticity Index:

61 14

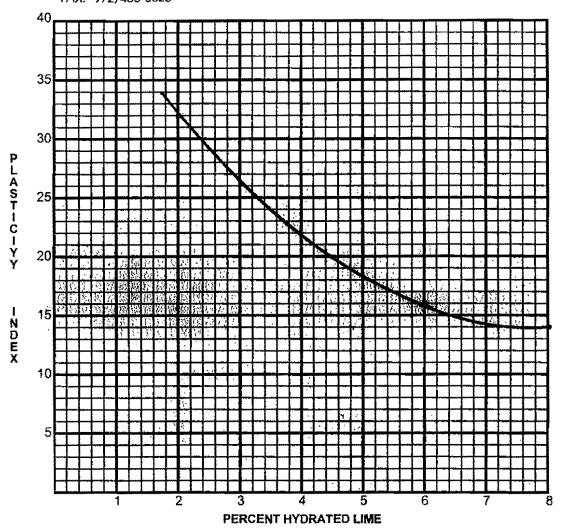
#### MOISTURE DENSITY RELATIONSHIP



## ALPHA TESTING, INC.

## MECHANICAL LIME STABILIZATION

2209 Wisconsin St., Suite 100 Dallas, Texas 75229 972/620-8911 - 972/263-4937 (Metro) FAX: 972/406-8023



SAMPLE NO.

Composite Sample (Borings 3-16)

DESCRIPTION:

**Brown Clay** 

		<b>E</b>	N	T	٠.
v	1		12		

#### LABORATORY TEST:

GBW ENGINERRS, INC.	LIME SERIES
GARLAND, TEXAS	Figure 10

## PROJECT NAME: ALPHA PROJECT NODATE: MIDWAY ROAD RECONSTRUCTION D0988 April 3, 2001 ADDISON TEXAS



### **RECORD OF** SUBSURFACE EXPLORATION

C	lient	GBW EX	Boring No. B-1												
Α	rchitect/Engineer												·····		
P	roject Name	YAWDIM	ROAD REC	ONSTRUC	TION		C	rawn	Ву			MA	···		
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1					_	4	ST					2.2	1	25	
$\exists$						<b>j</b>	1								
_						5	ST		:			1.7		24	
1				6'		1	<del></del> -								
7	Tan firm CALCAR	EOUS CL	AY(CL)		6										
7	with some silty				_	6	ST					1.0			LL=33
コ	limestone grave -stiff 6'-7'.	£1.				1									PL=15
_	the state of the second				-	1	-	1	١ ، ا						PI=18
					-	7	ST					0.7		27	
-					8	<b></b>									
7					_	8	ST					0.5		28	
7					_	1									
_	,			-			•								
					-	9	ST					0.5		46	
1					10 —	1	-					1			
1	BOTTOM OF TEST	BORING A	AT 10'.			1						1	]		
$\exists$					-	1									
-						1	1				A. C.				
7					_	1						-			
7			•		12	1					<u> </u>	1			
L,												•		·	

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION

5 FT.

AFTER

HRS. FT.

WATER ON RODS

8 FT.

**BORING METHOD** 

HSA - HOLLOW STEM AUGERS

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



### **RECORD OF** SUBSURFACE EXPLORATION

	ent														***
Arc	hitect/Engineer _				THE PAST								-		
Pro	ject Name	MIDWAY	ROAD REC	ONSTRUC	TION		l	) poco:	ind Ru						
Pro								-thhir	sed nå						
Dan	e Started	ING AND SAI 1-21-01	Hammer Wt				_ lbs.	1		<b></b>	IESI	DATA			
Dat	e Completed	1-21-01	Hammer Dro	p			in.	Į.	13/F1						
Dril	l Foreman	EDI	Spoon Samp	ole OD	~~ <del>      </del>		_ in.	Sieve	200			1			
Ins	pector		Rock Core D	)ia			in.	Š	Tes St (	٠. آم	9				
Bor	ing Method	CFA	Shelby Tube	: OD			in.	N	ation Te	lotal	essiv	<u></u>			×
		LASSIFICATIO				***	***	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Sail Suction Test (Total), pF	ned Compressive	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	Liquid Limit Plastic Limit Plasticity Index
	SURFA	CE ELEVATIO	N	STRATUM	DEPTH	SAMPLE NO.	SAMPLE	Percent	Texas C Standar	Sail Suc	Unconfined ( Strength Tons/Sq Ft.	Pooket Fons/Sc	Dry Umi	Water C	
+	Brown hard C		th some	1	0 -	1	1		- 7	¥´		<u> </u>			
1 :	and and gra	vel.			-	1									
╡`	7.75" of co	ncrete at s	surrace.			1 1	ST					4.5+	•	33	LL=68
_					-	1	and the second	ĺ							PL≃37
7				2'		1									PI=31
十,	 Reddish Brow	n and Tan	very	<del>                                     </del>	2	1	1								
1 ,	stiff CLAY(C	H/CL) with	some		-	.2	ST					4.5+		26	
1 8	sand, calcar gravelhar	eous nocure d 2'-3'.	es and	ļ	<u> </u>	1									
	stiff below				-	1 3	ST	İ				3.5		22	
1	•				-	1 ′	- J.A.							24	
7				L.	4	1							•		
1					-	4	ST					2.5		20	
1	<del>-</del>		·	5'_		1							ļ		
				1	_	1 5	ST					2.2		21	
						1 ~								~*	
	Tan firm CAL				6 -	1							<b>!</b> .		
	with some si Limestone gr		tf.cr		-	6	ST	1				1.2		24	
1.	very stiff	5'-6'.	,			<b>I</b>		1							
]	-stiff 6'-7'	è			-	7	ST					0.5		29	
						1						•••			
					8 -		] .	j			ĺ				
1					<u> </u>	1 8	ST	l				0.5		30	
7				A		<b>_</b>	•				]				
1	•				-	9	ST	Į				0.5		32	
						] [								1	
	SOTTOM OF TE	ST BORING	AT 10'.		10 -	1						}			
7						7	]								
_				ļ .	* <b>*</b>										
7					1 1		′								
1		A	, , , , , , , , , , , , , , , , , , , ,	L	.12	le selo	1	:	, <u></u>			,			

SAMPLER TYPE SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE

CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST

GROUNDWATER OBSERVATIONS

AT COMPLETION

5 FT.

AFTER HRS. 8 FT. WATER ON RODS

FT.

BORING METHOD **HSA - HOLLOW STEM AUGERS** CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



### **RECORD OF** SUBSURFACE EXPLORATION

Client GBW EN		Boring No. B-3  Job No. 00988						***************************************					
Architect/Engineer				,	J	ob No	ı,						
Project Name MIDWAY	ROAD RECO	NSTRUC	MOIT!	***	C	)rawn	Ву			AM			
Project Location	ADDISON,	TEXAS			A	/pprov	ed By	***************************************	***************************************	DA	<u>L</u> _		
DRILLING AND SAF	MPLING INF	ORMAT	ION							DATA			
Date Completed 1-21-01	Hammer Dro				in.		/F0						
Drill Foreman EDI	Spoon Samp	ie OD			in.	έρ	or ows						
inspector	Rock Core Di	a.			ìn.	Sie	est (B	r.				* ALABAMAN AND AND AND AND AND AND AND AND AND A	
Date Started 1-21-01  Date Completed 1-21-01  Drill Foreman EDI  Inspector  Boring Method CFA	Shelby Tube	OD	3		in.	002	on T		≥ 			TO A THE PROPERTY AND	
				T	T	, O	trati tion	Ē	7.65.	के ख			_ ž
SOIL CLASSIFICATIO		Σ			man	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total),	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	Liquid Limit Plastic Limit Plasticity Index
SURFACE ELEVATIO	N	F.	ΕΨ	Ē	E a	ent	as C	25	onfii ngth s/Sq	s/Sq	53	ja j	Sac uu
618±		STRATUM DEPTH	DEPTH	SAMPLE NO.	SAMPLE	Per	Tex	Soil	Stra	Ton	žž	¥	그룹 급
- Brown hard Lime Treated	3		0 -							<b>_</b>			
CLAY(CH) with some sand	d and			1					ļ			1	
calcareous nodules and -8" of concrete at surf			<b>*********</b>	1	ST					4.5+		ا ۾ د	LL=57
-8. of concrete at surr	-ace.		_	<u> </u>	13.1					# · J+		100	PL=36
7			_	1	Management (1)								PI=21
			2 —	<b> </b>									
			_	2	ST					4.0		31	
444 And		3'_		1 ~	37	1				4.0		->	
- Brown very stiff CLAY(C			**********	<del>                                     </del>						Ì	,	. 1	
some sand, calcareous r				3	ST					2.7		30	
and gravel.	•		4	<u> </u>									
-reddish brown below 4'	•		* -	}	ACCESS TO 100 TO								•
				4	ST					3.2		22	
veri				<b></b>									
1			***	5	ST				ļ	1.7		22	
		6'		1 ~	01					J., ,		22	
Tan firm CALCAREOUS CLA	AY (CL)	- <del>-</del> -	6	ļ —									
with some silty sand ar				6	ST					1.5		25	
limestone gravel.					-								
-stiff 6'-7'.				]						,			
	1		•	7	ST				-	0.5		26	
1			8 —	<b>-</b>									
<b>~</b>				8	ST					0.7		32	
		· ·		°	3 I					0.7		32	
				<u> </u>									
1			****	9	ST				1	0.5		35	
			٦٥							ļ			
BOTTOM OF TEST BORING A	AT 10'.		10 —	1									
			_	1	BA (BERT   BA (CO))				[				
<b>1</b>		and other properties		1	W								
<b>_</b>			****	1	İ						•		
₫			12	1	**************************************								
					1	<u> </u>	1					<b>.</b>	

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

5.5 FT. AT COMPLETION

AFTER HRS. FT. WATER ON RODS 8 FT.

**BORING METHOD HSA - HOLLOW STEM AUGERS** 

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



### **RECORD OF** SUBSURFACE EXPLORATION

Client GBW ENGINEERS, INC.						Boring No. B-4  Jeb No. 00988							
Architect/Engineer											<u> </u>		
Project Name MIDWAY	ROAD RECO	NSTRUC	TION		C	rawn	Ву			<u>am</u>			
Project Location	ADDISON,	TEXAS			A	pprov	red By			DA	L _		
DRILLING AND SA Date Started 1-21-01	MPLING INF Hammer Wt.	ORMAT	ION		_ lbs.				TEST	DATA		Г	
Date Completed 1-21-01	Hammer Drop	o			_ in.		S/Ft					l	
Drill Foreman EDI	Spoon Sampl	e OD			in.	Sieve	NO N						
Inspector	Rock Core Di	a,			in.	Si	T = 15	Ľā.					
Inspector Boring Method CFA	Shelby Tube	OD	3		in.	200	igo He	Stall,	Sive				
COLL OL SCRIPTOATIO		and the state of t				ŋ No.	enetra	est (Tr	Compressive	отпете	Ħ	88	
SOIL CLASSIFICATION	W	Σ				Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total),	Unconfined Co Strength Tons/Sq Ft.	Pocket Penatrometer Tons/Sq Ft.	Dry Unit Weight lbs./cu. ft.	Water Content	Liquid Limit Plastic Limit Plasticity Index
SURFACE ELEVATION	N	STRATUM DEPTH	픋끸	SAMPLE NO.	SAMPLE TYPE	cent	ndar ndar	Š	snorfi snotl	ket s/Sc	E G	ler (	36E
618±	A AMOR	STF	SCALE	SA	₹Ş	P. Gr	Tex Star	So.	D S C	8 <del>-</del>	D <sub>7</sub> y   <sub>DS</sub> .	ΜĀ	<b>ವ</b> ದ್ದ
Brown hard CLAY (CH) wi	th some		0										
sand and calcareous no	dules and		_	]									
gravel7.75" of concrete at	surface.			1 1	ST					4.5+		31	
				1					] [				
				1									
			2 —	<u> </u>									
			_	2	ST				[	4.0		33	
out.		3'_		]									
- Reddish Brown and Tan	very												
stiff CLAY(CH/CL) with				3	ST					4.0		25	
silty sand, calcareous and gravelhard 3'-4			4	1						t I			
-stiff below 5'.	•		• -										
_			_	4	ST				Ì	3.2		20	
				<b> </b>						1			
1				5	ST					3.2		23	
1		6'	****	1					İ	J.2		25	
Tan firm CALCAREOUS CL	AY(CL)		6 —										
with some silty sand a			-	6	ST					0.7		26	
_ limestone gravel.				<u> </u>	)				1				
			-	1	A. A. A. A. A. A. A. A. A. A. A. A. A. A		,		}			1	
7				7	ST					0.7		29	
			8 —	<u> </u>	]								
				8	ST					0.5		30	
	:			ľ	13.1		ĺ			V.J		30	
				<b>1</b>					]				
				9	ST				1	0.5		28	
		10										ļ	
BOTTOM OF TEST BORING		10 —	<b>1</b>					<b>#</b>					
	SOLION OF TEST BOXESTS III TO								]				
	I A AMM		1								j		
<b>_</b>	an en			1			Ì						
12													
			12	<u> </u>									

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE

CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION 4.5 FT.

HRS.

FT.

7 FT. WATER ON RODS

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS** CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



### **RECORD OF** SUBSURFACE EXPLORATION

Client GBW ENGINEERS	INC.									·		
Architect/Engineer Project Name MIDWAY ROAD RECONSTRUCTION												
Project Name MIDWAY ROAD REC	CONSTRU	CTION		[	rawn	Ву			MA			
Project Location ADDISON,	TEXAS	<del></del>			\ppro\	red By			DA	L		
DRILLING AND SAMPLING IN Date Started 1-21-01 Hammer W	't.			lbs.	<u> </u>			TEST	DATA			
Date Completed 1-21-01 Hammer Dr.  Drill Foreman EDI Spoon Sam Inspector Rock Core	ор			_ in.		s/Ft						
Orill Foreman EDI Spoon Sam	iple OD _			_ in.	8	9 0		*				
Inspector Rock Core Boring Method CFA Shelby Tub	Dia.			_ in.	Sie	Tes st (E	μ				*	
Boring Method CFA Shelby Tub	e 00	3		_ in.	[ 72	tion Te	otal	SSIV(6				
SOIL CLASSIFICATION			ш	11	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total),	ined Compressive h a Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Content %	Liquid Limit Plastic Limit Plasticity Index
SURFACE ELEVATION 617±	STRATUM	DEPTH	SAMPLE NO.	SAMPLE	Регсели	Texas ( Standar	Soil Suc	Unconfined ( Strength Tons/Sq Ft.	Pocket Tons/St	Dry Uni lbs./cu.	Water (	
Brown hard Lime Treated		0 -										
CLAY(CH) with some sand and		-										
calcareous nodules8" of concrete at surface.			1	ST					4.5+		37	LL=56
- of confidence at surface.			]									PL=35
-	2'		1									PI=21
Dark Brown very stiff CLAY(CH)	1 4 -	2 -										
with some sand.		-	]					}				
-brown with calcareous nodules		hir										
below 4'tannish brown below 8'.		_	2	ST					3.0		40	
- Caluitsi brown below 6 .		-	1									
	1	4 -	1					}	Ì			
			1									
_		-	1									
			3	ST				}	3.2		29	
									Ì			
		-										
-		6 -		]								
<u></u>		-	1						j		]	
			4.	ST					3.2		28	
		-										
_			1									
		8 –	<del>                                     </del>	1					1			
-	A. 10. IIII		•									
		-	_	\ \a_{m}								
			5	ST					3.0		28	
<b>1</b>		-	1									
		10 —	1	ļ	]							
BOTTOM OF TEST BORING AT 10'.			]									
			1	1								
			1									•
		_	1								-	
3 <u></u>		1.2 -		<u> </u>		<i>}.</i>						

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION DRY FT. FT. HRS.

WATER ON RODS NONE FT.

**BORING METHOD HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS** DC - DRIVEN CASINGS MD -MUD DRILLING



## RECORD OF SUBSURFACE EXPLORATION

Client GBW EI			E	Soring	No.			В-6	5				
Architect/Engineer										00988	}		
Project Name MIDWAY	ROAD RECO	ONSTRUC	TION	······································		)rawn	Ву	<u></u>		AM			
Project Location	ADDISON,	TEXAS				/ppro/	ed By			DA	L		
DRILLING AND SAI Date Started 1-21-01	MPLING INF	ORMAT	ION			,	yana			DATA		1 -	
Date Completed 1-21-01	Hammer Dro	p			in.		or (ows/Ft)		W. W. W. W. W. W. W. W. W. W. W. W. W. W				
Drill Foreman EDI	Spoon Samp	le OD			in.	မွ	2 0 0 0 0 0						
Inspector	Rock Core D	ia			_ in.	Sign	i est	占					
Boring Method CFA	Shelby Tube	OD	3		_ in.	200 Sieve	lon Tes	tall;	Sive Sive		]		
				1		Š	trat	은	9.0	9,6		م. ا	de x
SOIL CLASSIFICATIO		2		1 + 1	***	Percent Passing No.	Texas Cone Penetration Test Standard Penetration Test (Bl.	Soil Suction Test (Total),	ned Compressive	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	Liquid Limit Plastic Limit Plasticity Index
SURFACE ELEVATIO	N	STRATUM	DEPTH SCALE	SAMPLE NO.	SAMPLE	Percent	Fexas C Standar	Soil Suc	Unconfined ( Strength Tons/Sq Ft.	Pocket Fons/Sc	Ory Uni bs./cu.	Water C	13
Brown very Dense SAND(S	3P) with	1	0	<del> </del>	T								
some gravel and clay.		]								,	<u> </u>		
8" of concrete at sur	face.	]		1	ST	13	]					30	
			_	<b>]</b>	"	ريد						30	: f
THE STATE OF THE S		]	_						ľ				
		_ 2'	2	<u> </u>	]								ļ
Brown very stiff CLAY(	CH) with		-										
-tannish brown with cal	lcareous	1		1			ĺ				ļ		
nodules and gravel belo	ow 4'.			2	ST				1.2	2.7	80	34	LL=80
-tannish brown below 8			_	1				<b>-</b>		l			PL=30
344-		Ì		Ì			ĺ						PI=50
			4 —		1								
				1						-			
				3	ST		Ī		}	3.7		26	
			<u>-</u>										
		Í	6	<b></b>	1		Ī	Į	}				
				1			•			Í			ı
				1			1			<u> </u>			i
		1		4	ST	ľ	] ,		ĺ	3.0		24	LL=66
_			-	1				ĺ					PL=24
										1			PI=42
		İ	8	1	1								1
				1			•	İ					
				5	ST			<u> </u> 		2.2		29	
<b></b>		***************************************		1									
_			-	1						]			
DOMESTIC OF STREET PARTY	ימו דימ		10 -	ļ	1								
BOTTOM OF TEST BORING	PT TO, "			I									
				ļ	Í								
<u></u>		diameter (Alexandria)							4				ĺ
		A CONTRACTOR OF THE PROPERTY O							] .				
- <u> </u>	*		12 -										

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE

CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION DRY FT.
AFTER HRS. FT.

WATER ON RODS NONE FT.

**BORING METHOD** 

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVEN CASINGS
MD -MUD DRILLING



## **RECORD OF** SUBSURFACE EXPLORATION

Client GBW E	NGINEERS,	INC.				laring	No.		B-7				
Architect/Engineer													
Project Name MIDWAY	ROAD REC	ONSTRU	CTION			)rawn	Ву			AM			
Project Location	ADDISON,	TEXAS			/	/ppro	ved By			DA	<u>L</u>		
DRILLING AND SA Date Started 1-21-01	MPLING INF	ORMAT	ION				r——			DATA			Two managements
Date Completed 1-21-01	Hammer Dro	·			-	t	1						
Drill Foreman EDI	Spoon Samp	le OD			in.	•	9 §			ļ			
Inspector	Rock Core D	ia.			in.	Sie	Gest Gest	ų,	Ì	]			
Baring Method CFA	Shelby Tube	OD	3		in.	200 Sieve	8 L	2	sike Sike		W-1-4-1		
		T		1	1	No.	tion	<u> </u>	) res	eter			÷ Š
SOIL CLASSIFICATION	ON		ANA ANAMANTA MATANA			Percent Passing I	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soll Suction Tast (Total),	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetromater Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	Liquid Limit Plastic Limit Plasticity Index
SURFACE ELEVATION	N	PE	프出	<u> </u>	2	E E	Sap	Suct	and the second	Sq.	P. C. J.	G W	
619±		STRATUM	DEPTH	SAMPLE NO.	SAMPLE	Per C	Stan Stan	7	Strei	Pack	V. SQ	Wate	ᄬᄬᆲ
Brown very stiff CLAY(	CH) with	7	0 -	ļ ·	V/ (***								<u> </u>
some sand and gravel.	CII, WILLII		-									1 /	
-8.25" of concrete at	surface.		-	_	ST	}				2.5		26	
				1	31					2.3		20	
			] -										ı
		<u>  2'_</u>	2 -	<b>1</b>	Ī								ı
Dark Brown very stiff with some sand, calcar	CLAY (CH)		-	1		l							
nodules and a trace of			_			l							
-brown below 6'.	-	ļ	-	2	ST					3.7		27	
-tannish brown below 8	` •		-			Į							
			4 -						}	ļ			
			_							}			
			-	3	ST					3.2		28	
			-	1									
			] -	1									
			6 -	<b></b>			]		<u>,</u>				
		1	] :	1		ł							
			-	4.	ST				Ì	3.0		24	
	•		-	1						3.0		2.4	
1			] =	1		ĺ					}		
		8'	8 -	<b>}</b>	1								
4			-	2		l							
4			] -		ANNO MINISTRA	[			1	# #	1		
Tan weathered SHALY LI	MESTONE.		-	<b>-</b>	1								
<b></b>			-	5	TCP	İ	100 3.3"				ļ	5	
			10-	<b></b>			3.3					[	
BOTTOM OF TEST BORING	AT 10'.		" -	İ							]		
1			-	}		Į				1	i		
1		4	<u> </u>	l.:									
7		1.			ļ. ·.	l							
1		أم بال	1/12	Vijesa		l. :					<b>F</b>		
SAMPLER TYPE		CO	OUNDWA	TED (	THEFP	VΔT	ONS		·	BORING	RAETLI	\r\ \r\	

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST GROUNDWATER OBSERVATIONS

AT COMPLETION DRY FT.

WATER ON RODS NONE FT.

FΤ,

HRS.

HSA - HOLLOW STEM AUGERS

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING



## **RECORD OF** SUBSURFACE EXPLORATION

		NGINEERS,		Boring No. B-8  Job No. 00988										
Architect/Engineer		-	J	ob No	). 									
Project Name	MIDWAY	ROAD RECO	ONSTRUC	CTION		L	orawn By AM approved By DAL							
Project Location		ADDISON,	TEXAS			<i>F</i>	pprov	ved by						
Date Started 1-	21-01	MPLING INF Hammer Wt.		140		lbs.				TEST	DATA			<del>-</del>
Date Completed 1	21-01	Hammer Dro	ρ	30		in.		13/E						
Drill Foreman	EDI ·	<sub>.</sub> Spoon Samp	ile OD			in. '	200 Sieve	500		ļ				
Inspector		Rock Core D	ia			in.	Š	1 5 15 15 15 15 15 15 15 15 15 15 15 15	, G	J 80				
Boring Method	CFA	Shelby Tube	OD	3		In.	Š.	n Te	otal)	\$89.	<u>.</u>		4	
	SSIFICATIO		STRATUM DEPTH	Ŧ4	SAMPLE NO.	SAMPLE	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total),	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	= Liquid Limit = Plastic Limit = Plasticity Index
	619±		STR	DEPTH	P.S.	SAN	Perc	Star	Pog.		Pec	D. 20	Wat	
Brown hard Lin CLAY(CH) with gravel8.5"	some sand	d and	2 '	0 -		ST				1	-		23	LL=46 PL=29
gravel8.5"   surface.   Dark Brown ve		/	**************************************		2	ST				1	3.7	***************************************	29	PI=17
with sand lami -with limestor	inations.			5	3	ST					2.7		28	
					4	ST					2.7		26	
		<u></u>	<u>8'</u> .	-	1	]			j					
Tan weathered	SHALY LII	MESTONE.			5	тср		100					9	
BOTTOM OF TEST	BORING	AT 10'.		10	1	]		, <b>.</b>	ļ ·					<u> </u>
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

DRY FT. AT COMPLETION AFTER HRS. FT.

WATER ON RODS NONE FT.

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS** DC - DRIVEN CASINGS MD -MUD DRILLING



### **RECORD OF** SUBSURFACE EXPLORATION

Client GBW ENG			Job No. 00988										
Project Name MIDWAY I	ROAD RECO	)NSTRU(	TION			)rawn	Ву			AM			
Project Location 2	ADDISON,	TEXAS				pprov	red By			DA	L _		
DRILLING AND SAM	PLING INF	ORMAT	ION							DATA			
Date Completed 1-21-01	Hammer Dro	P			_ in,		Ft.						
Drill Foreman EDI	Spoon Samp	le OD			in.	e e	5 G						
Inspector	Rock Core D	ia.			in.	Sie	t (B	u.					
Boring Method CFA	Shelby Tube	QD	3		_ in.	200 Sieve	on ] Tes	7				***************************************	
			1	T	T	0	rrati	Ē	Ser	ě			,
SOIL CLASSIFICATION SURFACE ELEVATION		Ž.	***	<u>"</u>	<b>11</b>	ercent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soll Suction Test (Total),	Unconfined Compressive Strength Tons/Sq Ft.	Pockat Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu, ft.	Water Contant %	Liquid Limit Plastic Limit Plasticity Index
618±		STRATUM DEPTH	S S S S S S S S S S S S S S S S S S S	SAMPLE NO.	SAMPLE TYPE	e ce	exas	io Si	Incon Streng Tons#	ocke ons/	Dry U	Vater	 #    #
			0 -	OZ	S =	<u> </u>	F V2	0)	<u> </u>				
Dark Brown stiff Lime Tr			_								ļ i		
calcareous nodules and g	gravel.	ļ	:	1									
-8" of concrete at surfa	ace			1	ST				0.9	1.2	79	37	LL=55 PL=32
			-	1	Water the Control of								PL=32 PI=23
		2'_	2 -		ļ					1			11-23
- Dark Brown very stiff CI	LAY (CH)												
with sand laminations are trace of calcareous node	nda	İ		1	AVAAOOMINIO VV								
- trace of calcareous node	ites.			2	ST					2.2		33	
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7				<b> </b>	<b>*</b>								
7				5	ST					2.2		31	
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			10 -	<u> </u>	. W								
- BOTTOM OF TEST BORING AT	r 10'.			}						1			
7		A A A	_	1						1	ĺ		
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

DRY FT. AT COMPLETION FT. AFTER HRS. WATER ON RODS NOME FT.

**HSA** - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING

**BORING METHOD** 



### **RECORD OF** SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.					ΕΕ	oring	No.	B-10					
Architect/Engineer	t/Engineer								00988					
Project Name	MIDWAY ROAD RECONSTRUCTION						)rawn	Ву	AM					
Project Location	Location ADDISON, TEXAS					Approved By DAL								
DRILLING AND SAMPLING INFORMATION  Date Started 1-21-01 Hammer Wt.						lbs.				TEST	DATA			
Date Completed	1-21-01 Hammer Dro		P		in. in. in. in.		Sieve	S/Ft	44	and the control of th	**************************************		-	
Drill Foreman	EDI Spoon Samp		ole OD					Test or st (Blowe						
Inspector	Rock Core D		)ia											
Boring Method	CFA	Shelby Tube	OD	3		in.	20	g <del>š</del>	神	Sive				
					ž	etrat ation	ı Ç	L Saud	ne te	ĺ	8	dex		
SOIL CLASSIFICATION  SURFACE ELEVATION  618±		STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE	Percent Passing	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Yotal),	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content 9	LL = Liquid Limit PL = Plastic Limit P1 = Plasticity Index	
							Texas C Standar	Soil Suc						
Brown hard Lime Treated CLAY(CH) with some sand, calcareous nodules and gravel8" of concrete at surface -with lime to 17".		3'	0 -	1	ST		and the same party and the same			4.5+		38	LL=53 PL=38	
				2	ST					2.5		35	PI=17	
Dark Brown very stiff CLAY(CH) with sand laminationsstiff with limestone gravel			5	3	ST					3.0		36	LL=83	
below 8'.		Table 1 April	-	4	ST	de contraction de la contracti				2.0		29	PL=31 PI=52	
1				-	5	ST		***************************************			1.5		33	
BOTTOM OF T	DOT BODING	አጥ ኀ <u>ለ፣</u>		10 -	<u> </u>	1								
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

DRY FT. AT COMPLETION AFTER HRS. FT. WATER ON RODS NONE FT.

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS** CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING



### **RECORD OF** SUBSURFACE EXPLORATION

Client GBW ENGINEERS,	INC.		,	E	loring	No.			B-1	1			
Architect/Engineer			Job No					00988					
Project Name MIDWAY ROAD RECONSTRUCTION				Drawn By				AM					
Project Location ADDISON, TEXAS					Approved By DAL					<u>L</u>			
DRILLING AND SAMPLING INFORMATION  Date Started 1-21-01 Hammer Wt.						T		TEST	DATA				
Date Completed 1-21-01 Hammer Drop						J.L.							
Drill Foreman EDI Spoon Same	ole OD			in.		8 o							
Inspector Rock Core D	dia.	a.			S	on Test Test (BI	tall, pF	sive		A COLOR AND AND AND AND AND AND AND AND AND AND			
Boring Method CFA Shelby Tube	OD 3			in.									
r	· · · · · · · · · · · · · · · · · · ·	1	Γ'''		S S	ig tr	Ë	J. G.	eter			F A	
SOIL CLASSIFICATION	STRATUM DEPTH	DEPTH	SAMPLE NO.	SAMPLE TYPE	Percent Passing N	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total),	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	LL = Liquid Limit PL = Plastic Limit Pl = Plasticity Index	
SURFACE ELEVATION													
632±						Tex					Wat		
Dark Brown stiff CLAY(CH) with		0 =	Į	A				1					
some sand8" of concrete at surface						ļ :							
}			1.	ST					1.7		34		
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		4		ST					2.5				
Dark Brown very stiff CLAY(CH)			2								31		
with some sand and a trace of													
calcareous nodules and gravel.											1		
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4				ļ									
-		-	3	ST	Į				3.0		32		
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		ļ	4	ST				ļ	2.5		38		
<u>-</u>													
<u> </u>	<u>8</u> '_	8 -								]			
- Tan and Gray hard CALCAREOUS		<b>-</b>	1										
CLAY(CL) with some silty sand and gravel.		-	}										
and graver.	**************************************		5	ST				]	4.5+		18		
<b>1</b> ·													
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- BOTTOM OF TEST BORING AT 10'.		10 _	l	1									
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	<u></u>	12	<u> </u>		<u> </u>			<u> </u>					

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION DRY FT. FT. HRS.

WATER ON RODS NONE FT.

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS** 

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



## RECORD OF SUBSURFACE EXPLORATION

•	Client GBW B	ngineers,	INC.				Soring	No.						
	Architect/Engineer											·····		
į	Project Name MIDWAY	ROAD REC	ONSTRUC	CTION	***************************************	[	Drawn	Ву			AM			
j	Project Location	ADDISON,	TEXAS				∤ppro≀	ed By		-	DA	<u>L</u>		
1	DRILLING AND SA Date Started 1-21-01					_ lbs.	<u> </u>			TEST	DATA			
	Date Completed 1-21-01					_ in.		on Test or Test (Blows/Ft)						
ı	Drill Foreman EDI	_ Spoon Samp	ole OD _			in.		\$ 0 0						
	Inspector	Rock Core D	ia.			in.	200 Sieve	est (B	u di					
ļ	Boring Method CFA	_ Shelby Tube	OD	3		_ in.		tion .	otal),	Ssive	Eus.			
	SOIL CLASSIFICATION		<u> </u>	and the state of t	ш		Percent Passing No.	Texas Cone Penetrati Standard Penetration	Soil Suction Test (Total),	ined Compressive h q Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Content %	Liquid Limit Plastic Limit Plasticity Index
	SURFACE ELEVATION 632 ±	)N	STRATUM	DEPTH	SAMPLE NO.	SAMPLE	Percent	Texas ( Standar	Soil Su	Unconfined C Strength Tons/Sq Ft.	Pocket Tons/Si	Dry Un lbs./cu.	Water (	148
	Dark Brown stiff Lime CLAY(CH) with some san -8" of concrete at sur	â.		0 -	1	ST				0.6	1.2	78	40	LL=60 PL=23 PI=37
	Dark Brown very stiff with sand laminationsstiff 2'-4'.		2'_	2	2	5				A care manufacture of care of	1.7		35	
	•			4	3	ST				4 A A A	2.0	t de la constitución de la const	34	LL=46 PL=29 PI=17
	Tannish Brown very sti	ff	7.5'	6 -	4	ST		# # # # # # # # # # # # # # # # # # #		instruments to the state of the	2.0	-	34	
11111	silty and and gravel.	cii some		8	5	ST				THE TAX AND ADDRESS OF THE PARTY OF THE PART	3.0		22	LL=38 PL=18
	BOTTOM OF TEST BORING	AT 10'.		10		The same of the desired of the same of the								PI=16 PI=20
1	·			12	\$ \$ \$ &					THE TAX AND ADDRESS OF THE TAX AND ADDRESS OF				

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE

CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST GROUNDWATER OBSERVATIONS

AT COMPLETION DRY FT.

AFTER

WATER ON RODS NONE FT.

HRS.

FT.

BORING METHOD

HSA - HOLLOW STEM AUGERS

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



## **RECORD OF** SUBSURFACE EXPLORATION

Client GBW E	NGINEERS,	INC.			8	loring	No.			B-1:			
Architect/Engineer					J	lob No	)			00988			
Project Name MIDWAY	ROAD RECO	ONSTRUC	CTION		C	)rawn	Ву	***************************************		MA			
Project Location	ADDISON,	TEXAS				pprov	ed By	····	· · · · · · · · · · · · · · · · · · ·	DA	L		
DRILLING AND SA Date Started 1-21-01	MPLING INF	ORMAT	ION 140		ibs.				TEST	DATA		ì	
Date Completed 1-21-01					in.		J. Ft						
Drill Foreman EDI	Spoon Samp	le OD			in.	4)	5 6 6		***************************************				
Inspector	Rock Core D	ia.			in. ˈ	<u>8</u>	15.5 (B)	<b>#</b>				A	i
Boring Method CFA	Shelby Tube	OD	3_		_ in.	200 Sieve	on ]		sive				
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SOIL CLASSIFICATION		<b>2</b>	To an annual value of the control of	ш	w	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suption Test (Total),	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq.Ft.	Dry Unit Weight Ibs./cu, ft.	Water Content %	Liquid Limit * Plastic Limit Plasticity Index
SURFACE ELEVATION	N	STRATUM DEPTH	ŧΞ	SAMPLE NO.	SAMPLE	gent :	as C ndar	Š	S. S.	ket s/S	5 €	iei	#       #
633 ±		STE	DEPTH	A O	SY	à	E S	, <u>p</u>	STA	Tor	Dry Bs.	88	크로 <b>ಪ</b>
Dark Brown stiff Lime 'CLAY(CH) with some sand	d.	######################################	0 -										
-8" of concrete at sur:	face.		*****	1	ST				1,1	1.2	70	42	LL=79
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Dark Brown stiff CLAY(	CH) WICH		_	1									
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		6'_	-	1						<u> </u>			
Tan and Gray hard CALC	AREOUS	<u> </u>	6-	-								]	
CLAY(CL) with limeston	e seams.		_	-	ĺ								
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Tan weathered SHALY LI	MESTONE.												
and '		A	-	5	TCP		100					18	
			10 -	1	- Constitution of the Cons		*						
BOTTOM OF TEST BORING .	AT 10'.			1									
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		>	12	1					- Variable				
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SAMPLER TYPE SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER

TCP- TEXAS CONE PENETRATION TEST

**GROUNDWATER OBSERVATIONS** 

AT COMPLETION DRY FT. HRS. FT.

WATER ON RODS NONE FT.

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS** 

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



## **RECORD OF** SUBSURFACE EXPLORATION

Client		NGINEERS,												
Architect/Engineer	***************************************					`	Job N	o			0098			
Project Name														
Project Location	· · · · · · · · · · · · · · · · · · ·	ADDISON,	TEXAS				Appro	ved By			DA	L		
DRIL Date Started	LING AND SAI 1-21-01					lbs.	·	_		TEST	DATA	·	1	
Date Completed								s/Ft)			ļ			
Drill Foreman							دو	70 W						
Inspector		Rock Core D	ia.			in.	8	Tesi st (B	Ä,					
Boring Method	CFA	Shelby Tube	OD	3_		in.	1 **	tion Te	orali	SSIVE	ļ 			
	CLASSIFICATIO	····	¥		411		Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blow:	Suction Test (Total), pF	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft,	Dry Unit Weight Ibs./cu. ft.	Content %	Liquid Limit Plastic Limit Plasticity Index
SURFA	ACE ELEVATIO 634±	N	STRATUM	DEPTH	SAMPLE NO.	SAMPLE	Percent	Texas C Standan	Soil Suc	Unconfii Strengt Tons/Sq	Pocket F	Dry Unit	Water C	P. = Lic P. = P. ic P. = P. ic
Dark Brown	very stiff I	ime		0 -						,				
Treated CLA	Y(CH) with a f concrete a		<u> </u>	] -										
surface.		A. C.			1	ST					2.0		36	
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1			2 '		1									
Dark Brown	very stiff (	CLAY (CH)	<del></del>	2 -	1						}	,		
with sand la			i	-							_		[ [	
-brown below	₩ <b>%</b> .			_	2	ST					2.2		30	
				_										
						A. A. A. A. A. A. A. A. A. A. A. A. A. A			<u> </u>					
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Tan weather	ed SHALY LIN	MESTONE.			1									
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				-	4	TCP		1.5"					18	
BOTTOM OF T	EST BORING A	T 10'.		10 —	-	}								
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

DRY FT. AT COMPLETION

HRS. FT, WATER ON RODS NONE FT.

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS** CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



### **RECORD OF** SUBSURFACE EXPLORATION

Client	GBW E	ngineers,	INC.									5		
Architect/Engineer						<u> </u>	lob No	).			00988			
Project Name	YAWDIM	ROAD REC	ONSTRU	CTION		[	)rawn	Ву	unna		AM		·	
Project Location		ADDISON,	TEXAS			<i>‡</i>	/ppro	∉ed By			DA	<u>L</u>		
Date Started	LLING AND SAI 1-21-01	Hammer Wt	•	**************************************	,,,	_ lbs.				TEST	DATA			
Date Completed	1-21-01	Hammer Dro	р			in.	ļ	s/Ft						
Drill Foreman	EDI	Spoon Samp	ole OD _			_ in.		200						į
Inspector		Rock Core D	ia			in.	200 Sieve	Tes st (E	Ľ.					
Boring Method	CFA	Shelby Tube	OD	3		in.		A Te	otal	SSIVE	<b>5</b>			_
SOIL	CLASSIFICATIO	) N	*			A CONTRACTOR OF THE CONTRACTOR	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soll Suction Test (Total), pF	hed Compressive Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	ontent %	Liquid Limit Plastic Limit Plasticity Index
SURF	ACE ELEVATIO 635±	N	STRATUM	DEPTH	SAMPLE NO.	SAMPLE	Percent	Texas C Standare	Soll Suci	Unconfined ( Strength Tons/Sq Ft.	Pocket P Tons/Sq	Dry Unit Ibs./cu.	Water Content	35 E
Dark Brown	very stiff (	CLAY (CH)		0 -	1									
	and and a t	race of									ļ		}	
_ gravel.	concrete at	surface	}		1	ST					3.5		37	LL=85
1				-	1									PL=30
	calcareous	nodules			1									PI=55
below 8'.				2 -	<b>1</b>									ĺ
7				-	1						 			
7				-	1			ļ					3.0	
_					2.	ST				ļ	2.0	ļ	32	
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7				*******	3	ST					2.2		37	
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7				-	1									
				6	1	1					Ì	ĺ		
1				-	1			ļ						
					4	ST					2.5		32	
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<b>1</b>					1									ĺ
<b>1</b>				<u> </u>	5	ST					2.7		34	
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-														
BOTTOM OF T	EST BORING A	AT 10'.		10 -										
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<b>4</b> ;.					1									
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<b>4</b> €.	* * *				1	ļ								
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TÜBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION

AFTER

HRS. FT.

WATER ON RODS NONE FT.

**BORING METHOD** 

HSA - HOLLOW STEM AUGERS

CFA - CONTINUOUS FLIGHT AUGERS DC - ORIVEN CASINGS MD -MUD DRILLING



## **RECORD OF** SUBSURFACE EXPLORATION

Client	GBW E	ngineers,	INC.			E	oring	No.			B-1	6		
Architect/Engineer							lob No	o	****		00988	3		
Project Name	MIDWAY	ROAD REC	ONSTRUC	CTION			)rawn	Ву			AM			
Project Location		ADDISON,	TEXAS				Appro	ved By			DA	L		
	LING AND SA	MPLING INF	ORMAT	ION				,			DATA			
Date Completed	1-21-01	Hammer Dro	·	***************************************		in.		Æ						ı
Drill Foreman	EDI	Spoon Samp	le OD			ln.		§ §		<b></b>				
Inspector		Rock Core D	ia.			in.	Sie	1 (BI	뇹					
Boring Method	CFA	Shelby Tube	OD	3		in.	200	ion T	stal),	sive				
***	CLASSIFICATIO		<b>.</b>			# 1 M	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total), pF	ned Compressive	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	Liquid Limit Plastic Limit Plasticity Index
SURF/	ACE ELEVATIO 635±	N	STRATUM	DEPTH	SAMPLE NO.	SAMPLE TYPE	Percent	Texas C Standan	Soil Suc	Unconfined C Strength Tons/Sq Ft.	Pocket Tons/Sc	Dry Uni	Water C	111 111 111
- Dark Brown	hard CLAY(C	H) with		0 -										
some sand a				-				1			-			
gravel8.: surface -ve					1	ST					4.5+		35	LL=65
	Ly wanta wa			-	1							}		PL=36
				_	1	W W								PI=29
				2 —		1								
				-	}		ĺ	ĺ				(		
				_	] _					ļ	]			
7					2	ST					1.7		33	
				-	1									
				4						}			1	
				<b>-</b> -	1				<u> </u>					
				_	}									
					3	ST				}	2.2		31	LL=83
														PL=30
meter .			6,	-	1								1	PI=53
Dark Brown	very stiff	CLAY (CH)	·	6	1									
with some s				_	1						}			
					4.	ST					2.2		32	
_				_	1			,					J#	
1				_	1									
Tannish Brow			8'_	8 —	<del>                                     </del>	}								1
CLAY(CL/CH)					1					}				
odor.				_	] _						]			
_					5	ST					1.5		22	
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_				10 —	<u> </u>									
BOTTOM OF T	EST BORING	AT 10'.			}		1				]			
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7					1									
<b>1</b> .		•		12	1					1				
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

DRY FT. AT COMPLETION AFTER HRS. FT.

WATER ON RODS NONE FT.

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS** CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



### **RECORD OF** SUBSURFACE EXPLORATION

Achieve/Uniques	Client	GBW E	NGINBERS,	INC.			E	loring	No.			B-1	7		
Project Location	Architect/Engineer							lob Ne	).		***************************************	00988			
DRILLING AND SAMPLING INFORMATION   Dark Completed   1-21-01   Hammer Drop   30   Interpretation   SDI   Spoon Sample OD   Interpretation   SDI   Spoon Sample OD   Interpretation   Solid CLASSIFICATION   SOIL CLASSIFICATION   SURFACE ELEVATION   G44±   Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill   -6.5" of concrete at surface   2   2   ST   ST   ST   ST   ST   ST	Project Name	MIDWAY	ROAD REC	ONSTRUC	CTION			rawn	Ву	····					····
Date   Seried   1-21-01	Project Location		ADDISON,	TEXAS			£	\ppro	ed By			DA	L		
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.  1 ST 2.0 27 LL=B5 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8							_ lbs.			,- · · · · · · · · · · · · · · · · · · ·	TEST	DATA			
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.  1 ST 2.0 27 LL=B5 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8							in.		s/£t)		and the state of t				
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.  1 ST 2.0 27 LL=B5 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8	Drill Foreman	BDI	Spoon Samp	ole OD			in.		ροσ			<b>.</b>			
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.  1 ST 2.0 27 LL=B5 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8	Inspector		Rock Core D	)ia			_ in.	Sle	Test st (8	r.	4.				
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.  1 ST 2.0 27 LL=B5 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8	Boring Method	CFA	Shelby Tube	OD	3	······································	_ in.		rtion n Ter	otal)	ssive	 			¥
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.  1 ST 2.0 27 LL=B5 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8	SOIL CI	LASSIFICATIO	ON	2				Passing No.	one Perretra   Penetratio	ion Test (T	ed Compre Ft.	enetromete Ft.	Weight t.		uid Limit istic Limit sticity Index
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.  1 ST 2.0 27 LL=B5 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8	SURFA	CE ELEVATIO	N	F E	E∃	퓔	置	t a	S S S S S S S S S S S S S S S S S S S	Srd	and the second	Sign	Co. 1	Č ä	
Dark Brown very stift and some sand - poss. fill - 1 ST 2.0 27 LL=85 PL=30 PI=55  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay soneshard with limestone seams below 4'. 5'  Tan weathered SHALY LIMESTONE. 6 - 1 ST 2.7		644±		STR	SCA	SAN NO.	SAN	Perc	Texe	Soil	Unc Strei Tont	Pock Tons	Dry lbs./	Wat	
-6.5" of concrete at surface.  -1 ST  2 ST  2 ST  2 ST  3 ST  Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CR) with clay zoneshard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  -8'  Tan weathered SHALY LIMESTONE.  -5 TCP  BOTTOM OF TEST BORING AT 10'.  2.7 LL=85 PL=30 PL=30 PL=35 PL=30 PL	with calcare	ous deposi	t and		0 -		WWW.							1	
Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8	-6.5" of con	crete at s	urface.			1	ST					2.0		27	PL=30
Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zoneshard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8 4 5	<b>-</b>			ļ	2 -		-								ET-23
Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zoneshard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8 4 5				-	_	1	am	l				/	ļ ļ	20	
Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones. hard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8	*****			3:		2	D1					* · /		35	
stiff CALCAREOUS CLAY(CL/CH) with clay zoneshard with limestone seams below 4'.  Tan weathered SHALY LIMESTONE.  8' 8		m and Grav	verv	†		ļ	1								
Tan weathered SHALY LIMESTONE.  8' 8	stiff CALCAR	EOUS CLAY	CL/CH)	<b>VALUE - 1997</b>	_	3	ST					2.5		27	
Tan weathered SHALY LIMESTONE.  8' 8 -			Aame		4	<b></b>									
Tan weathered SHALY LIMESTONE.  8' 8 - 1		.Imescone s	cento		* -						i i				
Tan weathered SHALY LIMESTONE.  8' 8   5   TCP   100   1"				61		4	ST					4.5+		15	
Tan weathered SHALY LIMESTONE.  BOTTOM OF TEST BORING AT 10'.  15  10  12  12  13	Tan waathara	A SHALV LI	MESTONE	1-2-		<del>                                     </del>									
Tan weathered SHALY LIMESTONE.  5 TCP 100 1"	Tan weathere		. 100.0.11.			1	ĺ								
Tan weathered SHALY LIMESTONE.  5 TCP 100 1"					-						1		_		
Tan weathered SHALY LIMESTONE.  5 TCP 100 1"						1							,		
Tan weathered SHALY LIMESTONE.  5 TCP 100 1"				ļ	_						1				
Tan weathered SHALY LIMESTONE.  5 TCP 100 1"	····														
Tan weathered SHALY LIMESTONE.  5 TCP 100 1"				1	]				,			}			
BOTTOM OF TEST BORING AT 10'.				81		<i>.</i>					ļ				
BOTTOM OF TEST BORING AT 10'.			·	<u> </u>	8 -	'		٠,							
BOTTOM OF TEST BORING AT 10'.	<b>d</b>			**************************************	) =		[	ĺ							
BOTTOM OF TEST BORING AT 10'.		CHETATEF T TT	MTD CHENCH TITT				1								
BOTTOM OF TEST BORING AT 10'.	l ran weathere	d Suant bli	MESIUNE.			1 _			100			]			
BOTTOM OF TEST BORING AT 10'.						5	TOP							15	
	BOTTOM OF TE	ST BORING	AT 10'.		10 _	<b>t</b>	1								
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	SAMPLER TY			<u>                                     </u>	16.1.2 14.5 16. 14.00	المراجدة المحاولية	1424	ا مقدر در و	45,855	-	<u> </u>	روز. مُدُنُونُونُ مُعرِي			

SAMPLER TYPE SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE

CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST AT COMPLETION DRY FT. FT.

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING HRS. WATER ON RODS NONE FT.

HSA - HOLLOW STEM AUGERS



## **RECORD OF** SUBSURFACE EXPLORATION

Client	gbw ei	NGINEERS,	INC.			В	oring	No			B-1	8		
Architect/Engineer						J	ob No	ɔ			00988	3		
Project Name	MIDWAY	ROAD REC	ONSTRUC	TION		C	irawn	Ву		***************************************	AM			
Project Location		ADDISON,	TEXAS				pprov	ed By			DA	L		
DRIL Date Started	LING AND SAI	MPLING INF Hammer Wt.	ORMAT	ION 140		_ lbs.				TEST	DATA			
Date Completed	1-21-01	Hammer Dro	р	30		in.		3/Ft)		and Anniholish				
Drill Foreman	EDI .	Spoon Samp	le QD			in.	ů.	₽ <u>0</u>		O. C. C. C. C. C. C. C. C. C. C. C. C. C.				
Inspector		Rock Core D	iia			_ in.	<u>8</u>	Test it (B	4					
Date Started Date Completed Drill Foreman Inspector Boring Method	CFA	Shelby Tube	OD	3	<u></u>	_ in.	. 200	ation in Tes	otal),	ssive	<b>₩</b>			×
SOIL (	CLASSIFICATIO	)N	<b>X</b>			***	Percem Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total), pF	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./ov. ft.	ontent %	Liquid Limit Plastic Limit Plasticity Index
SURF	ACE ELEVATIO 644±	N	STRATUM	DEPTH	SAMPLE NO.	SAMPLE TYPE	Percent	Texas C Standar	Soil Suc	Unconfi Strengti Tons/So	Pocket   Tons/Sc	Dry Uni Ibs./cv.	Water Content	기   기 기 기 기 기 기 기 기 기 기 기 기 기 기 기 기 기 기
- Dark Brown	very stiff (	CLAY (CH)		0	1	ST					3.2		32	LL=73
with some s   nodules - p	and and calcoss. fill	careous												PL=27
	ncrete at su		<u>  3'_</u> .		2	ST					3.2	į	38	PI=46
- Tan and Gra	y hard CALC	AREOUS		_	3	ST					4.5+	<u> </u>	19	
CLAY(CL/CH)	with limes	cone	5'	5	4	ST			1		4.5+		14	
	ed SHALY LI	MESTONE.				Andrew Waller								
·····			81		1						1			
		<u> بسر بسد نند</u>		-								Ì		
Gray SHALY	LIMESTONE.		ļ	10 —	5	TCP		100					14	
BOTTOM OF T	EST BORING	AT 10'.			]			_						
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7				15 —	1							}		
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SAMPLER TYPE SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION DRY FT. HRS. FT. WATER ON RODS NONE FT.

**BORING METHOD HSA - HOLLOW STEM AUGERS** CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING



### **RECORD OF** SUBSURFACE EXPLORATION

Client	GBW E	NGINEERS,	INC.			8	loring	No.			B-1	9		
Architect/Engineer						J	ob No	).			00988	}		
Project Name	***************************************													
Project Location		ADDISON,	TEXAS			^	\ppro\	red By			DA	L	·····	····
DRIL Date Started	LING AND SAI			10N 140		_ lbs.				TEST	DATA		Ī	
Date Completed	1-21-01	Hammer Dro	ρ	30		in.		F					A	
Drill Foreman	EDI	Spoon Samp	le OD			_ in.	a: >	10 %						
Inspector		Rock Core D	ia			_ in.	Sie	Test st (B	ű.					
Boring Method	CFA	Shelby Tube	OD	3		_ in.	No. 200 Sieve	ration on Tex	Totall	essive	i.			×
	CLASSIFICATIO		W		241	<b>45</b> F	Percent Passing N	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total), pF	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Water Content %	Liquid Limit Plastic Limit Plasticity Ind
SURF	ACE ELEVATIO 644±	N	STRATUM DEPTH	DEPTH	SAMPLE NO.	SAMPLE TYPE	Percent	Texas ( Standar	Sod Suc	Unconfi Strengtl Tons/Sc	Pocket Tons/Sc	Dry Uni Ibs./cu.	Water C	1999 11999 11999
	an hard CLA			0 -										
with calcar	eous deposit	fill			1			] 						
- and some sa 6.5" of co	nd poss. ncrete at si	irface.	1		1	ST					4.5+		21	LL=73
				-										PL=28
				_	1					<u> </u>				PI=45
				2 -							ļ			
1				<u> </u>	2	ST					4.5+		32	
<b></b>					ļ	1								
				_										
_			4'	-	1	E-vocamentum								
Tan and Gra	y hard CALC	AREOUS		4		1					1			
	th limestone			-	3	ST				1	4.5+		20	
<b>_</b>			]	<u> </u>				•			]			PL=20 PI=28
			ļ			}								F1=78
_			6'	- -				•		}				
Tan weather	ed SHALY LIN	MESTONE.	T	6	1			ļ						
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			8 '								ļ			
		relation program account distance second	<b>-</b>	8 —										
				-	1									
	T #64MAMANA		- Andrews											
Gray SHALY	LIMESTORE.			-		man		100						
			1	-	4	TCP		1.3"					13	
BOTTOM OF T	EST BORING A	AT 10'.		10 -	<b> </b>	1								
	mancrum pas and suffatta 300 at 5 and 32	·		-						-				1
_					1					Western Annual Park				
-										1				
1														
				12 -	<u> </u>	<u> </u>	<u> </u>			<u> </u>	<u> </u>			

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION DRY FT.

AFTER HRS. FT. WATER ON RODS NONE FT.

**BORING METHOD** HSA - HOLLOW STEM AUGERS

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING



### **RECORD OF** SUBSURFACE EXPLORATION

Client	GBW E	NGINEERS,	INC.			B	oring	No.			B-2	0		
Architect/Engineer						J	ob No	o			00988	}		
Project Name	MIDWAY	ROAD RECO	ONSTRUC	TION		c	rawn	Ву			AM	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		· · · · · · · · · · · · · · · · · · ·
Project Location		ADDISON,	TEXAS			A	ppro	ved By			DA	<u>r                                      </u>		
	ING AND SA	MPLING INF	ORMAT	ION		_ lbs.		г			DATA			
Date Completed						in.		s/Ft)						
Drill Foreman	EDI	Spoon Samp	le OD			_ in.		200						
Inspector	***************************************	Rock Core D	ia			_ in.	Sieve	l est	r G	- Annual Company				
Boring Method	CFA	Shelby Tube	OD	3		_ in.	200	55	ţali,	Sive Sive	_			
SOIL CL	ASSIFICATIO	ON	<b>X</b>				Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total), pF	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight lbs./cu. ft.	Water Content %	Liquid Limit Plastic Limit Plasticity Index
SURFA	CE ELEVATIO	N	STRATUM DEPTH	DEPTH	SAMPLE NO.	SAMPLE	cent	ras C ndard	Suct	confin ength 1s/Sq	3.52 P	Ħ a	žį.	
	643±		STA		& S 8 S	S.F.	D.	§\$\$	Soi	555	A P	ద్జి	Wa	크로교
Tannish Brow CALCAREOUS C limestone se	LAY(CL) wit			0		man or in Changle (WWWWWINDOWN				100	and the state of t			
-7.25" of co	ncrete at	surface.		<u> </u>	1	ST	j				4.5+			LL=59
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Gray SHALY L	TMECTYNE				}						<b>!</b>			
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

AT COMPLETION DRY FT. AFTER HRS. FT. WATER ON RODS NONE FT.

**BORING METHOD HSA - HOLLOW STEM AUGERS** 

CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING



## **RECORD OF** SUBSURFACE EXPLORATION

Client GBW Architect/Engineer						ob No	o			0098	3		
Project Name MIDWA	Y ROAD REC	ONSTRU	CTION		[	ìrawn	Ву			AM			
Project Location	ADDISON,	TEXAS				\ppro	ved By			DA	ഥ		
DRILLING AND S Date Started 1-21-01					ìbs.				TEST	DATA			
Date Completed 1-21-01	Hammer Dro	op	30		in.		s/Ft)						
Drill Foreman EDI	Spoon Sam	ple OD			in.	9	500		}				
Inspector	Rock Core I	)ia			_ in.	Se	Test it (B	rg.					
Date Started 1-21-01 Date Completed 1-21-01 Drill Foreman EDI Inspector Boring Method CFA	Shelby Tube	OD	3		in.	200	ig.	tal),	sive.				,
SOIL CLASSIFICAT	ION				ψ. (γ. (γ. (γ. (γ. (γ. (γ. (γ. (γ. (γ. (γ	Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total), pF	Unconfined Compressive Strength Tons/Sq Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight Ibs./cu. ft.	Content %	Liquid Limit Plastic Límit Plasticity Index
SURFACE ELEVAT	ION	STRATUM DEPTH	DEPTH	SAMPLE NO.	SAMPLE	Percent	Texas C Standar	Soil Suc	Unconfi Strengt Tons/Sc	Packet Tons/Sc	Dry Uni	Water C	112 " " " " " " " " " " " " " " " " " " "
Tannish Brown very st hard CALCAREOUS CLAY( limestone seams. -6.75" of concrete at	CL) with		0	1	ST					2.7		22	
		2'	2 —				]		gr				
Gray SHALY LIMESTONE.			4	2	TCP		<u>100</u> 1.5"						
			8										
BOTTOM OF TEST BORING	AT 10'.		10	3	TCP		100 1.3"					16	
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SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST **GROUNDWATER OBSERVATIONS** 

DRY FT. AT COMPLETION

HRS.

FT.

WATER ON RODS NONE FT.

**BORING METHOD** 

**HSA - HOLLOW STEM AUGERS** CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS



### **RECORD OF** SUBSURFACE EXPLORATION

Client GBW ENGINE	ERS, INC.			E	Boring	No.			B-2	2		
Architect/Engineer					lob No	)			00988	}		
Project Name MIDWAY ROAL	RECONSTR	UCTION			)rawn	Ву			AM			
Project Location ADDI	SON, TEXA	S	**********		\ppro	ved By			DA	<u>L</u>		***
DRILLING AND SAMPLING Date Started 1-21-01 Hammed But Completed 1-21-01 Hammed But Spoot Inspector Rock Boring Method CFA Shelb									DATA			
Date Completed 1-21-01 Hami	ner Dron	30		in		E						
Drill Foreman RDT Spoo	n Sample OD			in	m,							
Inspector Rock	Core Dia			'''' in	ieve	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	u_					
Boring Method CFA Shell	v Tube OD	3		— '''	ဝ	es T	 	l e				
5,100	.,			***	7	o Tic	Cota	888	ā			×
SOIL CLASSIFICATION	Σ				Percent Passing No.	Texas Cone Penetration Test or Standard Penetration Test (Blows/Ft)	Soil Suction Test (Total), pF	ed Compressive Ft.	Pocket Penetrometer Tons/Sq Ft.	Dry Unit Weight lbs./cu. ft.	Water Content %	Llquid Limit Plastic Limit Plasticity Index
SURFACE ELEVATION	₽₹	푠씍	뷥	4	l la	ad C	Suct	offin Garn	75 P	Ę,	ŭ	고 문 문
643±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE	<b>6</b>	Texa Stand	Soil	Unconfined ( Strength Tons/Sq Ft.	Pock Tons	Dry L	Wate	## ## ################################
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-6.75" of concrete at surfa	ice.	_	1	ST	ļ				4.5+		18	LL=35
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	2'	Ī -	1									PI=18
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- Gray SHALY LIMESTONE.	1	-	}									
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SAMPLER TYPE	Ğ	ROUNDWA	TER C	BSER	VATIO	ÌNS		F	ORING !	METHO	n	

SAMPLER TYPE

SS - STANDARD PENETRATION TEST

ST - SHELBY TUBE CA - CONTINUOUS FLIGHT AUGER TCP- TEXAS CONE PENETRATION TEST AT COMPLETION DRY FT. HRS. FT.

WATER ON RODS NONE FT.

HSA - HOLLOW STEM AUGERS CFA - CONTINUOUS FLIGHT AUGERS DC - DRIVEN CASINGS MD -MUD DRILLING



#### ALPHA TESTING, INC.

2209 Wisconsin St., Suite 100 Dallas, Texas 75229

(972) 620-8911

#### KEY TO SOIL SYMBOLS AND CLASSIFICATIONS

THE ABBREVIATIONS COMMONLY EMPLOYED ON EACH "RECORD OF SUBSURFACE EXPLORATION", ON THE FIGURES AND IN THE TEXT OF THE REPORT, ARE AS FOLLOWS:

## SOIL OR ROCK TYPES (SHOWN IN SYMBOLS COLUMN)







CLAY





SHALE

ASPHALT/CONCRETE

#### I. SOIL DESCRIPTION

#### (A) COHESIONLESS SOILS

RELATIVE DENSITY	И,	BLOUS	/FT
VERY LOOSE	O	TO	4
LOOSE	5	TO	10
COMPACT	11	TO	30
DENSE	31	TO	50
VERY DENSE		OVER	50

#### III. RELATIVE PROPORTIONS

DESCRIPTIVE TERM	PERCENT		
TRACE	1		10
LITTLE	11		- 20
SOME	21	-	35
AND	35	<del></del>	50

#### (B) COHESIVE SOILS

CONSISTENCY	Qu, TSF		
UERY SOFT	LESS	THAN	. 25
SOFT	. 25	ТО	. 50
FIRM	. 50	TO	1.00
STIFF	1.00	TO	2.00
VERY STIFF	2.00	TO	4.00
HARD	OUE	3	4.00

#### IV. PARTICLE SIZE IDENTIFICATION

BOULDERS: -8 INCH DIAMETER OR MORE

COBBLES: -3 TO 8 INCH DIAMETER

GRAVEL: -CORRSE - 3/4 TO 3 INCH

-FINE - 5.0 MM TO 3/4 INCH

SAND: -COARSE - 2.0 MM TO 5.0 MM

-MEDIUM - 0.4 MM TO 2.0 MM

-FINE - 0.07 MM TO 0.4 MM

SILT: -0.002 MM TO 0.07 MM

#### II. PLASTICITY

DEGREE OF		PLASTICITY	
PLASTICITY		INDEX	
NONE TO SLIGHT	0	_	4
SLIGHT	5		10
MEDIUM	11	-	30
HIGH TO VERY HIGH		OVER	30

#### U. DRILLING AND SAMPLING SYMBOLS

-0.002 MM

AU: AUGER SAMPLE
RC: ROCK CORE
TCP: TEXAS CONE PENETRATION TEST
SS: SPLIT-SPOON 1 3/8" 1.D. 2" O.D.
EXCEPT WHERE NOTED
ST: SHELBY TUBE = 3" O.D. EXCEPT
WHERE NOTED
US: WASHED SAMPLE
HSA: HOLLOW STEM AUGERS
CFA: CONTINUOUS FLIGHT AUGERS
MD: MUD DRILLING

NOTE: ALL SOILS CLASSIFIED ACCORDING TO

THE UNIFIED SOIL CLASSIFICATION

SYSTEM (ASTM D-2487)