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TAB 10-3  
H3  
H64  
No. 574

NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II  
SOIL EXPLORATION REPORT

KAAHELE ST. EXT.

WAIMALU, OAHU, HAWAII  
TAX MAP KEY: 9-8-02: POR. 2

**FOR REFERENCE**

not to be taken from this room

To:  
COMMUNITY PLANNING, INCORPORATED

WALTER LUM ASSOCIATES, INC.

CIVIL, STRUCTURAL, SOILS ENGINEERS

NOVEMBER 7, 1973

MUNICIPAL REFERENCE & RECORDS CENTER  
City & County of Honolulu  
City Hall Annex, 505 S. King Street  
Honolulu, Hawaii 96813

**WITHDRAWN**

**WALTER LUM ASSOCIATES, INC.**

**CIVIL, STRUCTURAL, SOILS ENGINEERS**

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

WALTER LUM  
EDWARD WATANABE  
EZRA KOIKE  
WALLACE WAKAHIRO

November 7, 1973

COMMUNITY PLANNING, INC.  
700 Bishop Street, Suite 608  
Honolulu, Hawaii 96813

Gentlemen:

Subject: Newtown Estates 2nd Access Road - Phase II  
Soil Exploration Report  
(for roadway grading and pavement thickness  
design purposes)  
Waimalu, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

Transmitted herewith is our soil exploration report for roadway grading and pavement thickness design purposes for the Newtown Estates 2nd Access Road - Phase II at Waimalu, Oahu, Hawaii.

This report includes a Boring Location Sketch, boring logs, laboratory test results, recommendations and limitations.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By

Ezra Koike  
Ezra Koike

CR/EK:ms

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NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II  
SOIL EXPLORATION REPORT

WAIMALU, OAHU, HAWAII  
TAX MAP KEY: 9-8-02: POR. 2

SCOPE OF EXPLORATION

The purpose of this exploration was to evaluate general soil conditions for grading of the proposed Newtown Estates 2nd Access Road - Phase II at Waimalu, Oahu, Hawaii.

This report includes field exploration, laboratory test results, recommendations for roadway grading and pavement thickness design and limitations.

FIELD EXPLORATION AND LABORATORY TESTS

Nine borings were made along the proposed alignment of the roadway. The approximate boring locations are shown on the Boring Location Sketch. Also attached are logs of borings from "Newtown Estates 2nd Access Road - Phase I" and "Newtown Estates Recreation Center, Park and School Site."

Borings were made with 4-in. diameter augers using finger type, carbide drag and roller rock bits. Soil samples were recovered with a 2-in. standard split spoon sampler driven with a 140-lb hammer falling 30 inches. Rock samples were recovered with a "BX" double tube core barrel with carbide and diamond coring bits.

Laboratory tests included: natural water content, Atterberg limit, AASHO T-180-57 density, expansion and CBR.

#### SOIL CLASSIFICATION SYSTEM

Soil samples were visually observed and subjected to appropriate tests in the laboratory. Based on visual observations and laboratory tests, the soil descriptions given on the boring logs are generally made in accordance with the "Unified Soil Classification System."

#### SOIL CLASSIFICATION BY OTHERS

U. S. Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," August 1972:

p. 79 - Lahaina silty clay (ML-CL soils)

p. 119 - Rock land

#### GENERAL SITE CONDITIONS

The proposed access road alignment is planned on a ridge west (Ewa) of Waimalu Stream and north (mauka) of the Waimalu Viaduct of the H-1 freeway.

The ridge generally slopes down to the southwest at about 5 to 15% with variations in localized areas.

The side slopes of the ridge vary from about 50 to 90% with steeper slopes in localized areas. Some rock outcrops were noticed in the side slopes.

The roadway will cross a former sugarcane field. Haul roads were noted on the ridge and along the tops of slopes during the field explorations.

#### INTERPRETATION OF SOIL CONDITIONS

From the field exploration and laboratory test results, the soils along the proposed access road may be generally approximated as follows:

##### About Sta. 9+00 (Beginning of Phase II) to About Sta. 20+00

A surface layer about 8 to 10 ft thick of stiff to hard clayey silts (MH soils) underlain by decomposed rock and lava rock layers to about 40 ft, the maximum depth drilled.

##### About Sta. 20+00 to About Sta. 36+00 (End of Phase II)

A surface layer about 29 ft thick and decreasing to about 4 ft thick of stiff to hard, reddish-brown clayey silts (MH soils) and silty clays (ML-CL soils) underlain by decomposed rock layers to about 40 ft, the maximum depth drilled.

Lava rock was noted in Boring No. 8 from about 29 to 40-ft depths.

Brown clays (CH soils) were noted in Boring Nos. 9 and 10 from about 13 to 18-ft depths.

Decomposed rock was noted in Boring Nos. 11 and 12 from about 3.5 to 20-ft depths.

Occasional boulders were encountered.

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

Variations to the above soil conditions are to be expected in localized areas. For more detailed descriptions of soils encountered in the borings, refer to the boring logs.

#### DISCUSSION AND RECOMMENDATIONS

A 2nd Access Road is planned into the Newtown Estates Development from Moanalua Road near Waimalu Stream. The access road is planned along the top of the ridge on the Ewa (northwest) side of Waimalu Valley.

The Phase II portion of the access road extends the roadway in the northeastern direction about 2,700 ft in length (Sta. 9+00 to Sta. 36+00).

This section of the access roadway is generally planned in cuts of about 15 to 35 ft.

To minimize erosion of the slopes, surface water runoff should be diverted away from slopes by berms or ditches whenever practicable.

#### Sta. 9+00 (Beginning of Phase II) to Sta. 20+00

The borings generally indicated 8 to 10-ft thick clayey silts over decomposed rock and lava rock layers.

Cuts of about 35 ft are being considered.

Slope ratios of 2 horizontal to 1 vertical may be used for the surface soil and decomposed rock layers.

Slope ratios of 1 horizontal to 1 vertical may be used for cuts thru fairly continuous underlying rock formations.

Loose pockets of rock or clinker layers may be grouted in place as they are encountered in the field.

If slope heights (top to toe) of greater than 20 ft are being considered, 8-ft-wide benches should be placed at height intervals of about 15 ft. From Sta. 9+00 to Sta. 13+00, bench height intervals of about 20 ft may be considered in cuts if 2 horizontal to 1 vertical slope ratios are used and surface drainage is away from the top of slope.

Sta. 20+00 to Sta. 36+00 (End of Phase II)

The borings generally indicated clayey silts and silty clays with decomposed rock. Lava rock may be encountered in the lower half of excavations toward the end of the project.

Cuts of about 6 to 35 ft are being considered.

Slope ratios of 2 horizontal to 1 vertical may be used for the surface soil and decomposed rock layers.

Slope ratios of 1 horizontal to 1 vertical may be used for cuts thru fairly continuous underlying rock formations. Loose



pockets of rock or clinker layers may be grouted in place as they are encountered in the field.

If slope heights (top to toe) of greater than 20 ft are being considered, 8-ft-wide benches should be placed at height intervals of about 15 ft. From Sta. 21+25 to Sta. 22+75, bench height intervals of about 20 ft may be considered in cuts if 2 horizontal to 1 vertical slope ratios are used and surface drainage is away from the top of slope.

#### Roadway Pavement Design

In general, for the light automobile traffic and drained subgrade conditions, the roadway pavement thickness may be as follows:

1. Wearing course - 2-in. asphaltic concrete.
2. Base course - 6-in. base course.
3. Subbase course - 0 in. over decomposed rock and rocky ground.

12-in. select borrow over a prepared subgrade of the on-site soils.

If pockets of "CH" soils are encountered, the subbase thickness may be adjusted out in the field.

### Unforeseen Conditions

Because of the variability of soil deposits, site improvements, designs and construction techniques, conditions may be encountered that cannot be foreseen with even the most exhaustive studies of site and project conditions. These unforeseen conditions should be recognized when encountered and then evaluated so that the designs or the construction methods may be modified accordingly, if necessary.

Unforeseen or undetected conditions such as soft spots, existing utility trenches, structure foundations, voids or cavities, boulders, expansive soil pockets or seepage water, etc., may occur in localized areas and will have to be adjusted and corrected in the field as they are detected.

## BORING LOGS

The stratification lines shown on each of the boring logs represent the approximate boundary between soil types and the transition may be gradual.

### Symbols

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

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

Where no parenthesis "MH" is used, the soil sample was classified from either the Atterberg limit or sieve analysis test results.



NEWTOWN 2ND ACCESS ROAD

Boring Log

PROJECT NEWTOWN ESTATES  
2ND ACCESS ROAD - PHASE II  
 LOCATION Waimalu, Oahu, Hawaii  
 Tax Map Key: 9-8-02: Por. 2

BORING NO. 5 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
 Driller W. LUM ASSOC., INC. Date SEPT. 30, 1972 & JULY 27, 1973  
 Field Party MEYER, YAMAMOTO  
RADOVICH, KUTAKA, SHIROMA  
 Type of Boring AUGER & CORING (MOBILE B-50 & B-40) Diam. 4" & "BX"

HAMMER:  
 Weight 140#  
 Drop 30"  
 SAMPLER: 2"SS - 2" STANDARD SPLIT SPOON  
"BX" - BX DOUBLE TUBE CORE BARREL

Elev. 108' ± \* Datum \_\_\_\_\_  
 Drill Bit T.C. DRAG, FINGER TYPE & DIAMOND CORING  
 Water Level NOT NOTICED NOT NOTICED  
 Time \_\_\_\_\_  
 Date 9-30-72 7-27-73

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA				
										Standard Penetration Test				
										N (Blows per foot)				
										0	10	20	30	40
	STIFF, REDDISH BROWN SANDY SILT	0 - 2'55"	2"SS	5-A	-	20	-	-	-					
	Boulder	2'55" - 5'	2"SS	5-B	-	ROCK	FRAGMENT							20/0.2'
	MEDIUM, REDDISH BROWN CLAYEY SILT	5' - 10'	2"SS	5-C	-	24	-	-	-					23/0.3'
	END OF BORING @ 12' 9-30-72 BLUE, DENSE LAVA ROCK	10' - 15'	"BX"	RUN #1										
	BLUE, DENSE LAVA ROCK W/ SOME SMALL VESICLES	15' - 20'	"BX"	RUN #2										
	END OF BORING @ 21' 7-27-73	20' - 21'												

\*ELEVATION ESTIMATED FROM TOPO MAP

**Boring Log** NEWTOWN ESTATES  
**PROJECT** 2ND ACCESS ROAD - PHASE II  
**LOCATION** Waimalu, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

**BORING NO.** 6 **Sheet No.** \_\_\_\_\_ of \_\_\_\_\_  
**Driller** W. LUM ASSOC., INC. **Date** JULY 19 20, 1973  
**Field Party** KADOVICH, KUTAKA  
**Type of Boring** ALGER (MOBILE B-30) **Diam.** 4"  
**Elev.** 145 ± \* **Datum** \_\_\_\_\_  
**Drill Bit** T.C. DRAG

**HAMMER:**  
**Weight** 140#  
**Drop** 30"  
**SAMPLER:** 2" STANDARD SPLIT SPOON

<b>Water Level</b>	<u>NOT NOTICED</u>	<u>NOT NOTICED</u>		
<b>Time</b>	<u>-</u>	<u>-</u>		
<b>Date</b>	<u>7-19-73</u>	<u>7-20-73</u>		

NEWTOWN 2ND ACCESS ROAD

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA				
											Standard Penetration Test N (Blows per foot)				
											0	10	20	30	40
(MH-GH)		STIFF, REDDISH BROWN SILTY CLAY W/TRACES OF ROOTS	0 - 5		G-A	-	23	-	-	-					
			5 - 7.19.73		G-B	-	22	-	-	-					
			7.19.73 - 10		G-C	-	19	-	-	-				48	
(SM)		MEDIUM DENSITY MOTTLED GRAY SILTY SAND (DECOMPOSED ROCK)	10 - 15		G-D	-	34	-	-	-					
			15 - 17.20.73		G-E	-	14	-	-	-				50/0.3	
		MOTTLED DARK GRAY DECOMPOSED ROCK	17.20.73 - 20		G-F	-	ROCK	FRAGMENT	-	-				50/0.1	
		END OF BORING @ 23.2' 7-20-73	20 - 23.2												

\*ELEVATION ESTIMATED FROM TOPO MAP

NEWTOWN 2ND ACCESS ROAD

**Boring Log**

PROJECT NEWTOWN ESTATES  
2ND ACCESS ROAD - PHASE II  
 LOCATION Waimalu, Oahu, Hawaii  
 Tax Map Key: 9-8-02: Por. 2

BORING NO. 7 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
 Driller W. LUM ASSOC., INC. Date JULY 19, 1973  
 Field Party RADOVICH, KUTAKA  
 Type of Boring AUGER (MOBILE P-30) Diam. 4"  
 Elev. 177 ± \* Datum \_\_\_\_\_  
 Drill Bit J.C. DRAG

HAMMER:  
 Weight 140#  
 Drop 30"  
 SAMPLER: 2" STANDARD SPLIT SPOON

Water Level	<u>NOT NOTICED</u>			
Time				
Date	<u>7-19-73</u>			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA				
										Standard Penetration Test N (Blows per foot)				
DRILL RATE	ELEV. = 177 ± *	0								0	10	20	30	40
(ML-CL)	STIFF, DARK BROWN SILTY CLAY W/TRACES OF ROOTS	0 - 5	7-A	-	21	-	-	-	-					
(MH)	STIFF, MOTTLED BROWN SILTY CLAY	5 - 10	7-B	-	19	-	-	-	-					52
	PUKA PUKA ROCK FRAGMENTS W/SOME BROWN CLAYEY SILT	10 - 15	7-C	-	24	-	-	-	-					
	DENSE, GRAY SILTY SAND W/DECOMPOSED ROCK & CLAYEY SILT	15 - 19.5	7-D	-	19	-	-	-	-					10/0.5'
		19.5 - 20	7-E	-	19	-	-	-	-					50/0.4'
	END OF BORING @ 19.5'	20												

\* ELEVATION ESTIMATED FROM TOPO MAP

NEWTOWN 2ND ACCESS ROAD

**WALTER LUM ASSOCIATES, INC.**

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**Boring Log**

NEWTOWN ESTATES  
PROJECT 2ND ACCESS ROAD - PHASE II

BORING NO. 8 Sheet No. JULY 18 1973 of 19  
Driller W. LUM ASSOC., INC. Date OCT 2 1973

LOCATION Waimalu, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

Field Party RADOVICH, KUTAKA, KAU  
Type of Boring AUGER (MOBILE B-30) Diam. 4"

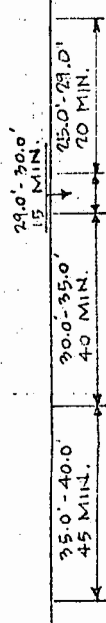
HAMMER:  
Weight 140#  
Drop 30"

Elev. 217 ± \* Datum -  
Drill Bit T.C. DRAG

SAMPLER: 2" STANDARD SPLIT SPOON

Water Level NOT NOTICED  
Time -  
Date 7-19-73

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA				
										Standard Penetration Test				
DRILL RATE	ELEV. = 217 ± * <sub>2</sub>									N (Blows per foot)				
										0	10	20	30	40
(ML-CL)	STIFF, REDDISH BROWN SILTY CLAY	0 - 1.5	7-18-73	8-A	-	21	-	-	-					
(ML)	HARD, REDDISH BROWN CLAYEY SILT	1.5 - 3.0	7-18-73	8-B	-	19	-	-	-					64
		3.0 - 4.5	7-18-73	8-C	34	23	49	-	-					55
ML	HARD TO STIFF, BROWN CLAYEY SILT	4.5 - 10.0	7-18-73	8-D	-	24	-	-	-					
MH	HARD, MOTTLED BROWN SILTY CLAY w/ DECOMPOSED ROCK	10.0 - 15.0	7-18-73	8-E	34	26	63	-	-					80
		15.0 - 20.0	7-19-73	8-F	-	27	-	-	-					50/0.2
ML	GRAY CLAYEY SILT (DECOMPOSED ROCK)	20.0 - 25.0	7-19-73	8-G	35	26	49	-	-					50/0.3
		25.0 - 30.0	10-2-73	8-H	NO RECOVERY									50/0.0
		30.0 - 35.0	10-2-73	8-I	NO RECOVERY									50/0.1
		35.0 - 40.0	10-2-73	8-J	NO RECOVERY									50/0.1



\* ELEVATION ESTIMATED FROM TOPO MAP



NEWTOWN 2ND ACCESS ROAD - PHASE II

# WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT NEWTOWN ESTATES  
2ND ACCESS ROAD - PHASE II  
 LOCATION Waimalu, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

BORING NO. 9 Sheet No. \_\_\_\_\_ of \_\_\_\_\_

Driller W. LUM ASSOC., INC. Date JULY 18, 1973

Field Party RADOVICH, KAU, KUTAKA

Type of Boring AUGER (MOBILE B-30) Diam. 4"

Elev. 227' ± Datum \_\_\_\_\_

Drill Bit T.C. DRAG

HAMMER:  
 Weight 140#  
 Drop 30"  
 SAMPLER: 2" STANDARD SPLIT SPOON

Water Level	<u>NOT NOTICED</u>			
Time				
Date	<u>7-18-73</u>			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA					
										Standard Penetration Test N (Blows per foot)					
										0	10	20	30	40	
(ML-CL)	STIFF, REDDISH BROWN SILTY CLAY	0 - 3		9-A	-	21	-	-	-				10	0.5	
				9-B	-	22	-	-	-						20
(MH)	STIFF, BROWN CLAYEY SILT	3 - 10		9-C	-	30	-	-	-						
				9-D	-	29	-	-	-						
(GH)	STIFF, MOTTLED BROWN CLAY	10 - 15		9-E	-	36	-	-	-						
MH	STIFF, MOTTLED BROWN SILTY CLAY W/ CLAY STREAKS	15 - 20		9-F	39	44	75	-	-						
	END OF BORING @ 21.5'														
	7-18-73														

\* ELEVATION ESTIMATED FROM TOPO MAP

NEWTOWN 2ND ACCESS ROAD PHASE II

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

**Boring Log**

PROJECT NEWTOWN ESTATES  
2ND ACCESS ROAD - PHASE II  
 LOCATION Waimalu, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

BORING NO. 10 Sheet No. \_\_\_\_\_ of \_\_\_\_\_

Driller W. LUM ASSOC., INC. Date APRIL 23, 1973

Field Party ASATO, K. MEYER

Type of Boring AUGER (MOBILE B-50) Diam. 4"

Elev. 238.2\* Datum \_\_\_\_\_

Drill Bit FINGER TYPE

HAMMER:  
 Weight 140#  
 Drop 30"

Water Level <sup>NOT</sup> NOTICED

Time \_\_\_\_\_

SAMPLER: 2" STANDARD SPLIT SPOON

Date 4-23-73

**PENETRATION DATA**

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	Standard Penetration Test				
										N (Blows per foot)				
										0	10	20	30	40
ML-CL	HARD DARK REDDISH BROWN SILTY CLAY	0-5	[Diagram]	10-A	-	20	-	-	-	46				
		5-10	[Diagram]	10-B	28	22	49	-	-	46				
MH	STIFF, DARK BROWN CLAYEY SILT	10-15	[Diagram]	10-C	34	22	53	-	-	42				
CH	HARD, BROWN CLAY	15-20	[Diagram]	10-D	36	28	87	-	-	80				
	COBBLE	20-21.5	[Diagram]											
(MH)	HARD, MOILED BROWN SILTY CLAY	21.5-21.5	[Diagram]	10-E	-	36	-	-	-	52				
	END OF BORING @ 21.5 4-23-73													

\* ELEVATION ESTIMATED FROM TOPO MAP

NEWTOWN 2ND ACCESS ROAD - PHASE II

# WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT NEWTOWN ESTATES  
2ND ACCESS ROAD - PHASE II  
 LOCATION Waimalu, Oahu, Hawaii  
 Tax Map Key: 9-8-02: Por. 2

BORING NO. 11 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
 Driller W. LUM ASSOC., INC. Date NOV. 25, 1972  
 Field Party GAFFIN, KAKU, ASATO  
 Type of Boring LOG OF SLOPE & AUGER  
(MOBILE B-50) Diam. 4"  
 Elev. 230' ± Datum \_\_\_\_\_  
 Drill Bit FINGER TYPE

HAMMER:  
 Weight 140#  
 Drop 30"

Water Level NOT NOTICED  
 Time 10:45 AM  
 Date 11-25-72

SAMPLER: 2" STANDARD SPLIT SPOON

Unified Soil Classification	DESCRIPTION	Depth (ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA					
										Standard Penetration Test					
										N (Blows per foot)					
										0	10	20	30	40	
(ML-CL)	DARK REDDISH BROWN SILTY CLAY		LOG OF SLOPE	2' ±	-	19	-	-	-						
(ML)	REDDISH BROWN CLAYEY SILT			3.5' ±	-	7	-	-	-	-					
	MOTTLED REDDISH BROWN & GRAY DECOMPOSED ROCK (BOULDER)			6' ±	-	12	-	-	-	-					
(MH)	DARK REDDISH BROWN CLAYEY SILT W/SOME ROOTS & DECOMPOSED ROCK			10' ±	-	20	-	-	-	-					
	BEGIN BORING ↓	0													ELEV. = 230' ± *2
(MH)	STIFF MOTTLED LIGHT BROWN CLAYEY SILT, W/ DECOMPOSED ROCK & TRACES OF ROOTS			11-A	-	24	23	-	-						
	MOTTLED REDDISH BROWN & GRAY DECOMPOSED ROCK (SOME CRUSHES TO CLAYEY SILT.)	5		11-B	-	23	-	-	-				47		
	GRAY DECOMPOSED ROCK (CRUSHES TO SILTY CLAY.)	10		11-C	-	28	-	-	-					4 1/0.5	
	END OF BORING @ 11'														

\*ELEVATION ESTIMATED FROM TOPO MAP

NEWTOWN ACCESS ROAD - PHASE II

**Boring Log** NEWTOWN ESTATES  
 PROJECT 2ND ACCESS ROAD - PHASE II  
 LOCATION Waimalu, Oahu, Hawaii  
 Tax Map Key: 9-8-02: Por. 2

BORING NO. 12 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
 Driller W. LUM ASSOC., INC. Date NOV. 25, 1972  
 Field Party GAFFIN, KAKU, ASATO  
 Type of Boring AUGER (MOBILE B-50) Diam. 4"  
 Elev. 242' ± \* Datum \_\_\_\_\_  
 Drill Bit FINGER TYPE  
 Water Level NOT NOTICED  
 Time \_\_\_\_\_  
 Date 11-25-72

HAMMER: \_\_\_\_\_  
 Weight 140 #  
 Drop 30"  
 SAMPLER: 2" STANDARD SPLIT SPOON

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA				
										Standard Penetration Test				
DRILL RATE	ELEV. = 242' ± *									N (Blows per foot)				
										0	10	20	30	40
(MH)	STIFF, MOTTLED REDDISH BROWN CLAYEY SILT	0 - 2	[Symbol]	12-A	-	40	-	-	-					
(MH)	STIFF MOTTLED GRAY-BROWN CLAYEY SILT	2 - 5	[Symbol]	12-B	-	39	-	-	-					
	MOTTLED GRAY DECOMPOSED ROCK (CRUSHES TO CLAYEY SILT)	5 - 10	[Symbol]	12-C	-	14	-	-	-					50/10.5
	GRAY ROCK FRAGMENTS	10 - 15	[Symbol]	12-D	-	14	-	-	-					50/10.5
	MOTTLED GRAY & BROWN WEATHERED PUKA PUKA ROCK	15 - 20	[Symbol]	12-E	-	16	-	-	-					50/10.4
	END OF BORING @ 20.4' 11-25-72	20.4												HAMMER BOUNCES

\* ELEVATION ESTIMATED FROM TOPO MAP

NEWTOWN ESTATES - 2<sup>ND</sup> ACCESS ROAD - PHASE II

TABLE I A - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	6		8	8
SAMPLE NO.				C
DEPTH BELOW SURFACE	SURFACE		SURFACE	5'-6.5'
DESCRIPTION	REDDISH-BROWN SILTY CLAY		REDDISH-BROWN SILTY CLAY	BROWN CLAYEY SILT
GRAIN-SIZE ANALYSIS (% Passing)				
Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL		NATURAL	NATURAL
Liquid Limit	51		46	49
Plastic Limit	28		27	34
Plasticity Index	23		19	15
Dilatancy	SLOW		SLOW	SLOW-MED.
Toughness	MEDIUM		MEDIUM	SLIGHT-MED.
Dry Strength	MED.-HIGH		MEDIUM	SLIGHT-MED.
UNIFIED SOIL CLASSIFICATION	MH-CH		ML-CL	ML
APPARENT SPECIFIC GRAVITY			2.88	
EXPANSION AND CBR TESTS (Surcharge-51 P.S.F.)				
Molding Moisture, %	24.1		23.3	
Molding Dry Density, P.C.F.	95.4		101.6	
Swell upon saturation, %	2.3		0.7	
CBR at 0.1" Penetration	6.7		18.0	
MOISTURE-DENSITY RELATIONS OF SOILS (AASHTO T-180-57 Method )			A	
Dry to Wet or Wet to Dry			DRY TO WET	
Max. Dry Density (P.C.F.)			102.5	
Optimum Moisture (%)			23.7	

REMARKS:

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

Date 10-22-73 By BT

NEWTOWN ESTATES 2ND ACCESS ROAD-PHASE II

TABLE I B - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	<u>8</u>	<u>8</u>		<u>9</u>
SAMPLE NO.	<u>E</u>	<u>G</u>		<u>F</u>
DEPTH BELOW SURFACE	<u>15'-16.5'</u>	<u>25'-26.8'</u>		<u>20'-21.5'</u>
DESCRIPTION	MOTTLED BROWN SILTY CLAY W/DECOMP. ROCK	GRAY CLAYEY SILT (DECOMP. ROCK)		MOTTLED BROWN SILTY CLAY W/CLAY STREAKS
GRAIN-SIZE ANALYSIS (% Passing)				
Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL		NATURAL
Liquid Limit	63	49		75
Plastic Limit	34	35		39
Plasticity Index	29	14		36
Dilatancy	SLOW	SLOW-MED.		NONE-SLOW
Toughness	SLIGHT-MED.	SLIGHT		MED.-HIGH
Dry Strength	SLIGHT-MED.	MEDIUM		MED.-HIGH
UNIFIED SOIL CLASSIFICATION	MH	ML		MH
APPARENT SPECIFIC GRAVITY				
EXPANSION AND CBR TESTS (Surcharge-51 P.S.F.)				
Molding Moisture, %				
Molding Dry Density, P.C.F.				
Swell upon saturation, %				
CBR at 0.1" Penetration				
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-57 Method )				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

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

Date 10-22-73 By BT

NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II

TABLE I C - SUMMARY OF LABORATORY TEST RESULTS

BORING NO. SAMPLE NO. DEPTH BELOW SURFACE	10 B	10 C	10 D
DEPTH BELOW SURFACE	SURFACE	5'-6.5'	10'-11.5'
DESCRIPTION	DARK REDDISH-BROWN SILTY CLAY	DARK REDDISH-BROWN SILTY CLAY	DARK BROWN CLAYEY SILT
GRAIN-SIZE ANALYSIS (% Passing)			
Sieve			
1"			
1/2"			
#4			
#10			
#20			
#40			
#100			
#200			
ATTERBERG LIMITS			
Air Dried or Natural	NATURAL	NATURAL	NATURAL
Liquid Limit	50	49	53
Plastic Limit	28	28	34
Plasticity Index	22	21	19
Dilatancy	MEDIUM	SLOW-MED.	MEDIUM
Toughness	MEDIUM	SLIGHT-MED.	SLIGHT-MED.
Dry Strength	MEDIUM	MEDIUM	SLIGHT-MED.
UNIFIED SOIL CLASSIFICATION	ML-CL	ML-CL	MH
APPARENT SPECIFIC GRAVITY			
EXPANSION AND CBR TESTS (Surcharge-51 P.S.F.)			
Molding Moisture, %	28.5		
Molding Dry Density, P.C.F.	93.5		
Swell upon saturation, %	0.4		
CBR at 0.1" Penetration	4.0		
MOISTURE-DENSITY RELATIONS OF SOILS (AASHTO T-180-57 Method )			
Dry to Wet or Wet to Dry			
Max. Dry Density (P.C.F.)			
Optimum Moisture (%)			

REMARKS:

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

Date 10-22-73 By BT

NEWTOWN ESTATES 2<sup>ND</sup> ACCESS ROAD PHASE II

TABLE I D - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	<u>12</u>			
SAMPLE NO.				
DEPTH BELOW SURFACE				
DESCRIPTION	<u>SURFACE</u> <u>MOTTLED</u> <u>REDDISH-</u> <u>BROWN</u> <u>CLAYEY SILT</u>			
GRAIN-SIZE ANALYSIS (% Passing)				
Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	<u>NATURAL</u>			
Liquid Limit	<u>51</u>			
Plastic Limit	<u>35</u>			
Plasticity Index	<u>16</u>			
Dilatancy	<u>QUICK</u>			
Toughness	<u>MEDIUM</u>			
Dry Strength	<u>SLIGHT-MED.</u>			
UNIFIED SOIL CLASSIFICATION	<u>MH</u>			
APPARENT SPECIFIC GRAVITY				
EXPANSION AND CBR TESTS (Surcharge-51 P.S.F.)				
Molding Moisture, %	<u>29.3</u>			
Molding Dry Density, P.C.F.	<u>92.2</u>			
Swell upon saturation, %	<u>0.3</u>			
CBR at 0.1" Penetration	<u>5.5</u>			
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-57 Method <u>    </u> )				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

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

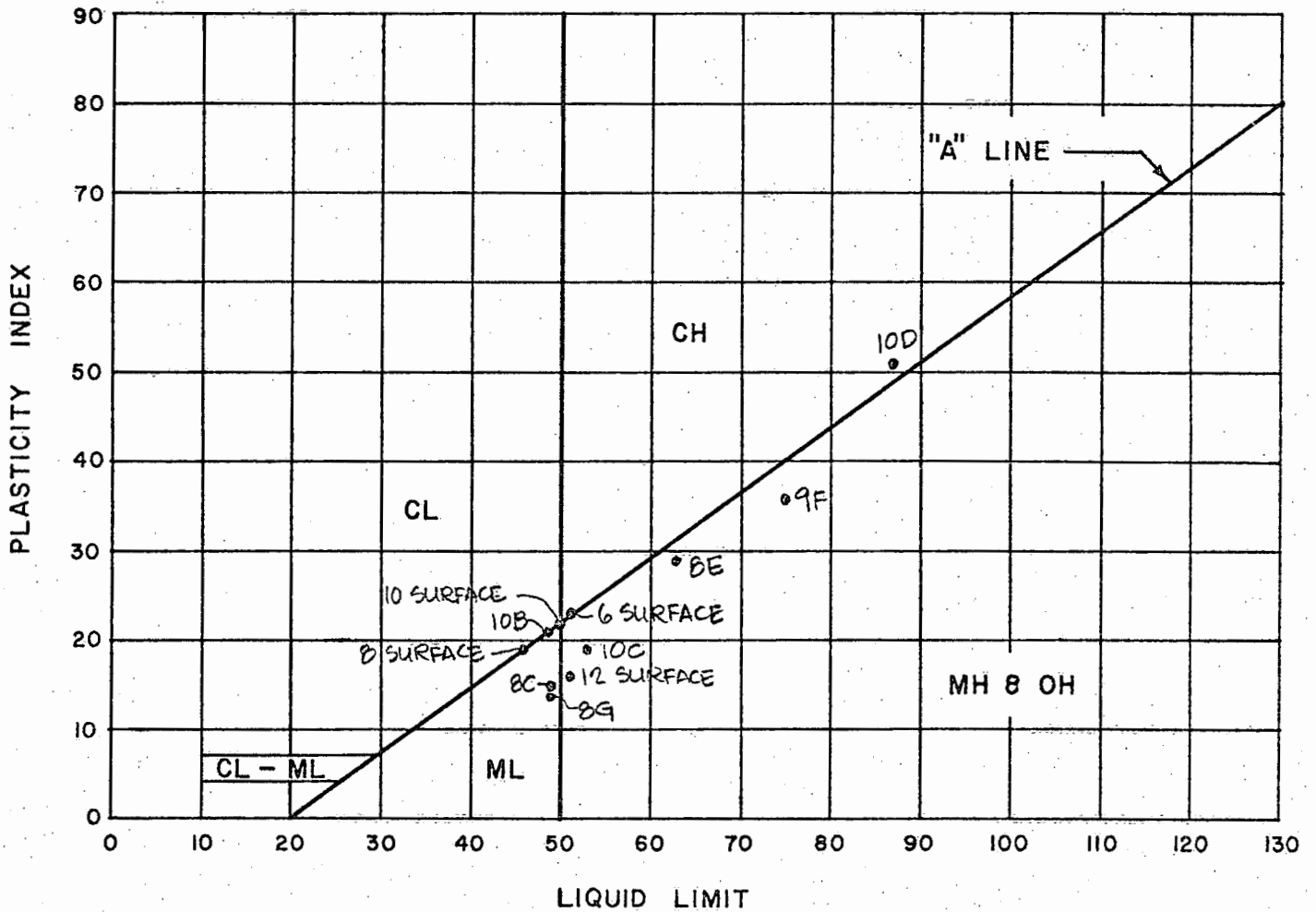
Date 10-22-73 By BT



# PLASTICITY CHART

PROJECT: NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II

LOCATION: WAIMALU, EWA, OAHU, HAWAII



DATE 10-22-73 BY RY

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

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

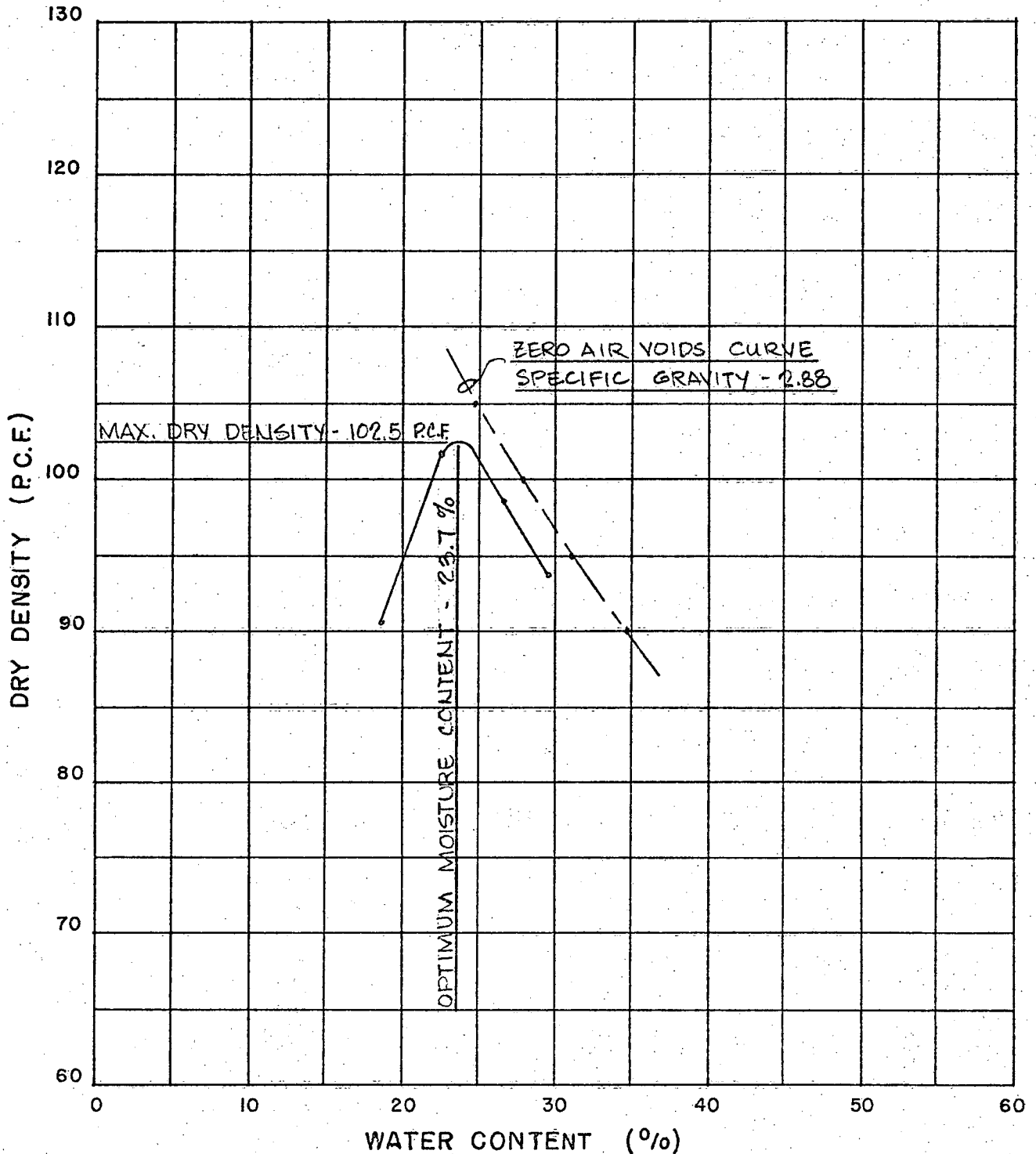
PROJECT: NEWTOWN ESTATES 2ND ACCESS ROAD -  
PHASE II

LOCATION: WAIMALU, EWA, OAHU, HAWAII

SAMPLE NO.: 8 SURFACE

SAMPLE DESCRIPTION: REDDISH-BROWN SILTY CLAY

AGGREGATE: 1/4" MINUS  
MOLD SIZE: 4"  $\phi$  X 4.504" HIGH  
HAMMER: 10 LBS. 18" DROP  
LAYERS: 5  
BLOWS: 25/LAYER



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

DATE 8-6-73 BY NI

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

PROJECT: NEWTOWN ESTATES 2ND ACCESS ROAD  
PHASE II

LOCATION: WAIMALU, EWA, OAHU, HAWAII

SAMPLE NO.: 12 SURFACE

SAMPLE DESCRIPTION: MOTTLED REDDISH-BROWN  
CLAYEY SILT

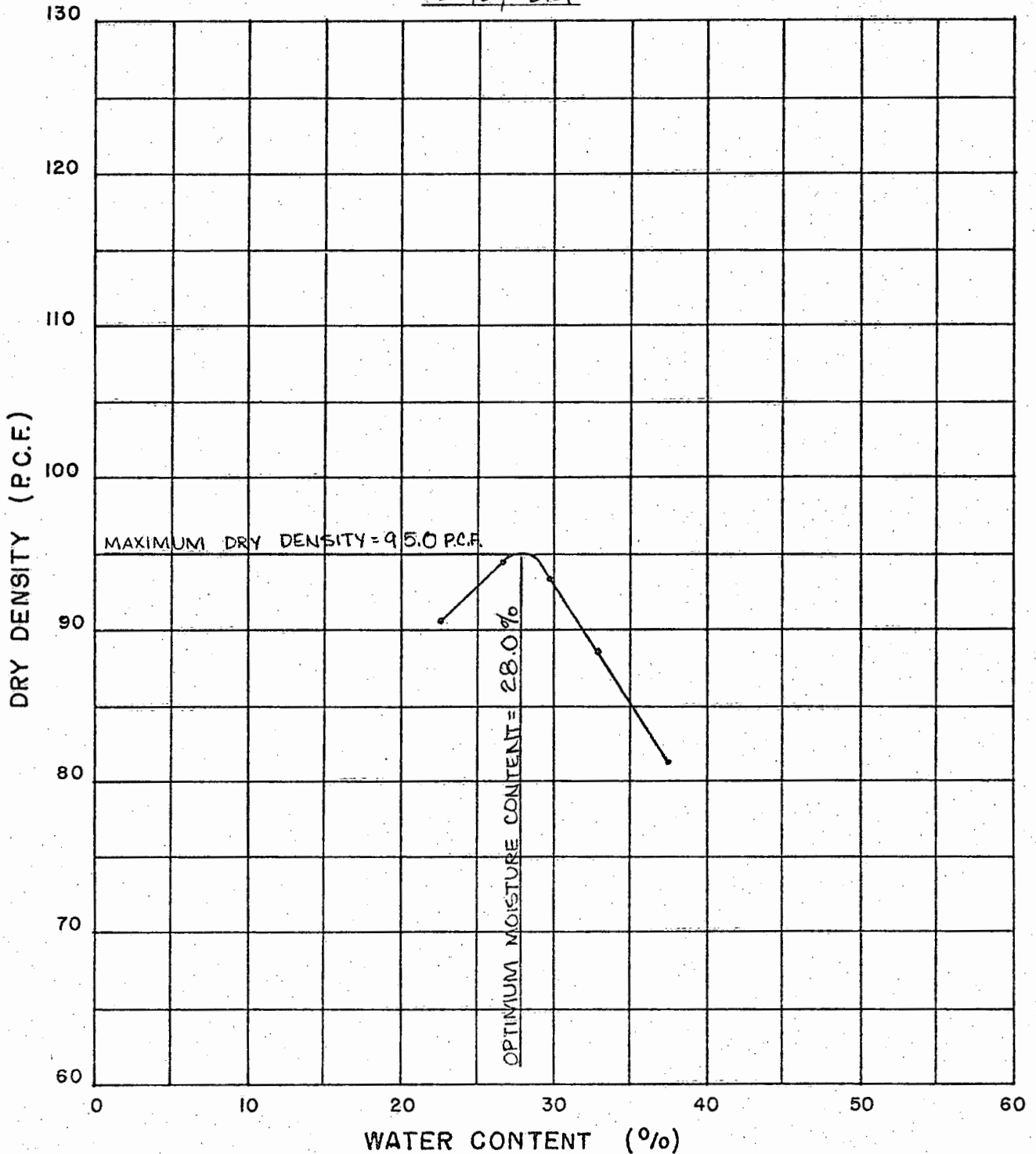
AGGREGATE: 1/4" MINUS

MOLD SIZE: 4"  $\phi$  4.59" HIGH

HAMMER: 10 LBS. 18" DROP

LAYERS: 5

BLOWS: 56/LAYER



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

DATE 12-14-72 BY N.L.

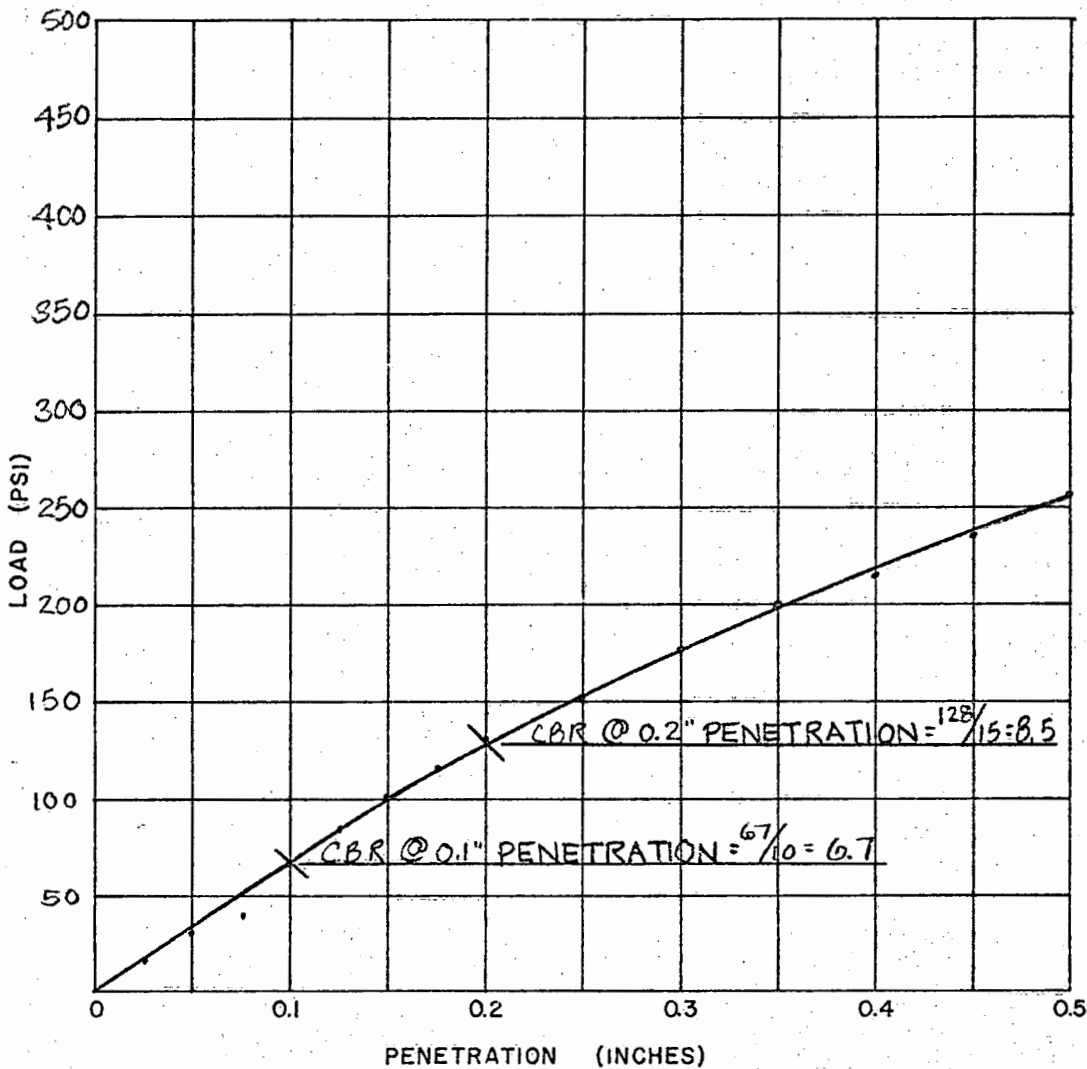
# CBR TEST

PROJECT: NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II

LOCATION: WAIMALU, OAHU, HAWAII

SAMPLE NO: 6 SURFACE

SAMPLE DESCRIPTION: REDDISH-BROWN SILTY CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS)	LOAD (PSI)
0.025	44	15
0.050	90	30
0.075	147	39
0.100	200	67
0.125	253	84
0.150	303	101
0.175	349	116
0.200	389	130
0.250	457	152
0.300	530	177
0.350	600	200
0.400	646	215
0.450	709	236
0.500	768	256

AGGREGATE 1/4" MINUS  
 HAMMER WEIGHT 10 LBS  
 HAMMER DROP 18"  
 No. OF BLOWS 56/LAYER  
 No. OF LAYERS 5

## TEST RESULTS:

MOLDING MOISTURE, % 24.1  
 MOLDING DRY DENSITY, P.C.F. 95.4  
 CBR @ 0.1" PENETRATION 6.7  
 DAYS SOAKED 4

DATE 8-7-73 BY LY

DATE 8-8-73 BY JS

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

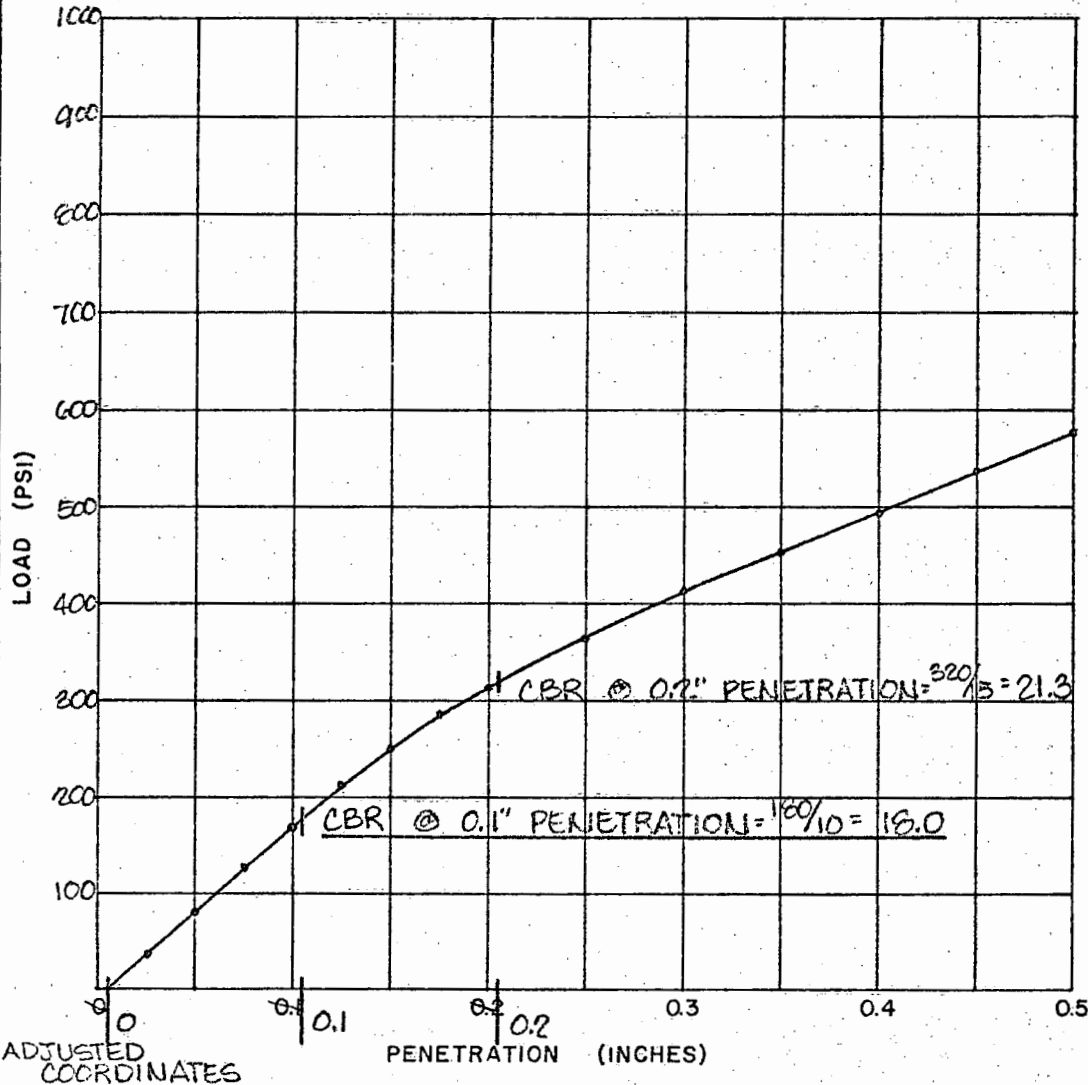
# CBR TEST

PROJECT: NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II

LOCATION: WAIMALU, EWA, OAHU, HAWAII

SAMPLE NO: 8 SURFACE

SAMPLE DESCRIPTION: REDDISH-BROWN SILTY CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS)	LOAD (PSI)
0.025	110	37
0.050	240	80
0.075	370	123
0.100	505	168
0.125	635	212
0.150	740	247
0.175	850	283
0.200	935	312
0.250	1085	362
0.300	1235	412
0.350	1360	453
0.400	1485	495
0.450	1610	537
0.500	1725	575

AGGREGATE 1/4" MINUS  
 HAMMER WEIGHT 10 LBS  
 HAMMER DROP 18"  
 No. OF BLOWS 56/LAYER  
 No. OF LAYERS 5

## TEST RESULTS:

MOLDING MOISTURE, % 23.3  
 MOLDING DRY DENSITY, P.C.F. 101.6  
 CBR @ 0.1" PENETRATION 18.0  
 DAYS SOAKED 4

DATE 8-7-73 BY LY  
 DATE 8-8-73 BY NI

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

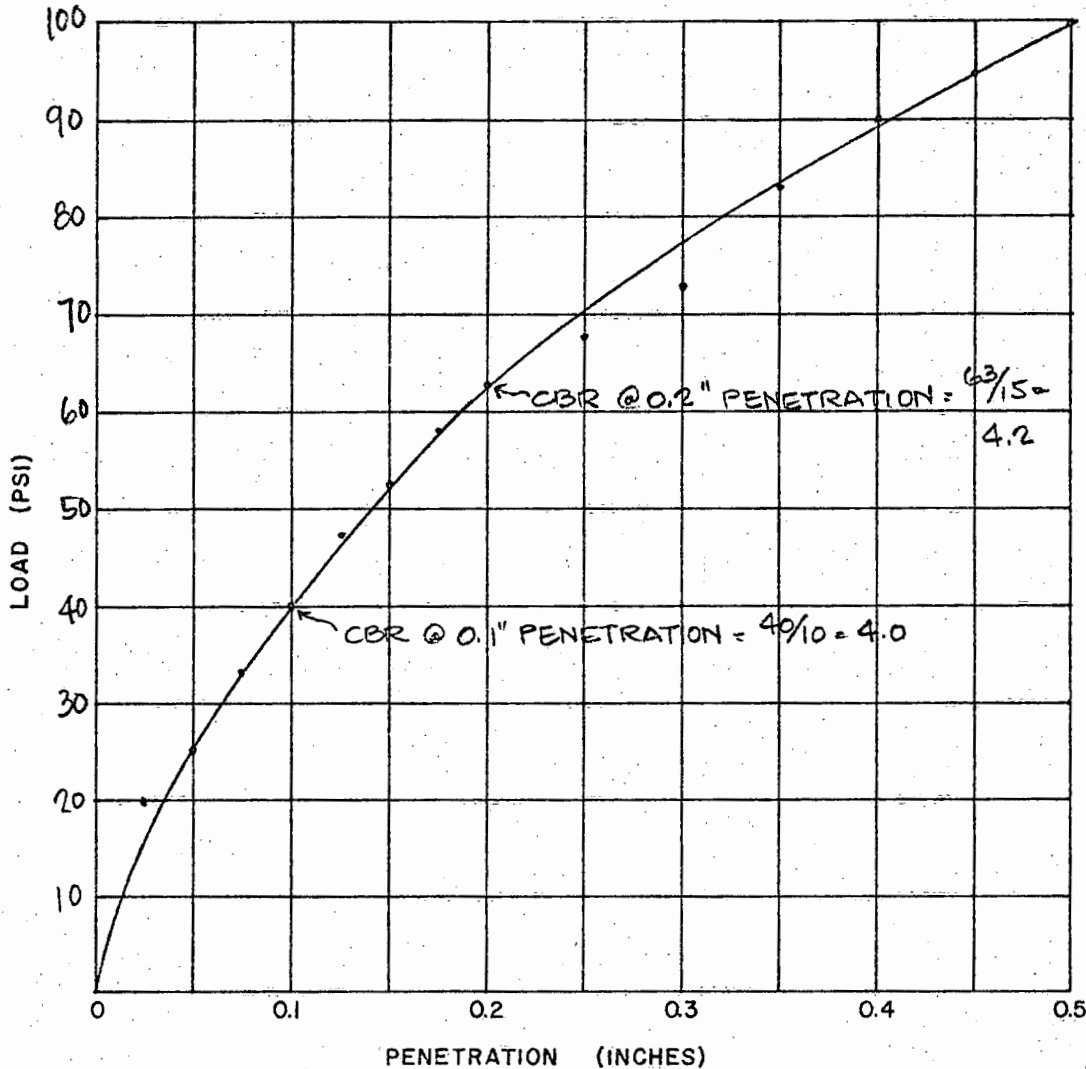
# CBR TEST

PROJECT: NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II

LOCATION: WAIMALU, EWA, OAHU, HAWAII

SAMPLE NO: 10 SURFACE

SAMPLE DESCRIPTION: DARK REDDISH-BROWN SILTY CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS)	LOAD (PSI)
0.025	60	20
0.050	75	25
0.075	100	33
0.100	120	40
0.125	140	47
0.150	160	53
0.175	170	57
0.200	190	63
0.250	200	67
0.300	220	73
0.350	250	83
0.400	270	90
0.450	285	95
0.500	300	100

AGGREGATE 1/4" MINUS  
 HAMMER WEIGHT 10 LBS.  
 HAMMER DROP 18"  
 No. OF BLOWS 56/LAYER  
 No. OF LAYERS 5

## TEST RESULTS:

MOLDING MOISTURE, % 28.5  
 MOLDING DRY DENSITY, P.C.F. 93.5  
 CBR @ 0.1" PENETRATION 4.0

DATE 4-30-73 BY L.Y.

DATE 10-19-73 BY B.T.

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

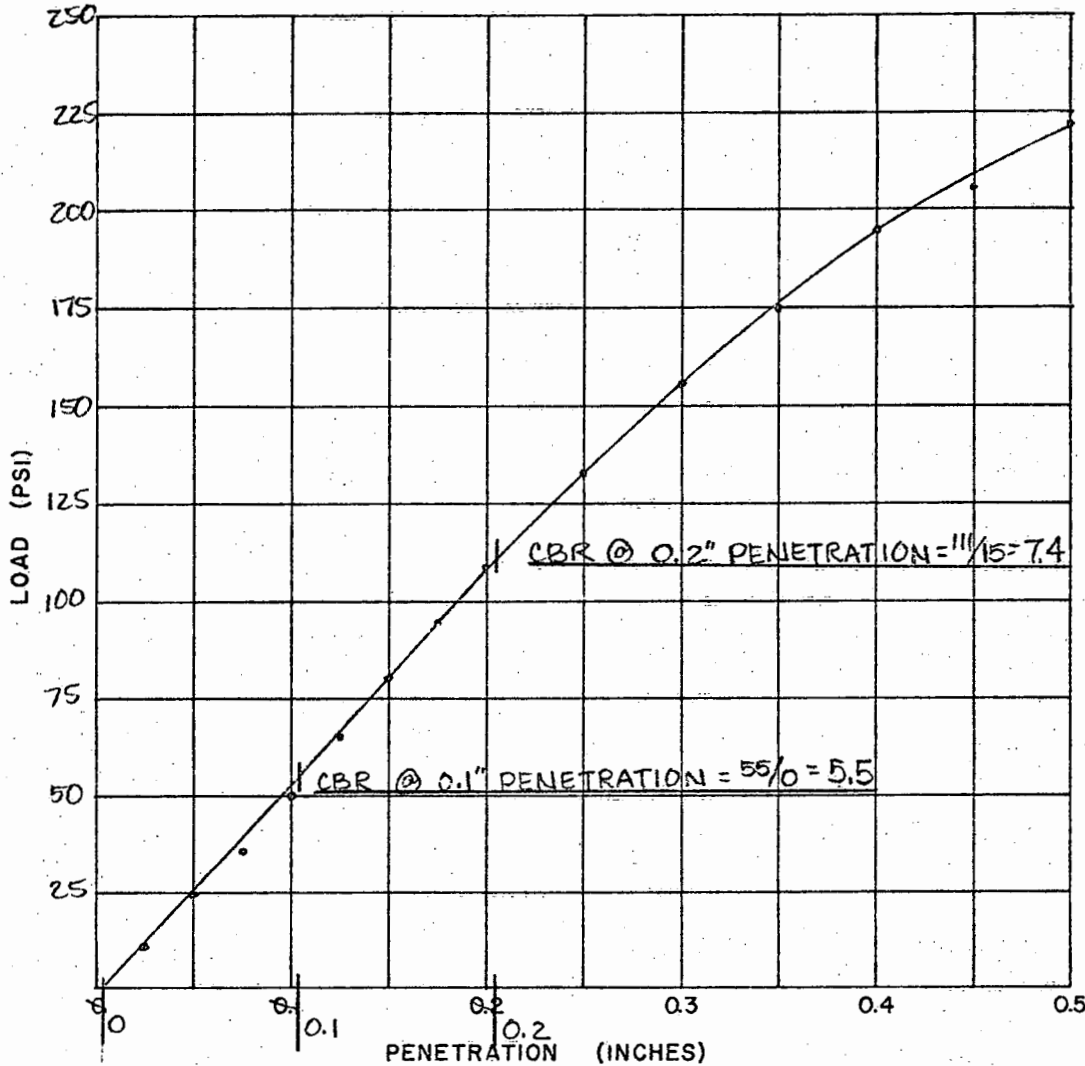
# CBR TEST

PROJECT: NEWTOWN ESTATES 2ND ACCESS RD. - PHASE II

LOCATION: WAIMALU, EWA, OAHU, HAWAII

SAMPLE NO: 12 SURFACE

SAMPLE DESCRIPTION: MOTTLED REDDISH-BROWN CLAYEY SILT



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS)	LOAD (PSI)
0.025	33	11
0.050	73	24
0.075	107	36
0.100	151	50
0.125	195	65
0.150	240	80
0.175	282	94
0.200	327	109
0.250	340	113
0.300	468	156
0.350	526	175
0.400	586	195
0.450	582	194
0.500	666	222

AGGREGATE 1/4" MINUS  
 HAMMER WEIGHT 10 LBS.  
 HAMMER DROP 18"  
 No. OF BLOWS 56/LAYER  
 No. OF LAYERS 5

## TEST RESULTS:

MOLDING MOISTURE, % 29.3  
 MOLDING DRY DENSITY, P.C.F. 92.2  
 CBR @ 0.1" PENETRATION 5.5  
 DAYS SOAKED 4

DATE 12-16-72 BY L.Y. & T.K.

DATE 12-18-72 BY M.I.

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

LOGS OF BORINGS

FROM

NEWTOWN ESTATES 2ND ACCESS ROAD -

PHASE I

DATED

DECEMBER 5, 1972

AND

NEWTOWN ESTATES RECREATION CENTER,

PARK AND SCHOOL SITE

DATED

JUNE 30, 1972



NEWTOWN 2ND ACCESS ROAD

Boring Log

PROJECT NEWTOWN ESTATES  
2ND ACCESS ROAD - PHASE I  
 LOCATION Waimalu, Ewa, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2  
 HAMMER: 140 #  
 Weight 30"  
 Drop 2"SS - 2" STANDARD SPLIT SPOON  
 SAMPLER: "BX" - BX DOUBLE TUBE CORE BARREL

BORING NO. 3 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
 Driller W. LUM ASSOC., INC. Date SEPT. 30 & OCT. 7, 1972  
 Field Party GAFFIN, KAKU, HORIUCHI, MEYER, RADOVICH  
 Type of Boring AUGER (MOBILE P-40) Diam. 4"  
 Elev. 93' ± \* Datum \_\_\_\_\_  
 Drill Bit FINGER TYPE, DIAMOND & T.C. CORING  
 Water Level NOT NOTICED  
 Time \_\_\_\_\_  
 Date 10-1-72

PENETRATION DATA

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	Standard Penetration Test				
											N (Blows per foot)				
											0	10	20	30	40
ML-MH		STIFF, REDDISH BROWN CLAYEY SILT w/ TRACES OF DECOMPOSED ROCK & ROOTS	0-5	2"SS	3-A	35	21	50	-	-					
(MH)		STIFF, MOTTLED REDDISH BROWN CLAYEY SILT w/ DECOMPOSED ROCK	5-10	2"SS	3-B	-	27	-	-	-					
		MOTTLED GRAY DECOMPOSED ROCK (SOME CRUSHES TO CLAYEY SILT)	10-15	2"SS	3-C	-	24	-	-	-					45
		BOULDERS OR ROCK FORMATION?	15-18	2"SS	3-D	-	9 (CUTTINGS)	-	-	-					40/0.3'
		BLUE, DENSE LAVA ROCK	18-20	"BX"	RUN #1										
			20-22	"BX"	RUN #2										
			22-24	"BX"	RUN #3										
			24-26	"BX"	RUN #4										
			26-28	"BX"	RUN #5										
		REDDISH BROWN, CLINKER & DECOMPOSED ROCK	28-30	"BX"	RUN #6										
			30-32	"BX"	RUN #7										
		GRAY WEATHERED CLINKER w/ TAN CLAY	32-34	"BX"	RUN #8										
			34-36	"BX"	RUN #9										
		BLUE, DENSE LAVA ROCK	36-38	"BX"											
			38-40	"BX"											
		END OF BORING @ 40'	40												

12-15 MIN.  
10 MIN.  
15-18 MIN.  
40 MIN.

HAMMER BOUNCES

NEWTOWN RECREATION CENTER

**Boring Log** NEWTOWN ESTATES  
RECREATION CENTER, PARK  
PROJECT AND SCHOOL SITE

LOCATION Waimalu, Ewa, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

HAMMER:  
Weight 140#  
Drop 30"  
SAMPLER: 2" S - 2" O.D. THIN WALL TUBE  
2" SS - 2" STANDARD SPLIT SPOON

BORING NO. 8 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
Driller W. LUM ASSOC., INC. Date MAY 12, 1972  
Field Party MAKAULA MAESHIRO, SETO  
Type of Boring AUGER (MOBILE B-50) Diam. 4"  
Elev. 218' ± \* Datum \_\_\_\_\_  
Drill Bit FINGER TYPE  
Water Level NOT NOTICED  
Time \_\_\_\_\_  
Date 5-12-72

PENETRATION DATA

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	Standard Penetration Test					
										N (Blows per foot)					
										2" O.D. THIN WALL TUBE SAMPLER					
										0	10	20	30	40	
(MH)	STIFF, REDDISH BROWN SILTY CLAY w/ROOTS	0 - 2.5	2" S	8-A	-	28	-	9940	-						4/0.5' 5/0.5'
(MH)	STIFF, REDDISH BROWN & BROWN CLAYEY SILT	2.5 - 5	2" SS	8-B	-	38	-	-	-						
	GRAY DECOMPOSED ROCK	5 - 10	2" SS	8-C	-	32	-	-	-						50/0.4'
	LAVA ROCK FORMATION & DECOMPOSED ROCK	10 - 13.5													
	END OF BORING @ 13.5'														
	NOTE: DRILL TIME 12.0' - 13.5' = 45MIN.														

\* ELEVATION ESTIMATED FROM SURVEY STAKES BY PARK ENGINEERING, INC.

NEWTOWN RECREATION CENTER

Boring Log NEWTOWN ESTATES RECREATION CENTER, PARK AND SCHOOL SITE

PROJECT \_\_\_\_\_  
 LOCATION Waimalu, Ewa, Oahu, Hawaii  
 Tax Map Key: 9-8-02: Por. 2

BORING NO. 9 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
 Driller W. LUM ASSOC., INC. Date MAY 11, 1972  
 Field Party MAKAULA, MAESHIRO, SETO  
 Type of Boring AUGER (MOBILE B-50) Diam. 4"  
 Elev. 223' ± \* Datum \_\_\_\_\_  
 Drill Bit FINGER TYPE

HAMMER:  
 Weight 140\*  
 Drop 30"  
 SAMPLER: 2" S - 2" O.D. THIN WALL TUBE  
2" SS - 2" STANDARD SPLIT SPOON

Water Level				
Time				
Date				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA						
										Standard Penetration Test						
										2" O.D. THIN WALL TUBE SAMPLER						
										N (Blows per foot)						
										0	10	20	30	40	BLOWS/0.5'	
(MH)	STIFF, REDDISH BROWN CLAYEY SILT w/ SOME ROOTS	0	2" S	9-A	-	24	-	890	-							7/0.5' 7/0.5'
(MH)	STIFF, BROWN CLAYEY SILT	5	2" SS	9-B	-	30	-	-	-							
MH	STIFF MOTTLED REDDISH BROWN CLAYEY SILT w/ TRACES OF DECOMPOSED ROCK	10	2" SS	9-C	39	41	52	-	-							
	ROCK OR BOULDER															
ML-MH	STIFF, MOTTLED GRAY-BROWN RED CLAYEY SILT	15	2" SS	9-D	36	43	50	-	-							13/0.5' 22/0.5'
	LAVA ROCK FORMATION & DECOMPOSED ROCK															
		20	2" SS	9-E												50/0.2'
		25	2" SS	9-F												60/0.2'
(MH)	STIFF, REDDISH BROWN CLAYEY SILT w/ DECOMPOSED ROCK	30	2" SS	9-G	-	35	-	-	-							
(SM)	DENSE, MOTTLED BROWN SILTY SAND (CINDERS)	35	2" SS	9-H	-	31	-	-	-							
	END OF BORING @ 36.5															

\* ELEVATION ESTIMATED FROM TOPO MAP

NEWTOWN RECREATION CENTER

**Boring Log** NEWTOWN ESTATES  
RECREATION CENTER, PARK  
AND SCHOOL SITE

BORING NO. 10 Sheet No. \_\_\_\_\_ of \_\_\_\_\_

PROJECT \_\_\_\_\_

Driller W. LUM ASSOC., INC. Date MAY 12, 1972

LOCATION Waimalu, Ewa, Oahu, Hawaii

Field Party MAKAULA, MAESHIRO, SETO

Tax Map Key: 9-8-02: Por. 2

Type of Boring AUGER (MOBILE B-50) Diam. 4"

HAMMER: Weight 140#

Elev. 234' ± \* Datum \_\_\_\_\_

Drop 30"

Drill Bit FINGER TYPE

SAMPLER: 2" S - 2" O.D. THIN WALL TUBE  
2" SS - 2" STANDARD SPLIT SPOON

Water Level NOT NOTICED

Time \_\_\_\_\_

Date 5-12-72

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA					
										Standard Penetration Test				2" O.D. THIN WALL TUBE SAMPLER	
										N (Blows per foot)					
										0	10	20	30	40	BLOWS/0.5'
(ML)	STIFF, REDDISH BROWN CLAYEY SILT	0 - 2.5	2" S	10-A	-	25	-	-	-						7/0.5' 9/0.5'
(MH)	STIFF, BROWN CLAYEY SILT	2.5 - 5	2" SS	10-B	-	34	-	-	-						51
(MH)	STIFF, MOTTLED REDDISH BROWN & GRAY SILTY CLAY	5 - 10	2" SS	10-C	-	33	-	-	-						60
(MH)	STIFF, MOTTLED GRAY CLAYEY SILT w/ TRACES OF DECOMPOSED ROCK	10 - 15	2" SS	10-D	-	43	-	-	-						
(MH)	STIFF, MOTTLED GRAY CLAYEY SILT w/ TRACES OF DECOMPOSED ROCK	15 - 20	2" SS	10-E	-	39	-	-	-						51
(MH)	STIFF, MOTTLED GRAY CLAYEY SILT w/ TRACES OF DECOMPOSED ROCK	20 - 25	2" SS	10-F	-	45	-	-	-						48
	END OF BORING @ 26.5'	25 - 26.5													

\* ELEVATION ESTIMATED FROM TOPO MAP

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

**Boring Log** NEWTOWN ESTATES  
RECREATION CENTER, PARK  
PROJECT AND SCHOOL SITE

LOCATION Waimalu, Ewa, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

HAMMER:  
Weight 140#  
Drop 30"  
SAMPLER: 2" S - 2" O.D. THIN WALL TUBE  
2" SS - 2" STANDARD SPLIT SPOON

BORING NO. 11 Sheet No. \_\_\_\_\_ of \_\_\_\_\_  
Driller W. LUM ASSOC., INC. Date MAY 9, 1972  
Field Party MAKAJULA, MAESHIRO, SETO  
Type of Boring AUGER (MOBILE B-50) Diam. 4"  
Elev. 237' ± \* Datum \_\_\_\_\_  
Drill Bit FINGER TYPE  
Water Level NOT NOTICED  
Time \_\_\_\_\_  
Date 5-9-72

PENETRATION DATA

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	Standard Penetration Test					
										N (Blows per foot)					
	ELEV. = 237' ± *	0								2" O.D. THIN WALL TUBE SAMPLER					
										0	10	20	30	40	BLOWS/0.5'
ML	STIFF, BROWN CLAYEY SILT w/ TRACES OF SAND (FILL?)	0 - 2.5	2" S	11-A	-	25	-	18190	-						7/0.5' 12/0.5'
	LAVA ROCK FORMATION & GRAY, DECOMPOSED ROCK (SOME CRUSHES TO CLAYEY SILT)	2.5 - 8.0	2" SS	11-B	-	39	-	-	-						
	NOTE: DRILL TIME 10.5' - 15.0' = 1 HOUR														
	END OF BORING @ 15'	8.0 - 10.5	2" SS	11-C	-	25	-	-	-						54/0.5'
		10.5 - 15.0	2" SS	11-D	-	NO RECOVERY	-	-	-						50/0.0' HAMMER BOUNCES

\* ELEVATION ESTIMATED FROM SURVEY STAKES BY PARK ENGINEERING, INC.

NEWTOWN RECREATION CENTER

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

**Boring Log** NEWTOWN ESTATES  
RECREATION CENTER, PARK  
PROJECT AND SCHOOL SITE

BORING NO. 11A Sheet No. \_\_\_\_\_ of \_\_\_\_\_

Driller W. LUM ASSOC., INC. Date MAY 10, 1972

LOCATION Waimalu, Ewa, Oahu, Hawaii  
Tax Map Key: 9-8-02: Por. 2

Field Party MAKAULA MAESHIRO SETO

Type of Boring AUGER (MOBILE B-50) Diam. 4"

HAMMER:  
Weight 140#  
Drop 30"

Elev. 246' ± \* Datum \_\_\_\_\_

Drill Bit FINGER TYPE

SAMPLER: 2" S - 2" O.D THIN WALL TUBE  
2" SS - 2" STANDARD SPLIT SPOON

Water Level: NOT NOTICED

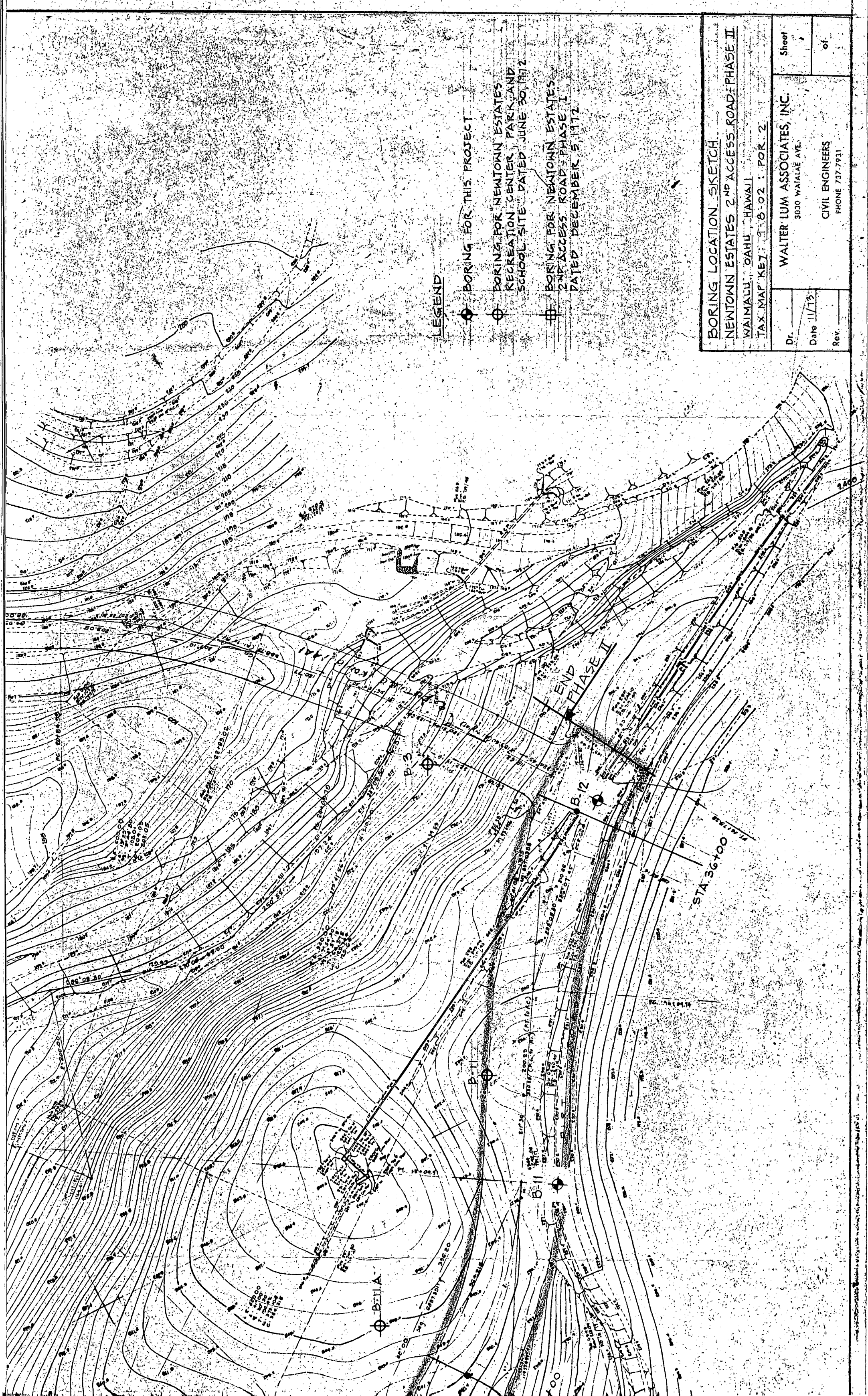
Time \_\_\_\_\_ Date 5-10-72

PENETRATION DATA

Unified Soil Classification	DESCRIPTION	Depth (ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	Standard Penetration Test					2" O.D. THIN WALL TUBE SAMPLER	
										N (Blows per foot)	0	10	20	30		40
(MH)	STIFF, REDDISH BROWN CLAYEY SILT SOME ROOTS	0	2" S	11A-A	-	23	-	27980	-							5/0.5' 6/0.5'
(MH)	STIFF, BROWN CLAYEY SILT	5	2" SS	11A-B	-	30	-	-	-							
(MH)	STIFF, REDDISH BROWN CLAYEY SILT DECOMPOSED ROCK	10	2" SS	11A-C	-	32	-	-	-							42
(MH)	STIFF, REDDISH BROWN CLAYEY SILT w/ TRACES OF DECOMPOSED ROCK	15	2" SS	11A-D	-	38	-	-	-							40
(MH)	STIFF DARK REDDISH BROWN CLAYEY SILT	20	2" SS	11A-E	-	42	-	-	-							34/0.5' 15/0.1'

END OF BORING @ 21.1'

\* ELEVATION ESTIMATED FROM TOPO MAP



**LEGEND**

- BORING FOR THIS PROJECT
- BORING FOR "NEWTOWN ESTATES RECREATION CENTER, PARK AND SCHOOL SITE" DATED JUNE 30, 1972
- ⊕ BORING FOR "NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE I" DATED DECEMBER 5, 1972

**BORING LOCATION SKETCH**  
**NEWTOWN ESTATES 2ND ACCESS ROAD - PHASE II**  
 WAIMALU, OAHU, HAWAII  
 TAX MAP KEY: 9-8-02: POR 2

Dr.	WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVE.	Sheet	1
Date	11/73	of	1
REV.	CIVIL ENGINEERS PHONE 737-7931		

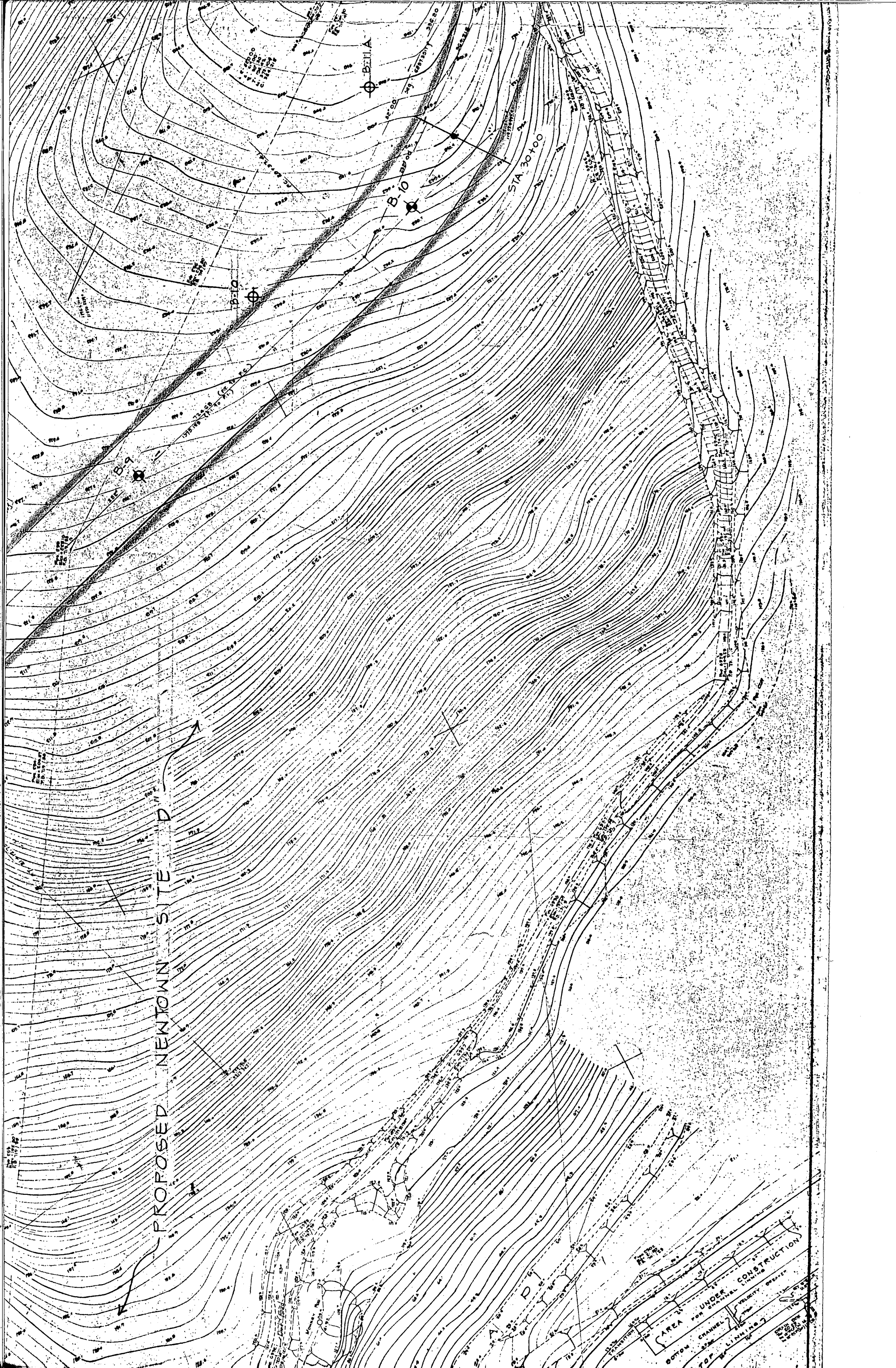
END PHASE II

STA 36+00

B-11

B-12

B-13



PROPOSED NEWTOWN SITE D

AREA UNDER CONSTRUCTION  
FOR CHANNEL LINING  
VELOCITY GREATER

B-10

STA 30+00

B-11

B-12

BOTTOM CHANNEL

TOP LINING

1:2500

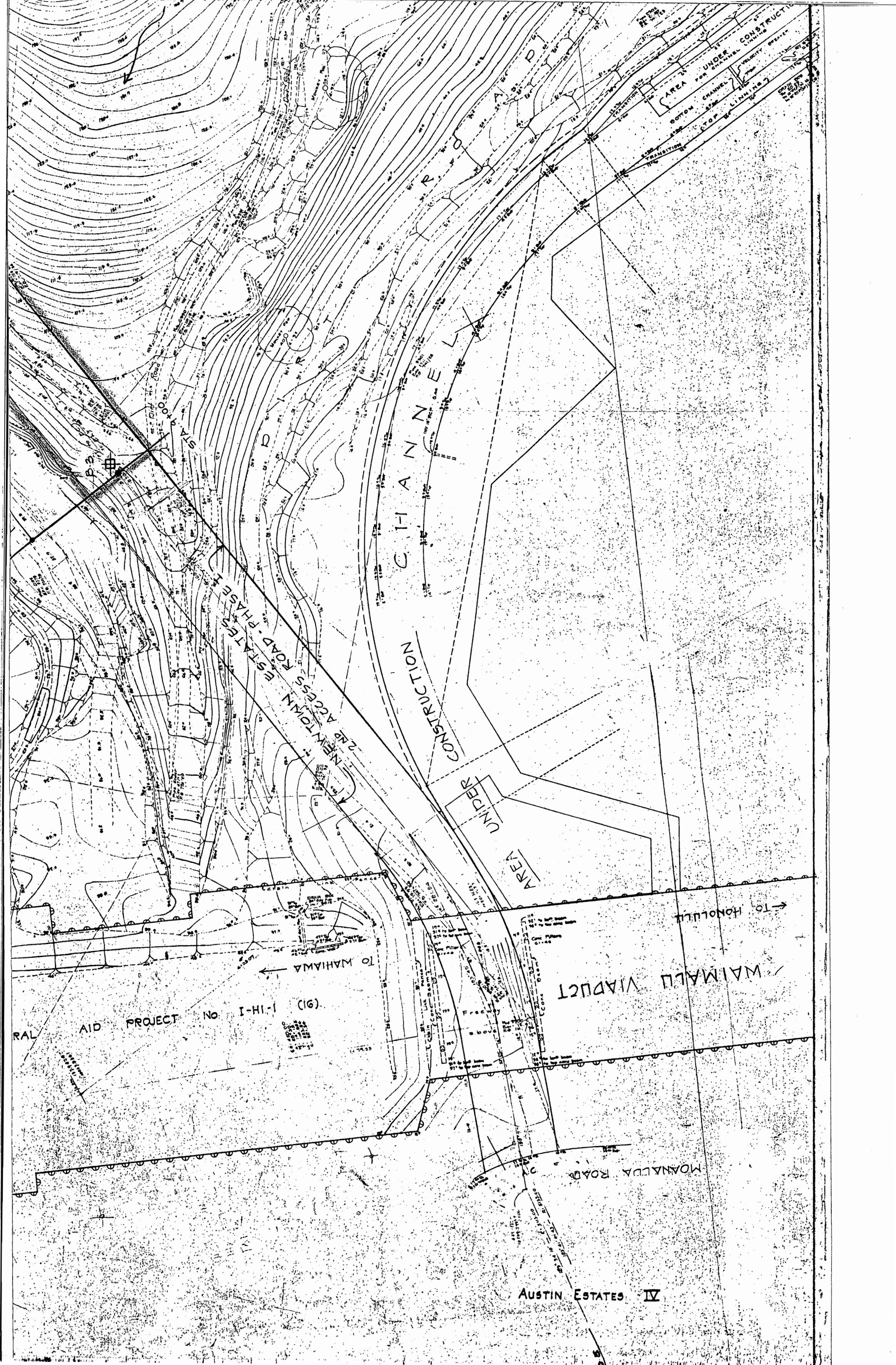
1950

1950

1950

1950





FEDERAL AID PROJECT NO. I-HI-1 (16)

AUSTIN ESTATES IV

WAIMALU VIADUCT

MOANALEA ROAD

CONSTRUCTION

AREA UNDER

C-I-I-A-N-N-E-L

NEW TOWN ESTATES PHASE 1

TO MAHAMA

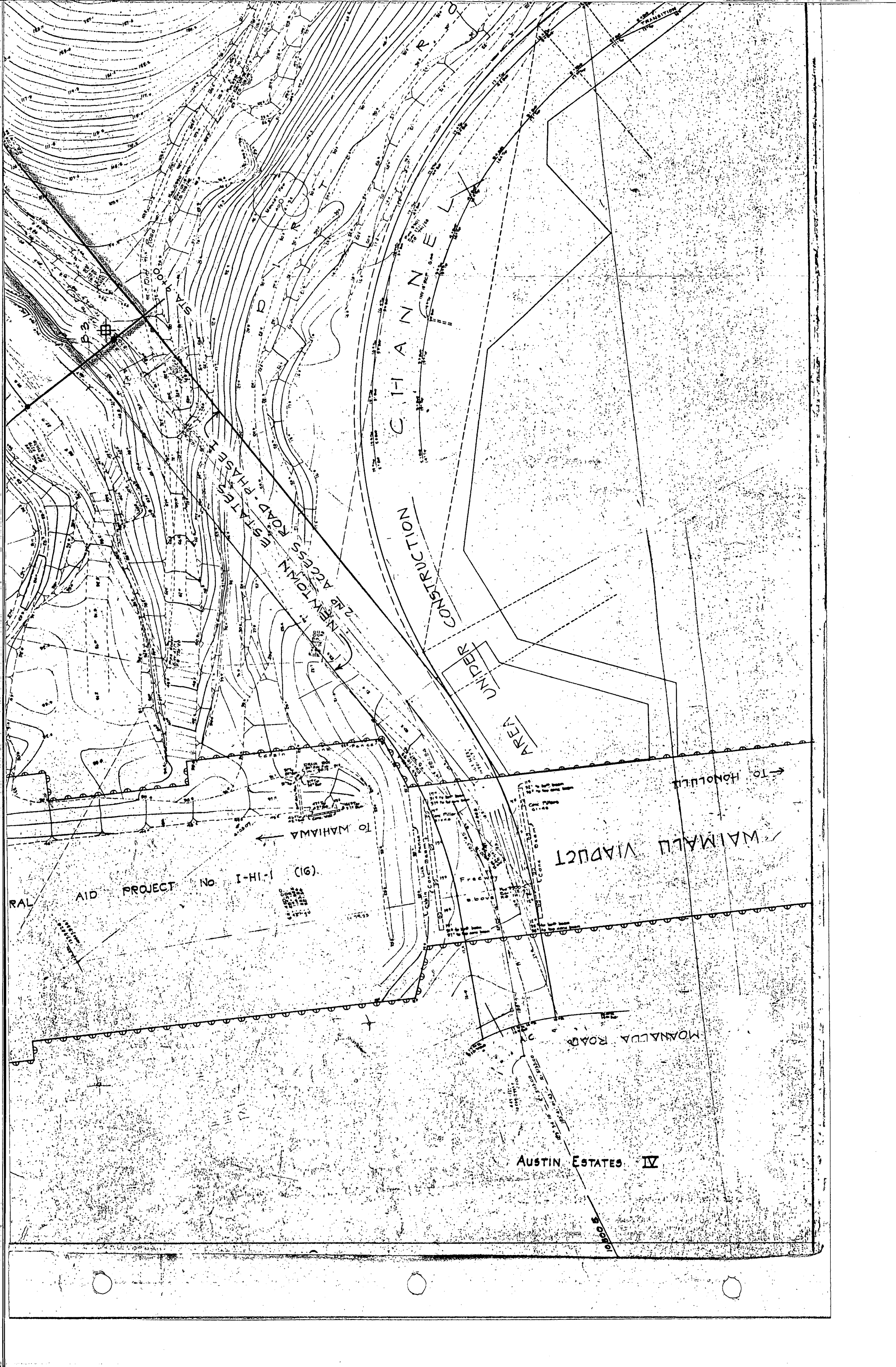
TO HONOLULU

AREA UNDER CONSTRUCTION

CHANNEL

TRANSITION

VELOCITY GREATER



CITANNELE CONSTRUCTION

AREA UNDER CONSTRUCTION

WAIMALU VIADUCT

MOANALUA ROAD

AUSTIN ESTATES IV

NEW TOWN ESTATES - PHASE 1

RAILROAD AID PROJECT No. I-HI-1 (16)

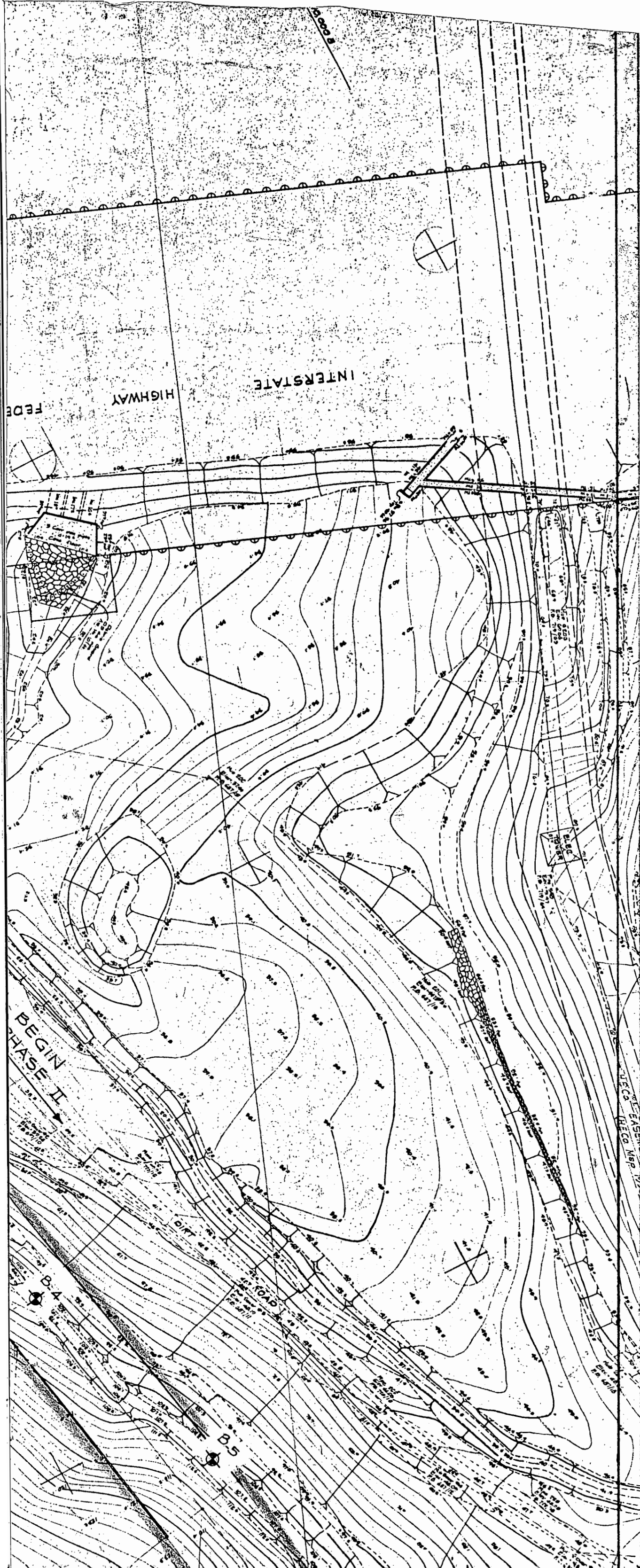
TO MAHAMA

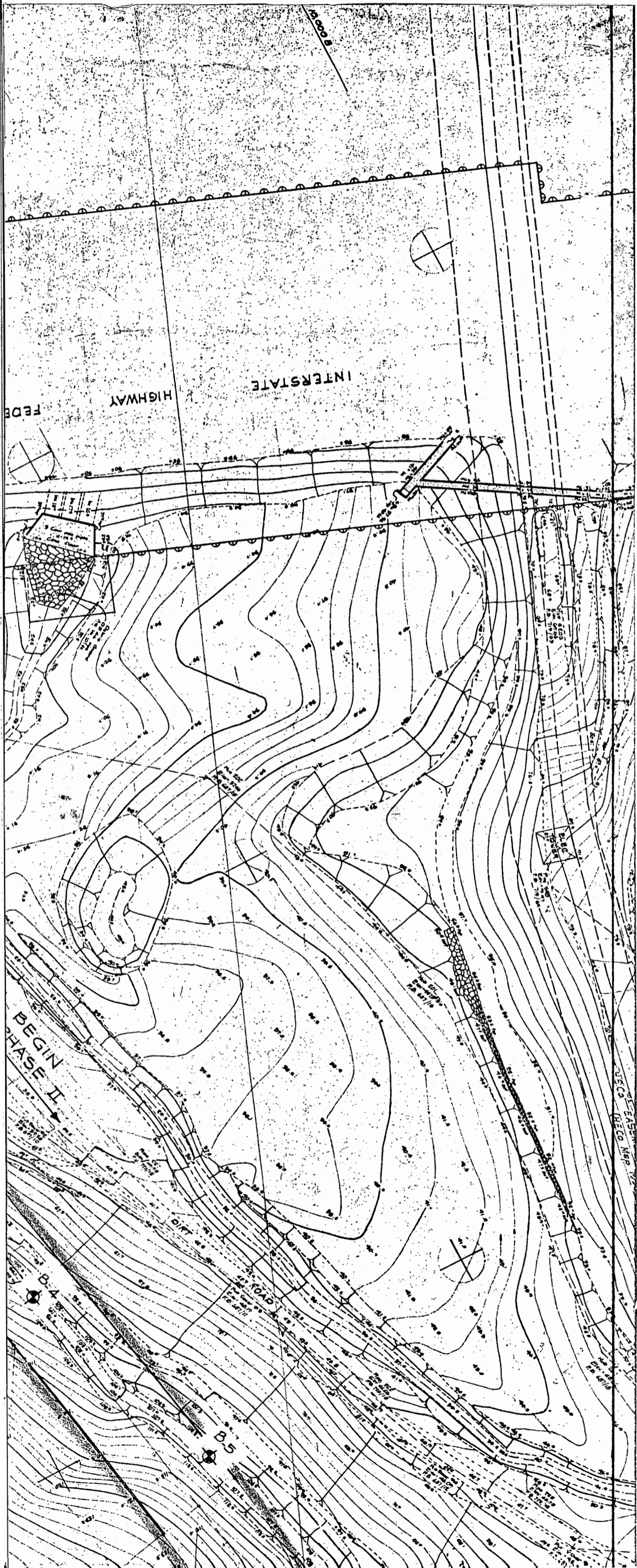
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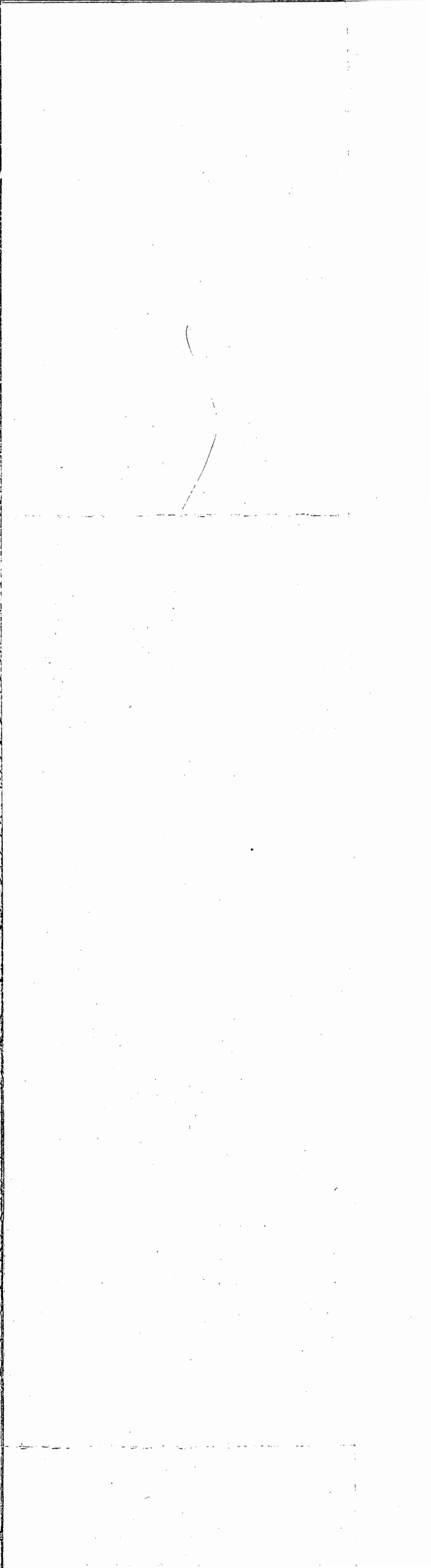
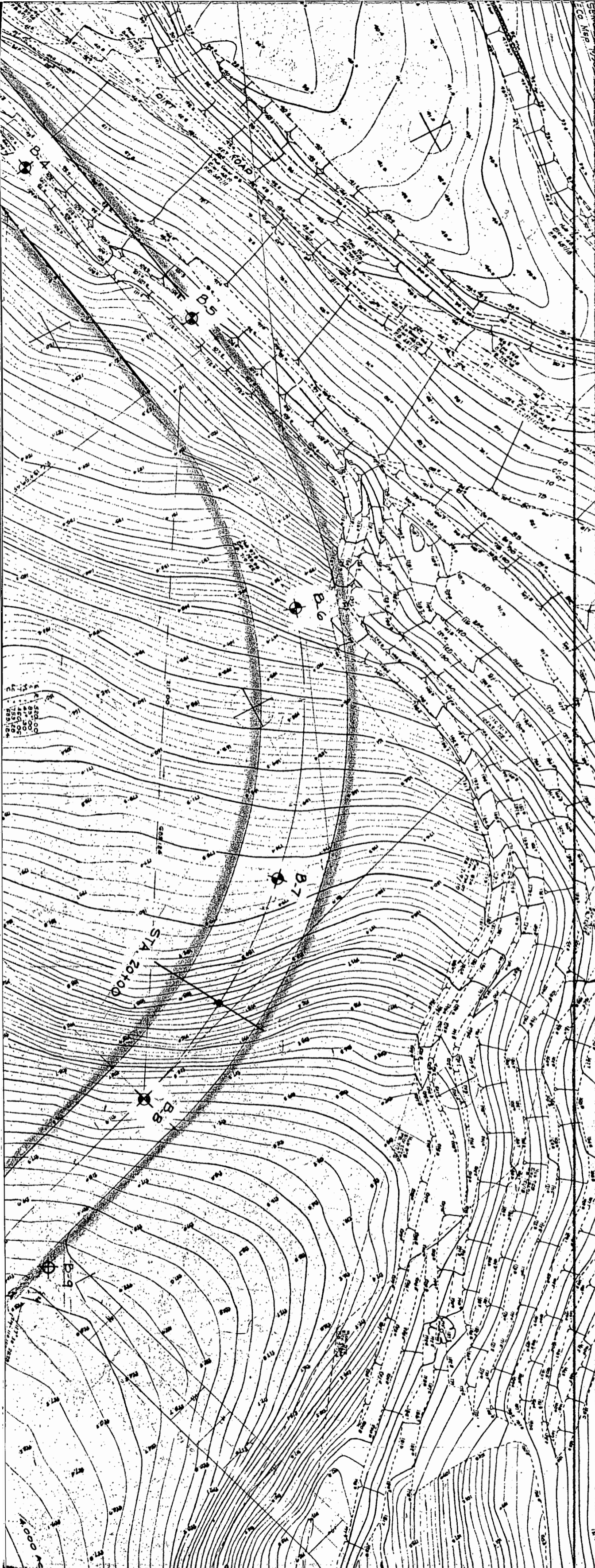
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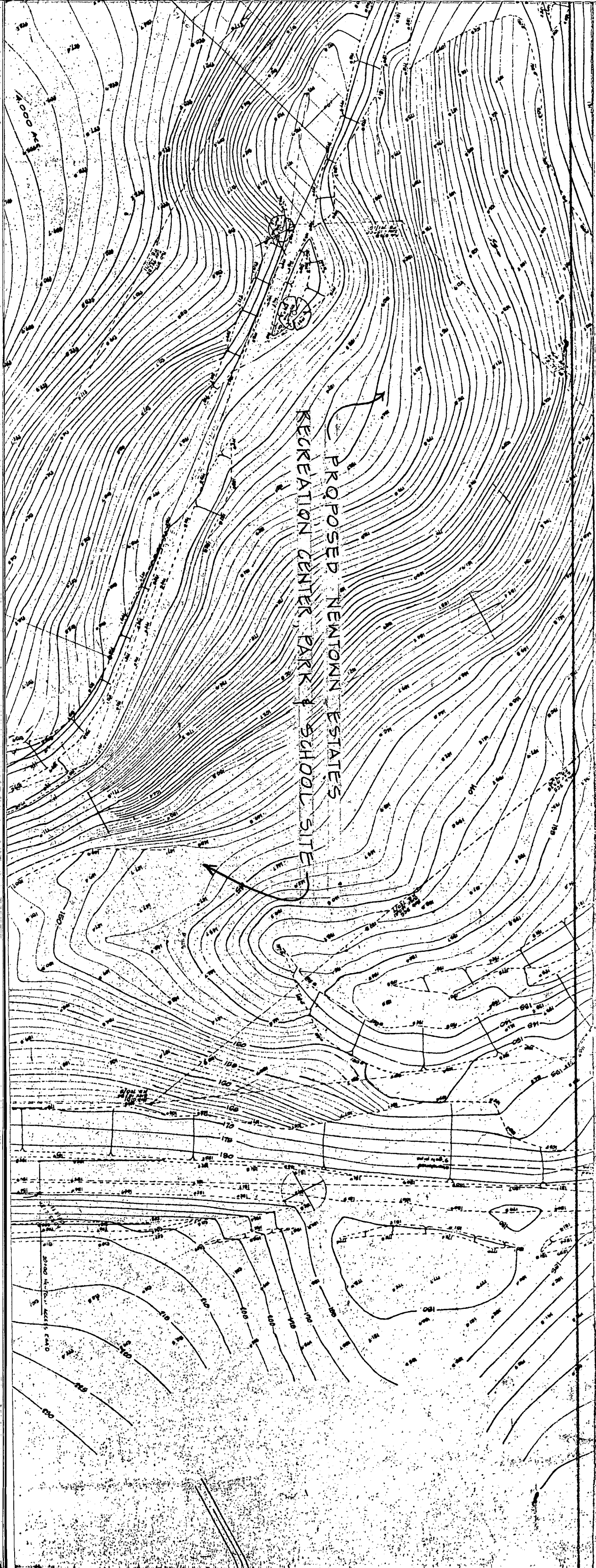
STATION

10005







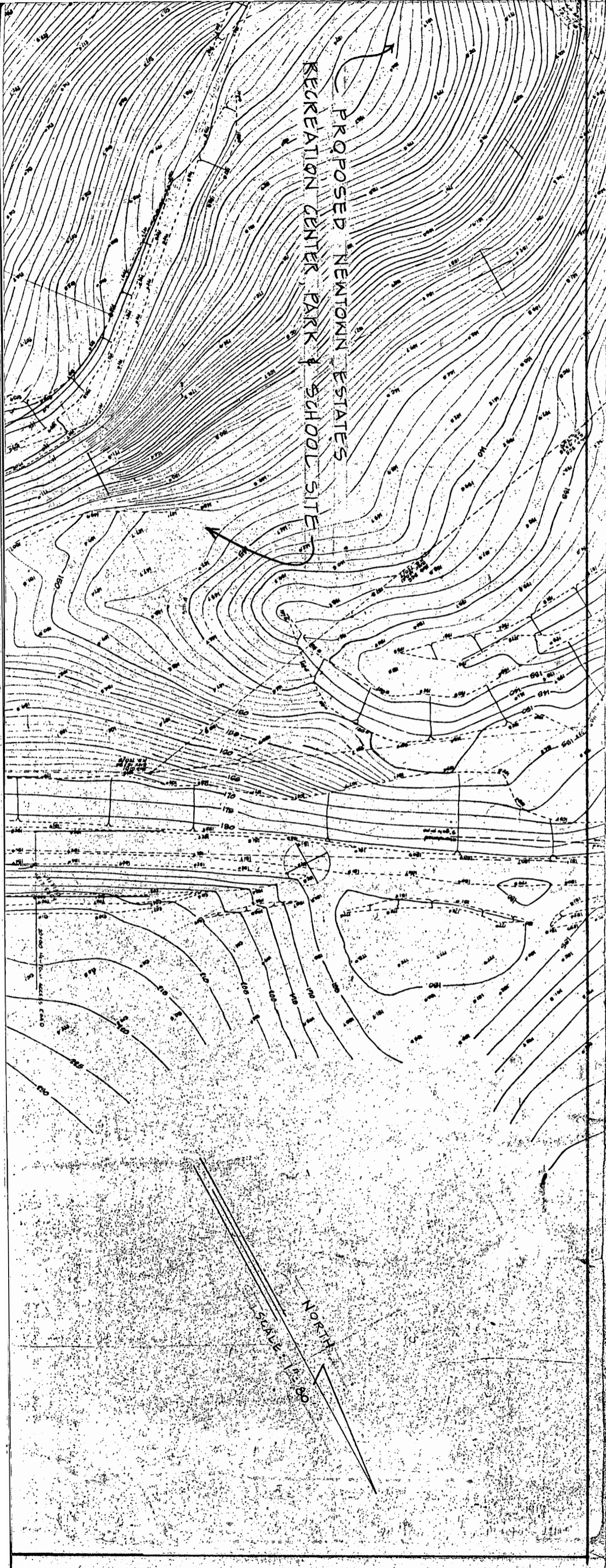


PROPOSED RECREATION CENTER

PROPOSED NEWTOWN ESTATES

SCHOOL SITE

PROPOSED NEWTOWN ESTATES  
RECREATION CENTER PARK & SCHOOL SITE



### LIMITATIONS

In general, soil formations are commonly erratic and rarely uniform or regular. The boring logs indicate the approximate subsurface soil conditions encountered only at the drill holes where the borings were made at the times designated on the logs and may not represent conditions at other locations or at other dates. Soil conditions and water levels may change with the passage of time and construction methods or improvements at the site.

During construction, should subsurface conditions much different from those in the borings be observed, encountered, or otherwise indicated, we should be advised immediately to review or reconsider our recommendations in light of the new developments.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes, plan changes, or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the recommendations considering the time lapse, changed conditions, and changes in the state of the art of soil engineering.

Our professional services were performed, findings obtained and recommendations prepared in accordance with generally accepted engineering practices. This warranty is in lieu of all other warranties expressed or implied.