

**GEO-TEST**

**GEOTECHNICAL ENGINEERING  
SERVICES, JOB NO. 1-31001  
APACHE MESA SUBDIVISION  
PLACITAS, NEW MEXICO**

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**PREPARED FOR:  
MARK GOODWIN & ASSOCIATES, P.A.**

**GEO-TEST**

December 9, 2003  
File No. 1-31001

**Mark Goodwin & Associates, P.A.**  
**PO Box 90606**  
**Albuquerque, NM 87199**

**ATTN: Mr. Joe David Montano**

**RE: Geotechnical Engineering Services Report**  
**Apache Mesa Subdivision**  
**Placitas, New Mexico**

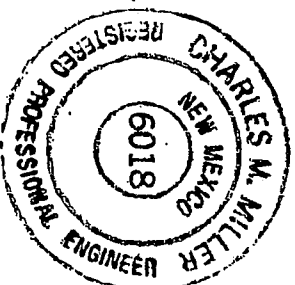
**Dear Mr. Montano:**

Submitted herein is the Geotechnical Engineering Services Report for the above referenced project. The report contains the results of our field investigation, laboratory testing and recommendations for foundation and slab on grade floor design, as well as criteria for site grading.

It has been a pleasure to serve you on this project. If you should have any questions, please contact me in the Albuquerque Office at (505) 857-0933

Sincerely:  
**GEO-TEST, INC.**

*Charles M. Miller*  
Charles M. Miller, P.E.



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## **INTRODUCTION**

This report presents results of the geotechnical engineering services performed for the proposed Apache Mesa Subdivision. The site is located as shown on the Boring Location Map, Figure 1, in Placitas, New Mexico.

The objective of this investigation is to:

- 1) Determine the nature and engineering properties of the subsurface soils.
- 2) Provide recommendations for the general design and construction of foundations and floor slabs, and criteria for site grading.

The services included subsurface exploration, representative soil sampling, laboratory testing of the samples, performing an engineering analysis and preparation of this report.

## **PROPOSED CONSTRUCTION**

It is understood that the subdivision is to be developed with single family residences. Conventional construction is anticipated with light to moderate structural loads. The site is currently undeveloped and it is covered with native vegetation.

Should structural details vary significantly from those outlined above, this firm should be notified for review and revision of recommendations contained herein.

## **FIELD EXPLORATION**

Eighteen exploratory borings were drilled to depths ranging from approximately 6 to 20 feet below existing grade across the site. The approximate locations of borings are shown on the accompanying Boring Location Map. The borings were continuously logged during the drilling operation. Boring Logs are presented in a following section of this report. Drilling was accomplished by a truck mounted drill rig using 5.25 inch diameter continuous flight hollowstem auger. Subsurface materials were sampled in the borings at five foot intervals or less utilizing an open tube split barrel sampler driven by a standard penetration test hammer.

### LABORATORY TESTING

Representative samples were tested in the laboratory to determine certain engineering properties of the soils. Moisture contents were determined to evaluate the various soil deposits both with depth and laterally. Sieve Analysis and Atterberg Limits Tests were performed to aid in soil classification.

Results of the laboratory tests are presented in the Tabulation of Laboratory Test Results and on the Boring Logs. All soil samples will be discarded 30 days after the date of this report unless we receive a specific request to retain the samples for a longer period of time.

### SITE SEISMICITY

As determined by the 1997 UBC, the site is located in Seismic Zone 2B. A Soil Profile Type of  $S_D$  should be used for design.

### SUBSURFACE SOIL CONDITIONS

As encountered in the exploratory borings, soils underlying the site are erratic and vary with depth and laterally. The soils generally consist of loose to very dense, slightly silty to silty or clayey sand with varying amounts of gravel and cobble. Refusal to auger drilling was encountered in Borings #7, #8, #13, and #15. Some of the clayey sands are medium plasticity and will swell when subjected to moisture increases. The loose silty sands will decrease in volume when wetted. The dense silty sands are relatively stable and would adequately support conventional foundations. Please refer to the Boring Logs for detailed strata descriptions. Groundwater was not encountered in any of the borings.

### CONCLUSIONS

The variable soil conditions would require differing foundation types and/or earthwork specifications for different lots. However, it may be most advantageous to simplify earthwork and inspection requirements and use post tensioned slabs on grade for foundation construction. The earthwork requirements outlined in the Site Grading section of this report should be carefully followed, as well as the moisture protection provisions.

## FOUNDATIONS

The structure should be supported on a post-tensioned slab on grade system (BRAB Type III) bearing on native soils or engineered fill placed to bring the site to final grade. This system would provide the structural rigidity to span or cantilever areas of localized soil volume change or to resist building movement from overall differential soil expansion or consolidation.

The following criteria is recommended for design of the slabs in accordance with the method presented in "Design and Construction of Post-Tensioned Slabs-on-Ground" published by the Post-Tensioning Institute:

- 1) Allowable soil bearing pressure 2,000 psf
- 2) Edge moisture variation distance center lift - 5 feet  
edge lift - 2.5 feet
- 3) Differential soil movement center lift - 2.0 in.  
edge lift - 1.0 in.
- 4) Slab-Subgrade friction coefficient 0.75

Clayey subgrade beneath foundations should not be allowed to dry and desiccate during construction. All utilities penetrating the slab should be isolated from the slab and the moisture protection of subgrade soils mentioned in this report is crucial to the performance of the post tensioned system.

## LATERAL LOADS

Resistance to lateral forces can be assumed to be provided by soil friction on the footing base and by passive earth resistance. A coefficient of friction of 0.40 should be used for computing the lateral resistance between the base of the foundation and soil. With backfill as recommended in the site grading section of this report, a passive soil resistance equivalent to a fluid weighing 325 pounds per cubic foot should be used for analysis.

### SLABS ON GRADE

If the grading requirements are complied with, concrete slabs may be supported on grade. However, if required as a working surface, a 4 inch course of gravel should be placed on properly prepared subgrade. The gravel base should consist of 1 inch maximum size aggregate with less than 15% passing the No. 200 sieve.

The gravel base will act as a capillary barrier, but will not eliminate moisture intrusion totally. If this is critical, an impervious membrane barrier should be placed beneath the slabs with 2 inches of clean non-plastic sand overlying the barrier to minimize differential cracking and curling of floor slabs.

### SITE-GRADING

The following general guidelines should be included in the project construction specifications to provide a basis for quality control during site grading. It is recommended that all structural fill and backfill be placed and compacted under engineering supervision and in accordance with the following:

- 1) After stripping the site and making all required site over excavations and prior to placement of any fill, the building areas should be densified. This will include a minimum area of 3 feet outside the building area.
- 2) Densification for other site preparation areas shall consist of scarification of the subgrade to a depth of 8 inches, moisture conditioning to optimum moisture content  $\pm 2\%$  and compacting the surface to a minimum of 95 percent of the ASTM D-1557 maximum dry density. Vibrations should be controlled or eliminated as necessary to avoid damage to nearby structures.
- 3) The site can then be brought to final grade with properly placed and compacted fill.
- 4) Blended on-site materials may be reused providing the criteria outlined below are met or imported fill meeting the same criteria may be used. All backfill material shall be non expansive, free of vegetation and debris and contain no rocks larger than 6 inches. Gradation of the backfill material, as determined in accordance with ASTM D-422, should be as

follows:

Size	Percent Passing
3 inch	90 - 100
No. 4	60 - 100
No. 200	0 - 50

- 5) The plasticity index should be no greater than 12 when tested in accordance with ASTM D-4318.
- 6) Fill or backfill, consisting of soil approved by the Geotechnical Engineer, shall be placed in controlled compacted layers with approved compaction equipment. All compaction of fill or backfill shall be to a minimum of 95 percent of the maximum dry density determined in accordance with the ASTM D-1557 test method.
- 7) Tests for degree of compaction shall be determined by the ASTM D-1556 method or ASTM D-2922. Observation and field tests shall be carried on during fill and backfill placement by the Geotechnical Engineer to assist the contractor in obtaining the required degree of compaction. If less than 95 percent is indicated, additional compaction effort shall be made with adjustment of the moisture content as necessary until 95 percent compaction is obtained.

#### RETAINING WALLS

Retaining walls which are free to rotate or translate such that the top of the wall can deflect laterally a distance equal to 0.001 times the height of the wall can be designed to resist an active lateral earth pressure equal to 35 pounds per square foot per foot of depth. Walls which are restrained from movement should be designed for at-rest pressures of 60 pounds per square foot per foot of depth.

Retaining walls may be founded on conventional spread footings bearing on a minimum of 2 feet of non expansive structural fill or densified non expansive native soils compacted in accordance with the criteria outlined in the



Conclusions and Site Grading sections of this report. Footings should be designed for a maximum soil bearing pressure of 2000 pounds per square foot.

These pressures assume no build up of hydrostatic pressures behind the wall. To prevent the buildup of hydrostatic pressures, adequate weep holes or composite drainage systems such as Miradrain or equivalent can be readily installed by attaching to the backside of a subgrade wall prior to backfilling. The drainage layer would be connected to a perforated collector pipe at the base of the wall and routed to a sump or to a positive gravity drain.

As an alternative, a conventional french drain type system comprised of free draining granular fill can be placed behind the walls. A perforated PVC drainage pipe would be placed at the bottom of the wall to collect water from the granular fill. A filter fabric should encapsulate the granular fill to control migration of fines into the drain.

To minimize the potential for saturation of the backfill by infiltration of surface water, the ground surface behind the wall should be sloped to drain away from the structure at a minimum 2 percent slope.

During backfilling, the contractor should be limited to the use of hand operated compaction equipment within a zone of about 5 feet horizontally from the back of the wall. The use of heavier equipment could apply lateral pressures well in excess of the earth pressure, particularly over the upper portions of the wall.

#### **CONSTRUCTION EXCAVATION**

Excavated slopes for foundation and utility construction should be designed and constructed in accordance with 29 CFR 1926, Subpart P, and any applicable state or local regulations. Excavated slopes should not exceed 2 horizontal to 1 vertical.

#### **MOISTURE PROTECTION**

Precautions should be taken during and after construction to minimize saturation of the foundation soils. Positive drainage should be established away from the structure. Concrete walks and asphalt pavement should be constructed adjacent to the exterior foundations where possible. All utility trenches leading into the structures should be backfilled with compacted fill.

Special care should be taken during installation of the subfloor sewer and water lines to reduce the possibility of future subsurface saturation.

#### **FOUNDATION REVIEW AND INSPECTION**

This report has been prepared to aid in the evaluation of this site and to assist in the design of this project. It is recommended that the Geotechnical Engineer be provided the opportunity to review the final design drawings and specifications in order to determine whether the recommendations in this report are applicable to the final design. Review of the final design drawings and specifications will be noted in writing by the Geotechnical Engineer.

Variations from soil conditions presented herein may be encountered during construction of this project. In order to permit correlation between the conditions encountered during construction and to confirm recommendations presented herein, it is recommended that the Geotechnical Engineer be retained to perform sufficient review during construction of this project. Observation and testing should be performed during construction to confirm that suitable fill soils are placed upon competent materials and properly compacted and foundation elements penetrate the recommended soils.

#### **CLOSURE**

Our conclusions, recommendations and opinions presented herein are:

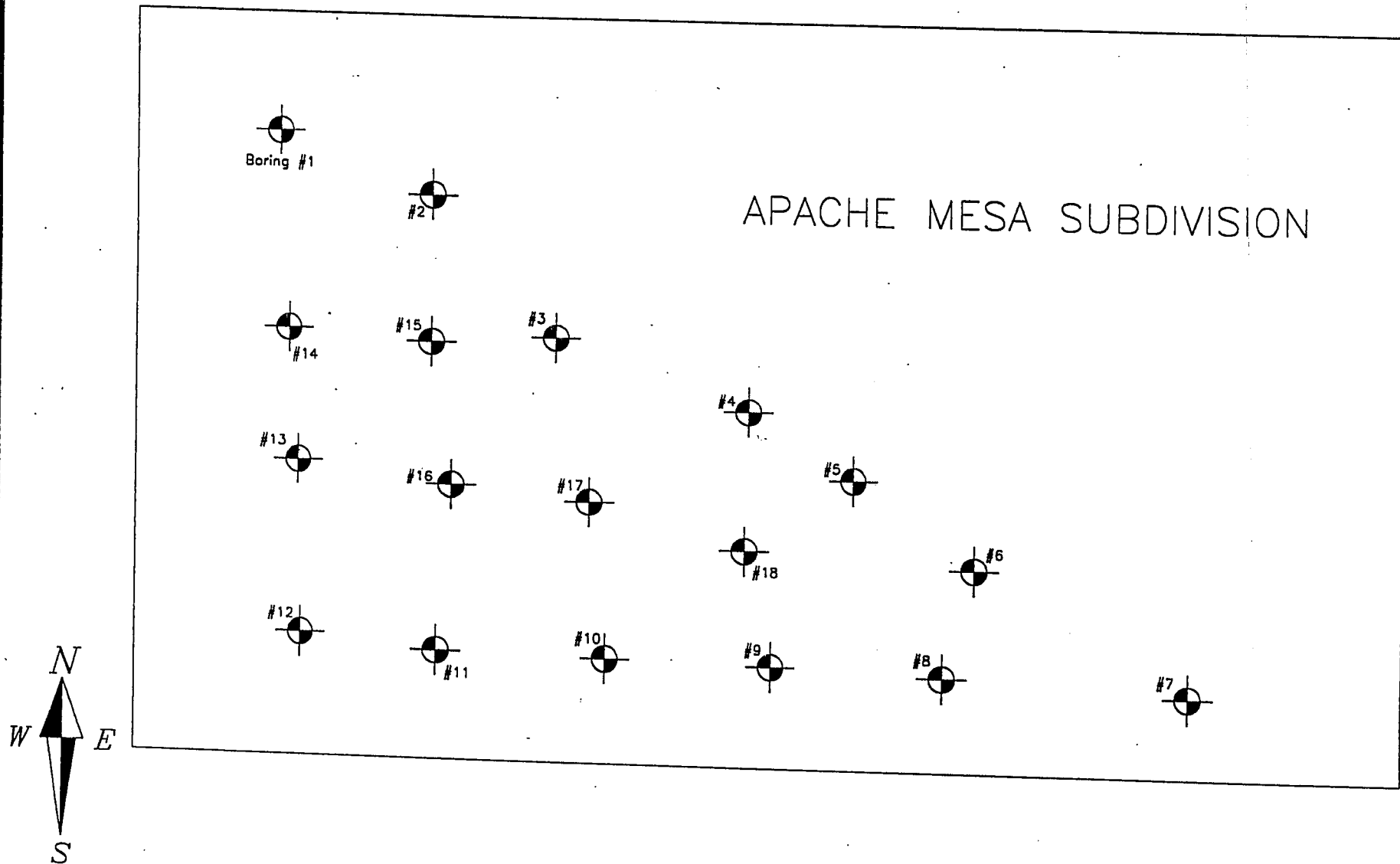
- 1) Based upon our evaluation and interpretation of the findings of the field and laboratory program.
- 2) Based upon an interpolation of soil conditions between and beyond the explorations.
- 3) Subject to confirmation of the conditions encountered during construction.
- 4) Based upon the assumption that sufficient observation will be provided during construction.
- 5) Prepared in accordance with generally accepted professional

geotechnical engineering principles and practice.

We make no other warranty, either express or implied. Any person using this report for bidding or construction purposes should perform such independent investigation as he deems necessary to satisfy himself as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project. If conditions are encountered during construction that appear to be different than indicated by this report, this office should be notified.

# BORING LOCATION MAP

Not to Scale



Apache Mesa Subdivision  
Placitas, New Mexico  
Job No. 1-31001

Figure 1

**GEO-TEST**  
GEOTECHNICAL ENGINEERING, ENVIRONMENTAL  
MATERIAL TESTING  
SANTA FE - ALBUQUERQUE - LAS CRUCES

# DEO-TEST

Project: Apache Mesa Subdivision  
 Date: 10/09/03 Project No: 1-31001  
 Elevation: Type: 5" OD HSA

## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 1

During Drilling: None After 24 Hours:

DEPTH (Feet)	LOG	SAMPLE						SUBSURFACE PROFILE	
		SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft
0-5	[Pattern]		SS	40	4.4		SM	SILTY SAND fine grained, some clay, low plasticity to non-plastic, dense, slightly moist, brown	20
5-10	[Pattern]		SS	25	1.4				40
10-15	[Pattern]		SS	46	4.1		SM	SILTY SAND WITH GRAVEL AND COBBLES non-plastic, very dense, slightly moist, brown	60
15-30	[Pattern]							STOPPED AUGER AT 14' 6" SAMPLER REFUSAL AT 14' 10"	80

### LEGEND

- SS - Spit Spoon
- AC - Auger Cuttings
- CAL - Modified California Sampler
- AMSL - Above Mean Sea Level
- CS - Continuous Sampler
- UD - Undisturbed

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

**Project:** Apache Mesa Subdivision  
**Date:** 10/09/03  
**Elevation:** .  
**Project No:** 1-31001  
**Type:** 5" OD HSA

## GROUNDWATER DEPTH

	During Drilling: None	After 24 Hours:
1. <b>Visual Inspection:</b>	None	None
2. <b>Moisture Content:</b>	None	None
3. <b>Soil Temperature:</b>	None	None
4. <b>Soil pH:</b>	None	None
5. <b>Soil Density:</b>	None	None
6. <b>Soil Permeability:</b>	None	None
7. <b>Soil Compaction:</b>	None	None
8. <b>Soil Settlement:</b>	None	None
9. <b>Soil Erosion:</b>	None	None
10. <b>Soil Contamination:</b>	None	None
11. <b>Soil Fertility:</b>	None	None
12. <b>Soil Health:</b>	None	None
13. <b>Soil Structure:</b>	None	None
14. <b>Soil Texture:</b>	None	None
15. <b>Soil Color:</b>	None	None
16. <b>Soil Odor:</b>	None	None
17. <b>Soil Taste:</b>	None	None
18. <b>Soil Smell:</b>	None	None
19. <b>Soil Sound:</b>	None	None
20. <b>Soil Touch:</b>	None	None
21. <b>Soil Sight:</b>	None	None
22. <b>Soil Smell:</b>	None	None
23. <b>Soil Taste:</b>	None	None
24. <b>Soil Smell:</b>	None	None
25. <b>Soil Taste:</b>	None	None
26. <b>Soil Smell:</b>	None	None
27. <b>Soil Taste:</b>	None	None
28. <b>Soil Smell:</b>	None	None
29. <b>Soil Taste:</b>	None	None
30. <b>Soil Smell:</b>	None	None
31. <b>Soil Taste:</b>	None	None
32. <b>Soil Smell:</b>	None	None
33. <b>Soil Taste:</b>	None	None
34. <b>Soil Smell:</b>	None	None
35. <b>Soil Taste:</b>	None	None
36. <b>Soil Smell:</b>	None	None
37. <b>Soil Taste:</b>	None	None
38. <b>Soil Smell:</b>	None	None
39. <b>Soil Taste:</b>	None	None
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41. <b>Soil Taste:</b>	None	None
42. <b>Soil Smell:</b>	None	None
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57. <b>Soil Taste:</b>	None	None
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59. <b>Soil Taste:</b>	None	None
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80. <b>Soil Smell:</b>	None	None
81. <b>Soil Taste:</b>	None	None
82. <b>Soil Smell:</b>	None	None
83. <b>Soil Taste:</b>	None	None
84. <b>Soil Smell:</b>	None	None
85. <b>Soil Taste:</b>	None	None
86. <b>Soil Smell:</b>	None	None
87. <b>Soil Taste:</b>	None	None
88. <b>Soil Smell:</b>	None	None
89. <b>Soil Taste:</b>	None	None
90. <b>Soil Smell:</b>	None	None
91. <b>Soil Taste:</b>	None	None
92. <b>Soil Smell:</b>	None	None
93. <b>Soil Taste:</b>	None	None
94. <b>Soil Smell:</b>	None	None
95. <b>Soil Taste:</b>	None	None
96. <b>Soil Smell:</b>	None	None
97. <b>Soil Taste:</b>	None	None
98. <b>Soil Smell:</b>	None	None
99. <b>Soil Taste:</b>	None	None
100. <b>Soil Smell:</b>	None	None

DEPTH (Feet)		LOG		SAMPLE						SUBSURFACE PROFILE	
				SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC	DESCRIPTION	

## LEGEND

SS - Split Spoon	AMSL - Above Mean Sea Level
AC - Auger Cuttings	CS - Continuous Sampler
CAL - Modified California Sampler	UD - Undisturbed

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

# GEO-TEST

Project: Apache Mesa Subdivision

Date: 10/09/03

Project No: 1-31001

Elevation:

Type: 5" OD HSA

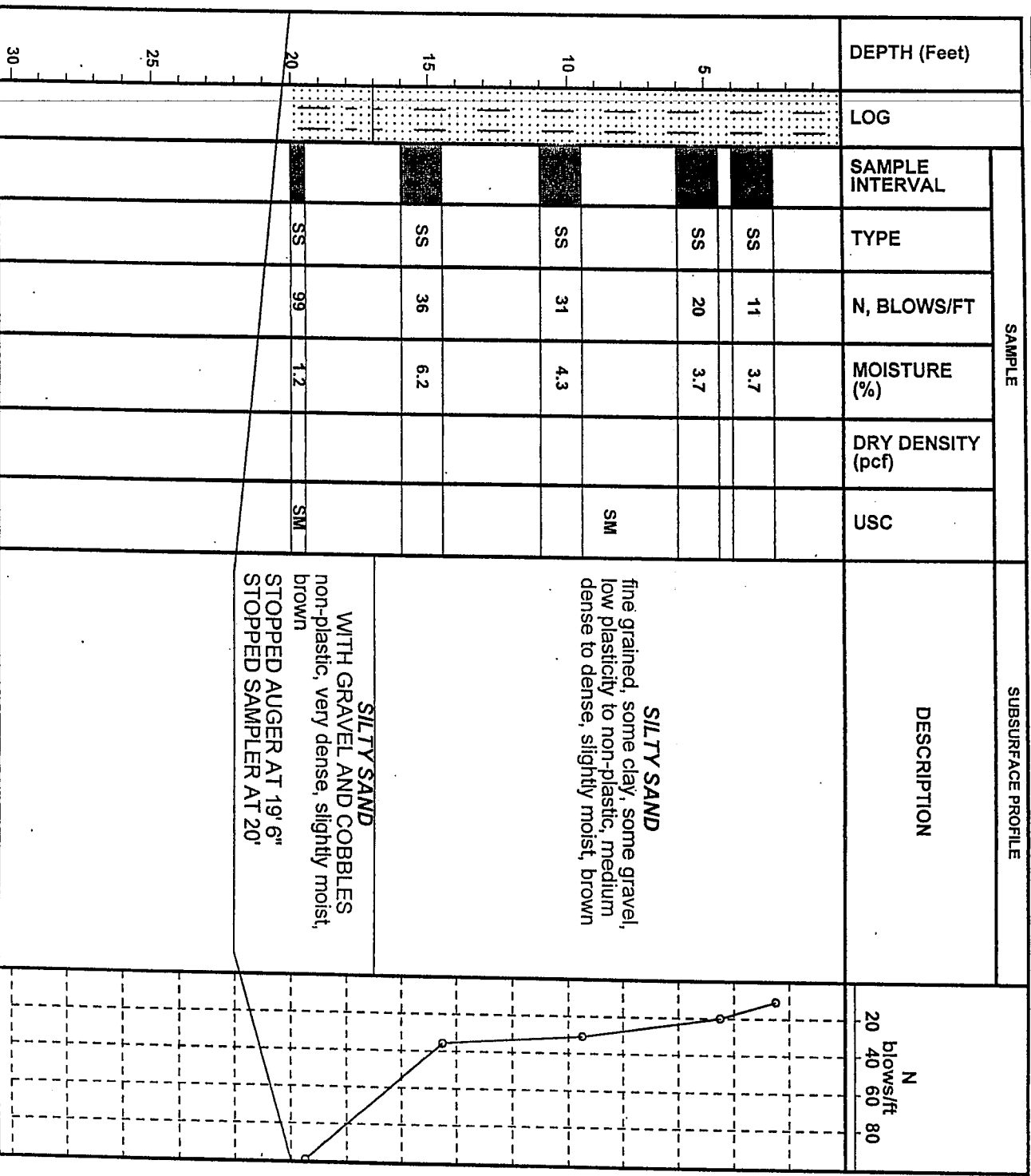
## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 3

During Drilling: None

After 24 Hours:



### LEGEND

SS - Split Spoon  
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Project: Apache Mesa Subdivision

Date: 10/09/03

Project No: 1-31001

Elevation:

Type: 5" OD HSA

## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 4

During Drilling: None

After 24 Hours:

DEPTH (Feet)	LOG	SAMPLE					SUBSURFACE PROFILE	
		SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC	DESCRIPTION
			SS	21	6.5		SC	CLAYEY SAND medium plasticity, medium dense, slightly moist, brown
			SS	23	5.5			
			SS	29	5.2		SM	SILTY SAND fine grained, some clay, some gravel, low plasticity to non-plastic, medium dense to dense, slightly moist, brown
			SS	31	4.5			STOPPED AUGER AT 14' 6" STOPPED SAMPLER AT 16'
30								
25								
20								
15								

### LEGEND

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Elevation:

Type: 5" OD HSA

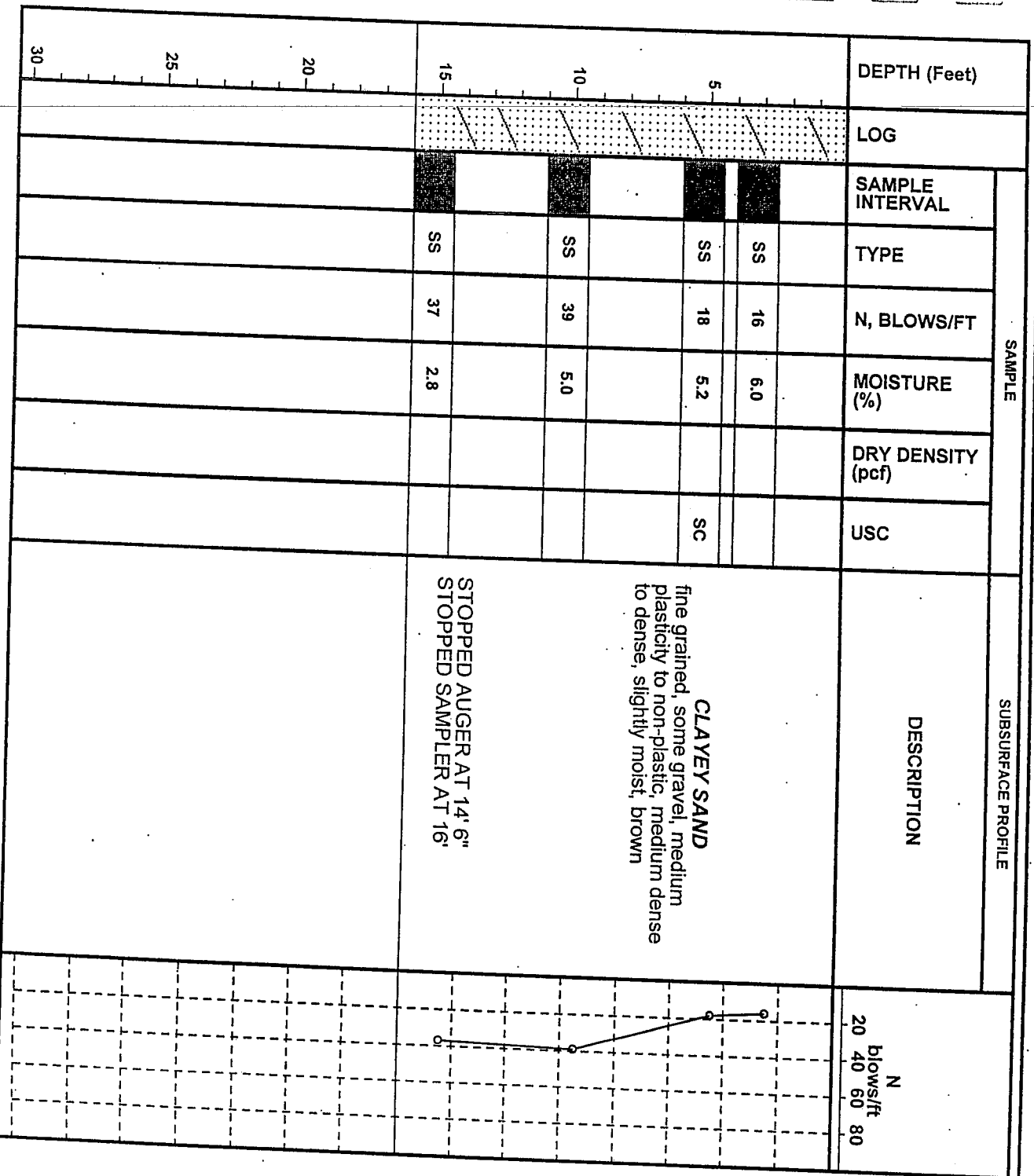
## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 5

During Drilling: None

After 24 Hours:



### LEGEND

SS - Split Spoon  
AC - Auger Cuttings  
CAL - Modified California Sampler  
UD - Undisturbed  
AMSL - Above Mean Sea Level  
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Elevation:

Type: 5" OD HSA

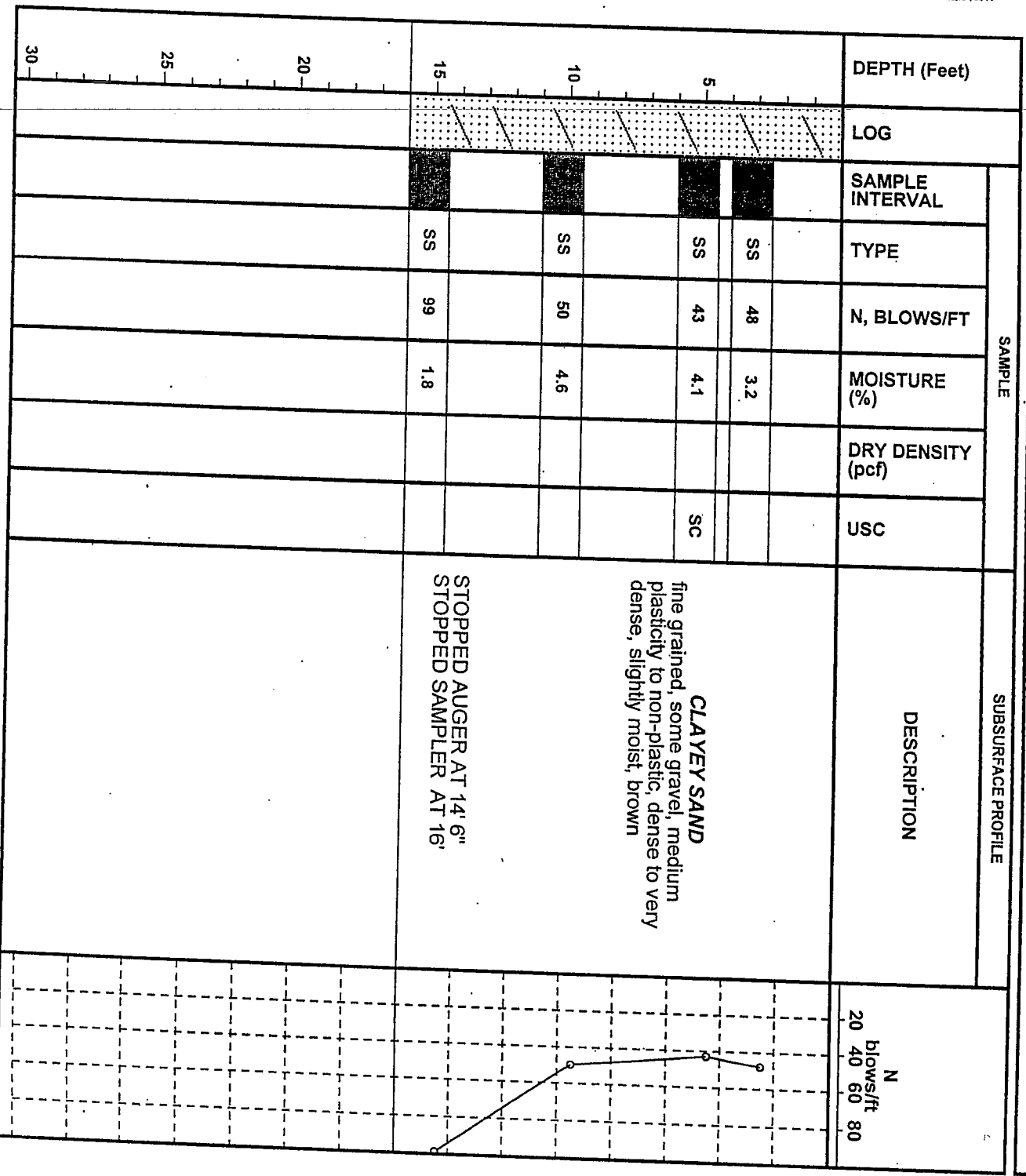
## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 6

During Drilling: None

After 24 Hours:



### LEGEND

- SS - Split Spoon
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- UD - Undisturbed

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**Project:** Apache Mesa Subdivision  
**Date:** 10/09/03  
**Elevation:**  
**Project No:** 1-31001  
**Type:** 5" OD HSA

## GROUNDWATER DEPTH

**NO: 7**

**During Drilling: None**

### After 24 Hours:

DEPTH (Feet)		SAMPLE							SUBSURFACE PROFILE	
LOG		SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft 20 40 60 80	
5			SS	41	1.5		SP-SM	SLIGHTLY SILTY SAND WITH GRAVEL AND COBBLES non-plastic, dense to very dense, slightly moist, brown		
			SS	>100	1.7					
								AUGER REFUSAL AT 7'		

## LEGEND

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**Project:** Apache Mesa Subdivision  
**Date:** 10/09/03  
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**Project No:** 1-31001  
**Type:** 5" OD HSA

## GROUNDWATER DEPTH

During Drilling: None	After 24 Hours:
	

SUBSURFACE PROFILE		SAMPLE							DEPTH (Feet)
DESCRIPTION	USC	DRY DENSITY (pcf)	MOISTURE (%)	N, BLOWS/FT	TYPE	SAMPLE INTERVAL	LOG		
CLAYEY SAND fine grained, some gravel, medium plasticity to non-plastic, medium dense, slightly moist, brown	SC		4.6	19	SS				
			6.6	11	SS				
SLIGHTLY SILTY SAND WITH GRAVEL AND COBBLES non-plastic, very dense, slightly moist, brown AUGER REFUSAL AT 9'	SP-SM								

DEPTH (Feet)

LOG

SAMPLE INTERVAL

TYPE

N, BLOWS/FT

MOISTURE (%)

DRY DENSITY (pcf)

USC

DESCRIPTION

N  
blows/ft  
20 40 60 80

5

10

15

20

25

30

**Project:** Apache Mesa Subdivision  
**Date:** 10/09/03  
**Elevation:**

**Project No:** 1-31001  
**Type:** 5" OD HSA

# LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 9

**During Drilling: None**

### After 24 Hours:

SUBSURFACE PROFILE						
DEPTH (Feet)		LOG		SAMPLE		DESCRIPTION
SAMPLE INTERVAL		TYPE		N, BLOWS/FT		
0	5		SS	16	2.1	<p><b>SILTY SAND</b> fine grained, some gravel, non-plastic, medium dense to very dense, slightly moist, brown</p>
5	10		SS	52	2.6	
10	15		SS	99	4.6	
15	20		SS	99	3.7	
20	25		SS	99	3.7	
25	30					<p>STOPPED AUGER AT 14' 6"</p> <p>STOPPED SAMPLER AT 15'</p>

# GEO-TEST

Project: Apache Mesa Subdivision

Date: 10/09/03

Project No: 1-31001

Elevation:

Type: 5" OD HSA

## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 10

During Drilling: None

After 24 Hours:

DEPTH (Feet)	LOG	SAMPLE						SUBSURFACE PROFILE	
		SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC	DESCRIPTION	N blows/ft 20 40 60 80
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

### LEGEND

SS - Split Spoon  
AC - Auger Cuttings  
CAL - Modified California Sampler  
UD - Undisturbed

AMSL - Above Mean Sea Level  
CS - Continuous Sampler

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

# GEO-TEST

Project: Apache Mesa Subdivision

Date: 10/10/03

Project No: 1-31001

Elevation:

Type: 5" OD HSA

## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 11

During Drilling: None

After 24 Hours:

DEPTH (Feet)	LOG	SAMPLE						SUBSURFACE PROFILE
		SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC	
			SS	9	2.6			CLAYEY SILTY SAND fine grained, some gravel, non-plastic, loose to dense, slightly moist, brown
			SS	27	3.0		SC-SM	
			SS	50	2.7			
			SS	38	3.5			
			SS					
								STOPPED AUGER AT 14' 6"
								STOPPED SAMPLER AT 16'

### LEGEND

SS - Split Spoon  
AC - Auger Cuttings  
CAL - Modified California Sampler  
AMSL - Above Mean Sea Level  
CS - Continuous Sampler  
UD - Undisturbed

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.





# GEO-TEST

Project: Apache Mesa Subdivision

Date: 10/10/03

Project No: 1-31001

Elevation:

Type: 5" OD HSA

## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 13

During Drilling: None

After 24 Hours:

DEPTH (Feet)	LOG	SAMPLE						SUBSURFACE PROFILE	
		SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC	DESCRIPTION	
5			SS	57	2.3		SM	SILTY SAND WITH GRAVEL AND COBBLES non-plastic, very dense, slightly moist, brown	
			SS	99	1.8				
								AUGER REFUSAL AT 7'	
10									
15									
20									
25									
30									

### LEGEND

SS - Split Spoon  
AC - Auger Cuttings  
CAL - Modified California Sampler

AWSL - Above Mean Sea Level  
CS - Continuous Sampler  
UD - Undisturbed

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

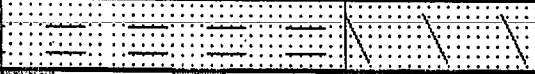
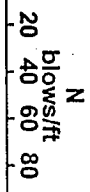
Type: 5" OD HSA

## GROUNDWATER DEPTH

NO: 14

**During Drilling: None**

### After 24 Hours:

SUBSURFACE PROFILE									
SAMPLE							DESCRIPTION		
DEPTH (Feet)	LOG	SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	USC		
0								CLAYEY SAND fine grained, low plasticity, medium dense, slightly moist, brown	
5			SS	19	5.7		SC		
10			SS	32	3.0				
15			SS	31	2.2		SM		
20								SILTY SAND fine grained, some gravel, non-plastic, medium dense to dense, slightly moist, brown	
25									
30								STOPPED AUGER AT 14' 6" STOPPED SAMPLER AT 16'	

**Project:** Apache Mesa Subdivision  
**Date:** 10/10/03  
**Elevation:**  
**Project No:** 1-31001  
**Type:** 5" OD HSA

## GROUNDWATER DEPTH

**During Drilling: None**

### After 24 Hours:

SS - Split Spoon  
AC - Auger Cuttings  
CAL - Modified California Sampler

LEGEND

AMSL - Above Mean Sea Level  
CS - Continuous Sampler  
UD - Undisturbed

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

**Project:** Apache Mesa Subdivision  
**Date:** 10/10/03  
**Elevation:**  
**Project No:** 1-31001  
**Type:** 5" OD HSA

Project No: 1-31001  
Type: 5" OD HSA

## GROUNDWATER DEPTH

### After 24 Hours:

[illegible]

SS - Split Spoon  
AC - Auger Cuttings  
CAL - Modified California Sampler  
UD - Undisturbed

AMSL - Above Mean Sea Level  
CS - Continuous Sampler

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.



# GEO-TEST

Project: Apache Mesa Subdivision

Date: 10/10/03

Project No: 1-31001

Elevation:

Type: 5" OD HSA

## LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 18

During Drilling: None

After 24 Hours:

DEPTH (Feet)	LOG	SAMPLE					SUBSURFACE PROFILE	
		SAMPLE INTERVAL	TYPE	N, BLOWS/FT	MOISTURE (%)	DRY DENSITY (pcf)	DESCRIPTION	N blows/ft 20 40 60 80
			SS	19	2.6		CLAYEY SAND fine grained, some gravel, low plasticity, medium dense to dense, slightly moist, brown	
			SS	33	4.1			
			SS	37	3.8			
			SS	42	4.1			
			SS					
							STOPPED AUGER AT 14' 6"	
							STOPPED SAMPLER AT 16'	

### LEGEND

SS - Split Spoon  
AC - Auger Cuttings  
CAL - Modified California Sampler  
AMSL - Above Mean Sea Level  
CS - Continuous Sampler  
UD - Undisturbed

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

# TABULATION OF LABORATORY TEST RESULTS APACHE MESA SUBDIVISION PLACITAS, NEW MEXICO

SIEVE ANALYSIS PERCENT PASSING															
TEST HOLE	DEPTH (FEET)	UNITED GLASS	% MOIST	LL	PL	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"
1	2.5	SM	4.4	NV	NP	43.6	71	81	87	91	93	95	100		
1	5		1.4												
1	10		4.1												
1	15		4.4												
2	2.5		2.9												
2	5	SC-SM	4.0	24	7	34.3	51	64	85	93	100				
2	10		4.2												
2	15		4.9												
3	2.5	SM	3.7	NV	NP	27.7	41	51	74	87	96	100			
3	5		3.7												
3	10		4.3												
3	15		6.2												
3	20		1.2												
4	2.5	SC	6.5	41	21	43.3	60	72	89	96	100				
4	5		5.5												
4	10		5.2												
4	15		4.5												
5	2.5		6.0												
5	5	SC	5.2	35	19	39.5	62	71	85	92	97	98	100		
5	10		5.0												
5	15		2.8												
6	2.5	SC	3.2	28	17	35.2	49	56	67	72	76	80	88	100	
6	5		4.1												
6	10		4.6												
6	15		1.8												
7	2.5	SP-SM	1.5	NV	NP	11.6	17	27	55	75	86	90	100		
7	5		1.7												
8	2.5		4.6												
8	5	SC	6.6	28	13	48.8	69	79	89	94	97	98	100		
9	2.5		2.1												

**SIEVE ANALYSIS  
PERCENT PASSING**

TEST HOLE	DEPTH (FEET)	UNITED GLASS	% MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"
9	5	SM	2.6	NV	NP	28.3	64	71	82	91	95	96	100		
9	10		4.6												
9	15		3.7												
10	2.5		2.2												
10	5	ML	5.9	NV	NP	51.4	83	94	99	100					
10	10		4.5												
10	15		4.9												
11	2.5	SC-SM	2.6	23	4	28.9	42	48	66	89	98	100			
11	5		3.0												
11	10		2.7												
11	15		3.5												
12	2.5	SC	7.5	35	19	39.7	57	77	94	99	100				
12	5		1.6												
12	10		5.5												
12	15		2.7												
13	2.5		2.3												
13	5	SM	1.8	NV	NP	12.0	21	26	43	70	89	92	100		
14	2.5		5.7												
14	5	SC	3.0	23	8	25.3	39	49	75	92	99	100			
14	10		2.2												
14	15		2.2												
15	2.5	SC	2.1	23	8	19.1	28	35	67	93	100				
16	2.5		6.9												
16	5	SC	5.0	27	11	45.3	64	75	86	91	95	98	100		
16	10		5.1												
16	15		4.7												
17	2.5	SC-SM	2.5	20	6	27.5	43	50	68	86	94	95	100		
17	5		3.4												
17	10		3.1												
17	15		3.4												
18	2.5		2.6												
18	5	SC	4.1	23	8	42.2	70	80	93	99	100				
18	10		3.8												



SIEVE ANALYSIS PERCENT PASSING															
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	% MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"
18	15		4.1												

LL = LIQUID LIMIT  
PI = PLASTICITY INDEX  
NV = NO VALUE  
NP = NON PLASTIC

# TABULATION OF LABORATORY TEST RESULTS

## APACHE MESA SUBDIVISION

### PLACITAS, NEW MEXICO

SIEVE ANALYSIS PERCENT PASSING															
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	% MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"
1	2.5	SM	4.4	NV	NP	43.6	71	81	87	91	93	95	100		
1	5		1.4												
1	10		4.1												
1	15		4.4												
2	2.5		2.9												
2	5	SC-SM	4.0	24	7	34.3	51	64	85	93	100				
2	10		4.2												
2	15		4.9												
3	2.5	SM	3.7	NV	NP	27.7	41	51	74	87	96	100			
3	5		3.7												
3	10		4.3												
3	15		6.2												
3	20		1.2												
4	2.5	SC	6.5	41	21	43.3	60	72	89	96	100				
4	5		5.5												
4	10		5.2												
4	15		4.5												
5	2.5		6.0												
5	5	SC	5.2	35	19	39.5	62	71	85	92	97	98	100		
5	10		5.0												
5	15		2.8												
6	2.5	SC	3.2	28	17	35.2	49	56	67	72	76	80	88	100	
6	5		4.1												
6	10		4.6												
6	15		1.8												
7	2.5	SP-SM	1.5	NV	NP	11.6	17	27	55	75	86	90	100		
7	5		1.7												
8	2.5		4.6												
8	5	SC	6.6	28	13	48.8	69	79	89	94	97	98	100		

**SIEVE ANALYSIS  
PERCENT PASSING**

TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	% MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"
9	2.5		2.1												
9	5	SM	2.6	NV	NP	28.3	64	71	82	91	95	96	100		
9	10		4.6												
9	15		3.7												
10	2.5		2.2												
10	5	ML	5.9	NV	NP	51.4	83	94	99	100					
10	10		4.5												
10	15		4.9												
11	2.5	SC-SM	2.6	23	4	28.9	42	48	66	89	98	100			
11	5		3.0												
11	10		2.7												
11	15		3.5												
12	2.5	SC	7.5	35	19	39.7	57	77	94	99	100				
12	5		1.6												
12	10		5.5												
12	15		2.7												
13	2.5		2.3												
13	5	SM	1.8	NV	NP	12.0	21	26	43	70	89	92	100		
14	2.5		5.7												
14	5	SC	3.0	23	8	25.3	39	49	75	92	99	100			
14	10		2.2												
14	15		2.2												
15	2.5	SC	2.1	23	8	19.1	28	35	67	93	100				
16	2.5		6.9												
16	5	SC	5.0	27	11	45.3	64	75	86	91	95	98	100		
16	10		5.1												
16	15		4.7												
17	2.5	SC-SM	2.5	20	6	27.5	43	50	68	86	94	95	100		
17	5		3.4												
17	10		3.1												
17	15		3.4												
18	2.5		2.6												
18	5	SC	4.1	23	8	42.2	70	80	93	99	100				

SIEVE ANALYSIS PERCENT PASSING															
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	% MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"
18	10		3.8												
18	15		4.1												

LL = LIQUID LIMIT  
PI = PLASTICITY INDEX  
NV = NO VALUE  
NP = NON PLASTIC