Geotechnical Engineering

Construction Materials Testing

REMEDIAL GEOTECHNICAL EXPLORATION

on

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

ALPHA TESTING, INC.

Environmental Engineering

Consulting

REMEDIAL GEOTECHNICAL EXPLORATION

on

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

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:

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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.

STATE OF TEXAS
DAVID A. LEWIS
47040
REGISTERED PROFESSIONAL ENGINEER

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

MIDWAY ROAD RECONSTRUCTION
Beltline Road to Keller Springs Road
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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

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 (shaly 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 shaly 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 Unified Soil Classification System (ASTM D 2488). 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

11.5 inches	Portland-cement concrete
6 inches	crushed limestone base material
6 inches	compacted subgrade

OR

10.5 inches	Portland-cement concrete
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 $\pm$ 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

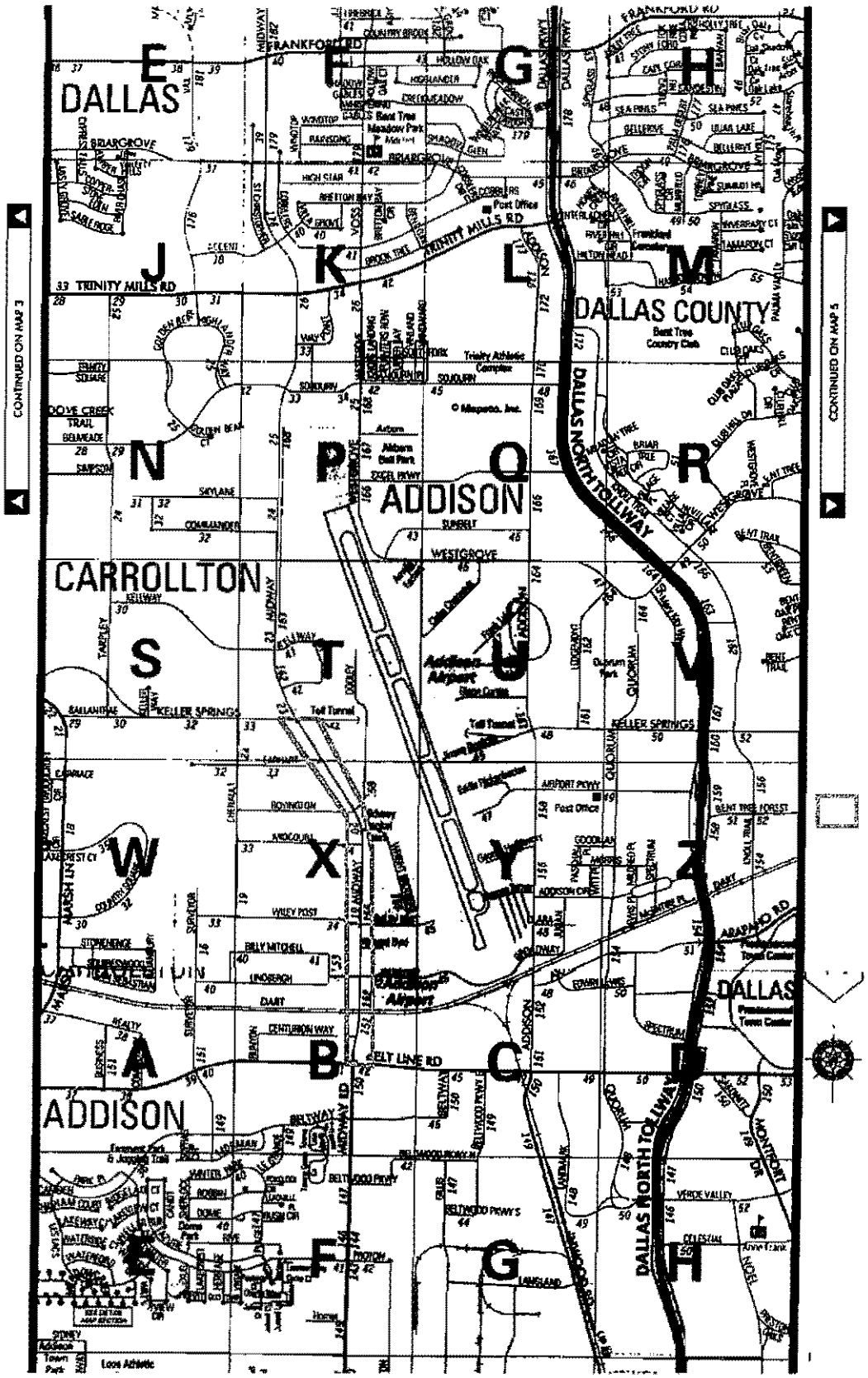
A-1 METHODS OF FIELD EXPLORATION

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.

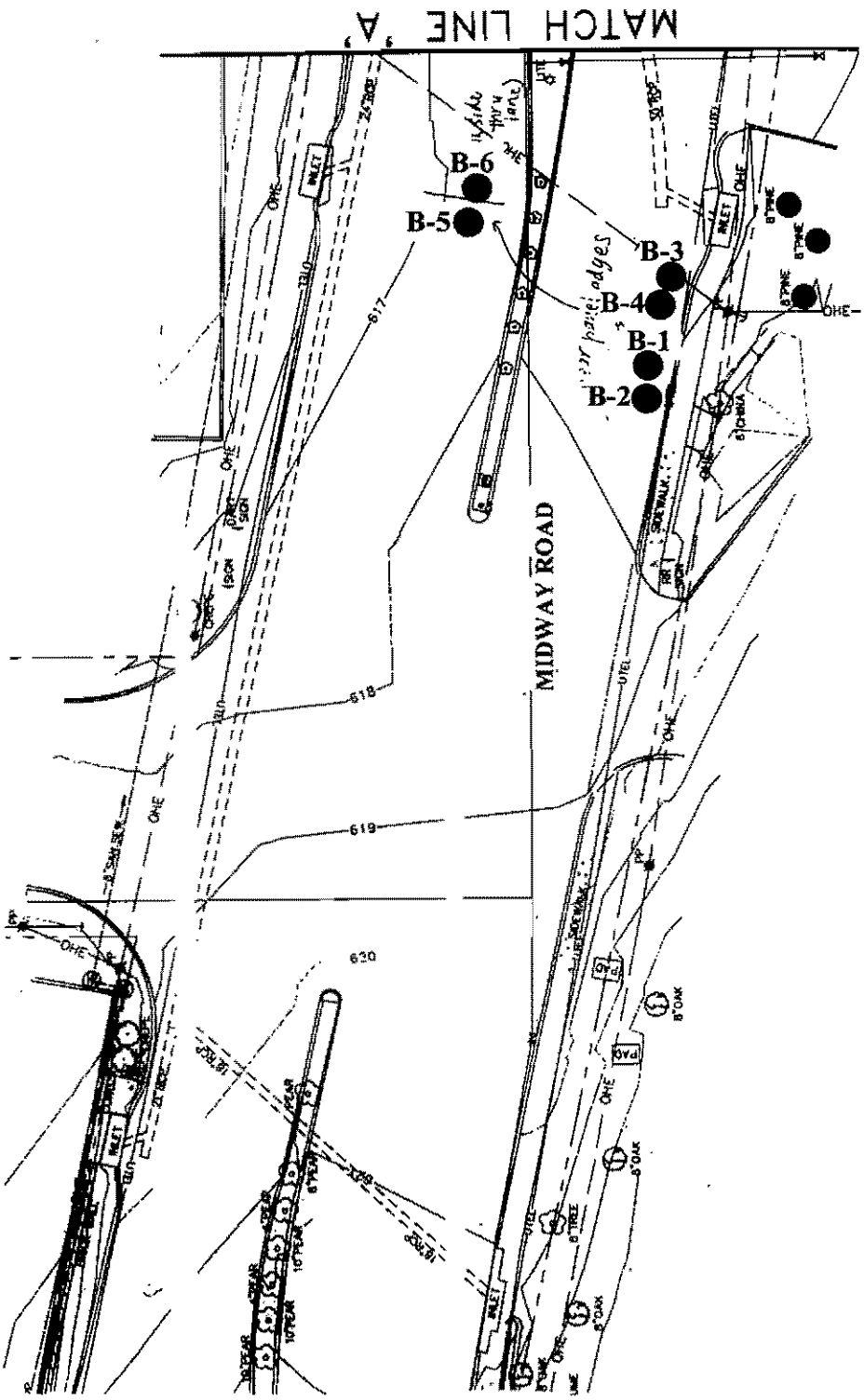
Relatively undisturbed samples of the cohesive subsurface materials have been obtained by hydraulically pressing 3-inch O.D. thin-wall sampling tubes into the underlying soils at selected depths (ASTM D 1587). These samples have been removed from the sampling tubes in the field and examined visually. 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 of Highways and Public Transportation strength correlations. In this case, 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.



GBW Engineers, Inc. **Garland, Texas**		**General Location** **Figure 1**	
Midway Road Reconstruction **Addison, Texas**		**00988**	**4/02/01**

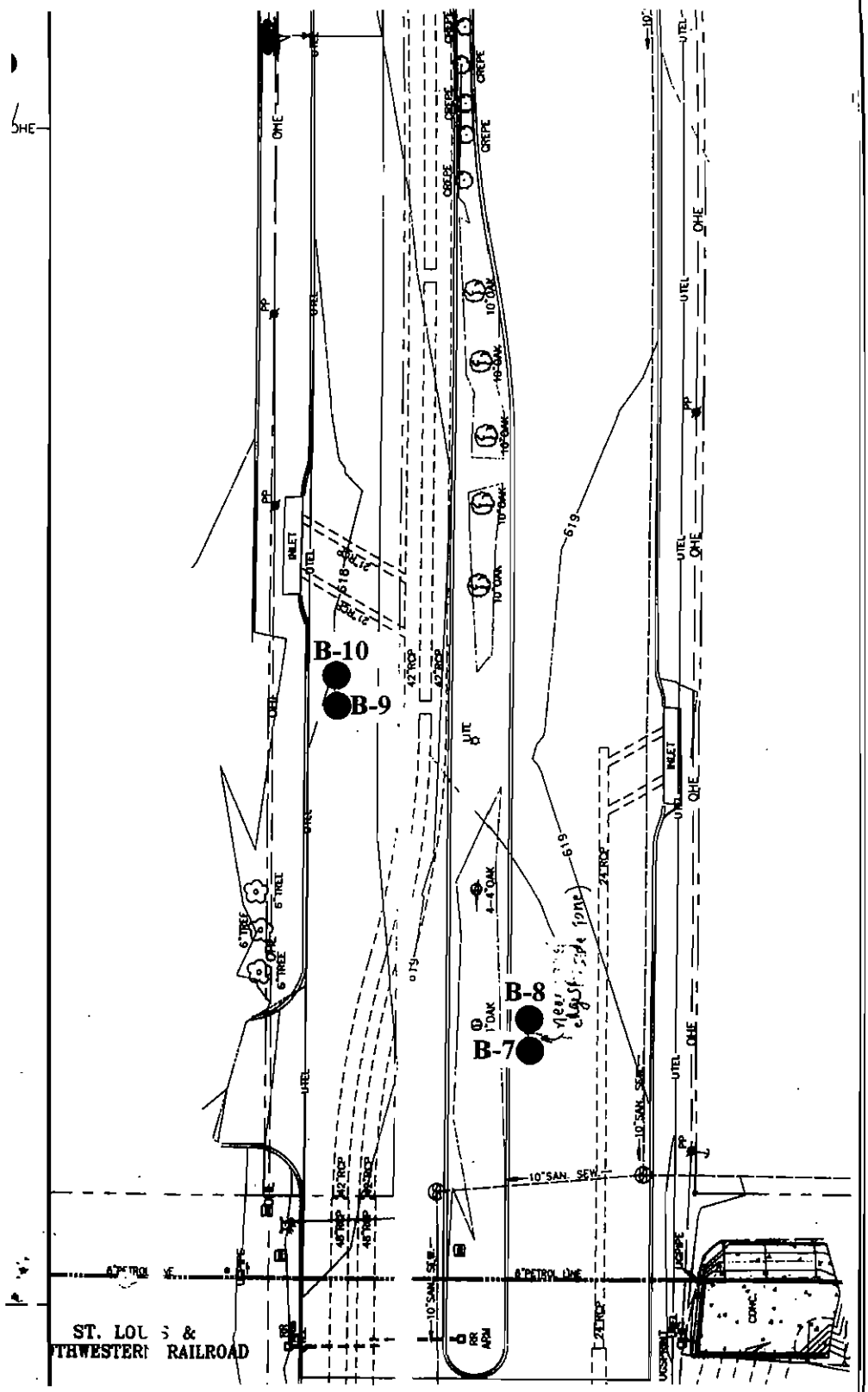


N

0 20 40

Graphic Scale In Ft.

GBW Engineers, Inc. Garland, Texas		Boring Location Plan Figure 2
Midway Road Reconstruction Addison, Texas		00988 | 4/02/01



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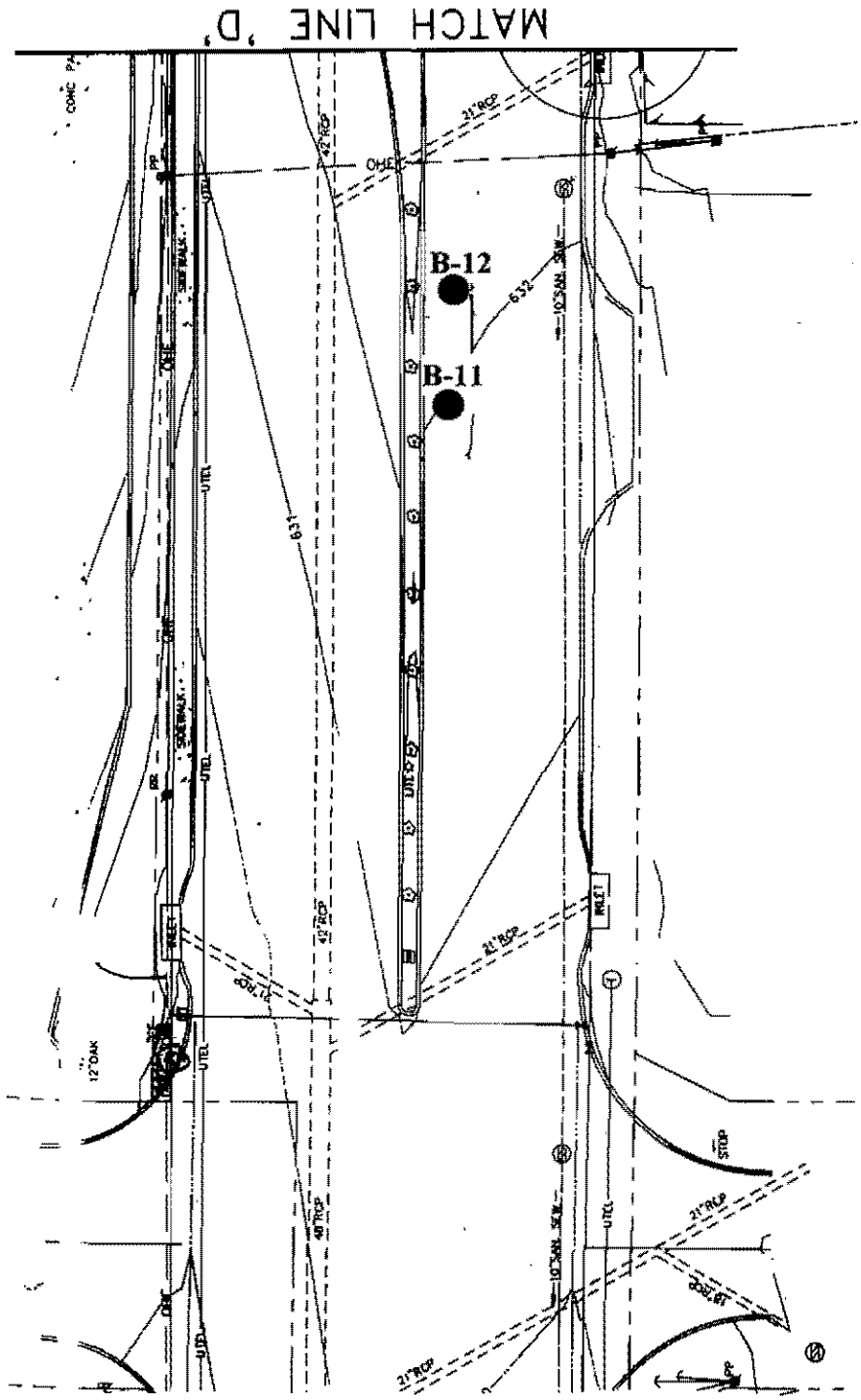
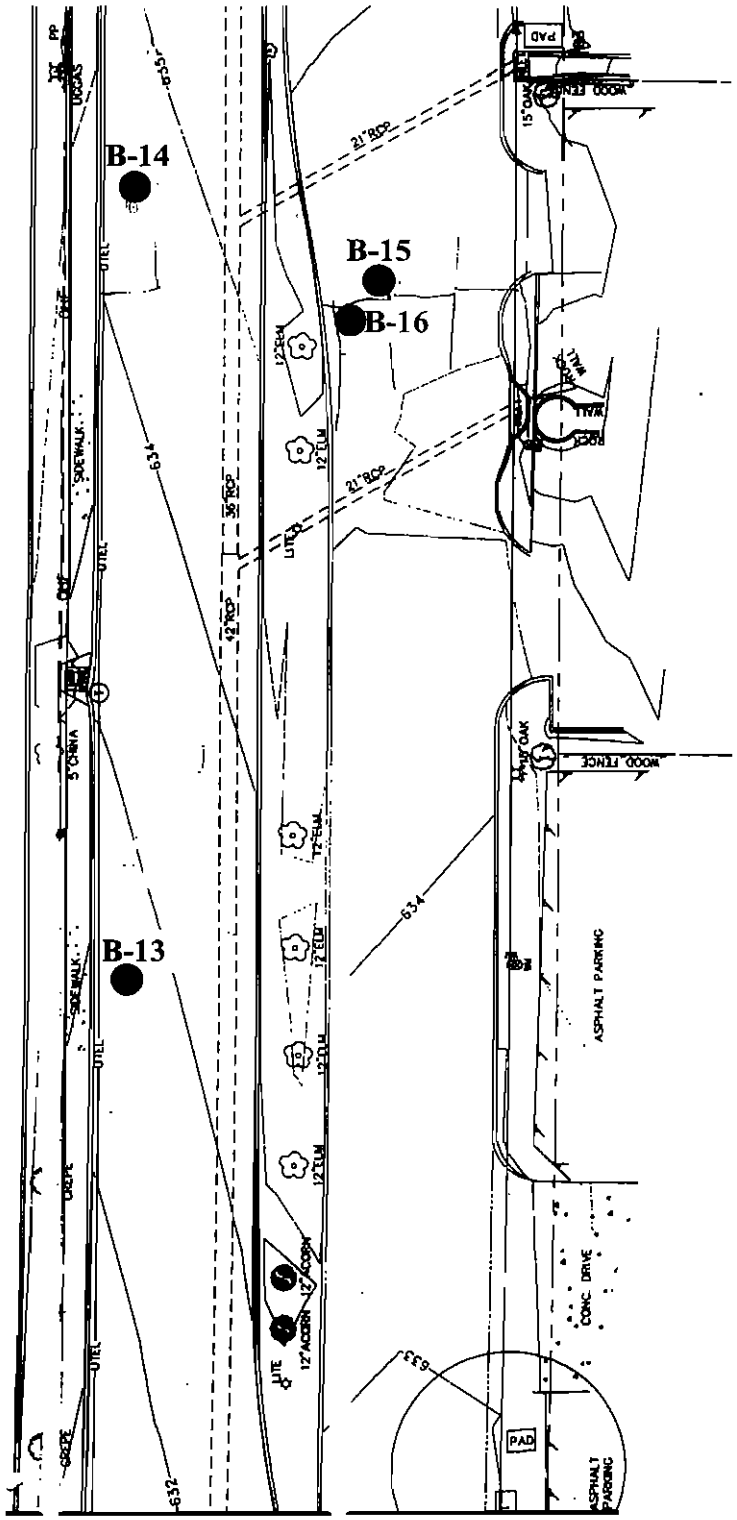
Graphic Scale In Ft.

GBW Engineers, Inc. Garland, Texas		Boring Location Plan Figure 3	
Midway Road Reconstruction Addison, Texas		00988	4/02/01



GBW Engineers, Inc. Garland, Texas		Boring Location Plan Figure 4
Midway Road Reconstruction Addison, Texas		00988 / 4/02/01



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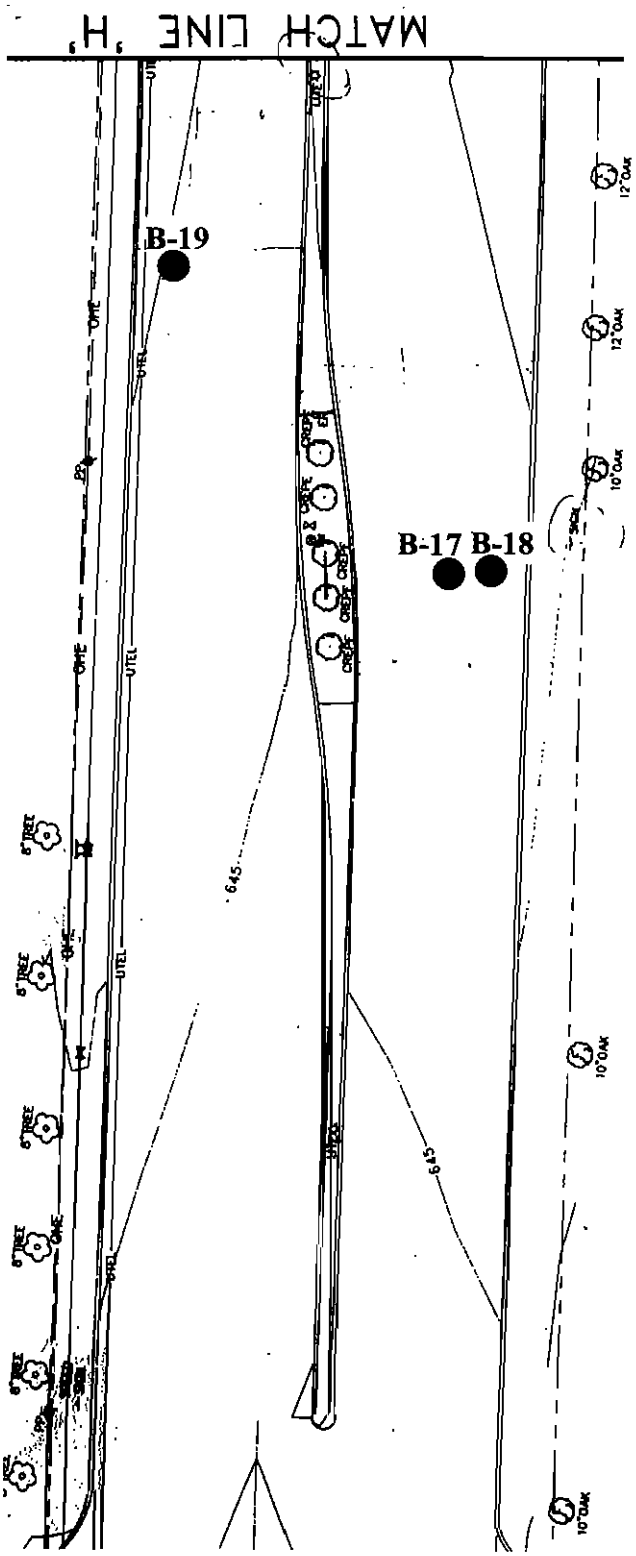
Graphic Scale In Ft.

GBW Engineers, Inc. Garland, Texas		Boring Location Plan Figure 5
Midway Road Reconstruction Addison, Texas		00988 / 4/02/01



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Graphic Scale In Ft.

GBW Engineers, Inc. Garland, Texas		Boring Location Plan Figure 6	
Midway Road Reconstruction Addison, Texas		00988	4/02/01

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.

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Client: BGW ENGINEERS, INC.
Garland, Texas
Project: Midway Road Reconstruction
Addison, Texas

Our Report Number:	00988	Date: 1/29/01
Material Description:	Dark Brown Clay	
Classification:	(CH)	
Sample Location:	Composite Sample B-3 to B-16	
Method of Test:	ASTM-D-698-A	
Soil Identification Number:	Composite	
Maximum Dry Unit Weight:	91.0	pcf
Optimum Moisture Content:	24.5	%
Liquid Limit:	77	
Plasticity Index:	48	

MOISTURE DENSITY RELATIONSHIP

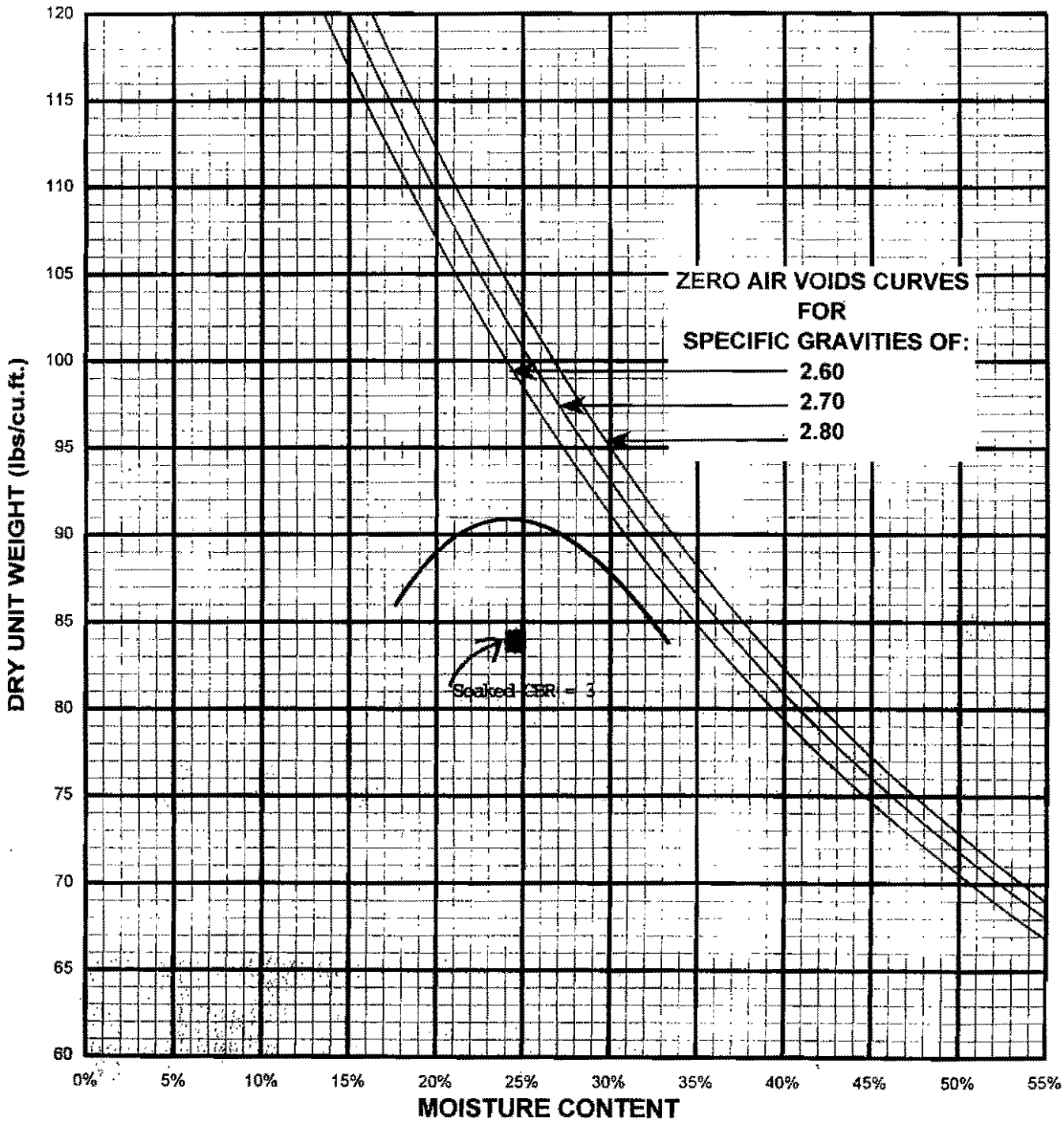


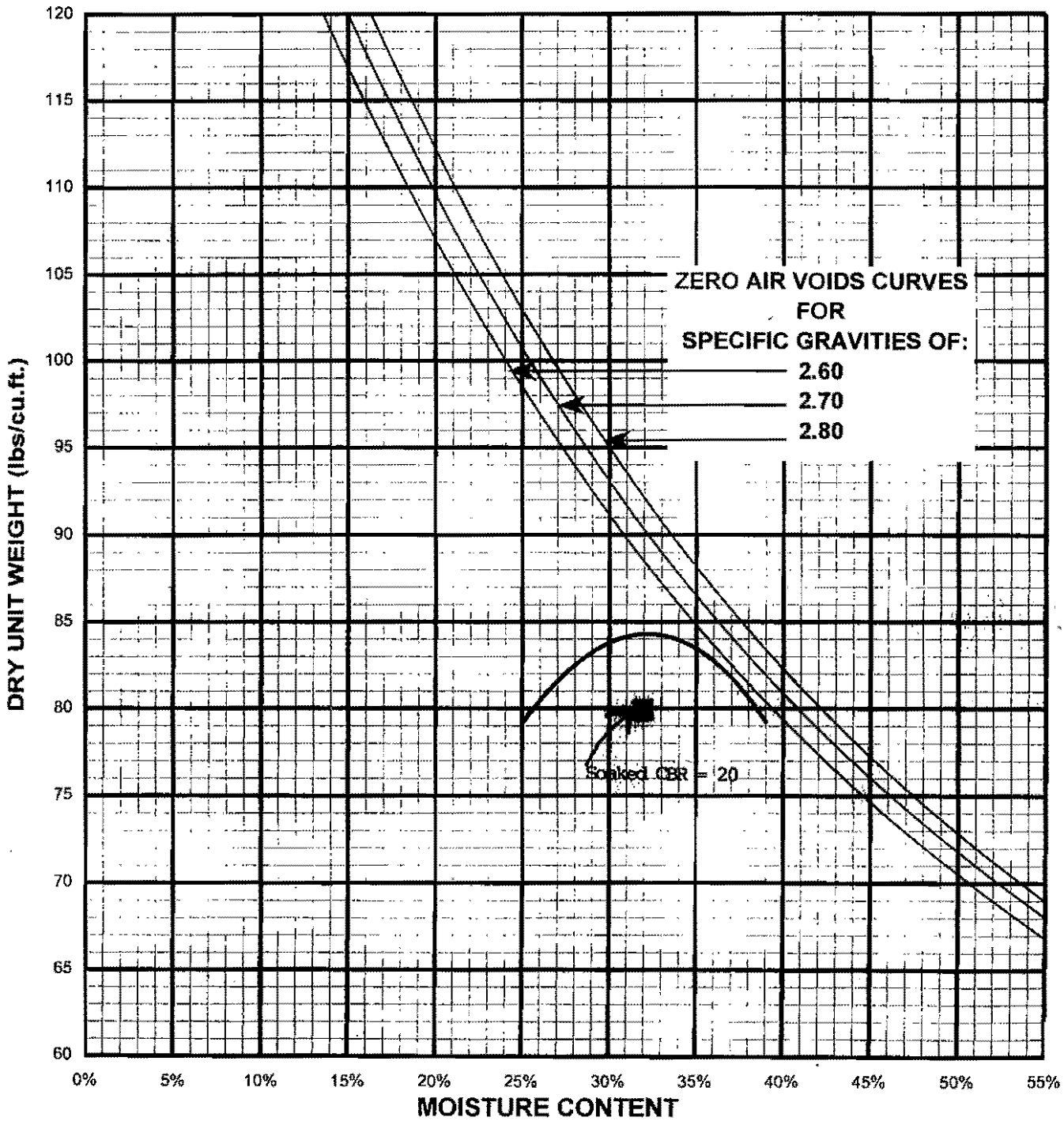
Figure - 8

ALPHA TESTING, INC.
2209 Wisconsin St., Suite 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.:	00988	Date: 1/29/01
Material Description:	Dark Brown Clay	
Classification:	with 8 percent lime added	
Sample Location:	Composite Sample B-3 to B-16	
Method of Test:	ASTM-D-698-A	
Soil Identification Number:	Composite	
Maximum Dry Unit Weight:	84.5	pcf
Optimum Moisture Content:	32.0	%
Liquid Limit:	61	
Plasticity Index:	14	

MOISTURE DENSITY RELATIONSHIP



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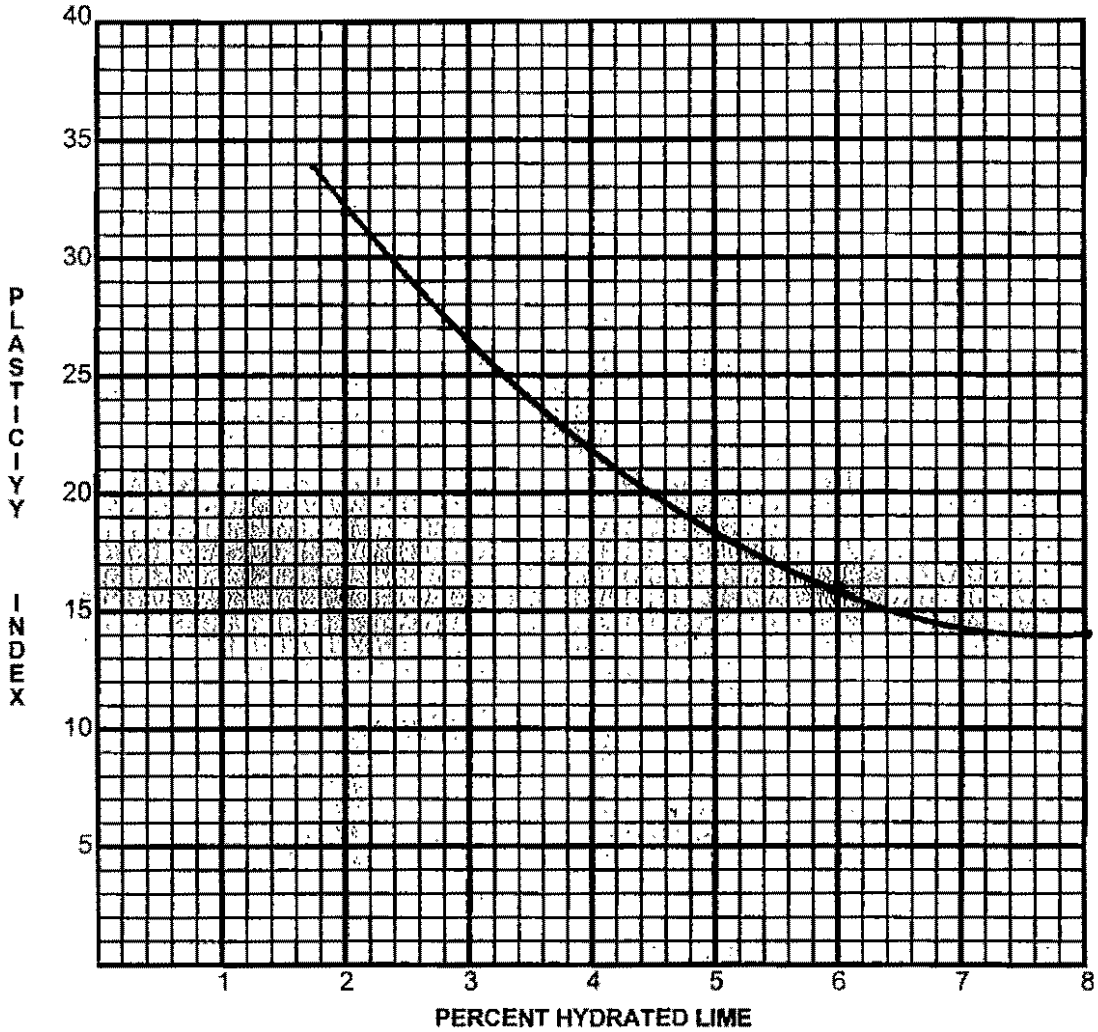
MECHANICAL LIME STABILIZATION



SAMPLE NO. Composite Sample (Borings 3-16)

DESCRIPTION: Brown Clay

CLIENT:	LABORATORY TEST:
GBW ENGINERRS, INC. GARLAND, TEXAS	LIME SERIES Figure 10

PROJECT NAME:	ALPHA PROJECT NO	DATE:
MIDWAY ROAD RECONSTRUCTION ADDISON, TEXAS	00986	April 3, 2001

ALPHA TESTING, INC.
2209 Wisconsin St., Suite 100
Dallas, Texas 75229
(972) 620-8911

RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-1
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt. ____ lbs.
Hammer Drop ____ in.
Spoon Sample OD ____ in.
Rock Core Dia. ____ in.
Shelby Tube OD 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 618±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown very stiff CLAY(CH) with some sand and gravel. -8" of concrete at surface.		0	1	ST					2.2		39	LL=76 PL=27 PI=49
	2'	2										
Reddish Brown very stiff CLAY(CH/CL) with some sand, calcareous nodules and gravel. -hard 2'-3'. -stiff below 5'.			2	ST					4.5+		26	
			3	ST					2.7		26	LL=53 PL=20 PI=33
		4	4	ST					2.2		25	
			5	ST					1.7		24	
	6'	6										
Tan firm CALCAREOUS CLAY(CL) with some silty sand and limestone gravel. -stiff 6'-7'.			6	ST					1.0		28	LL=33 PL=15 PI=18
			7	ST					0.7		27	
		8	8	ST					0.5		28	
			9	ST					0.5		46	
BOTTOM OF TEST BORING AT 10'.		10										
		12										

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
MD -MUD DRILLING

ALPHA TESTING, INC.
2209 Wisconsin St., Suite 100
Dallas, Texas 75229
(972) 620-8911

RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-2
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt. ____ lbs.
Hammer Drop ____ in.
Spoon Sample OD ____ in.
Rock Core Dia. ____ in.
Shelby Tube OD 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 618±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown hard CLAY(CH) with some sand and gravel. -7.75" of concrete at surface.		0	1	ST					4.5+		33	LL=68 PL=37 PI=31
	2'	2	2	ST					4.5+		26	
Reddish Brown and Tan very stiff CLAY(CH/CL) with some sand, calcareous nodules and gravel. -hard 2'-3'. -stiff below 5'.			3	ST					3.5		22	
		4	4	ST					2.5		20	
	5'		5	ST					2.2		21	
Tan firm CALCAREOUS CLAY(CL) with some silty sand and limestone gravel. -very stiff 5'-6'. -stiff 6'-7'.		6	6	ST					1.2		24	
			7	ST					0.5		29	
		8	8	ST					0.5		30	
			9	ST					0.5		32	
BOTTOM OF TEST BORING AT 10'.		10										
		12										

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
MD -MUD DRILLING

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2209 Wisconsin St., Suite 100
Dallas, Texas 75229
(972) 620-8911

RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-3
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	lbs.
Date Completed	1-21-01	Hammer Drop	in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 618±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown hard Lime Treated CLAY(CH) with some sand and calcareous nodules and gravel. -8" of concrete at surface.		0	1	ST					4.5+		38	LL=57 PL=36 PI=21
		2	2	ST					4.0		31	
	3'		3	ST					2.7		30	
Brown very stiff CLAY(CH) with some sand, calcareous nodules and gravel. -reddish brown below 4'. -stiff below 5'.		4	4	ST					3.2		22	
			5	ST					1.7		22	
	6'	6										
Tan firm CALCAREOUS CLAY(CL) with some silty sand and limestone gravel. -stiff 6'-7'.			6	ST					1.5		25	
			7	ST					0.5		26	
		8	8	ST					0.7		32	
			9	ST					0.5		35	
BOTTOM OF TEST BORING AT 10'.		10										
		12										

SAMPLER TYPE
SS - STANDARD PENETRATION TEST
ST - SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
TCP- TEXAS CONE PENETRATION TEST

GROUNDWATER OBSERVATIONS
AT COMPLETION 5.5 FT.
AFTER HRS. FT.
WATER ON RODS 8 FT.

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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-4
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	lbs.
Date Completed	1-21-01	Hammer Drop	in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

SOIL CLASSIFICATION / SURFACE ELEVATION 618±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown hard CLAY(CH) with some sand and calcareous nodules and gravel. -7.75" of concrete at surface.		0	1	ST					4.5+		31	
		2	2	ST					4.0		33	
	3'											
Reddish Brown and Tan very stiff CLAY(CH/CL) with some silty sand, calcareous nodules and gravel. -hard 3'-4'. -stiff below 5'.		4	3	ST					4.0		25	
			4	ST					3.2		20	
			5	ST					3.2		23	
	6'											
Tan firm CALCAREOUS CLAY(CL) with some silty sand and limestone gravel.		6	6	ST					0.7		26	
			7	ST					0.7		29	
		8	8	ST					0.5		30	
			9	ST					0.5		28	
BOTTOM OF TEST BORING AT 10'.		10										
		12										

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.
AFTER HRS. FT.
WATER ON RODS 7 FT.

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

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2209 Wisconsin St., Suite 100
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RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-5
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt. ____ lbs.
Hammer Drop ____ in.
Spoon Sample OD ____ in.
Rock Core Dia. ____ in.
Shelby Tube OD 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 617±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown hard Lime Treated CLAY(CH) with some sand and calcareous nodules. -8" of concrete at surface.	2'	0	1	ST					4.5+		37	LL=56 PL=35 PI=21
Dark Brown very stiff CLAY(CH) with some sand. -brown with calcareous nodules below 4'. -tannish brown below 8'.		2	2	ST					3.0		40	
		4	3	ST					3.2		29	
		6	4	ST					3.2		28	
		8	5	ST					3.0		28	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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2209 Wisconsin St., Suite 100
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RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-6
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt. ____ lbs.
Hammer Drop ____ in.
Spoon Sample OD ____ in.
Rock Core Dia. ____ in.
Shelby Tube OD 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 617±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index.
Brown very Dense SAND(SP) with some gravel and clay. -8" of concrete at surface.		0	1	ST	13				-		30	
	2'	2										
Brown very stiff CLAY(CH) with some sand. -tannish brown with calcareous nodules and gravel below 4'. -tannish brown below 8'.			2	ST				1.2	2.7	80	34	LL=80 PL=30 PI=50
		4	3	ST					3.7		26	
		6	4	ST					3.0		24	LL=66 PL=24 PI=42
		8	5	ST					2.2		29	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-7
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	lbs.
Date Completed	1-21-01	Hammer Drop	in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 619±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown very stiff CLAY(CH) with some sand and gravel. -8.25" of concrete at surface.		0	1	ST					2.5		26	
	2'	2										
Dark Brown very stiff CLAY(CH) with some sand, calcareous nodules and a trace of gravel. -brown below 6'. -tannish brown below 8'.			2	ST					3.7		27	
		4	3	ST					3.2		28	
		6	4	ST					3.0		24	
	8'	8										
Tan weathered SHALY LIMESTONE.			5	TCP		100 / 3.3"					5	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-8
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	140 lbs.
Date Completed	1-21-01	Hammer Drop	30 in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

SOIL CLASSIFICATION SURFACE ELEVATION 619±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown hard Lime Treated CLAY(CH) with some sand and gravel. -8.5" of concrete at surface.	2'	0	1	ST					-		23	LL=46 PL=29 PI=17
Dark Brown very stiff CLAY(CH) with sand laminations.			2	ST					3.7		29	
-with limestone seams below 6'.		5	3	ST					2.7		28	
			4	ST					2.7		26	
	8'											
Tan weathered SHALY LIMESTONE.			5	TCP		100/3"					9	
BOTTOM OF TEST BORING AT 10'.		10										
		15										
		20										
		25										
		30										

TEST DATA

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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-9
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	lbs.
Date Completed	1-21-01	Hammer Drop	in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 618±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown stiff Lime Treated CLAY(CH) with some sand, calcareous nodules and gravel. -8" of concrete at surface		0	1	ST				0.9	1.2	79	37	LL=55 PL=32 PI=23
	2'	2										
Dark Brown very stiff CLAY(CH) with sand laminations and a trace of calcareous nodules.			2	ST					2.2		33	
		4	3	ST					2.2		35	
		6	4	ST					2.2		31	
		8	5	ST					2.2		31	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-10
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	lbs.
Date Completed	1-21-01	Hammer Drop	in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

SOIL CLASSIFICATION / SURFACE ELEVATION 618±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown hard Lime Treated CLAY(CH) with some sand, calcareous nodules and gravel. -8" of concrete at surface -with lime to 17".	3'	0	1	ST					4.5+		38	LL=53 PL=38 PI=17
			2	ST					2.5		35	
Dark Brown very stiff CLAY(CH) with sand laminations. -stiff with limestone gravel below 8'.		5	3	ST					3.0		36	LL=83 PL=31 PI=52
			4	ST					2.0		29	
			5	ST					1.5		33	
BOTTOM OF TEST BORING AT 10'.		10										
		15										
		20										
		25										
		30										

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

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2209 Wisconsin St., Suite 100
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RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-11
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt. ____ lbs.
Hammer Drop ____ in.
Spoon Sample OD ____ in.
Rock Core Dia. ____ in.
Shelby Tube OD 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 632±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown stiff CLAY(CH) with some sand. -8" of concrete at surface		0										
			1	ST					1.7		34	
	2'	2										
Dark Brown very stiff CLAY(CH) with some sand and a trace of calcareous nodules and gravel.			2	ST					2.5		31	
		4	3	ST					3.0		32	
		6	4	ST					2.5		38	
	8'	8										
Tan and Gray hard CALCAREOUS CLAY(CL) with some silty sand and gravel.			5	ST					4.5+		18	
		10										
BOTTOM OF TEST BORING AT 10'.		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

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2209 Wisconsin St., Suite 100
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RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-12
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt. ____ lbs.
Hammer Drop ____ in.
Spoon Sample OD ____ in.
Rock Core Dia. ____ in.
Shelby Tube OD 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 632±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown stiff Lime Treated CLAY(CH) with some sand. -8" of concrete at surface		0	1	ST				0.6	1.2	78	40	LL=60 PL=23 PI=37
	2'	2										
Dark Brown very stiff CLAY(CH) with sand laminations. -stiff 2'-4'.			2	ST					1.7		35	
		4	3	ST					2.0		34	LL=46 PL=29 PI=17
		6	4	ST					2.0		34	
	7.5'											
Tannish Brown very stiff CALCAREOUS CLAY(CL) with some silty and and gravel.		8	5	ST					3.0		22	LL=38 PL=18 PI=20
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-13
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	140 lbs.
Date Completed	1-21-01	Hammer Drop	30 in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 633±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown stiff Lime Treated CLAY(CH) with some sand. -8" of concrete at surface.		0	1	ST				1.1	1.2	70	42	LL=79 PL=38 PI=41
	2'	2										
Dark Brown stiff CLAY(CH) with sand laminations.			2	ST					1.5		35	
		4	3	ST					1.5		34	
	6'	6										
Tan and Gray hard CALCAREOUS CLAY(CL) with limestone seams.			4	ST					4.5+		24	
	8'	8										
Tan weathered SHALY LIMESTONE.			5	TCP		100/1"					18	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-14
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	140	lbs.
Date Completed	1-21-01	Hammer Drop	30	in.
Drill Foreman	EDI	Spoon Sample OD		in.
Inspector		Rock Core Dia.		in.
Boring Method	CFA	Shelby Tube OD	3	in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 634±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown very stiff Lime Treated CLAY(CH) with some sand. -8" of concrete at surface.		0	1	ST					2.0		36	
	2'	2										
Dark Brown very stiff CLAY(CH) with sand laminations. -brown below 4'.			2	ST					2.2		30	
		4										
	5'		3	ST					2.2		30	
Tan weathered SHALY LIMESTONE.		6										
		8										
			4	TCP		100 / 1.5"					18	
		10										
BOTTOM OF TEST BORING AT 10'.		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-15
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	lbs.
Date Completed	1-21-01	Hammer Drop	in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 635±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown very stiff CLAY(CH) with some sand and a trace of gravel.		0										
-8.25" of concrete at surface			1	ST					3.5		37	LL=85 PL=30 PI=55
-brown with calcareous nodules below 8'.		2	2	ST					2.0		32	
		4	3	ST					2.2		37	
		6	4	ST					2.5		32	
		8	5	ST					2.7		34	
BOTTOM OF TEST BORING AT 10'.		10										
		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 - ORIVEN CASINGS
MD -MUD DRILLING

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-16
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	lbs.
Date Completed	1-21-01	Hammer Drop	in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 635±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown hard CLAY(CH) with some sand and a trace of gravel. -8.25" of concrete at surface -very stiff below 4'.		0	1	ST					4.5+		35	LL=65 PL=36 PI=29
		2	2	ST					1.7		33	
		4	3	ST					2.2		31	LL=83 PL=30 PI=53
	6'	6										
Dark Brown very stiff CLAY(CH) with some sand.			4	ST					2.2		32	
	8'	8										
Tannish Brown stiff CALCAREOUS CLAY(CL/CH) with petro-chemical odor.			5	ST					1.5		22	
		10										
BOTTOM OF TEST BORING AT 10'.		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-17
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	140 lbs.
Date Completed	1-21-01	Hammer Drop	30 in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 644±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown very stiff CLAY(CH) with calcareous deposit and some sand - poss. fill -6.5" of concrete at surface.		0	1	ST					2.0		27	LL=85 PL=30 PI=55
		2	2	ST					2.7		38	
	3'		3	ST					2.5		27	
Tannish Brown and Gray very stiff CALCAREOUS CLAY(CL/CH) with clay zones. -hard with limestone seams below 4'.		4	4	ST					4.5+		15	
	5'											
Tan weathered SHALY LIMESTONE.		6										
	8'	8										
Tan weathered SHALY LIMESTONE.			5	TCP		100/1"					15	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-18
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt.: 140 lbs.
Hammer Drop: 30 in.
Spoon Sample OD: in.
Rock Core Dia.: in.
Shelby Tube OD: 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 644±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Dark Brown very stiff CLAY(CH) with some sand and calcareous nodules - poss. fill -6.5" of concrete at surface.	3'	0	1	ST					3.2		32	LL=73 PL=27 PI=46
			2	ST					3.2		38	
Tan and Gray hard CALCAREOUS CLAY(CL/CH) with limestone seams.	5'		3	ST					4.5+		19	
		5	4	ST					4.5+		14	
Tan weathered SHALY LIMESTONE.	8'											
Gray SHALY LIMESTONE.		10	5	TCP		100/1"					14	
BOTTOM OF TEST BORING AT 10'.		15										
		20										
		25										
		30										

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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-19
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	140 lbs.
Date Completed	1-21-01	Hammer Drop	30 in.
Drill Foreman	EDI	Spoon Sample OD	in.
Inspector		Rock Core Dia.	in.
Boring Method	CFA	Shelby Tube OD	3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 644±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Brown and Tan hard CLAY(CH) with calcareous deposit, gravel and some sand. - poss. fill -6.5" of concrete at surface.		0	1	ST					4.5+		21	LL=73 PL=28 PI=45
		2	2	ST					4.5+		32	
	4'	4	3	ST					4.5+		20	LL=48 PL=20 PI=28
Tan weathered SHALY LIMESTONE.	6'	6										
	8'	8										
Gray SHALY LIMESTONE.			4	TCP		100 1.3"					13	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client: GBW ENGINEERS, INC.
Architect/Engineer:
Project Name: MIDWAY ROAD RECONSTRUCTION
Project Location: ADDISON, TEXAS

Boring No.: B-20
Job No.: 00988
Drawn By: AM
Approved By: DAL

DRILLING AND SAMPLING INFORMATION

Date Started: 1-21-01
Date Completed: 1-21-01
Drill Foreman: EDI
Inspector:
Boring Method: CFA

Hammer Wt.: 140 lbs.
Hammer Drop: 30 in.
Spoon Sample OD: in.
Rock Core Dia.: in.
Shelby Tube OD: 3 in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 643±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Tannish Brown and Gray hard CALCAREOUS CLAY(CL) with limestone seams. -7.25" of concrete at surface.		0	1	ST					4.5+			LL=59 PL=21 PI=38
	2'	2										
Gray SHALY LIMESTONE.		4	2	TCP		100/1.3"					13	
		6										
		8										
			3	TCP		100/1.3"					15	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-21
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	140	lbs.
Date Completed	1-21-01	Hammer Drop	30	in.
Drill Foreman	EDI	Spoon Sample OD		in.
Inspector		Rock Core Dia.		in.
Boring Method	CFA	Shelby Tube OD	3	in.

TEST DATA

SOIL CLASSIFICATION / SURFACE ELEVATION 643±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Tannish Brown very stiff to hard CALCAREOUS CLAY(CL) with limestone seams. -6.75" of concrete at surface.		0	1	ST					2.7		22	
	2'	2										
Gray SHALY LIMESTONE.		4	2	TCP		100/1.5"					13	
		6										
		8	3	TCP		100/1.3"					16	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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RECORD OF SUBSURFACE EXPLORATION

Client	GBW ENGINEERS, INC.	Boring No.	B-22
Architect/Engineer		Job No.	00988
Project Name	MIDWAY ROAD RECONSTRUCTION	Drawn By	AM
Project Location	ADDISON, TEXAS	Approved By	DAL

DRILLING AND SAMPLING INFORMATION

Date Started	1-21-01	Hammer Wt.	140	lbs.
Date Completed	1-21-01	Hammer Drop	30	in.
Drill Foreman	EDI	Spoon Sample OD		in.
Inspector		Rock Core Dia.		in.
Boring Method	CFA	Shelby Tube OD	3	in.

SOIL CLASSIFICATION / SURFACE ELEVATION 643±	STRATUM DEPTH	DEPTH SCALE	SAMPLE NO.	SAMPLE TYPE	Percent Passing No. 200 Sieve	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 %	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index
Tannish Brown and Gray hard CALCAREOUS CLAY(CL) with limestone seams. -6.75" of concrete at surface.		0	1	ST					4.5+		18	LL=35 PL=17 PI=18
	2'	2	2	CA							13	
Gray SHALY LIMESTONE.		4	3	TCP		100/1"					12	
		6										
		8	4	TCP		100/1.5"					16	
BOTTOM OF TEST BORING AT 10'.		10										
		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

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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


SILT


SAND


LIMESTONE


SHALE


ASPHALT/CONCRETE

I. SOIL DESCRIPTION

(A) COHESIONLESS SOILS

RELATIVE DENSITY	N, BLOWS/FT		
VERY LOOSE	0	TO	4
LOOSE	5	TO	10
COMPACT	11	TO	30
DENSE	31	TO	50
VERY DENSE		OVER	50

(B) COHESIVE SOILS

CONSISTENCY	Qu, TSF		
VERY SOFT	LESS THAN		.25
SOFT	.25	TO	.50
FIRM	.50	TO	1.00
STIFF	1.00	TO	2.00
VERY STIFF	2.00	TO	4.00
HARD	OVER		4.00

II. PLASTICITY

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

NOTE: ALL SOILS CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

III. RELATIVE PROPORTIONS

DESCRIPTIVE TERM	PERCENT		
TRACE	1	-	10
LITTLE	11	-	20
SOME	21	-	35
AND	36	-	50

IV. PARTICLE SIZE IDENTIFICATION

BOULDERS:		-8 INCH DIAMETER OR MORE
COBBLES :		-3 TO 8 INCH DIAMETER
GRAVEL	:	-COARSE - 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
CLAY	:	-0.002 MM

V. DRILLING AND SAMPLING SYMBOLS

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