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STATE OF CALIFORNIA

OFFICE MEMO
STD. 100 (REV. 11-75)

DATE

TO:

ROOM NUMBER

FROM:

PHONE NUMBER

SUBJECT:

~~City Council~~ 2 Aug 83
~~Donald Moore will review data~~

X NE corner for Phil Campbell
should read NW corner.
data from Mr. George Beaty
Santa Fe Springs
Planning Dept

~~Concern~~
~~Sept 83~~

~~Several Abandoned site projects~~

SFUND RECORDS CTR
2047-00101

FOUNDATION INVESTIGATION

Scope

This report presents the results and recommendations of our foundation investigation for the proposed commercial/industrial park to be located on approximately 4.8 acres of land at the northeast corner of Greenleaf Avenue and Los Nietos Road in Santa Fe Springs, California. The subject property encompasses Lot 1 of Tentative Parcel No. 14608. The preliminary development concept envisions the construction of light, concrete tilt-up structures along with access roads and parking areas.

* Planning Dept S.F. Springs says this should be northwest corner.

The purpose of the study was to determine general soil conditions at the site and provide recommendations for foundation design, site grading, and design of flexible pavement sections.

The investigation included site inspection, test borings, laboratory testing, and engineering calculations. The work was authorized by Mr. [illegible] of Castille Builders, Ltd., representing the client.

Structural Considerations

Definitive estimates of structural loads were not available at the time of writing [illegible] report. Consequently, for purposes of analysis, it was assumed that the maximum dead plus live load on columns would be less than 80 kips. We also assumed that none of the proposed buildings will have basements and that finished grade will be at or near to existing grade.

[illegible] S.F. Springs [illegible]

Field Investigation

The field investigation was completed in July, 1981 and included drilling eleven, 16-inch diameter bucket auger borings to depths ranging from 11 to 16 feet and excavating one shallow 2-foot deep test pit by hand. Details pertaining to the drilling operations are given on the Test Boring Logs, pages A-1 through A-6 in Appendix A. Boring locations are shown on the attached plan, page A-7.

Both bulk and undisturbed soil samples were obtained from the borings for laboratory testing. The undisturbed samples were obtained by means of a 2.5-inch I.D., thin wall sampler driven with a 1500 pound weight dropping approximately 12 inches. Sample depths and penetration rates are shown on the Test Boring Logs.

The drilling and sampling operations were performed under the direct supervision of an engineering geologist, who also logged the borings and prepared the samples for subsequent laboratory testing and reference. Boring elevations were obtained from a topographic plan prepared by Thomsen Engineering, Inc., dated June, 1981.

Soil Testing

In the field, earth materials were visually classified according to the Unified Soil Classification System by a careful examination of the samples and a continuous observation of the boring returns. A description of this classification system is given at the front of Appendix A.

In the laboratory, samples taken from borings were tested to determine moisture content, dry density, maximum dry density, expansion potential, shear strength, consolidation characteristics, Resistance value, soluble sulphates, and corrosivity (resisitivity and pH). The moisture density test results are shown on the Test Boring Logs and the results of other tests are given in Appendix B, on pages B-1 through B-5 . Briefly, these tests were conducted as follows.

A compaction test was performed on a near surface sample in order to determine the maximum dry density and optimum moisture content of representative soils. This test was carried out in accordance with ASTM Test Method D 1557-70. The test results are shown on page B-1.

Expansion tests were performed on two samples of representative soils in accordance with the standard procedure for the Expansion Index Test (UBC Standard 29-2). In this testing procedure, the remolded sample is compacted with an energy input of 11,300 ft-lbs per cubic foot at 50% saturation. After remolding, the sample is confined under a pressure of 144 psf and allowed to soak for twenty-four hours. The resulting volume change due to increase in moisture content is recorded together with initial moisture content and dry density. The results of the expansion tests are presented on page B-1.

Strength characteristics of the foundation soils were determined in the laboratory by direct shear tests performed on two undisturbed samples. Samples were saturated and tested under several different normal loads in 2.5- and 1.5- inch circular shear box, using a controlled displacement rate of 0.04-inch per minute. Results of these tests are presented on pages B-1 and B-2.

Settlement characteristics of five representative samples were evaluated by means of laboratory consolidation tests. These samples were tested in a floating ring consolidometer using a dead weight lever system for load application. Test results are shown on the "Consolidation Test-Pressure Curves," pages B-3 through B-5.

A Resistance (R-value) test was performed on a typical subgrade sample. Testing was conducted in accordance with Test Method No. California 301-F. The results of this test are given on page B-1.

The concentration of soluble sulphates was determined for two representative samples of surficial soil in accordance with Test Method No. California 417. The results of this test are given on page B-1.

Corrosivity tests were performed on two samples to determine the minimum resistivity and pH of the soils. These tests were conducted in accordance with Test Method California 643C and the results are shown on page B-1.

Site Conditions and Earth Materials

At the time of our investigation, the subject property was occupied by several small businesses housed in quonset huts or Butler type buildings. The ground surface throughout the project area is fairly flat and has no discernible drainage pattern. Driveways and other open spaces between structures generally were covered with broken asphalt or other debris. Several piles of loose, dumped earth material and debris were scattered over the site. Overhead and subsurface utility lines are present on the property.

The earth materials encountered within the depth of exploration consisted of a variable depth of loose fill underlain by native alluvial sediments of Pleistocene age.

Generally, a mantle of loose fill approximately one to five feet in thickness covers the majority of the site. This fill is composed of fine silty sand and sandy and clayey silt with intermixed trash and debris. Deeper fill areas believed to be former oil sumps were encountered in Borings 2, 3 and 8. These sump areas range up to approximately ten to fifteen feet in depth and contain debris laden fill along with bentonite. [illegible]

The native alluvial deposits underlying the fill consist of interbedded layers of semicompact to dense, fine to medium silty sand and soft to very stiff clayey and sandy silt.

Some water seepage was observed in the oil sump at Boring 8 at a depth of about six feet. This water is believed to be an extremely local effect confined to the oil sump area.

A more detailed description of the earth materials encountered is given on the Test Boring Logs.

CONCLUSIONS AND RECOMMENDATIONS

General

Footing foundations placed in firm native soil or approved compacted fill may be utilized for support of the proposed structures. A shallow, surficial layer of loose fill covers most of the project area. Moreover, oil sumps or deeper pockets of fill are also present on the site. All loose fill should be removed and replaced as approved compacted fill.

Chemical analyses indicate that on-site soils may be severely corrosive to buried metal conduit.

Foundation Preparation

A variable depth layer of loose fill and isolated oil sumps are present within the project area. At the initial stage of grading it will be necessary to search out, remove and replace all loose material or debris. To increase the probability that all existing fill and oil sumps are located, a special grading procedure is advised. This procedure should consist of removing all soil to a depth of eighteen inches and proof-rolling the excavated surface with a single pass of heavy rubber-tired equipment. The compaction induced by the equipment should be sufficient to locate soft areas. All loose fill and oil sumps should be excavated under close observation of the soil technician and properly backfilled in the following manner.

After removal of the poor material, the top eight inches of the exposed surface should be compacted to at least 90% of maximum density at about optimum moisture. If approved by the soil engineer, the excavated material may then be replaced as compacted fill. All debris and deleterious material should be disposed off-site.

All fill should be placed in accordance with the recommendations presented in the subsequent section of this report entitled "Grading Requirements".

Footing Foundations

Footings placed at least 18 inches below the lowest adjacent grade in firm native soil or approved compacted fill may be designed for a maximum allowable bearing pressure of 2000 psf. This bearing value may be increased by one-third for short term seismic or wind loading.

Providing the above recommendations are followed, the calculated settlement under the maximum assumed column load of 80 kips is about 0.9-inch. Post-construction differential settlement is estimated to be about 0.25-inch.

Lateral Loads

Lateral loads may be resisted by friction between the supporting soils and the bottom of footings. An allowable coefficient of friction of 0.35 is considered applicable for on-site soils. The recommended lateral bearing value of undisturbed native soil or approved compacted fill is 150 psf/foot of depth. If coefficient of friction and lateral bearing are used in combination, the coefficient of friction should be reduced by 25%.

Concrete Slabs

Concrete slabs on grade should be supported on at least 12 inches of soil with a minimum relative compaction of 90%. The existing on-site soils are not expansive, and if expansive soils are not imported, reinforcement or special processing for expansive soils will not be necessary. If expansive soils are imported, recommendations for reinforcement and special processing can be presented at the time of grading.

Concrete Corrosion

Laboratory tests indicate only a slight concentration of soluble sulphates within the native soil. Consequently, no special cement need be utilized in concrete that comes in contact with on-site soil.

Metallic Corrosion

Laboratory tests show that the foundation soils exhibit a very low electrical resistivity. This condition may indicate a potentially severe corrosive environment for metal conduit. It is recommended that an engineer with expertise in corrosion be consulted regarding suitable types of conduits or any necessary protective measures.

Pavement Design

Pavement sections have been determined by the State of California Department of Transportation (Caltrans) method of flexible pavement design, using a traffic index of 4.0 for automobile parking and drives, and 5.0 for

SEVERE ENVIRONMENT

areas subject to truck traffic. A Resistance value of 15 has been determined for the subgrade material. With these conditions, the following pavement sections are recommended.

Areas Subject to Automobile Traffic Only (T.I. = 4.0, R = 15)

Alternate 1	0.20'AC/0.55'AB
Alternate 2	0.45'AC Full Depth Section

Areas Subject to Truck Traffic (T.I. = 5.0, R = 15)

Alternate 1	0.25'AC/0.70'AB
Alternate 2	0.55'AC Full Depth Section

Asphalt concrete (AC) and aggregate base (AB) should conform to, and be placed in accordance with the latest revision of the Caltrans Standard Specifications. Prior to placing the pavement section, the subgrade soil should have a minimum relative compaction of 90% to a depth of 12 inches.

Drainage

Positive drainage of surface water away from the structures and to the parking and drive areas is very important. Water should not be allowed to pond at any location. Where slabs or pavement are not feasible adjacent to the buildings, the ground surface should be provided with a minimum gradient of about 6% to a distance of five feet away from the structures. Water should be transported off the site in approved drainage devices or [illegible] swales with a gradient of at least 1%. Swales or drainage paths through lawn or planting areas should be provided with a gradient of at least 2%. Where necessary, drainage paths could be shortened by use of area drains and collector pipes.

Planters adjacent to the structures should be avoided insofar as possible. Planting areas at grade should be provided with good positive drainage directed away from the building. Planters should not be depressed unless provisions for drainage, such as catch basins and pipe drains, are made.

Grading Requirements

These requirements should be furnished to the grading contractor.

The grading contractor is responsible for notifying the governmental agency, as required, and for notifying the soil engineer at the start of site clean-up, the start of grading operations, and any time that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the soil engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work.

All site clean-up and grading will be subject to the approval of this office and must conform to the requirements of the City of Santa Fe Springs and the following recommendations.

If parties other than Moore & Taber are contracted to provide control during grading operations, they must be notified of their assumption of responsibility for the successful completion of the geotechnical phase of the project.

(1) Prior to the start of grading, all vegetation, trash, surface obstructions, and debris resulting from demolition should be removed and disposed off-site. Any existing irrigation, drainage or utility lines or other abandoned subsurface structures should be removed, destroyed or abandoned in compliance with specifications of the appropriate building official and recommendations of this office.

(2) Subsequent to clean-up operations, a reasonable search should be made for subsurface obstructions, oil sumps and/or possible loose fill or detrimental soil types. This search should be conducted at the discretion and under the supervision of the soil engineer with the use of on-site equipment, as described in the section of the report entitled "Foundation Preparation".

(3) The resulting clean natural ground surface should be scarified, brought to about optimum moisture content, and compacted to a minimum of [illegible] relative compaction for a depth of eight inches below the existing or stripped surface, unless otherwise noted. Reference is directed to the sections on "Concrete Slabs" and "Pavement Design" for additional grading requirements.

(4) Fill should consist of approved earth material free of trash or debris, rocks, vegetation or other deleterious material. All fill, except expansive soil placed within three feet of finished grade, should be spread in six to eight-inch lifts, brought to about optimum moisture, and compacted to at least 90% of maximum density as determined by ASTM 1557-70. All expansive soil placed within three feet of finished grade should be placed at well over optimum moisture content (about 140% of optimum) and compacted to at least 87%, but not more than 92% of maximum density.

(5) All trench backfills, except for the bedding and six inches of cover, should be compacted to 90% of maximum density.

General Conditions

This report is based on the project as described and the geotechnical data obtained from the field tests performed at the locations indicated on the plan. The conclusions and recommendations do not reflect any non-linear variations which may occur between the field tests. Our firm should be notified of any pertinent change in the project or foundation plans. If foundation conditions are found to differ from those described herein, it may require a revaluation of the recommendations.

Our recommendations for this site are to a high degree dependent on proper fill placement and compaction. Consequently, our foundation recommendations are made contingent upon the opportunity for Moore & Taber to observe grading operations and foundation excavations for this phase of construction. If parties other than Moore & Taber are engaged to provide such services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the recommendations in this report or providing alternate recommendations.

This report has not been prepared for use by parties or projects other than those named or described above. It may not contain sufficient information for other parties or other purposes. It has been prepared in accordance with generally accepted geotechnical practices, and makes no other warranties, either expressed or implied, as to the professional advice or data included in it.

MOORE & TABER

Ted. M. Primas
Project Engineering Geologist
TMP/JJW:rb

Reviewed by J. J. Weaver
Registered Civil Engineer 32316

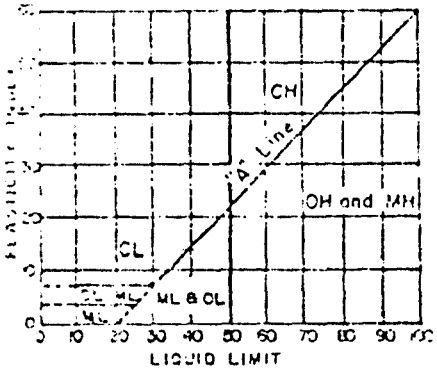
(6) Copies to Mr. Phil Campbell

APPENDIX A

FIELD EXPLORATION

UNIFIED SOIL CLASSIFICATION

Pt	OH	CH	MH	OL	CL	ML	SC	SM	SP	SW	GC	GM	GP	GW
Highly organic soils	Silts and clays Liquid limit greater than 50			Silts and clays Liquid limit less than 50			Sands with fines >12% fines		Clean sands <5% fines		Gravels with fines >12% fines		Clean gravels <5% fines	
							Sands - more than 50% of coarse fraction is smaller than Nº 4 sieve				Gravels - more than 50% of coarse fraction is larger than Nº 4 sieve			
Fine grained soils (More than 50% is smaller than Nº 200 sieve)							Coarse grained soils (More than 50% is larger than Nº 200 sieve)							



LABORATORY CLASSIFICATION CRITERIA

GW and SW - $C_u = \frac{D_{60}}{D_{10}}$ greater than 4 for GW & 6 for SW; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3.

GP and SP - Clean gravel or sand not meeting requirements for GW and SW.

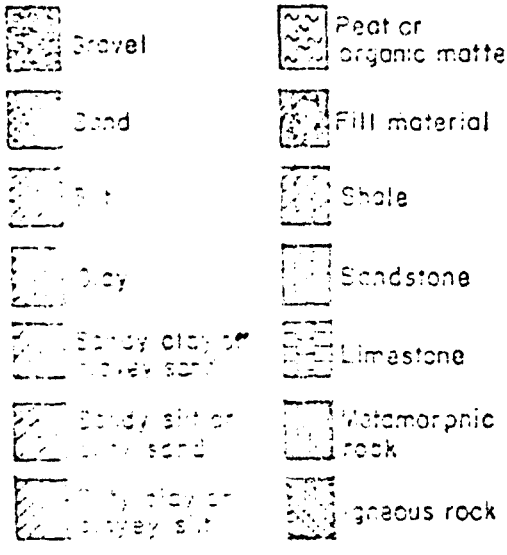
GM and SM - Atterberg limits below "A" line or P.I. less than 4.

GC and SC - Atterberg limits above "A" line with P.I. greater than 7.

Fines (silt or clay)	Fine sand	Medium sand	Coarse sand	Fine gravel	Coarse gravel	Cobbles	Boulders
Sieve sizes	#200	#40	#10	#4	3/4"	3"	12"

Classification of earth materials shown on this sheet is based on field inspection and should not be construed to imply laboratory analysis unless so stated.

MATERIAL SYMBOLS

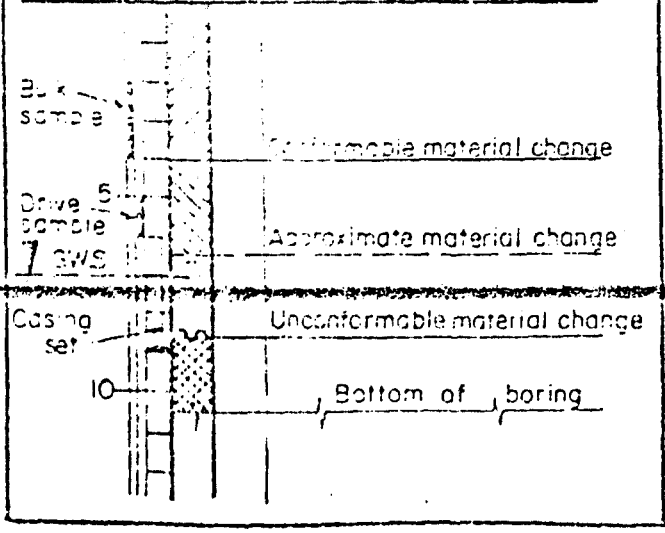


CONSISTENCY CLASSIFICATION FOR SOILS

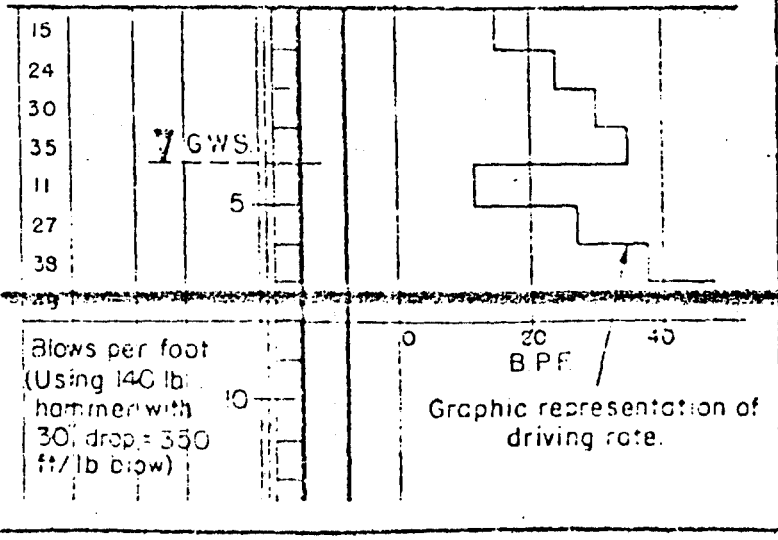
According to the Standard Penetration Test

Nº of blows	Granular	Cohesive
0 - 5	Very loose	Very soft
6 - 10	Loose	Soft
11 - 20	Semicompact	Stiff
21 - 35	Compact	Very stiff
36 - 70	Dense	Hard
>70	Very dense	Very hard

LEGEND OF BORING



LEGEND OF PENETRATION TEST



MOORE & TABER CONSULTING ENGINEERS AND GEOLOGISTS

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 156.5 | BORING

									Broken asphalt and base rock
		104.2	12.9	2	2.5 Bag	1 2			NATURAL: Dark red-brown SANDY SILT
		103.3	14.9	1	2.5	3	5	ML	... color change to red-brown - minute voids ... lighter red-brown color at 4' ... increasing SAND
		91.3	17.9	4	2.5	4	10		... decreasing SAND ... color change at 10' to light greenish brown - sample has minute voids
		101.2	21.7	5	2.5	5	15		... cemented modules of SANDY SILT ... sample has minute voids and material is cemented
							20		NOTES: 1) End of hole 16'. 2) No caving. 3) No groundwater encountered. 4) Backfilled 7-23-81.

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 157.5 | BORING 2

		101.2	[illegible]	[illegible]	2.5	1			FILL: 6" broken asphalt and green SILTY SAND, black fine-medium SILTY SAND with glass and nails.
		113.7	[illegible]	3	2.5	2	5	SM	... slight oil smell at 3' ... wire at 4.5'
		[illegible]	[illegible]	[illegible]	2.5	3			gray SANDY SILT with oil smell - SUMP
		[illegible]	[illegible]	[illegible]	2.5	4	10	ML	... mixed with drilling mud ... roots at 14'
		[illegible]	[illegible]	[illegible]	2.5	5	15	CL	NATURAL: mottled gray-green CLAYEY SILT
							20		NOTES: 1) End of boring 16'. 2) No caving. 3) No groundwater encountered. 4) Backfilled 7-23-81.

STRIKE / DIP	RELATIVE COMPACTION	DRY DENSITY (LBS/CU.FT)	MOISTURE (%)	BLOWS/FOOT 1500 FT-LB	SAMPLE SIZE (INCHES)	SAMPLE Nº	DEPTH IN FEET	MATERIAL SYMBOL	UNIFIED SOIL CLASS.

THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

LOGGED BY TMP | DATE 7-23-81

MOORE TABER CONSULTING ENGINEERS AND GEOLOGISTS

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 158.0 | BORING

Depth in Feet	Material Symbol	Unified Soil Class.	Description
		SM	Broken asphalt and base with yellow-brown SILTY SAND.
		SC	FILL: gray CLAYEY SAND with GRAVEL to 2".
5			white bentonite with GRAVEL to 2.5"
		ML	mottled blue-gray CLAYEY SILT with slight oil smell
10		ML	mottled blue-gray CLAYEY SILT and SAND with strong oil smell - SUMP
15			
20			

Dry Density (LBS/CU.FT)	Moisture (%)	Blows/Foot	Sample Size (Inches)	Sample No.
101.0	22.2	P	2.5 Bag	1 2
97.9	28.5	P	2.5	3
99.0	26.3	P	2.5	4

NOTES:

1) End of boring 11'.
2) Caved back to 9'.
3) No groundwater encountered.
4) Backfilled 7-23-81.

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 158.0 | BORING 4

Depth in Feet	Material Symbol	Unified Soil Class.	Description
		ML	3" broken asphalt NATURAL: red-brown CLAYEY SILT with minute voids.
		ML	red-brown SANDY SILT with minute voids ... color changed to light red-brown
5		ML	red-brown cemented CLAYEY SILT
10		ML	gray-green SANDY SILT with minute root voids
15			
20			

Dry Density (LBS/CU.FT)	Moisture (%)	Blows/Foot	Sample Size (Inches)	Sample No.
117.4	1[illegible]	8	2.5 Bag	1 2
113.7	22.[illegible]	7	2.5	3
[illegible]	[illegible]	8	2.5	4
[illegible]	[illegible]	6	2.5	5

NOTES:

1) End of boring 16'.
2) No caving.
3) No groundwater encountered.
4) Backfilled 7-24-81.

STRIKE / DIP | RELATIVE COMPACTION | DRY DENSITY (LBS/CU.FT) | MOISTURE (%) | BLOWS/FOOT 1500 ft lbs | SAMPLE SIZE (INCHES) | SAMPLE No. | DEPTH IN FEET | MATERIAL SYMBOL | UNIFIED SOIL CLASS.

THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

LOGGED BY TMP | DATE 7-24-81

MOORE & TABER CONSULTING ENGINEERS AND GEOLOGISTS

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 158.[illegible] | BORING [illegible]

Relative Compaction	Dry Density (lbs/cu ft)	Moisture (%)	Blows/Foot /300 [illegible]	Sample Size (inches)	Sample No	Depth in Feet	Material Symbol	Unified Soil Class.	Description
	88.1	14.7	2	Bag 2.5	1 2			ML	FILL: brown SANDY SILT with trace of CLAY and wood fragments
	101.6	9.5	2	2.5	3	5		SM	NATURAL: light brown fine SILTY SAND
	103.1	12.0	2	2.5	4			ML	dark red-brown CLAYEY SILT ... color change to red-brown at 9' with minute voids
	112.2	15.6	4	2.5	5	10			
								ML	light yellow-brown micaceous SANDY SILT
	101.1	19.0	5	2.5	6	15		SM	light yellow-brown micaceous fine SILTY SAND with voids
						20			1) End of boring 16'. 2) No caving. 3) No groundwater encountered. 4) Backfilled 7-23-81.

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 157.3 | BORING [illegible]

Relative Compaction	Dry Density (lbs/cu ft)	Moisture (%)	Blows/Foot /300 [illegible]	Sample Size (inches)	Sample No	Depth in Feet	Material Symbol	Unified Soil Class.	Description
	[illegible]	[illegible]	[illegible]	2.5	1			ML	FILL: yellow-brown SANDY SILT with GRAVEL and A.C. ... wire at 2.5'
	101.9	[illegible]	[illegible]	2.5	2	5		ML	NATURAL: mottled yellow-brown SANDY SILT
	118.[illegible]	18.[illegible]	[illegible]	2.5	3	10		ML	red-brown CLAYEY SILT ... minute voids
								ML	light red-brown SANDY SILT
	102.[illegible]	[illegible]	[illegible]	2.5	4	15		SM	yellow-brown fine-medium SILTY SAND
						20			NOTES: 1) End of boring 16'. 2) No caving. 3) No groundwater encountered. 4) Backfilled 7-23-81

Strike/Dip | Relative Compaction | Dry Density (lbs/cu ft) | Moisture (%) | Blows/Foot /300 [illegible] | Sample Size (inches) | Sample No | Depth in Feet | Material Symbol | Unified Soil Class.

THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

LOGGED BY [illegible] | DATE 7-23-81

MOORE TABER CONSULTING ENGINEERS AND GEOLOGISTS

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 157.9 | BORING

STRIKE / DIP	RELATIVE COMPACTION	DRY DENSITY (LBS/CU.FT)	MOISTURE (%)	BLOWS/FOOT /500 ft lbs	SAMPLE SIZE (INCHES)	SAMPLE NO	DEPTH IN FEET	MATERIAL SYMBOL	UNIFIED SOIL CLASS.	
		98.8	17.0	3	2.5	1			SM	FILL: mottled black SILTY SAND with trash debris and oil smell
					Bag	2			ML	mottled brown SANDY SILT
		79.7	32.1	P	2.5	3	5		SM	NATURAL: yellow-green fine SILTY SAND with oil smell
		126.1	5.8	3	2.5	4				
		109.8	15.9	P	2.5	5	10		ML	dark red-brown CLAYEY SILT with organic debris and some voids
		108.8	17.4		2.5	6	15		SM	yellow-brown fine SILTY SAND
							20			

NOTES:
1) End of boring 16'.
2) No caving.
3) No groundwater encountered.
4) Backfilled 7-23-81.

TEST BORING LOG

TYPE 16" Bucket | ELEVATION 158.6 | BORING 3

STRIKE / DIP	RELATIVE COMPACTION	DRY DENSITY (LBS/CU.FT)	MOISTURE (%)	BLOWS/FOOT /500 ft lbs	SAMPLE SIZE (INCHES)	SAMPLE NO	DEPTH IN FEET	MATERIAL SYMBOL	UNIFIED SOIL CLASS.	
										concrete and GRAVEL
		[illegible]	[illegible]	P	2.5	1			ML	FILL: mottled black and gray CLAYEY with some trash (nails, wood) and oil smell
		[illegible]	[illegible]	P	2.5	2	5		ML	gray-green CLAYEY SILT with oil smell and getting very wet (oil sump)
		[illegible]	[illegible]	[illegible]	2.5	3	10		SL	mottled blue-gray medium CLAYEY SAND with oil smell (oil sump)
										NATURAL: gray-black CLAYEY SILT with voids
							15			
							20			

NOTES:
1) End of boring 16'.
2) No caving.
3) Groundwater encountered.
4) Backfilled 7-24-81.
5) Groundwater encountered at 6' 7-24-81.

THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

LOGGED BY TP | DATE 7-23-81

MOORE TABER CONSULTING ENGINEERS AND GEOLOGISTS

TEST BORING LOG

TYPE 18" Bucket | ELEVATION 155.0 | BORING 9

STRIKE / DIP	RELATIVE COMPACTION	DRY DENSITY (LBS/CU.FT.)	MOISTURE (%)	BLOWS/FOOT 300 ft-lb	SAMPLE SIZE (INCHES)	SAMPLE NO	DEPTH IN FEET	MATERIAL SYMBOL	UNIFIED SOIL CLASS.	
		113.3	13.6	2	2.5	1			ML	FILL: mottled gray-green CLAYEY SILT ... color change to mottled yellow-brown
		115.7	13.9	3	2.5	2	5		ML	NATURAL: dark red-brown CLAYEY SILT with voids ... color change to red-brown - some SAND
		116.2	14.9	4	2.5	3				
					Bag	4				
		97.7	22.2	14	2.5	5	10		ML	gray-green CLAYEY SILT with trace of SAND and voids
					Bag	6			SM	yellow-green fine SILTY SAND
		108.9	8.6	10	2.5	7	15			
							20			

NOTES:
1) End of boring 16'.
2) No caving.
3) No groundwater encountered.
4) Backfilled 7-24-81

TEST BORING LOG

TYPE [illegible] Bucket | ELEVATION 157.5 | BORING 10

STRIKE / DIP	RELATIVE COMPACTION	DRY DENSITY (LBS/CU.FT.)	MOISTURE (%)	BLOWS/FOOT 300 ft-lb	SAMPLE SIZE (INCHES)	SAMPLE NO	DEPTH IN FEET	MATERIAL SYMBOL	UNIFIED SOIL CLASS.	
		[illegible]	[illegible]	[illegible]	2.5	1			ML	FILL: brown SANDY SILT with weeds and grass
		[illegible]	[illegible]	[illegible]	2.5	2	5		ML	NATURAL: mottled red-brown and gray CLAYEY SILT with roots and voids and organic debris
									SM	gray-green fine SILTY SAND with roots
		[illegible]	[illegible]	[illegible]	2.5	3	10		ML	brown CLAYEY SILT with voids ... sample has minute voids ... some fine SAND ... color change to mottled gray-brown at 13.5'
		[illegible]	[illegible]		2.5	4	15		SM	yellow-brown fine micaceous SILTY SAND
							20			

NOTES:
1) End of boring 16'.
2) No caving.
3) No groundwater encountered.
4) Backfilled 7-24-81.

THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

LOGGED BY TMP | DATE 7-24-81

MOORE & TABER CONSULTING ENGINEERS AND GEOLOGISTS

TEST BORING LOG

TYPE 16" Bucket | ELEVATION [illegible] | BORING [illegible]

Strike/Dip	Relative Compaction	Dry Density (Lbs/Cu.Ft.)	Moisture (%)	Blows/Foot 1500 ft lbs	Sample Size (Inches)	Sample No	Depth in Feet	Material Symbol	Unified Soil Class.	Description
									SM	FILL: orange-brown SILTY SAND with roots and grass
		110.6	10.4	2	2.5	1				
		108.5	14.2	1	2.5	2	5		ML	NATURAL: brown CLAYEY SILT with voids ... color change to red-brown at 4'
		94.0	24.4	10	2.5	3	10		ML	gray-green SANDY SILT
		97.0	26.1	6	2.5	4	15		SM	gray fine SILTY SAND
							20			

NOTES:
1) End of boring 16'.
2) No caving.
3) No groundwater encountered.
4) Backfilled 7-24-81.

TEST BORING LOG

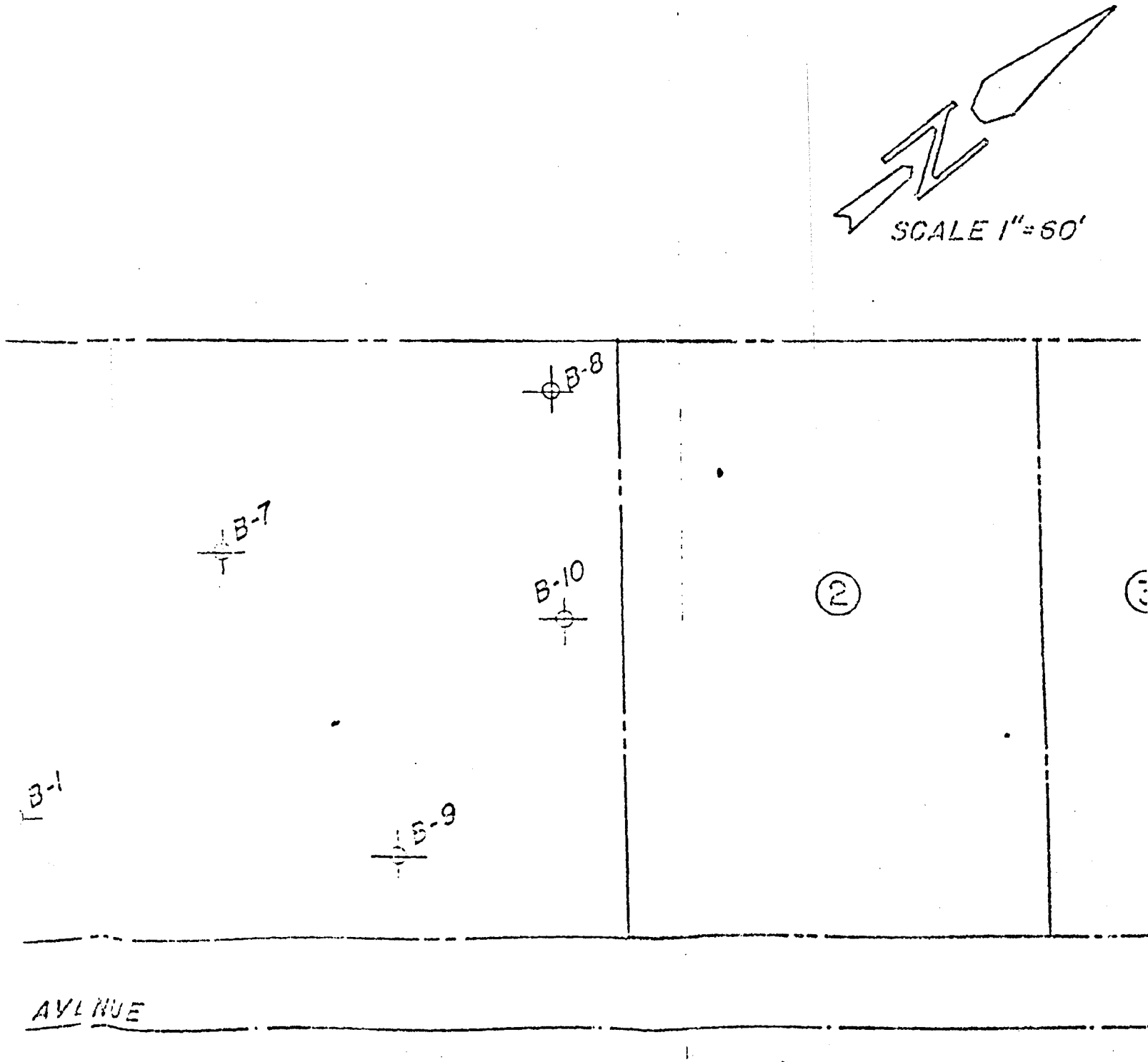
TYPE Hand Dug | ELEVATION 156.5 | BORING [illegible]2

Strike/Dip	Relative Compaction	Dry Density (Lbs/Cu.Ft.)	Moisture (%)	Blows/Foot 1500 ft lbs	Sample Size (Inches)	Sample No	Depth in Feet	Material Symbol	Unified Soil Class.	Description
									ML	FILL: brown CLAYEY SILT with trash debris
							5		ML	NATURAL: brown CLAYEY SILT with voids and roots
							10			
							15			
							20			

NOTES:
1) End of boring 2'.
2) No caving.
3) No groundwater encountered.
4) Backfilled 7-24-81.

THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

LOGGED BY TMP | DATE 7-24-81

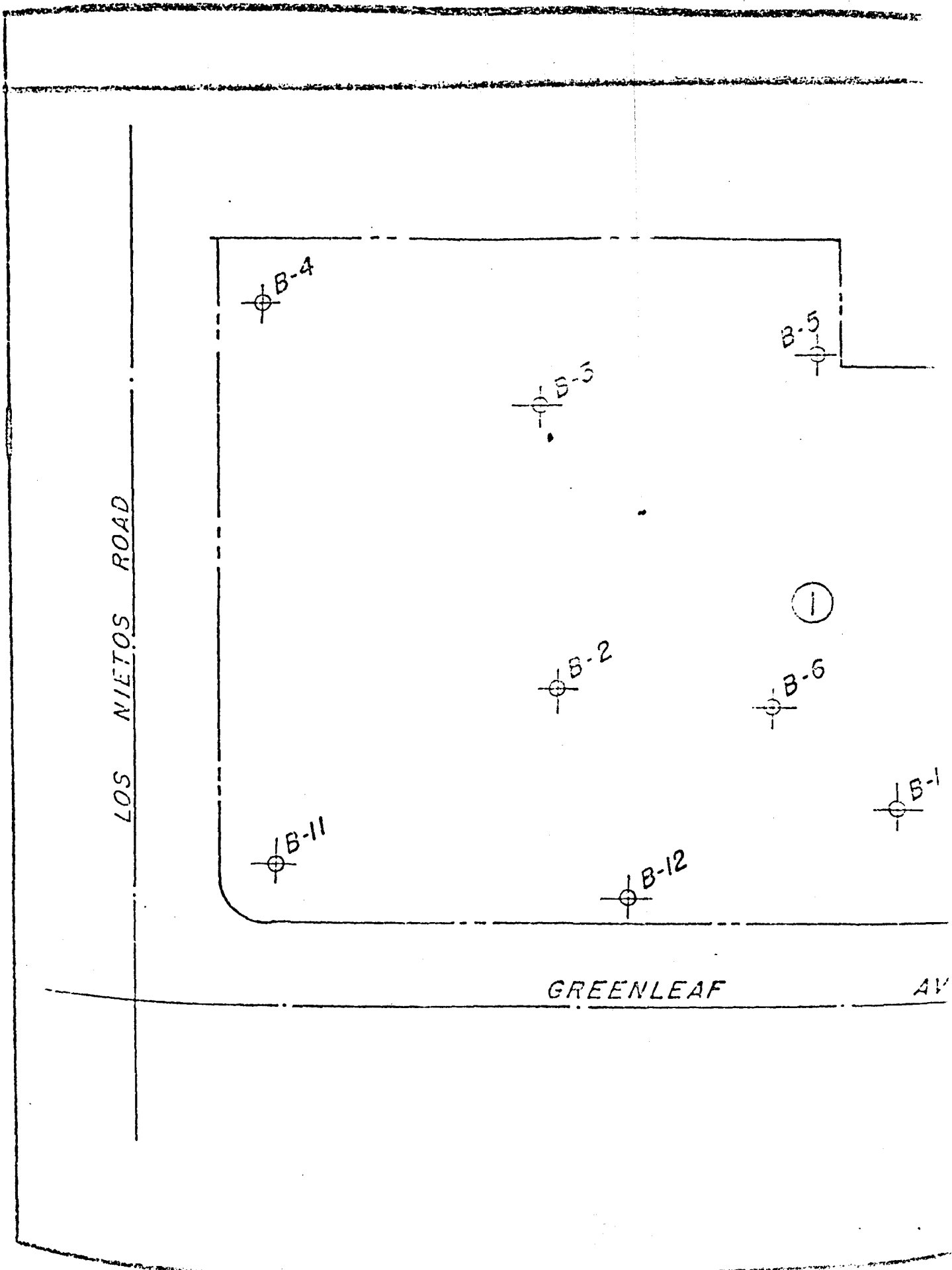


LOT Nº 1
PARCEL MAP Nº 14608
SANTA FE SPRINGS, CA.

LOCATION OF BORINGS

MOORE & TABER · Engineers - Geologists

DRAFT.	APPROV.	DATE	JOB Nº
A.L.S.		8-26-81	181 - 66


B-4
B-5
B-3
1
B-2
B-6
B-1
B-11
B-12
LOS NIETOS ROAD
GREENLEAF

APPENDIX B

LABORATORY TESTING & RESULTS

MOORE & TABER - *Engineers - Geologists*

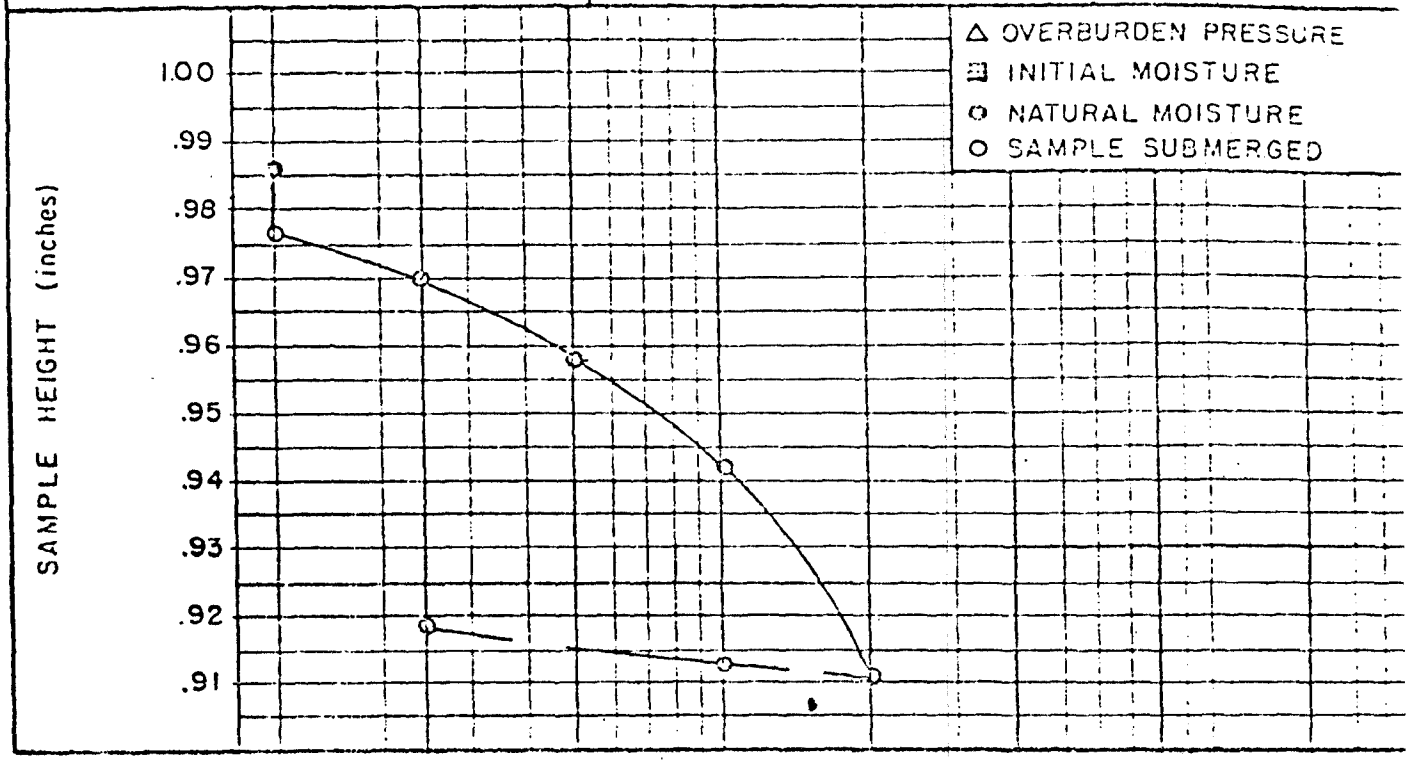
SOIL TEST RESULTS

Job No. 181-66 - August 26, 1981

BORING NO. / SAMPLE NO.	1/2	4/2	5/1	7/1	7/2
DESCRIPTION	Brown CLAYEY SILT	Brown SANDY SILT	Gray-Brown CLAYEY SILT	Green SANDY SILT	Brown SANDY SILT
UNIFIED SOIL CLASSIFICATION	ML	ML	ML	ML	ML
DIRECT SHEAR TEST (type)				Undisturbed	
Initial Moisture Content %				17.0 17.0 17.0	
Test Moisture Content %				Saturated	
Normal Stress (lbs./sq.ft.)				990 1980 2970	
Peak Shear Stress (lbs./sq.ft.)				1450 2170 2300	
Ultimate Shear Stress (lbs./sq.ft.)				860 1450 2020	
Angle of Internal Friction (degrees)				30	
Cohesion (lbs./sq.ft.)				300	
EXPANSION TEST	UBC 29-2				UBC 29-2
Initial Dry Density (lbs./sq.ft.)	113.5				109.5
Initial Moisture %	9.0				10.0
Final Moisture %	14.8				17.2
Pressure (lbs./sq.ft.)	144				144
Expansion Index / Swell %	8 / 0.8				5 / 0.5
COMPACTION TEST (type)			ASTM D1557-70		
Maximum Dry Density (lbs./sq.ft.)			116.0		
Optimum Moisture %			13.8		
SOLUBLE SULFATES			Calif. 417A		
[illegible] Concentration %			0.0959		
[illegible]			Calif. 643		
			7.5		
(ohm-cm)			555		
[illegible]		Calif. 301-F			
[illegible]		15			

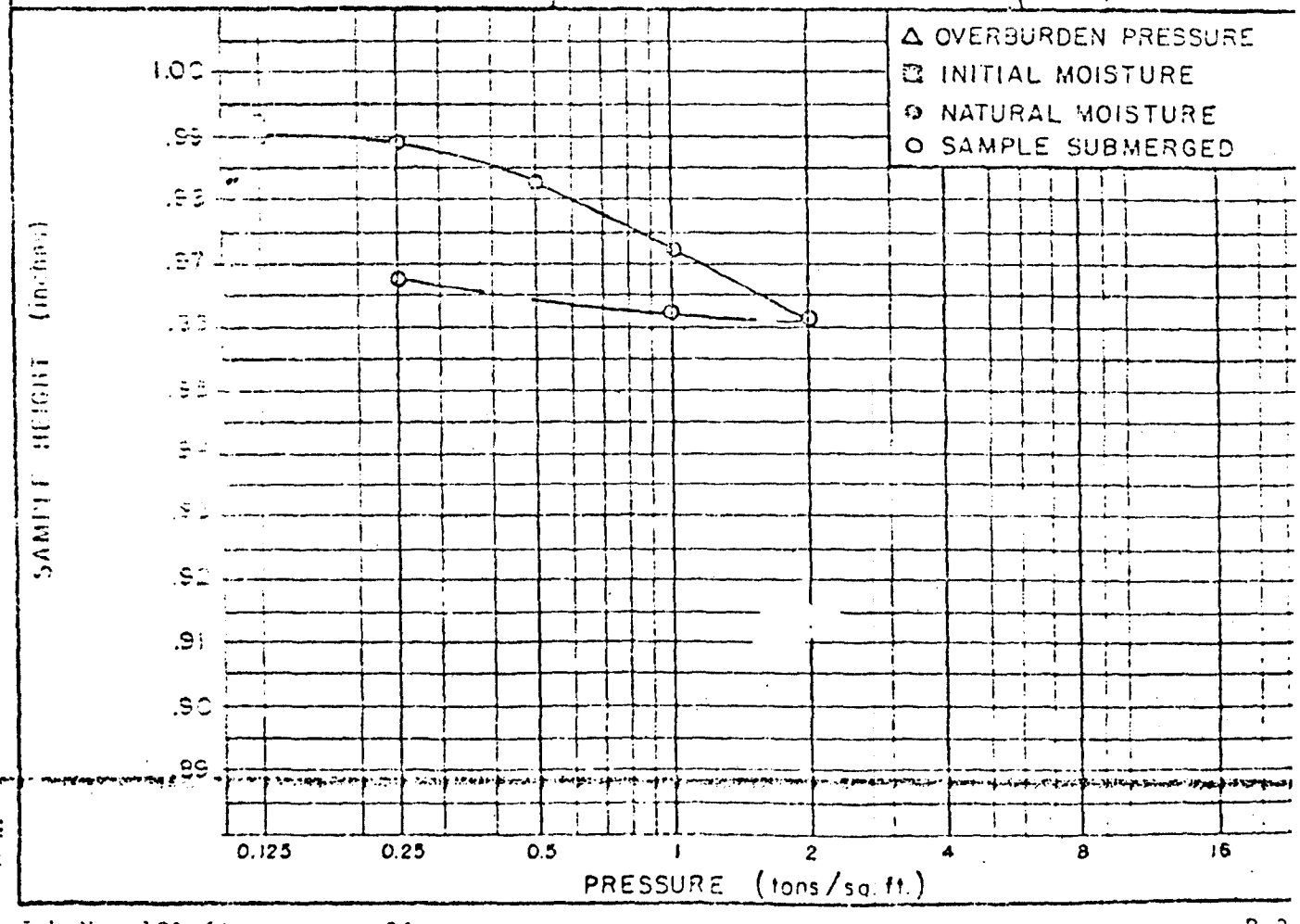
CONSOLIDATION TEST – PRESSURE CURVES

Bor./Sample Nº 1/1 | Elev. - Depth 2' | Date 8-6-81



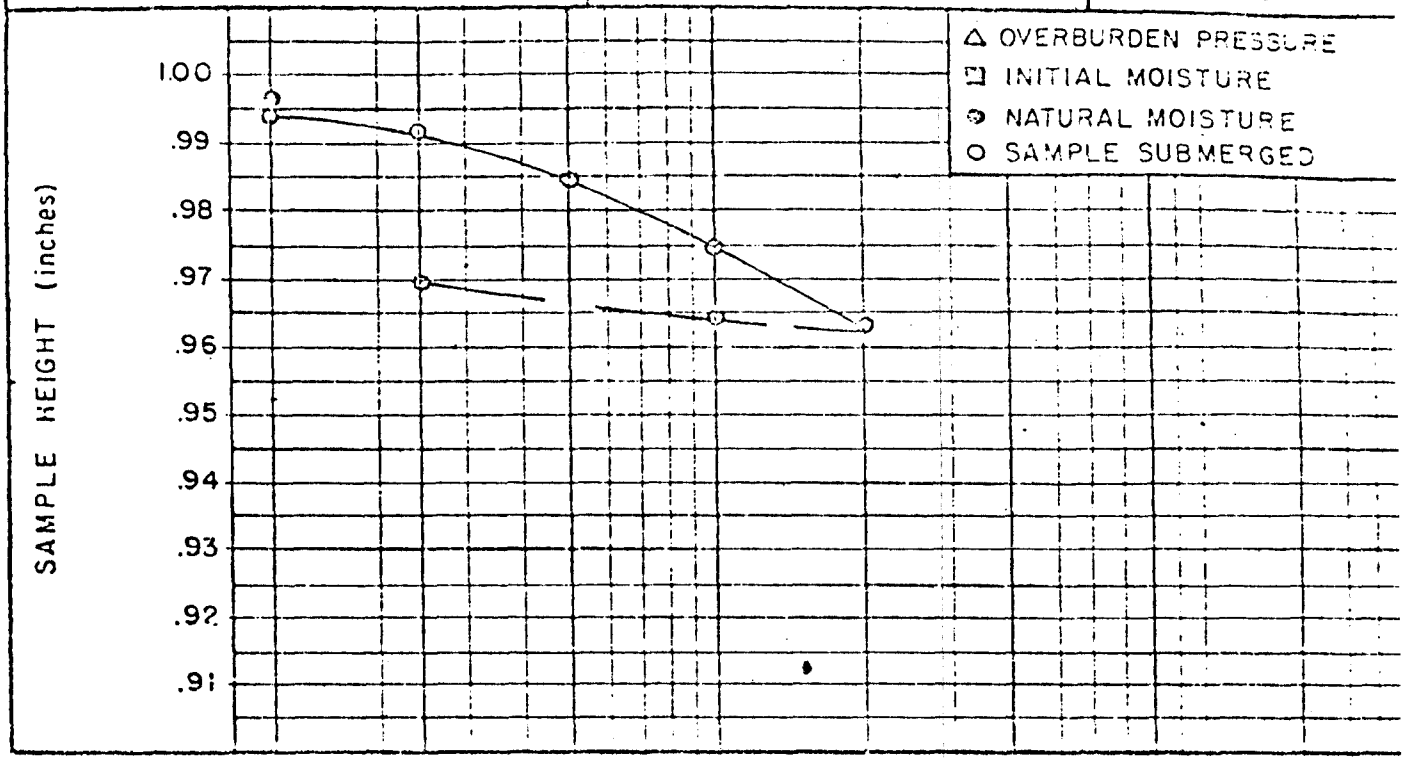
CONSOLIDATION TEST – PRESSURE CURVES

Bor./Sample Nº 4/1 | Elev. - Depth 2' | Date 8-6-81



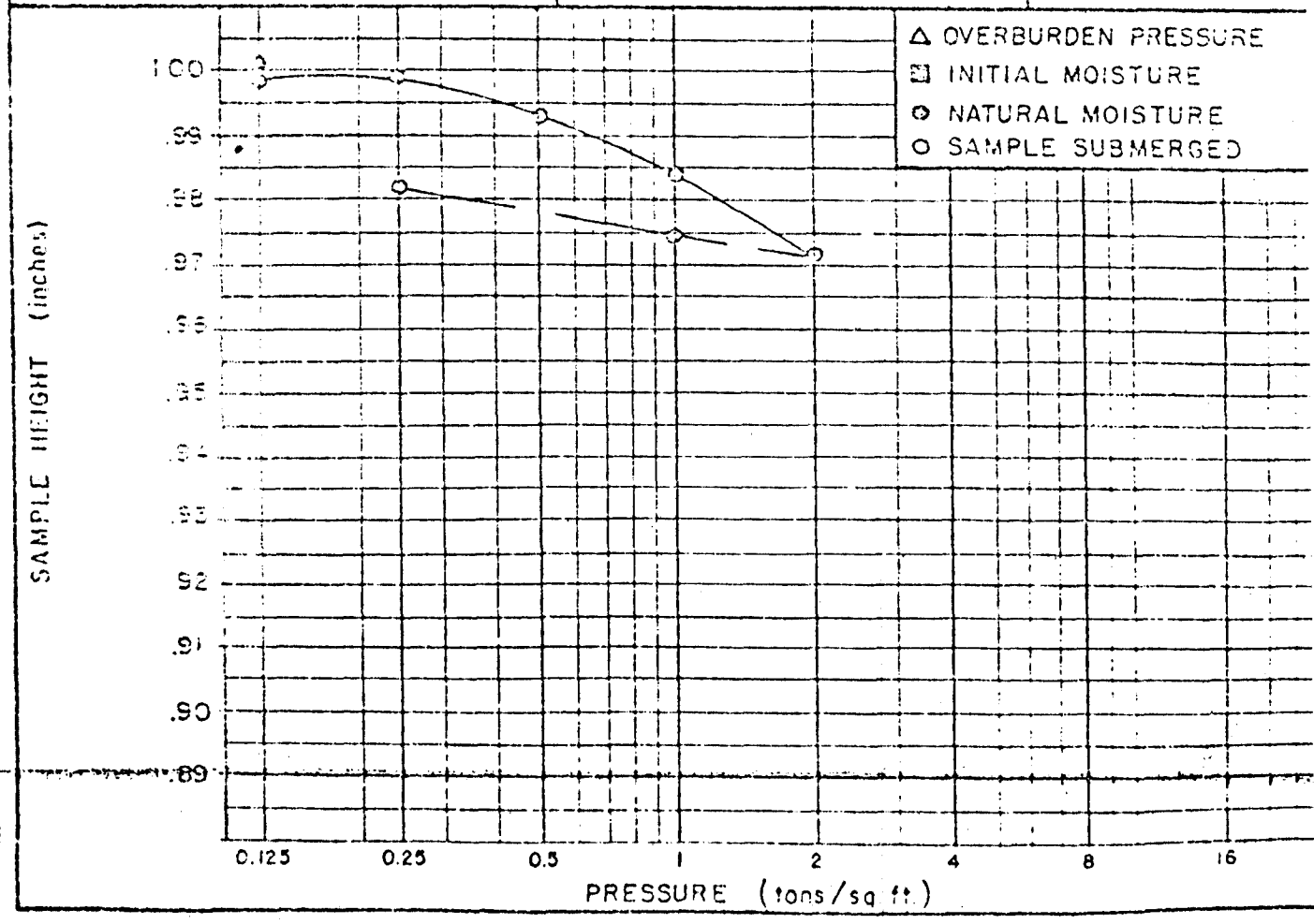
CONSOLIDATION TEST – PRESSURE CURVES

Bor./Sample Nº [illegible] | Elev. – Depth 5' | Date 8-6-81



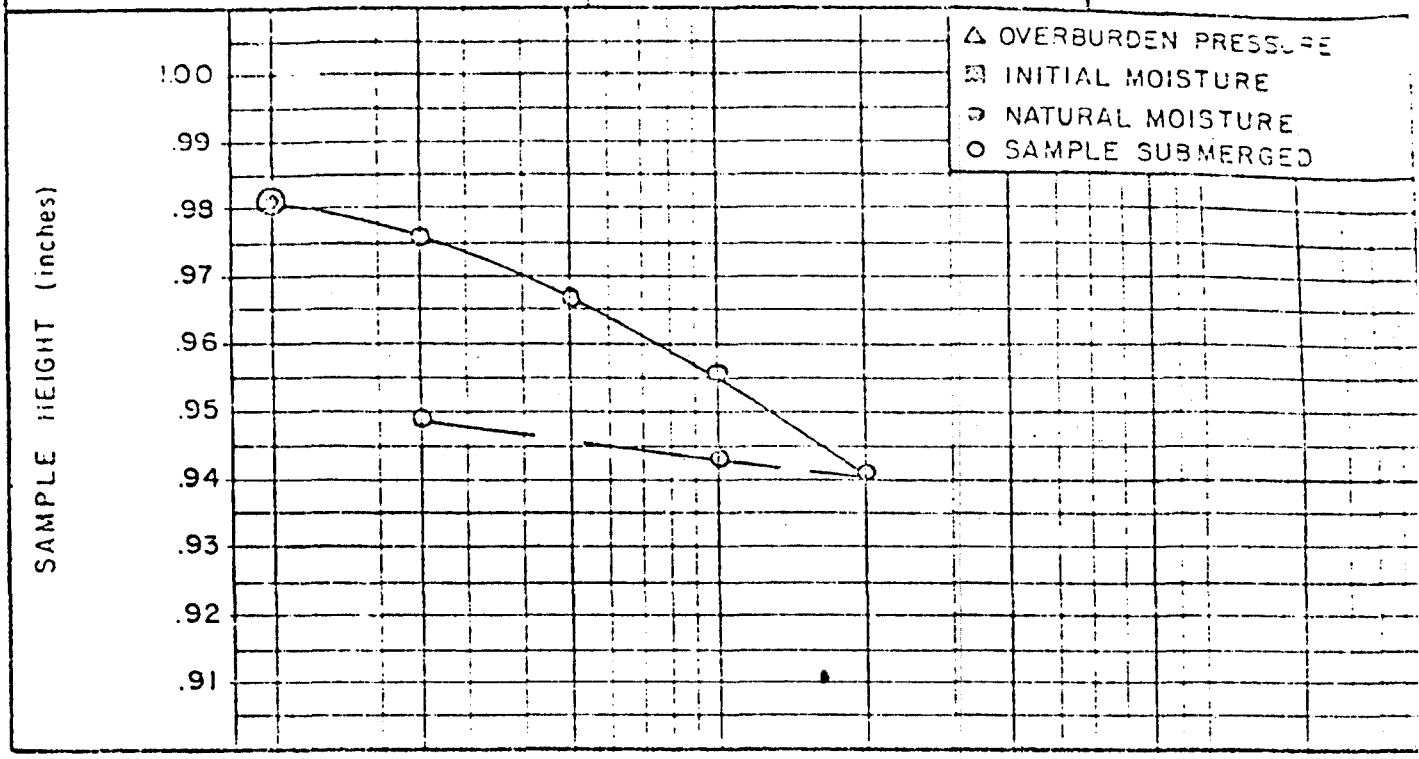
CONSOLIDATION TEST – PRESSURE CURVES

Bor./Sample Nº 5/5 | Elev. – Depth 10' | Date 8-6-81



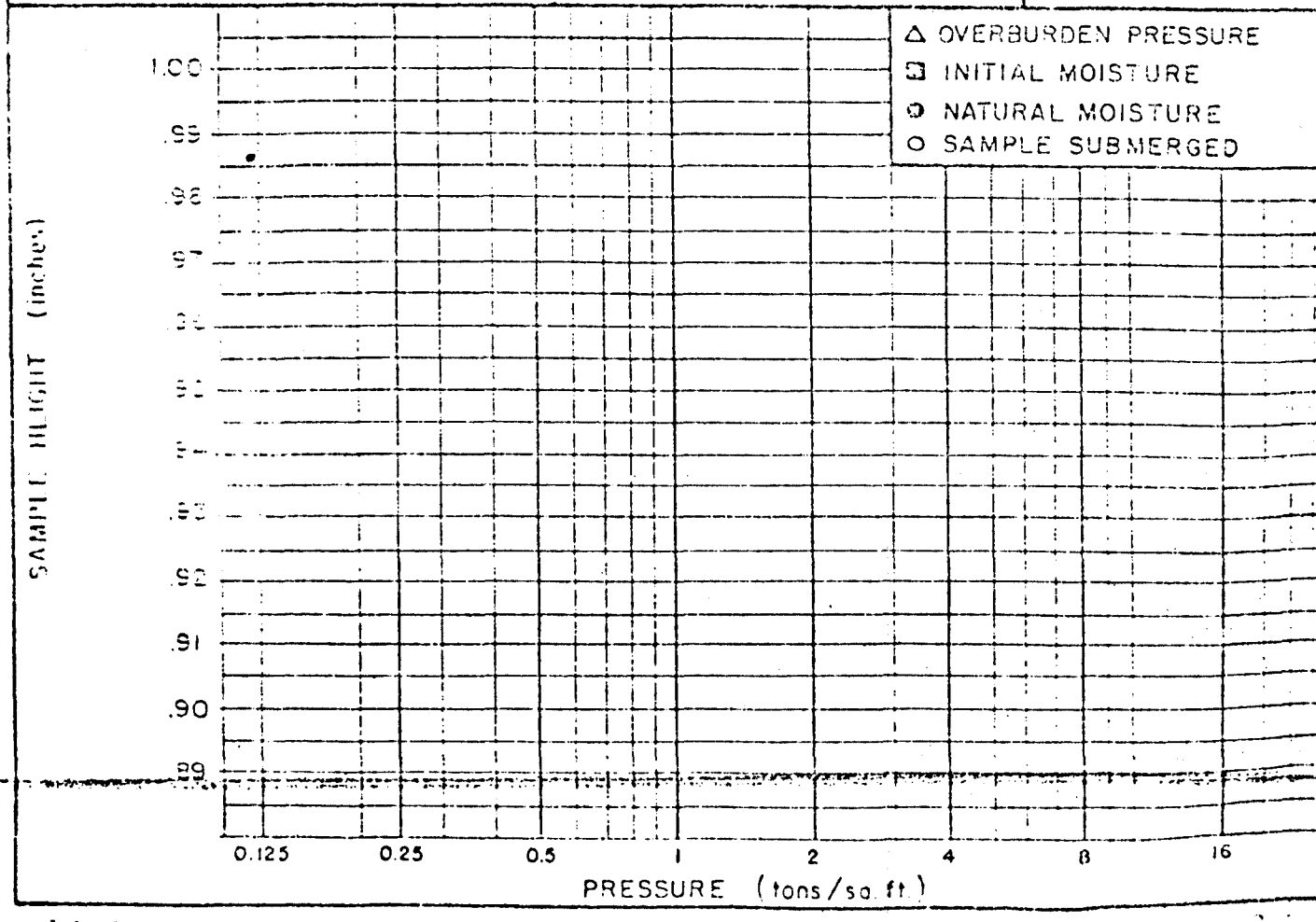
CONSOLIDATION TEST – PRESSURE CURVES

Bor / Sample Nº 7/5 | Elev. - Depth 10' | Date [illegible]



CONSOLIDATION TEST – PRESSURE CURVES

Bor / Sample Nº | Elev. - Depth | Date



Job No. 181-66 - August 26, 1981

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Job No. F75-115
October 22, 1975

FINAL REPORT OF COMPACTED FILL

Compacted Building Pad for Proposed Industrial Building, located at 12707 Los Nietos Road, City of Santa Fe Springs, California.

Developer: Coastal Developers Co.

Introduction

This report presents the results of field and laboratory tests and field supervision provided for during the excavation of fill materials, the processing and compaction of the exposed natural ground and the adequate placement and compaction of structural fill soils to construct the subject building pad. These soils engineering services were provided for by agreement with Steve McMillian representing Coastal Developers Company.

Grading Procedure

Grading operations were conducted by the Coastal Developers Company during the months of September and October, 1975. Prior to the grading of the site the ground surface was stripped of existing vegetation and debris. After the building area had been properly cleaned, the excavation of existing fill materials was conducted. All fill materials were completely excavated to a depth of 8.0 feet in the building area and at least 8 feet beyond the limits of the proposed building. After the fill soils had been excavated the underlying natural ground was processed for 12 inches and was compacted to at least 90% relative compaction. The excavated soils were then used for structural fill purposes and the soils were clean, stable earth materials free of deleterious substances. These soils were placed in thin lifts of 6 to 8 inches at near optimum moisture and were compacted by sheepsfoot equipment to at least 90% relative compaction. The rest of the building pad area was processed for a depth of 12 inches and compacted to 90% relative compaction. The maximum depth of the compacted fill soils in the building pad area was obtained by estimates made in the field and was on the order of 8.0 feet.

Testing

Maximum density determinations were made on the typical structural fill soils in accordance with the Standard Test Method

MR. Cause

A.S.T.M. D1557-70T with 25 blows in each of 5 layers with a 10 lb. hammer falling 18 inches in a mold of 1/30 cu.ft. volume.

Soil A — Medium brown sandy silt with clay binder; Maximum density 113.1 lbs./cu.ft. at 14.7% optimum moisture.

Soil B — Medium brown sandy silt; Maximum density 118.3 lbs./cu.ft. at 12.2% optimum moisture.

Soil C — Medium brown silty fine sand; Maximum density 115.7 lbs./cu.ft. at 12.7% optimum moisture.

The results of a textural and visual analysis of the typical foundation soils and expansion tests performed on remolded samples of soils compacted to over 90% and measured from oven dry to saturation after a period of several days and in complete accordance with the procedures as outlined by the "International Conference of Building Officials" are as follows:

Expansion Tests

Soil Type	Confining Load	% Expansion
A	650 p.s.f.	0.4
A	60 p.s.f.	3.0
B	650 p.s.f.	0.3
B	60 p.s.f.	1.5
C	650 p.s.f.	0.6
C	60 p.s.f.	2.5

The results of the expansion tests indicate that the typical foundation soils are slightly-expansive with respect to detrimental seasonal volume change.

The results of relative compaction tests taken daily during the grading operations are as follows:

Test No.	Soil Type	Field Moisture (%)	Dry Density (lbs./cu.ft.)	Relative Compt. %
S-1	B	15.0	114.2	97
S-2	B	17.2	110.6	93
S-3	B	12.4	113.9	96

Soil Test No.	Soil Soil Type	Field Moisture (%)	Dry Density (lbs./cu.ft.)	Relative Compt. %
S-4	B	16.8	114.0	96
S-5	A	21.0	102.4	91
S-6	A	17.3	101.7	90
S-7	B	17.9	106.7	90
S-8	B	14.8	111.3	94
S-9	B	15.3	113.0	95
S-10	B	18.0	109.3	92
S-11	B	18.1	110.7	94
S-12	C	14.1	104.9	91
S-13	B	12.8	116.9	98
S-14	B	16.0	110.1	93
S-15	A	13.5	109.6	97
S-16	A	13.5	103.6	92
S-17	A	17.7	106.4	94
S-18	A	8.4	106.1	94
S-19	B	17.5	110.9	94
S-20	B	17.3	112.6	95
S-21	A	20.0	102.5	91
S-22	B	16.0	111.0	94
S-23	B	15.2	108.0	91
S-24	B	16.3	113.1	96
S-25	B	18.7	107.3	91
S-26	B	17.4	109.4	92
S-27	B	15.7	113.6	96
S-28	B	17.1	110.2	93
S-29	B	8.4	105.9	90
S-30	C	14.4	104.8	91
S-31	B	14.7	109.7	93
S-32	A	11.8	101.4	90
S-33	B	13.4	109.4	93
S-34	C	7.4	104.8	91
S-35	B	16.0	108.7	92

Conclusions and Recommendations

All of the cleanup operations, the excavations, of fill materials, compaction of the natural ground and the final placement and compaction of structural fill soils were conducted in accordance with provisions of Chapter 70 of the Uniform Building Code and were also in compliance with all of our specifications and testing

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procedures. Allowable soil bearing pressures are now applicable for various sizes and types of footings as outlined in our Fill Investigation and Preliminary Soils Study, dated August 4, 1975, Job Job No. F75-99.

Based on the results of expansion tests and the results of the inspection and tests made during the grading and compaction operations, it is concluded that all of the pertinent foundation soils in proximity to the footings and slabs are non-expansive with respect to detrimental seasonal volume change.

It is suggested that a moisture barrier such as a polyethylene membrane be used beneath floor slabs where office areas might be involved and this will minimize the possibility of excessive moisture coming through the floors. In addition to this, fine grading, paving and landscaping should provide positive and permanent drainage away from all foundation areas and be directed towards the streets or approved drainage devices.

Respectfully submitted,

HAMMOND SOILS ENGINEERING

By Ross Hammond

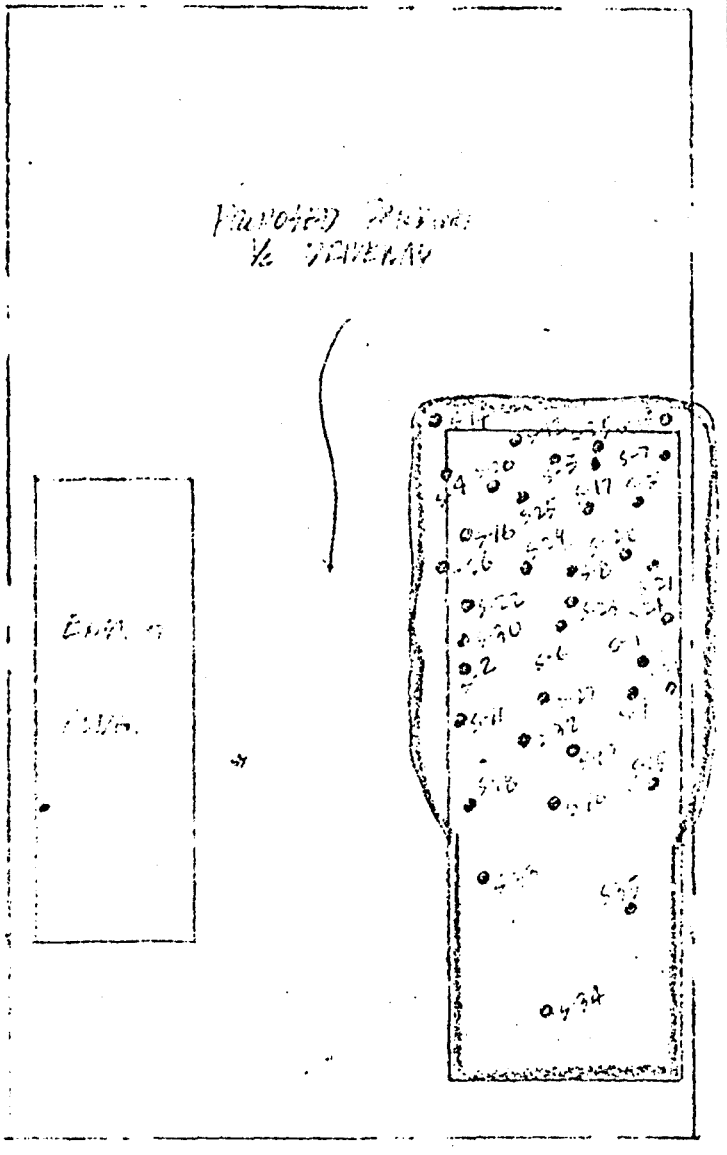
Reviewed By Ronald W. Martin
R.C.E. 14456

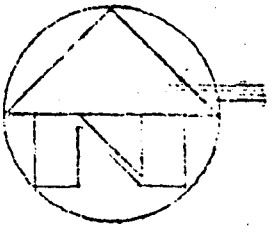
RH:plk
4-Coastal Developers

12707 Los Nietos Road, Santa Fe Springs

Coastal Developers Company

AAZ Job No. F75-115 10-22-75





SCALE 1" = 50'

LOS NIETOS ROAD

LEGEND

• APPROXIMATE LOCATIONS OF RELATIVE COMPACTION TESTS

APPROXIMATE LIMITS OF COMPACTED SOILS IN BUILDING PAD AREA

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FILL INVESTIGATION

AND

PRELIMINARY SOILS STUDY

Proposed Industrial Building located at 12707 East Los Nietos Road, Santa Fe Springs, Calif.

Developer: Coastal Developers Co.
1019 Mammoth Way
Placentia, CA

Job No. F75-99

August 4, 1975

MMOND SOILS ENGINEER G
PRELIMINARY SOILS INVESTIGATION • FOUNDATION STUDIES
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PHONE 633-5613
199 N. STATE COLLEGE BLVD. • ORANGE, CALIFORNIA

Job No. F75-99
August 4, 1975

FILL INVESTIGATION AND PRELIMINARY SOILS STUDY

Proposed Industrial Building located at 12707 East Los Nietos Road, Santa Fe Springs, Calif.

Developer: Coastal Developers Co.

Introduction

This Fill Investigation and Preliminary Soils Study presents the results of field work and laboratory testing in accordance with the City of Santa Fe Springs Department requirements for the development of the proposed industrial building. The property is rectangular shape with a frontage along Santa Fe Springs of 176 feet and a depth or length of 290 feet. The proposed industrial building will be located along the east side of the site with driveway and parking facilities planned over the west side of the property. The land is relatively flat and appears to have been used for a storage area. A small metal building is located at the south end of the site along Los Nietos Road.

Field Investigation

Should be deeper. *

A total of four backhoe excavations were made to depths ranging from [illegible] to 11 feet in the proposed building area to properly assess the existing soil conditions. The depth and frequency of these borings combined with a correlation of all of the soil and a study of the surrounding soil conditions provided a comprehensive surface and subsurface soils analysis with respect to the type of development intended.

The backhoe excavations uncovered fill materials which are located over approximately two-thirds of the proposed building pad area. These soils are described as mottled sandy silt and clay with some debris and deleterious material noted. Some oil contaminated soils were also noted. Our excavations indicate approximately 7.5 feet of fill at the extreme north end of the proposed building area with 8.5 feet of fill noted in the center of the building area. Excavations made at the south end of the proposed building indicate a shallow surface fill of approximately 1.5 feet. During the grading operations it will be necessary to completely excavate all of the fill soils from the building area. After the fill material has been excavated

and all undesirable debris removed from the soil, then the excavated fill material should be mixed with clean soils and may be used for backfill and recompaction purposes.

The typical native soils encountered below the fill soils were fairly uniform in composition and classified as clayey fine sandy silt and fine sandy silts with clay binder. Moisture content was generally in the vicinity of optimum varying from a low of 11.2% to a high of 20.1%, however, no ground water surface was encountered to a depth of ten feet and should be considerably below this depth so that it will have no affect whatsoever on either the underground utilities or the proposed foundations. With proper cleaning and removal of the deleterious fill soils and the proper processing and compaction of the native soils, satisfactory stable foundation soil conditions can be expected for the proposed structural fills and resulting building pad.

Laboratory Testing

The results of laboratory tests performed on the typical foundation soils are as follows:

	Soil Type A
Classification:	Medium brown sandy silt w/ clay binder
Maximum density:	113.1 lbs./cu.ft.
Optimum moisture:	14.7%

Expansion tests were performed on the typical near surface soils, these samples were remolded to over 90% and measured from air dry to saturation after a period of at least 24 hours and until no further expansion was recorded to .001 inches.

Expansion Tests

Soil Type	Confining Load	E.I.	% Expansion
A	650 p.s.f.		0.3
A	144 p.s.f.	22	2.2
A	60 p.s.f.		3.0

Based on the results of the tests and an analysis of the boring logs, the soils indicate slightly expansive characteristics. During and at the completion of the grading operations, a careful check and control on the soils will be conducted and further expansion tests will be conducted at that time.

Direct shear tests were performed on saturated remolded samples of the typical foundation soils and are shown on the following table:

Boring Sample No.	Water Content Natural (%)	Water Content Test (%)	Normal Stress (t.s.f.)	Peak Shear Stress (t.s.f.)	Peak Shear Strain (ins.)	Ultimate Shear Stress (t.s.f.)	Ultimate Shear Strain (ins.)
A-1	18.9	21.2	0.5	.38	.100	.35	.250
A-2	19.2	21.8	1.0	.67	.110	.63	.250
A-3	18.5	21.0	1.5	.97	.150	.91	.250

The above tests determined an angle of internal friction of 29° with 100 p.s.f. available cohesion. Applying the Terzaghi Bearing Capacity Equation and using factors comparable to the existing soil conditions we have:

$$q = CN_c + wD_fN_q + wBN_w$$

$$= 100(22) + 100(1.0)16 + 100(0.5)14$$

$$= 2200 + 1600 + 700$$

$$= 4500 \text{ p.s.f. (ultimate)}$$

q_a = 1500 p.s.f. (allowable for square or continuous footings not less than 12 inches wide and embedded at least 12 inches below approved finished grade)

q_a = 1750 p.s.f. (allowable for square or continuous footings not less than 12 ins. wide and embedded at least 18 ins. below approved finished grade)

q_a = 2000 p.s.f. (allowable for square or continuous footings not less than 24 ins. wide and embedded at least 18 ins. below approved finished grade)

For large isolated square footings with a minimum width of 3.0' and a minimum depth of 18 inches, a bearing value of 2400 p.s.f. may be used.

Note: The above values may be increased by one-third for wind and seismic loads. A coefficient of friction of 0.4 between the bottom of the footings and adjacent soils may be used when considering lateral forces.

The results of moisture tests, density tests and relative compaction tests procured adjacent to the borings and from them are indicated on the Log of Test Borings drawings at their proper depths.

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Grading and Foundation Recommendations

The cleanup operations will include the complete removal of all fill materials from the building pad area and extending beyond the footing areas for the depth of the fill materials. The excavated fill soils should be cleaned of any wood, debris or other deleterious materials and should then be mixed with clean soils to be used in the backfill and compaction of the excavation.

After the fill materials have been excavated to natural ground, the exposed native soils to a depth of approximately 12 inches should be processed, watered and mixed to approach optimum moisture and then thoroughly compacted, preferably by sheepsfoot rolling to a minimum of 90% relative compaction. All structural fill soils must be free of deleterious substances and spread in lifts of 6 to 8 inches, watered to near optimum requirements or allowed to dry if necessary and compacted to a minimum of 90% relative compaction as determined by the A.S.T.M. D1557-70T (25 blows, 3 layers, 10 lb. hammer falling 18 inches in a mold of 1/30 cu.ft. volume).

Provided the above recommendations are followed, the soils constituting the building areas of the subject site are considered adequate for design loads of 1500 p.s.f. to 2400 p.s.f. as outlined in this report. As the typical soils are slightly expansive, no horizontal reinforcement of the foundations is considered necessary, however, additional expansion tests will be made during and at the completion of grading operations when final recommendations will be made. It is recommended that all the soils in the foundation areas be kept in a moist condition during the grading and they should again be sprayed with a hose so that they are moist prior to the time the footings and slabs are poured. Utility trenches that traverse the slab area should be properly backfilled and compacted by handtamping or wheelrolling with native soils or clean sand can be used which is flooded in place. Fine grading, paving and landscaping should provide positive drainage away from all foundation areas and be directed towards the streets or approved drainage devices.

Respectfully submitted,

HAMMOND SOILS ENGINEERING

By Ross Hammond

Reviewed By Ronald W. Martin
R.C.E. 14456

RH:plk
4-Coastal Developers Co.

TEST BORING LOG

HAMMOND SOILS ENGINEERING

Job No: F75-99

BORING NO: 1,2

Depth in feet	Dry density (lbs./cu.ft.)	Moisture (%)	Stand. Penet. (blows/ft)	Sample size (inches)	Sample No.	Type	Soil description
							BORING 1
0							Dry hard, mottled sandy silt w/ clay and some debris
	102.0	15.5			1		Slightly compt. mottled moist, fine sandy silt w/ clay binder, slightly firm.
5		13.9			2		Firm red brown slightly sandy silt w/ clay binder
10							Firm to hard moist red brn clayey sli sandy silt
							BORING 2
	98.9	20.1			1		Hard damp red brn silty fine sand (fill) w/ very little crushed brick
							Layers of fill & dark gray brn oily sand (moist)
		[illegible]			2		Firm red brn sli sandy silt with clay binder

TEST BORING LOG

HAMMOND SOILS ENGINEERING

Job No: F75-99

BORING NO: 3,4

Depth in feet	Dry density (lbs./cu.ft.)	Moisture (%)	Stand. Penet. (blows/ft)	Sample size (inches)	Sample No.	Type	Soil description
							BORING 3
0							Loose dry lt brn sli sandy silt
5	108.0	15.1			1		Firm to hard moist red brn sli sandy clayey silt
10							
							BORING 4
							Sli firm to firm damp red brn sli sandy sli clay fine silt
	112.7	11.2			1		Hard moist red brn sli sandy clayey silt

TEST BORING LOG

HAMMOND SOILS ENGINEERING

Job No: F75-99

BORING NO: E-1, E-2

Type	Soil description
	E-1
0	Damp mottled clayey silt w/ fine sand and debris
5	
	Damp rust-brown silty clay with fine sand
10	
	E-2
	Damp mottled clayey silt w/ fine sand
	Damp rust-brown silty clay w/ fine sand

Depth in feet

Dry density (lbs./cu.ft.)

Moisture (%)

Stand. Penet. (blows/ft)

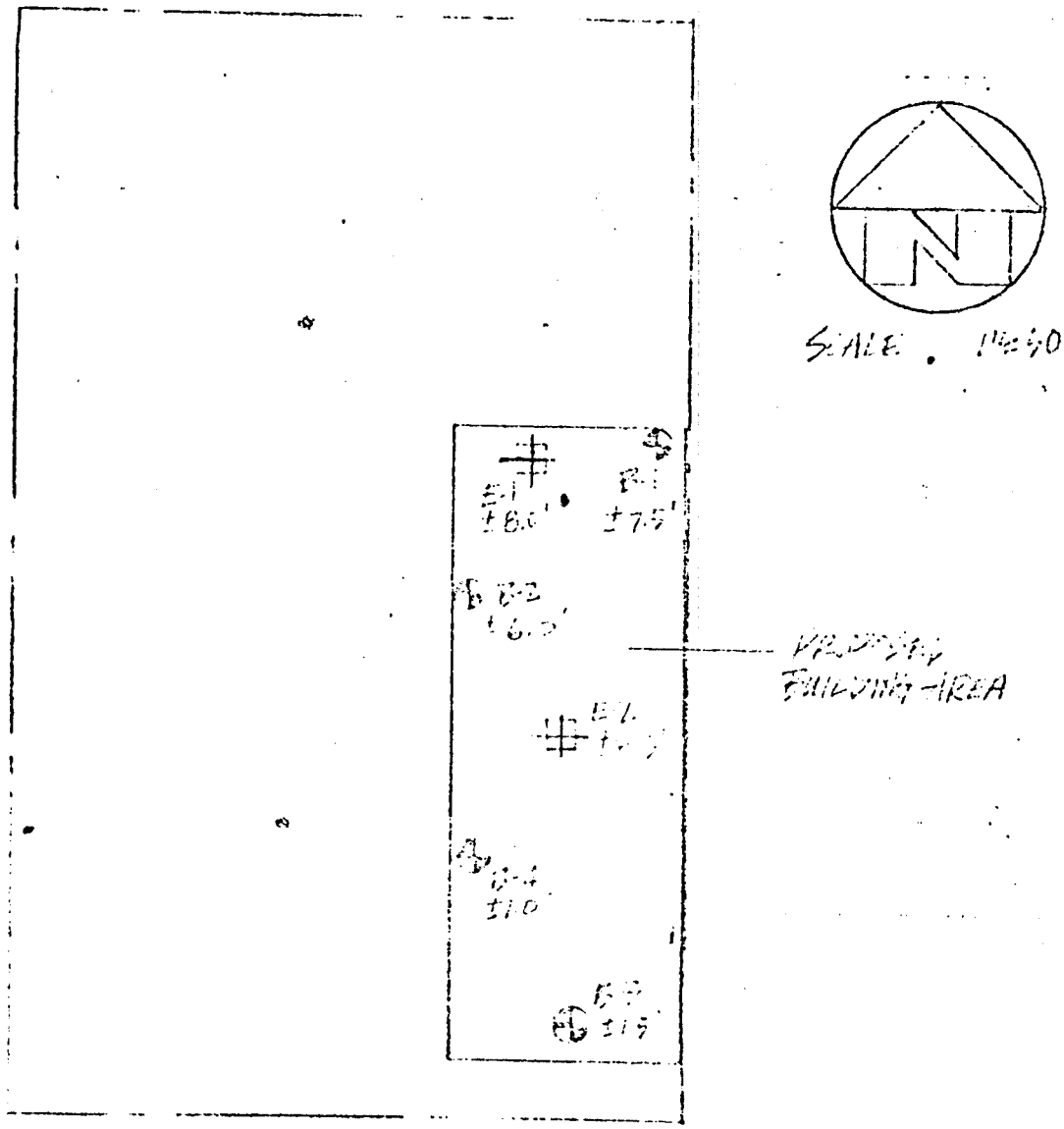
Sample size (inches)

Sample No.

HAYMOND SOILS ENGINEERING INC.
155 NO. [illegible] BLVD.
CRA[illegible]
[illegible]

Coastal Developers Co.

AAZ F7[illegible]99 8-4-75



Approximate location of Backhoe Excavations
±5.0' Approximate Depth of Fill

Approximate location of Borings done by others

PROJECT NO. A71-1147
OCTOBER 22, 1971

FOUNDATION INVESTIGATION
PROPOSED
INDUSTRIAL BUILDING
12707 EAST LOS NIETOS ROAD
SANTA FE SPRINGS, CALIFORNIA

PRELIMINARY
FOWARD

FOR

CAMPBELL PATTERN WORKS
12707 EAST LOS NIETOS ROAD
SANTA FE SPRINGS, CALIFORNIA 90670
ATT: MR. JACK ANDERSON

ADVANCED FOUNDATION ENGINEERING INC.

ADVANCED FOUNDATION ENGINEERING INC. / Consulting Foundation Engineers

October 22, 1971
Project A71-1147

Campbell Pattern Works
12707 East Los Nietos Road
Santa Fe Springs, California

Attention: Mr. Jack Anderson

Gentlemen:

Presented herewith is our report Preliminary Foundation Investigation conducted on the site of the proposed industrial building to be located at 12707 East Los Nietos Road, Santa Fe Springs, California.

The investigation was planned in accordance with the information furnished to us by your office. Column loads of 20 kips and continuous loads of 2,500 pounds per lineal foot, both maximum live plus dead loads, were indicated.

Prudent evaluation of site conditions has been made with regard to the structural aspects of the proposed structure.

Respectfully submitted,

ADVANCED FOUNDATION ENGINEERING, INC.

Syed Z. Ahmad
Civil Engineer

SZA/mm

Distribution: Campbell Pattern Works (4)
John McKay Construction Company (1)

PHILLIP L. BAILEY, Civil Engineer SYED Z. AHMAD, Civil Engineer DON P. HARRINGTON, Civil Engineer
3310 Airport Way - P.O. Box 47 - Long Beach, California 90801 • 213/426-3355 L.A. 636-2386 714/828-6432

SCOPE

The purpose of this investigation was to determine the surface and subsurface soil conditions on the site and to obtain information on which to base recommendations for designing adequate foundations for the proposed building.

SITE LOCATION AND CONDITION

The location of the site for the proposed building is shown on Plate "A" of the Appendix. The ground is fairly level. Tall, dry weeds lie along the west side of the proposed building area, the only appreciable vegetation on the site.

The property was being used as a parking and storage area for truck-trailers and as a storage area for steel beams.

Two metal buildings, one at the west side of the lot and one at 2' west of the proposed building site, were the only structures on the site.

Approximately 1.5 feet of fill material was indicated by the test borings. In Boring 1, lumber timbers were encountered 4' to 6' deep. In Boring 2, oil contaminants and brick remnants were encountered. The fill material is generally moderately expansive clayey silt material. The underlying natural soil was a silty clay with fine sand to 15.0 feet, with sandy soil to 20.0 feet.

No groundwater was encountered and no caving of the boring walls occurred during drilling operations on the date of drilling.

ADFE

ADVANCED FOUNDATION ENGINEERING, INC.

The following is a brief description of the surroundings:

North of the property: Vacant lot, with tall dry weeds.

South of the property: Los Nietos Road; So. Calif. Edison Station.

East of the property: Lumber mill.

West of the property: Existing metal building; Dow Chemical outlet.

RECOMMENDATIONS

Based on the overall evaluation of site conditions and laboratory test results on undisturbed bag and soil samples, the following recommendations for the design of foundations are provided:

1. Considering the nature of foreign matter found in the fill material, it is recommended that the proposed building be supported on piers which penetrate through the existing fill and are embedded a minimum of three (3.0) feet into native soils, approximately from 9.0 to 12.5 feet deep. The allowable bearing pressure for the pier footings is [illegible] pounds per square foot.

2. To provide [illegible] underlying support for the slab and continuous footings, all existing material in the building area should be excavated to a depth of [illegible] (2) feet over an area two (2) feet beyond the perimeter of the footings. Any root or other cavities found should be bladed clean of disturbed soil, compacted, and refilled with properly compacted soil.

A coefficient of friction of 0.5 for concrete on compacted site material and a passive pressure of 250 pounds per square foot may be used in computing the resisting lateral forces.

The recommendations contained in this report reflect our best estimate of soil conditions based upon information obtained from the limited number of test borings performed. It is not to be construed as a warranty of the condition of the soil in other areas or at other depths. Should any unusual condition become apparent during grading or foundation construction, this office should be contacted for instructions prior to continuation of the work.

A P P E N D I X

The following Appendix contains the substantiating data and laboratory test results to complement the engineering evaluations and recommendations contained in the report.

Plate "A"	Plot Plan
Plate "B-1" and "B-2"	Boring Logs
Plate "C"	Load-Settlement Curves
Plate "D"	Direct Shear Tests
Plate "M"	Mechanical Analyses

SITE EXPLORATION

On October 15, 1971 field explorations were made by drilling two test borings at the approximate locations indicated on the attached plot plan, Plate "A". A truck-mounted rotary drilling rig equipped with an 18 inch diameter bucket-auger bit was used to advance the bore holes to depths of 15 to 20 feet from the existing grade.

Description of the soils encountered, depth of undisturbed cores, field density and field moisture content are given on the log of borings for the test holes.

Undisturbed samples of soils were extracted in a barrel sampler with tapered cutting shoe. The undisturbed soil retained in 2.5 inch diameter by 1 inch rings within the sampler was tested in the laboratory to determine inplace density, moisture content, shear resistance and settlement characteristics.

Continuous observations of the materials encountered in the borings was recorded in the field. The soils were classified in the field by visual and textural examination and these classifications were supplemented by obtaining

bulk soil samples for future examination in the laboratory. All samples were secured in moisture-resistant bags as soon as taken to minimize the loss of field moisture while being transported to the laboratory and awaiting testing.

After the samples were visually classified in the laboratory, a testing program that would provide sufficient data for our analysis of the soils was established.

LABORATORY TESTS

Hydrometer and mechanical analyses were performed on various bulk soil samples to further check the visual classification and to determine the grain-size distribution of the soils. Mechanical analyses curves are presented on Plate "M".

Direct shear and consolidation tests were performed on selected undisturbed core samples to determine the shear strength and settlement characteristics of various soil samples.

LABORATORY TEST RESULTS

MAXIMUM DENSITY TEST RESULTS

The following Maximum Density Tests were conducted in accordance with ASTM D1557-[illegible] using 5 equal layers, 25 blows each layer, 10 pound hammer [illegible] in a 1/30 cubic foot mold.

Test Hole No.	Depth, Ft.	Maximum Density, pcf	Optimum Moisture, %
2	0.5-2.0	121.5	13.5

HYDROMETER ANALYSES RESULTS

Hole No.	Depth in Feet	% Sand	% Silt	% Clay
1	2.0	42.0	36.0	22.0
1	11.0-11.5	42.0	22.0	36.0
1	13.5-14.0	47.5	26.5	26.0
2	6.0-7.0	42.0	34.0	24.0
2	7.5-8.5	33.2	36.8	30.0
2	13.5-15.0	32.0	34.0	34.0

EXPANSION DETERMINATION

Expansion tests were performed on various soil samples to determine the swell characteristics of typical site materials and the following results were obtained for 60 pounds per square foot load.

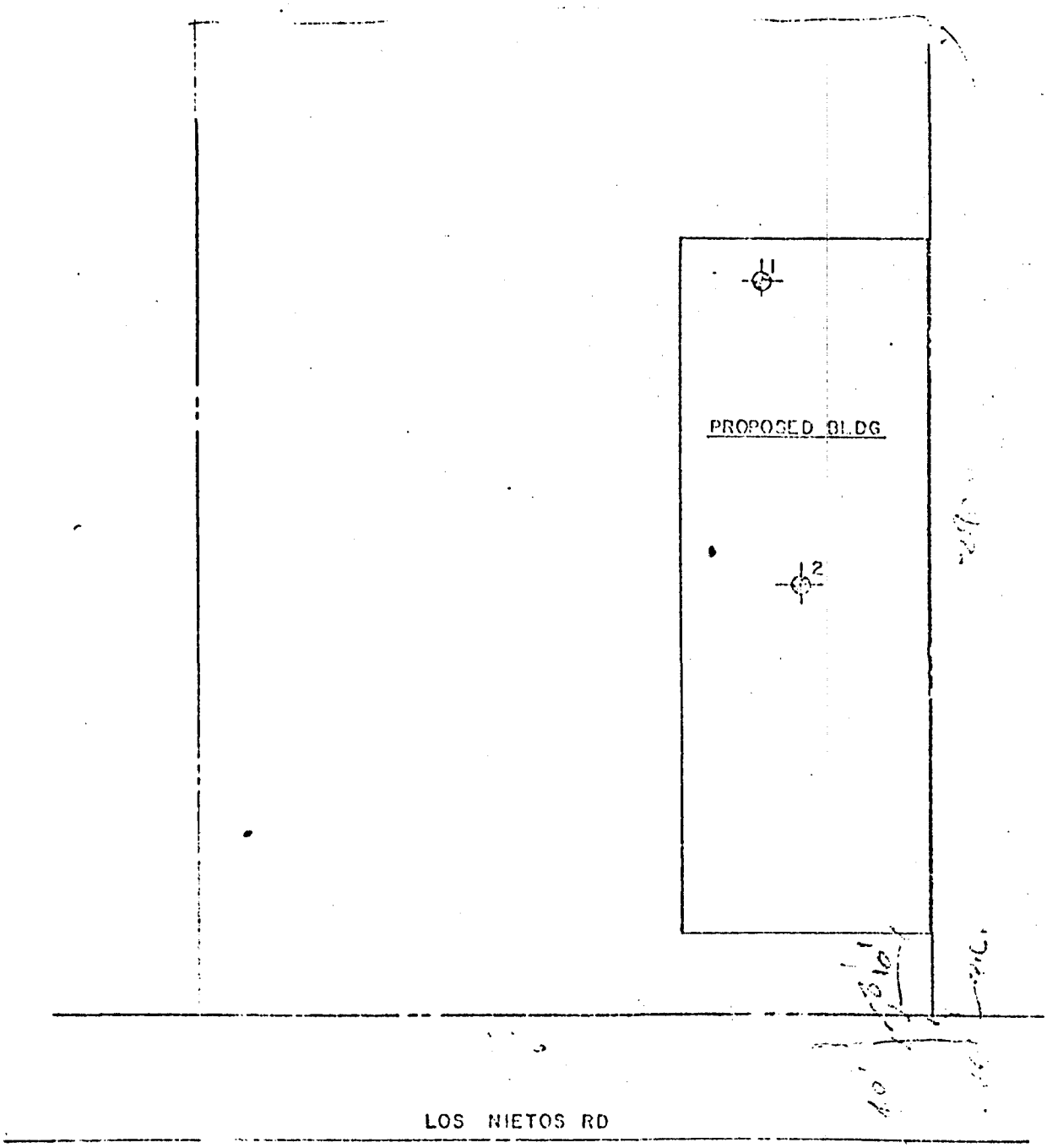
Material Classification	Location	Maximum Density pcf	Opt. Moist %	Molded Dry Density	Molded Moisture Content	Expansion, % 60 psf Surcharge
Light [illegible] brown clayey silt with fine sand ([illegible])	T[illegible].2 0.5-2.0	121.5	13.5	107.8	14.3	5.6

PROCEDURE FOR EXPANSION TEST

A brief description of conducting the expansion test on typical site surface soils is described in the following paragraphs.

The test sample was thoroughly mixed with sufficient distilled water to bring the soil to approximately the optimum moisture content as determined by ASTM D1557-70 method of test.

PROJECT A71-1147



SCALE 1" = 40'

DENOTES APPROX LOCATION OF TEST BORINGS

PLATE A

ADVANCED FOUNDATION ENGINEERING INC.

LOG OF BORINGS

WATER TABLE Not Encountered
CAVING None
DEPTH OF FILL 8.5'

PROJECT A71-1147
TEST HOLE NO. 2
DATE DRILLED October 15,197

DEPTH IN FEET	SOIL CLASSIFICATION (UNIFIED)	SYMBOL	DEPTH OF CORE SAMPLES Ft.	DRY DENSITY POUND / CU. FT.	MOISTURE PERCENT
	TEST HOLE NO. 2				
0.0-0.5	FILL - MISCELLANEOUS DEBRIS - Brick dust, brick, and concrete fragments.				
0.5-8.5	FILL - CLAYEY SILT - Light gray-brown with fine sand - lenses of silty clay and silty sand with alluvial appearance to 8.5' - oil smell between 4' and 5' - oil contaminated below 5.0' with silty clay lenses increasing and color grades to mottled dark gray-brown.	ML	0.5-2.0 2.0 3.0 4.0-5.0 5.0 6.0-8.5	* 104.0 103.4 * 101.6 *	9.9 14.9 16.3 16.3 17.7 13.0
8.5-15.0	NATURAL - SILTY CLAY - Rust-brown, with fine sand - sand increases below 12' - color grades to light rust-brown below 13.5'.	CL	8.5-10.0 10.0 13.5-15.0	* 116.8 *	12.4 14.3 16.3
15.0-18.0	CLAYEY FINE SAND - Rust-brown - sand increases with depth.	SC	15.0	116.7	9.9
18.0-18.5	SILTY FINE SAND - Light brown, ferrous stained . .	SM	18.0-18.5	*	8.7
18.5-20.0	FINE SAND - Light brown, with a trace of silt - trace of coarse sand apparent between 18.5' and 19.5'.	SP-SM	18.0-20.0	*	4.2

*Indicates bulk sample taken for classification and moisture determination only.

PLATE B-2

PROJECT A71-1147

CONSOLIDATION TEST RESULTS

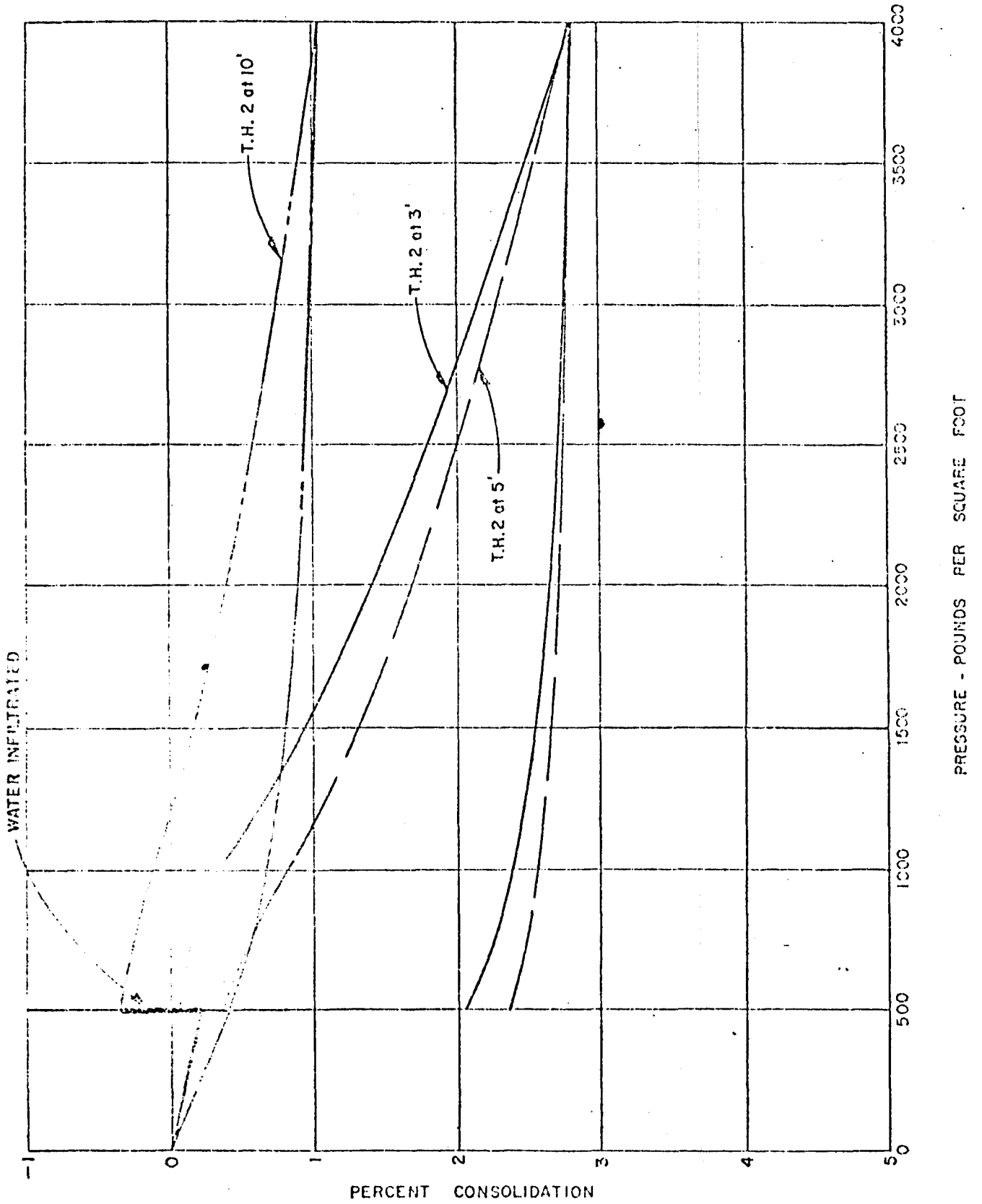


PLATE C

ADVANCED FOUNDATION ENGINEERING INC.

AE 45

PROJECT A71-1147

DIRECT SHEAR TEST

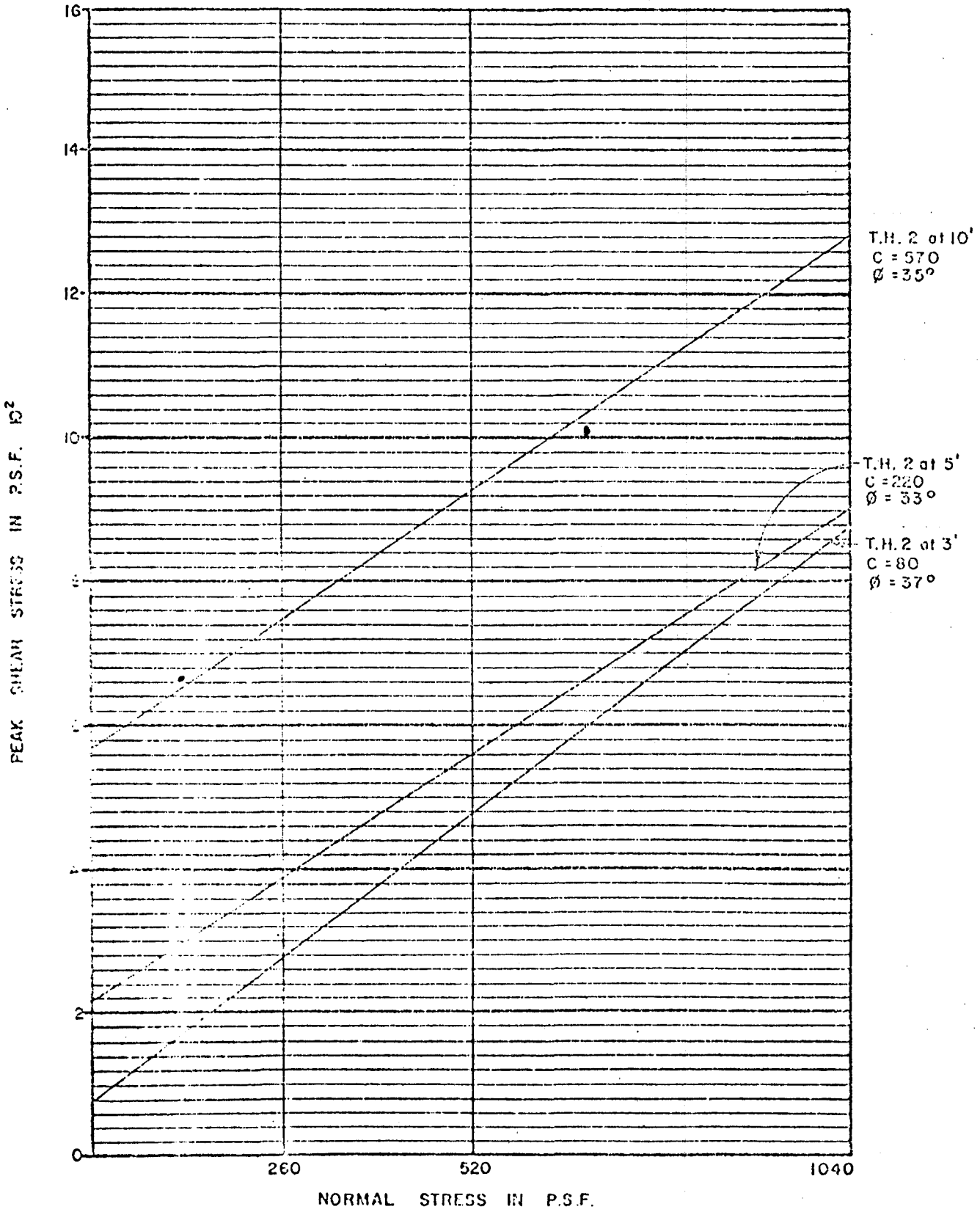


PLATE D

ADVANCED FOUNDATION ENGINEERING INC.

AE 31

MECHANICAL ANALYSIS CURVE

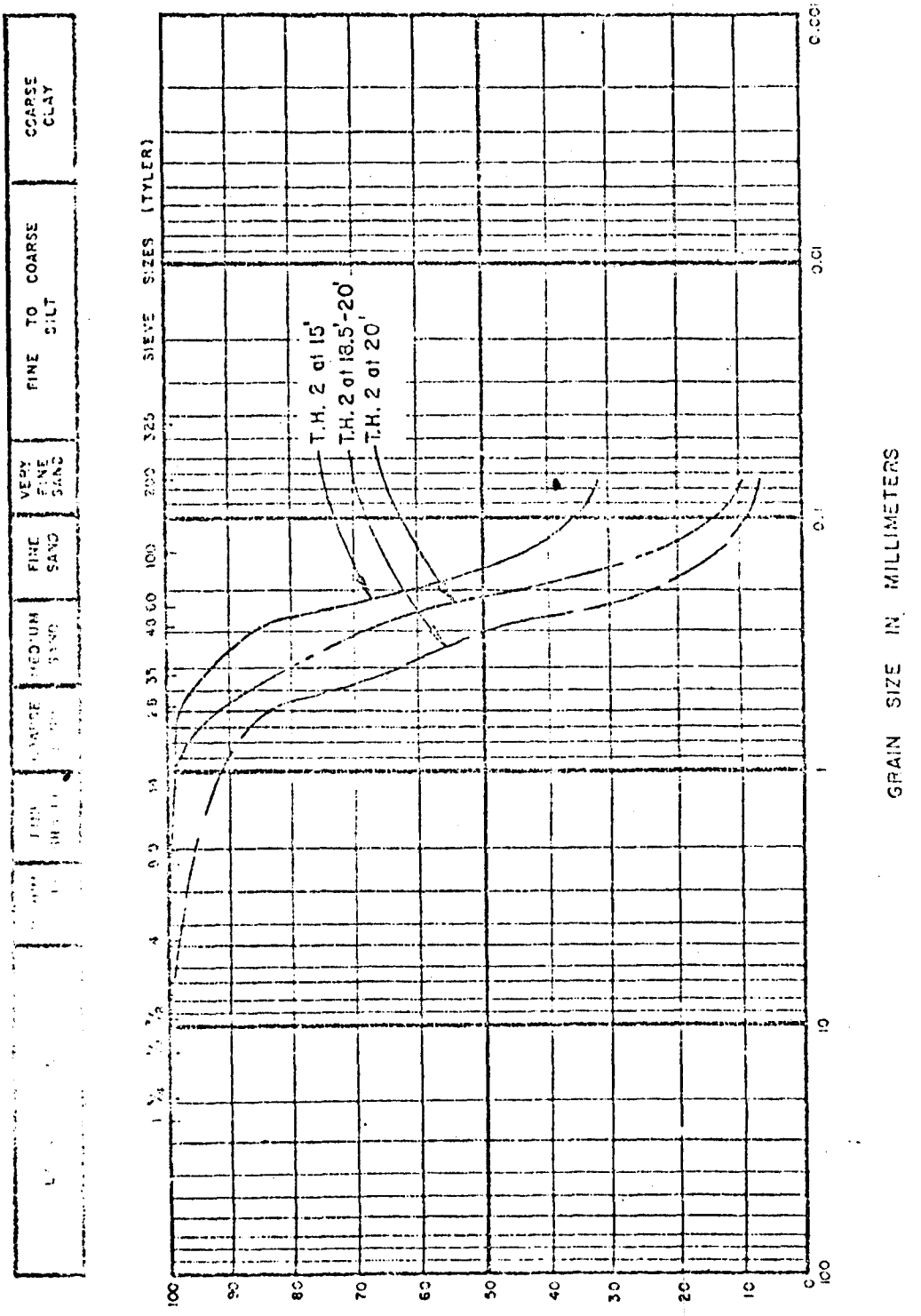


PLATE M