

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

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WALTER LUM
EDWARD WATANABE
EZRA KOIKE

FEB 14

3030 WAIKAEAE AVE., HONOLULU, HAWAII 96816 • TEL. 737-7931

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KAISER HAWAII KAI DEVELOPMENT CO.
P. O. Box 2997
Honolulu, Hawaii 96802

Gentlemen:

Subject: Borrow Site No. 4
For Kamiloiki Valley Subdivision Unit II
Maunaloa, Oahu, Hawaii
Tax Map Key: 3-9-10 & 14
Preliminary Borings and Laboratory Tests

In accordance with your request, four open pits were dug out with a bulldozer at the proposed Borrow Site No. 4 in Kamiloiki Valley, Maunaloa, Oahu, Hawaii. Auger holes were made at the bottom of the open pits and at one other location at the site.

The open pits and borings were made to explore the soils at the site for use as borrow material for the construction of fills in Kamiloiki Valley Subdivision Unit II. A soil sample was recovered from Boring No. 3 and was tested in our laboratory for identification and classification purposes.

The borings and laboratory tests generally indicated the following:

Surface layers of medium to stiff, brown-gray clay (adobe) with gravel, cobbles and boulders to about 15 to 21 ft, the depths drilled. Some clayey silt soils were encountered in Boring Nos. 3 and 5.

Water was not noted in the borings during the field exploration.

For more detailed descriptions of soils encountered in the borings, refer to the boring logs.

In general, it is recommended that the soils from the borrow area be selectively used for the construction of fills as follows:

1. The boulders should be removed.
2. The clay soils may be used to construct fills but these soils should be placed at least 2 ft below finish grades if practicable and away from sloping ground and slope faces.

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City & County of Honolulu
City Hall Annex, 558 S. King Street
Honolulu, Hawaii 96813

3. The silty and gravelly soils less than 3-in. sizes should be used in the upper 2 ft of fills.

For preliminary planning purposes, it is recommended that the adobe on natural slopes steeper than 6 horizontal to 1 vertical should be scraped off.

If diversion ditches are constructed at the top of the slope, care should be taken that sump conditions in the ditch profile that pond water are avoided, such as the use of gravel to fill low spots at invert of the ditch.

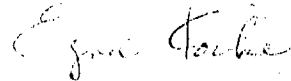
For future subdivision development, a lined ditch should be considered.

Further analysis of the borrow area should be made for the subdivision soil report after the borrow excavations are made and the proposed finished grades are established.

Attached are a Boring Location Plan, the boring logs and laboratory test results.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.



Ezra Koike
Professional Engineer
Hawaii No. 1450

EK:vi

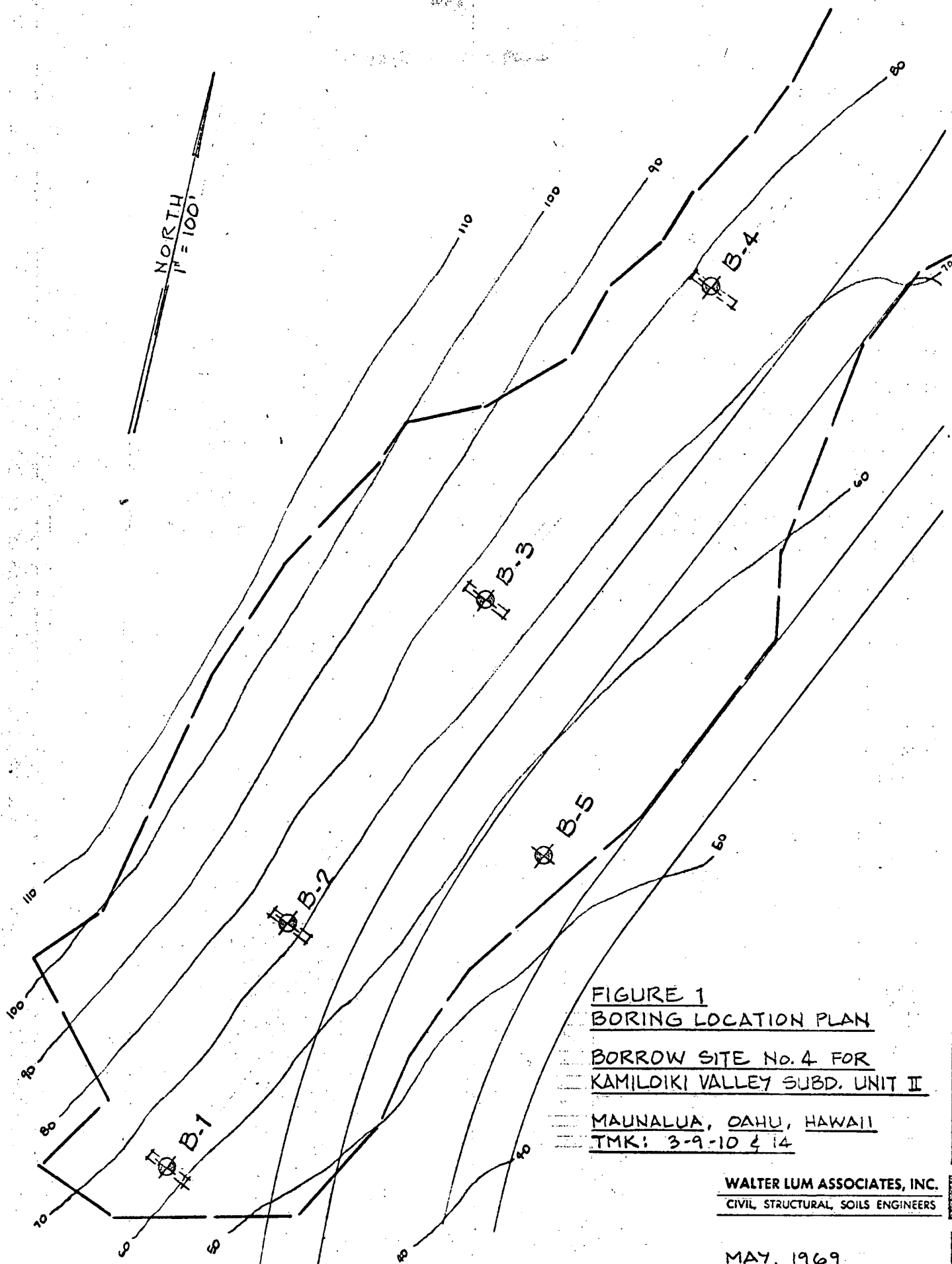


FIGURE 1
BORING LOCATION PLAN

BORROW SITE No. 4 FOR
KAMILOIKI VALLEY SUBD. UNIT II

MAUNALUA, OAHU, HAWAII
TMK: 3-9-10 & 14

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

MAY, 1969

Boring Log BORROW SITE No. 4

PROJECT FOR KAMILOIKI VALLEY SUBD. UNIT IILOCATION MAUNALUA, OAHU, HAWAIITMK: 3-9-10 & 14

HAMMER:

Weight 140#Drop 30"2" S - 2" O.D. THIN WALL TUBESAMPLER: 2" SS - 2" STANDARD SPLIT SPOONBORING NO. 1 Sheet No. _____ of _____Driller WALTER LUM ASSOC. Date APRIL 30, 1969Field Party MAESHIRD, SCHELLINGType of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"Elev. 63' ± * Datum -Drill Bit T.C. DRAGWater Level NOT NOTICEDTime -Date 4-30-69

Unified Soil Classification		DESCRIPTION	Depth (ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Moist. Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Lab. Torvane Shear P.S.F.	PENETRATION DATA						
											STANDARD PENETRATION TEST	2" O.D. THIN WALL TUBE SAMPLER	Blows Per Foot				
		ELEV. = 63' ± *									0	10	20	30	40	BLOWS / 0.5'	
(CH)	OPEN PIT	STIFF DARK BROWN-GRAY CLAY (ADOBE) w/COBBLES & BOULDER	0	2" S	1-A	109	34	82	4320	>1900							5' 5" 7' 5" 10" SLEDGE HAMMER
(CH)		STIFF DARK BROWN-GRAY CLAY (ADOBE) w/CORAL & COBBLES	5	2" SS	1-B	-	34	-	-	-	-						
CH	AUGER	COBBLES															
		STIFF DARK GRAY CLAY	10	2" SS	1-C	-	46	-	-	-	-						
(CH)		COBBLES															
		STIFF DARK BROWN-GRAY CLAY w/COBBLES	15	2" SS	1-D	-	40	-	-	-	-						
		END OF BORING @ 16.5'															
* ELEVATION ESTIMATED FROM CONTOUR MAP																	

5/6' 7/5'
 10# SLEDGE HAMMER

* ELEVATION ESTIMATED FROM CONTOUR MAP

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Boring Log BORROW SITE NO. 4

BORING NO. 2 Sheet No. _____ of _____

PROJECT FOR KAMILOIKI VALLEY SUBD. UNIT II

Driller WALTER LUM ASSOC. Date MAY 1, 1969

LOCATION MAUNALUA, OAHU, HAWAII

Field Party MAESHIRO, SHELUNG, KAKU

TMK: 3-9-10 & 14

Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"

Elev. 72' ± * Datum —

Drill Bit T.C. DRAG

HAMMER:

Weight 140 #

Drop 30"

SAMPLER: 2" SS - 2" STANDARD SPLIT SPOON

Water Level	NOT NOTICED				
-------------	-------------	--	--	--	--

Time	-				
------	---	--	--	--	--

Date	5-1-69				
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Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Moist. Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Lab. Torvane Shear P.S.F.	PENETRATION DATA	
										STANDARD PENETRATION TEST	2" O.D. THIN WALL TUBE SAMPLER
										Blows Per Foot	BLOWS/0.5'
										0 10 20 30 40	
(CH)	ELEV. = 72' ± * STIFF DARK BROWN-GRAY, CLAY W/COBBLES & BOULDER	0									
		5	2" S	2-A		NO RECOVERY					10/1' SAMPLER SMASHED
		10	2" S	2-B		33					
		15	2" S	2-C		44				9/5'	27/1'
		20	2" S	2-D		30				25/4' HAMMER BOUNCES	
END OF BORING @ 21.4'											

OPEN PIT

AUGER

* ELEVATION ESTIMATED FROM CONTOUR MAP

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Boring Log

BORROW SITE No. 4

PROJECT FOR KAMILOIKI VALLEY SUBD. UNIT II

LOCATION MAUNALUA, OAHU, HAWAII

TMK: 3-9-10 & 14

HAMMER:

Weight 140#

Drop 30"

2" S - 2" O.D. THIN WALL TUBE

SAMPLER: 2" SS - 2" STANDARD SPLIT SPOON

BORING NO. 3 Sheet No. of

Driller WALTER LUM ASSOC. Date APRIL 29 & 30, 1969

Field Party MAESHIRD, LUNING

Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"

Elev. 76' ± * Datum -

Drill Bit T.C. DRAG

Water Level NOT NOTICED

Time -

Date 4-30-69

Unified Soil Classification	DESCRIPTION	Depth (ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Moist. Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Lab. Torvane Shear P.S.F.	PENETRATION DATA			
										STANDARD PENETRATION TEST	2" O.D. THIN WALL TUBE SAMPLER	Blows Per Foot	
										0 10 20 30 40			
	ELEV. = 76' ± *	0											
(CH)	STIFF DARK GRAY-BROWN, CLAY w/COBBLES & BOULDER												
		5	2" S	3-A	-	40	-	-	-				3/5' 7/8' TUBE SMASHED
(MH)	GRAY-BROWN CLAYEY SILT w/COBBLES & BOULDER												
		10	2" SS	3-B	-	37	-	-	-				
(MH)	GRAY-BROWN CLAYEY SILT w/COBBLES												
		15	2" SS	3-C	-	35	-	-	-				
(MH)	COBBLES w/SOME BROWN-GRAY SILTY CLAY												
			2" SS	3-D	-	NO RECOVERY	-	-	-				
	ROCK OR BOULDER												
	END OF BORING @ 18.5'												

* ELEVATION ESTIMATED FROM CONTOUR MAP

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Boring Log

BORROW SITE No. 4

BORING NO. 4 Sheet No. _____ of _____

PROJECT FOR KAMILOIKI VALLEY SUBD. UNIT II

Driller WALTER LUM ASSOC. Date APRIL 30, 1969

LOCATION MAUNALUA, OAHU, HAWAII

Field Party MAESHIRO, SCHELLING

TMK: 3-9-10 & 14

Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"

Elev. 78' ± * Datum _____

HAMMER:

Weight 140#

Drop 30"

2" S - 2" O.D. THIN WALL TUBE

Drill Bit T.C. DRAG

SAMPLER:

2" SS - 2" STANDARD SPLIT SPOON

Water Level NOT NOTICED

Time _____

Date 4-30-69

Unified Soil Classification	DESCRIPTION	Depth (ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Moist. Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Lab. Torvane Shear P.S.F.	PENETRATION DATA				
										STANDARD PENETRATION TEST	2" O.D. THIN WALL TUBE SAMPLER			
										Blows Per Foot	0	10	20	30 40 BLOWS/0.5'
CH.	STIFF DARK BROWN - GRAY CLAY (ADOBE) W/COBBLES & BOULDER	0	2" S	4-A	115	31	80	7640	1900					
		5	2" S	4-B	105	39	76	2000	-					5/5' 5/5' 10' SLEDGE HAMMER
		10	2" SS	4-C	-	42	-	-	-					3/5' 3/5' 10' SLEDGE HAMMER
		15	2" SS	4-D	-	42	-	-	-					30/4' HAMMER BOUNCES
	END OF BORING @ 15.4'													

* ELEVATION ESTIMATED FROM CONTOUR PLAN

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Boring Log

BORROW SITE No. 4

PROJECT FOR KAMILDIKI VALLEY SUBD. UNIT II

LOCATION MAUNALUA, OAHU, HAWAII

TMK: 3-9-10 & 14

HAMMER:

Weight 140#

Drop 30"

2" S - 2" O.D. THIN WALL TUBE

SAMPLER:

2" SS - 2" STANDARD SPLIT SPOON

BORING NO. 5 Sheet No. of

Driller WALTER LUM ASSOC. Date MAY 1, 1969

Field Party MAESHIRO, SCHELLING, KAKU

Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"

Elev. 55' ± Datum

Drill Bit I.C. DRAG

Water Level NOT NOTICED

Time

Date 5-1-69

PENETRATION DATA

STANDARD PENETRATION TEST
Blows Per Foot
0 10 20 30 40
2" O.D. THIN WALL TUBE SAMPLER
BLOWS/0.5'

Unified Soil Classification

DESCRIPTION

ELEV. = 55' ± 2

Depth (Ft.)

Sampler

Sample No.

Wet Dens. P.C.F.

Moist. Cont. %

Dry Dens. P.C.F.

Unconf. Comp. P.S.F.

Lab. Torvane Shear P.S.F.

(CH)

MEDIUM DARK BROWN-GRAY CLAY (ADOBE) w/COBBLES & BOULDER

2'5

5-A

107

40

76

1350

1700

1/5' 3/5'

MH

STIFF BROWN-GRAY CLAYEY SILT w/COBBLES

5

2'55

5-B

-

35

-

-

-

COBBLES

10

2'55

5-C

-

42

35

-

-

-

3/5'

HAMMER BOUNCES

15 1/2'

(CH)

MEDIUM DARK GRAY, CLAY w/SOME COBBLES

15

2'55

5-D

-

34

25

-

-

-

(ML)

MEDIUM, REDDISH BROWN CLAYEY SILT w/GRAVEL

END OF BORING @ 16.5'

* ELEVATION ESTIMATED FROM CONTOUR MAP

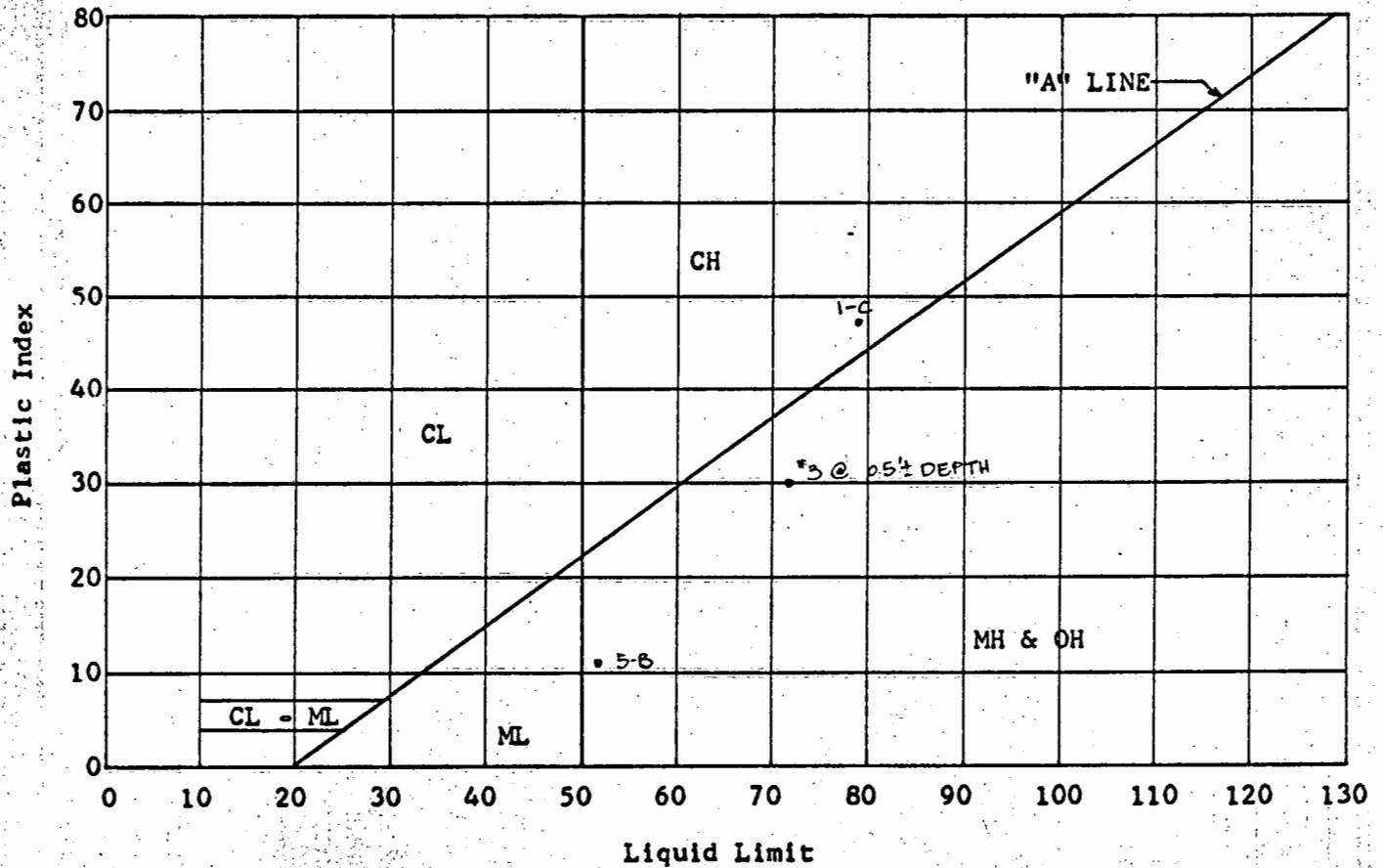
BORROW SITE No. 4
FOR KAMILOIKI VALLEY SUBD. - UNIT II

TABLE I - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	1		3		5
SAMPLE NO.	C		BAG		D
DEPTH BELOW SURFACE	10'-11.5'		0.5'		5'-6.5'
DESCRIPTION	DARK GRAY CLAY		GRAY-BROWN CLAYEY SILT		BROWN-GRAY CLAYEY SILT W/COBBLES
GRADING ANALYSIS (% Passing)					
Sieve					
1"			100		
1/2"			100		
#4			99.8		
#10			99.3		
#20			98.1		
#40			96.5		
#100			90.6		
#200			85.2		
ATTERBERG LIMITS					
Air Dried or Natural	NATURAL		NATURAL		NATURAL
Liquid Limit	79		72		52
Plastic Limit	32		42		41
Plasticity Index	47		30		11
Dilatancy	NONE		MEDIUM		SLOW-MED
Toughness	HIGH		MEDIUM		MEDIUM
Dry Strength	HIGH		MEDIUM		SLIGHT
UNIFIED SOIL CLASSIFICATION	CH		MH		MH
SPECIFIC GRAVITY			2.83		
EXPANSION AND CBR TESTS (Surcharge-51 P.S.F.)					
Molding Moisture Content, %			36.8		
Molding Dry Density, P.C.F.			82.2		
Swell upon saturation, %			7.6		
CBR at 0.1" Penetration			2.4		
COMPACTION TEST (AASHTO T-180-57 Method)			A		
Dry to Wet or Wet to Dry			WET TO DRY		
Max. Dry Density (P.C.F.)			ABOUT 86		
Optimum Moisture (%)			ABOUT 27		

JOB: BORROW SITE No. 4 FOR KAMILOIKI VALLEY SUB'D. UNIT II

LOCATION: MAUNALUA, OAHU, HAWAII



PLASTICITY CHART

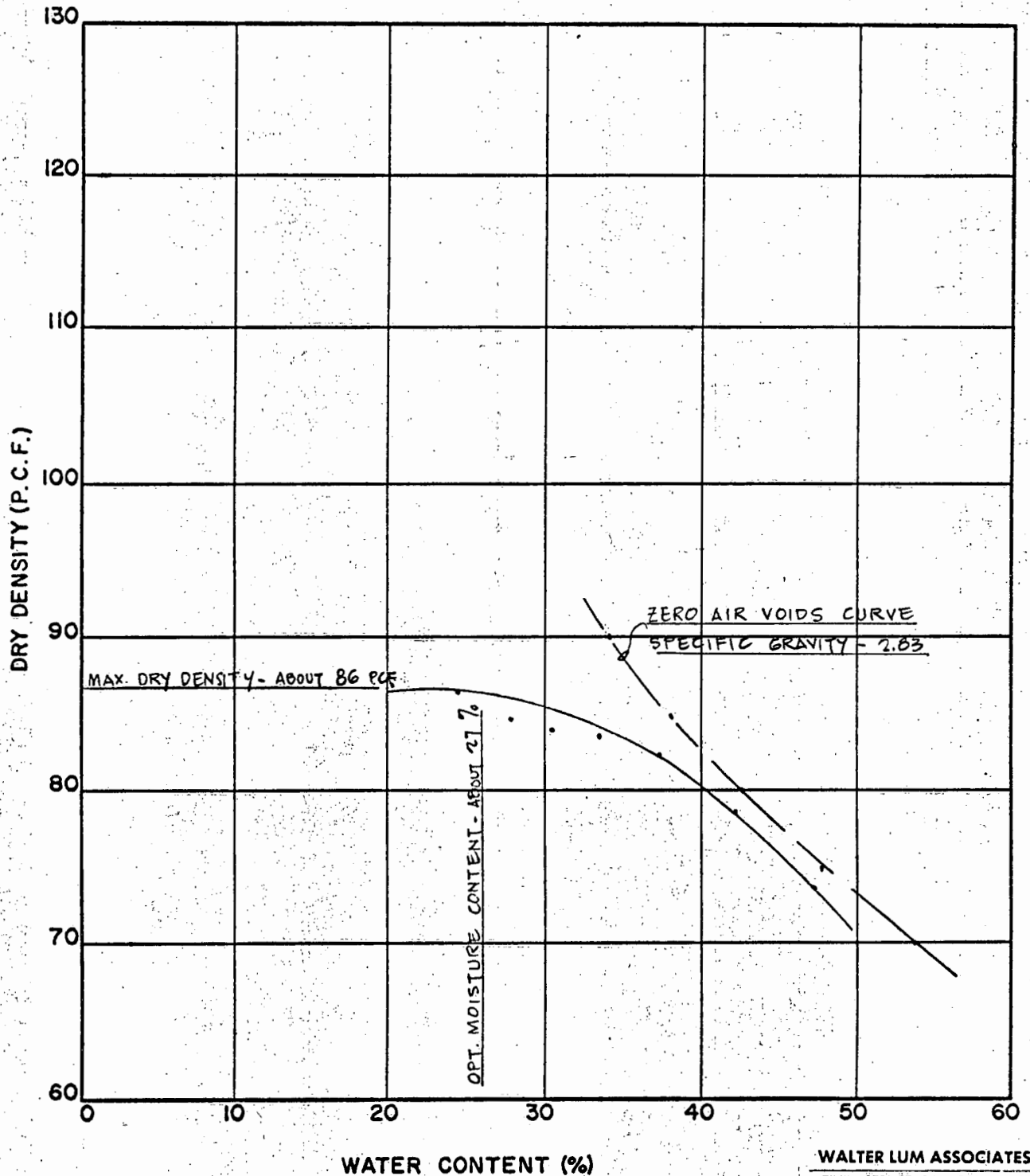
MOISTURE-DENSITY CURVE (AASHO T-180-57, METHOD A)

PROJECT: BORROW SITE NO. 4 FOR KAMILOIKI VALLEY SUBD.-UNIT II

LOCATION: MAUNALUA, OAHU, HAWAII

SAMPLE NO: 3 @ 0.5± DEPTH

SAMPLE DESCRIPTION: GRAY-BROWN CLAYEY SILT



WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

BY BT DATE 5-19-69

BORING LOGS

Symbols

Symbols used generally are in accordance with the Unified Soil Classification System.

Where a parenthesis "(SM)" is used, the soil sample was classified by visual observation of the sample recovered.

Where no parenthesis "SM" is used, the soil sample was classified from either the Atterberg limits or gradation test results.

LIMITATIONS

In general, soil formations are commonly erratic and rarely uniform or regular. The borings indicate the subsurface soil conditions encountered only at the drill holes where the borings were made. During construction, should subsurface conditions much different from those in the borings be observed, encountered, or otherwise indicated, we would be advised immediately to review or reconsider our recommendations in light of the new developments. The owner, architect, or engineer should make certain that the recommendations are incorporated into the plans and are properly carried out during construction.