PRELIMINARY GEOTECHNICAL INVESTIGATION
HCDA - POHUKAINA SCHOOL DEVELOPMENT DESIGN AND FEASIBILITY STUDY
HONOLULU, HAWAII
TMK: 2-7-51: 3, 5, 6 & 9

for

AM PARTNERS, INC.

ERNEST K. HIRATA & ASSOCIATES, INC.
W.O. 98-3000
April 9, 1998

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

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April 9, 1998
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Mr. Brian Takahashi
AM Partners, Inc.
1164 Bishop Street, Suite 1000
Honolulu, Hawaii 96813

Dear Mr. Takahashi:

Our report, "Preliminary Geotechnical Investigation, HCDA - Pohukaina School, Development Design and Feasibility Study, Honolulu, Hawaii, TMK: 2-1-51: 3, 5, 6 & 9," dated April 9, 1998, our Work Order 98-3000 is enclosed. This investigation was conducted in general conformance with the scope of work presented in our proposal dated July 14, 1997.

Due to the loose and compressible soils underlying the site at shallow depths, we believe that pile foundations will be required for the support of mid and high-rise structures. The piles will derive their capacity in end bearing on the medium hard coral stratum encountered in our borings at depths ranging from about 10.5 to 17 feet.

The use of spread footings to support single story structures is feasible, depending on the final structural loads, the type of building construction, and the expected site grading. Preliminary cost estimates should include overexcavation and recompaction of about 2 feet of the existing fill below all spread footings.

Preliminary recommendations are presented in this report in support of the feasibility study, and for planning purposes only. A supplementary investigation, including additional exploratory borings, will be required for the final design recommendations.

We appreciate this opportunity to be of service. Should you have any questions concerning this report, please feel free to call on us.

Very truly yours,

ERNEST K. HIRATA & ASSOCIATES, INC.

Ernest K. Hirata — President

EKH:ph

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PRELIMINARY GEOTECHNICAL INVESTIGATION
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INTRODUCTION

This report presents the results of our preliminary geotechnical investigation performed for the development design and feasibility study of the HCDA - Pohukaina School project. Our work scope for this study included the following:

- A visual reconnaissance of the site and its vicinity to observe existing conditions which may affect the project. The general location of the project site is shown on the enclosed Location Map, Plate 1.

- A review of available soils information pertinent to the site and the proposed project.

- Drilling and sampling 3 exploratory borings to depths ranging from about 48 to 50 feet. The soils encountered are described on the Boring Logs, Plates B1 through B6. The approximate exploratory boring locations are shown on the enclosed Boring Location Plan, Plate 2.

- Laboratory testing of selected soil samples. Laboratory testing procedures are presented in the Description of Laboratory Testing, Pages 1 and 2 in the Appendix. Laboratory test results are shown on the Boring Logs, and on Plates C1 through C3, D1, and D2.

- Engineering analyses of the field and laboratory data.

- Preparation of this report presenting the general subsurface soil conditions encountered, as well as our opinions regarding the feasibility of alternate foundation systems for the support of structures. For planning purposes, preliminary geotechnical recommendations for the design of slabs-on-grade,

resistance to lateral pressures, flexible pavement, and site grading are also presented.

PROJECT CONSIDERATIONS

We understand that the project involves (1) developing a master plan for an elementary school, an affordable housing and office tower, a community park, and adequate parking facilities for all uses, (2) preparing supporting materials for RFP documents for the housing and office tower, and (3) preparing schematic design documents for the elementary school and park.

SITE CONDITIONS

The project site is located in the Kakaako area of Honolulu, Hawaii, consisting of the entire block bordered by Keawe, Halekauwila, Cooke, and Pohukaina Streets. Commercial buildings border the site to the southeast and southwest, with 4 and 5-story residential buildings located to the northeast.

The property is bisected by the former Coral Street which runs in an approximate northeast-southwest alignment. The area northwest of the former Coral Street is occupied by the Library Services building. The structure is a single story masonry building with plan dimensions of about 105 by 175 feet. The remaining areas northwest of the former Coral Street are paved with asphaltic concrete pavement and used for parking.

Mother Waldron Playground occupies the area southeast of the former Coral Street. Open playcourts are located in the western corner of the park with a comfort station situated in the central section. The remaining areas are covered by grass lawn.

The property is relatively level with ground elevations generally ranging from about +4.5 to +6.5.

FIELD EXPLORATION

The site was explored from February 26 through March 3, 1998 by drilling 3 exploratory test borings with a truck-mounted Mobile B40-L22 drill rig. The borings varied in depth from about 48 to 50 feet. The soils were continuously logged by our field engineer and classified by visual examination in accordance with the Unified Soil Classification System. A Boring Log Legend is presented on Plate A1 and the Unified Soil Classification System is shown on Plate A2. The approximate boring locations are shown on Plate 2, and the soils encountered are logged on Plates B1 through B6.

Representative soil samples and core samples of coral were recovered from the borings for selected laboratory testing and analyses. Representative samples were obtained by driving a 3-inch O.D. thin-walled split tube sampler with a 140-pound hammer from a height of 30 inches. The blow counts required for 12 inches of penetration are shown at the appropriate depths on the enclosed Boring Logs.

Core samples were obtained by drilling with both an NX core barrel, which has an inside diameter of 2.1 inches, and a 4-inch I.D. core barrel. Recovery percentages for each core run are shown on the enclosed Boring Logs.

SOIL CONDITIONS

The surface soils were classified as fill consisting primarily of brown and tan silty sand and sandy silt mixed with gravel and coral fragments. The near surface soils

had a higher silt content. The fill was in a medium dense condition and extended to depths ranging from about 3.5 to 6 feet.

Underlying the surface fill was a stratum of gray silty sand with coral fragments. The silty sand was in a loose and compressible condition.

Coral was encountered in our borings at depths ranging from about 10.5 to 17 feet. Borings B1 and B2 encountered coral at depths of about 11 and 10.5 feet, respectively. The coral stratum was encountered deepest in boring B3, drilled at the south end of the site near the intersection of Pohukaina and Cooke Streets. Borings drilled for a previous study in the area northwest of the former Coral Street generally encountered coral at depths ranging from about 10 to 12 feet. (One of the previous borings encountered coral at about 15 feet; however this appeared to be an isolated condition.)

The coral was in a medium hard condition with pockets of cemented sand and coral fragments. The lower section of the stratum consisted of coral rubblestone, a conglomerate of partially cemented coralline silt, sand, and gravel-sized coral fragments. Borings B1 and B3 encountered dense to medium dense silty sand with coral fragments at depths of about 35 and 37 feet, respectively. The coralline material extended to the maximum depths drilled.

Groundwater was encountered in all our borings at depths ranging from about 5.5 to 6 feet below existing grade.

CONCLUSIONS AND RECOMMENDATIONS

Due to the loose and compressible soils underlying the site at shallow depths, we believe that pile foundations will be required for support of mid and high-rise structures. The piles will derive their capacity in end bearing on the medium hard coral stratum. For preliminary planning, allowable pile bearing loads of 40 and 80 tons can be assumed for 12-inch square and 16.5-inch octagonal prestressed concrete piles, respectively.

We believe that the use of spread footings to support single story structures is feasible, depending on the final structural loads, the type of building construction, and the expected site grading. Additional site preparation work, such as recompacting portions of the existing fill, may be necessary and allowable bearing values will be relatively low, on the order of 1500 to 2000 pounds per square foot.

We understand that an underground parking structure is being considered as part of the proposed development. The recommended foundation system will depend on the structure's location and finish floor elevation. To reduce waterproofing costs, only a partial basement level should be considered; however pile foundations would be required for support. If located in an area where coral underlies the site at about 10 feet, a full basement level would allow for the use of spread footings founded on coral for support.

The following are preliminary recommendations presented in support of the feasibility study and for planning purposes only. A supplementary investigation, including additional exploratory borings at the final building sites, will be required for design recommendations.

Foundations

Pile foundations will be required for support of mid and high-rise structures. The piles will derive their capacity in end bearing on the medium hard coral stratum. For preliminary planning purposes, allowable pile bearing loads of 40 and 80 tons can be assumed for 12-inch square and 16.5-inch octagonal prestressed concrete piles, respectively. We expect that pile lengths will be on the order of 15 feet.

We believe that spread footings may be used to support single story structures. However estimated settlements will depend on the final structural loads, the type of building construction, and the expected site grading in the building area. Placement of additional fill could result in significant settlements.

For planning purposes, we recommend that cost estimates include overexcavation and recompaction of about 2 feet of the existing fill below all spread footings. The allowable bearing value for footings founded on recompacted fill will be relatively low, on the order of 1500 to 2000 pounds per square foot.

If located in an area where coral underlies the site at about 10 feet, structures with a full basement level may be supported on spread footings founded on coral. An allowable bearing value of 5000 pounds per square foot may be used for planning purposes.

Lateral Design

The bearing values and pile capacities indicated above are for the total of dead and frequently applied live loads, and may be increased by one-third for short duration loading which includes the effect of wind and seismic forces.

Due to the relatively short pile lengths expected, we expect that the allowable lateral pile capacity will be negligible. Resistance to lateral loading may be provided by friction acting at the base of spread footings, and by passive earth pressure acting on the buried portions of foundations and pile caps.

For preliminary planning, the following parameters may be assumed:

- Coefficient of friction = 0.4
- Passive earth pressure = 300 pcf
- Active earth pressure = 40 pcf above water level
  = 94 pcf below water level

Slabs-on-Grade

The use of conventional slabs-on-grade is feasible for the proposed development. Slabs-on-grade will require only the standard 4-inch gravel cushion. All building slabs should also be protected by a plastic moisture barrier placed over the cushion material. Basaltic termite barrier (BTB) may be used in place of the 4 inches of clean gravel .

Pavement Design

Assuming only light passenger vehicle traffic, flexible pavement for driveways and parking areas may be designed based on 2 inches of asphaltic concrete over 6 inches of aggregate base course. The subgrade and base course material should be compacted to a minimum 95 percent compaction as determined by ASTM D 1557.

Site Grading

The project site should be cleared of all vegetation, concrete footing and slabs, asphaltic concrete pavement, and other deleterious material. Prior to placement of fill, the existing ground should be scarified to a depth of six inches and compacted to a minimum 95 percent compaction as determined by ASTM D 1557.

Structural fill may consist of either imported borrow or the existing surface fill material. The onsite silty sand fill may be reused provided all rock and coral fragments larger than six inches in maximum dimension are removed.

Imported structural fill should be well-graded, non-expansive granular material. Specifications for imported structural fill should indicate a maximum particle size of 3 inches, and state that not more than 20 percent of soil by weight shall pass the #200 sieve. In addition, the plasticity index (P.I.) of that portion of the soil passing the #40 sieve shall not be greater than 10.

All structural fill should be placed in horizontal lifts restricted to eight inches in loose thickness and compacted to a minimum 95 percent compaction as determined by ASTM D 1557. Fill placed in areas which slope steeper than 5:1 (horizontal to vertical), should be continually benched as the fill is brought up in lifts.

ADDITIONAL SERVICES

We recommend that we perform a general review of the pertinent RFP documents and schematic drawings to verify that our preliminary recommendations have been properly interpreted and implemented.

LIMITATIONS

The boring logs indicate the approximate subsurface soil conditions encountered only at those times and locations where our borings were made, and may not represent conditions at other times and locations.

This report was prepared specifically for AM Partners, Inc. and their subconsultants for the Development Design and Feasibility Study for the proposed Pohukaina

School project. The boring logs and preliminary recommendations presented in this report are for feasibility and planning purposes only, and are not intended for use in developing final design plans and specifications. As indicated above, a supplementary investigation, including additional exploratory borings, will be required for final design recommendations.

Our conclusions and preliminary recommendations are based upon the site materials observed, the preliminary information made available, the data obtained from our site exploration, our engineering analyses, and our experience and engineering judgement. The conclusions and preliminary recommendations are professional opinions which we have strived to develop in a manner consistent with that level of care, skill, and competence ordinarily exercised by members of the profession in good standing, currently practicing under similar conditions. No other warranty is expressed or implied.

Respectfully submitted,

ERNEST K. HIRATA & ASSOCIATES, INC.

Paul S. Morimoto

Paul S. Morimoto, P.E.

This work was prepared by
me or under my supervision

APPENDIX

DESCRIPTION OF LABORATORY TESTING

CLASSIFICATION

Field classification was verified in the laboratory in accordance with the Unified Soil Classification System. Laboratory classification was determined by visual examination. The final classifications are shown at the appropriate locations on the Boring Logs, Plates B1 through B6.

MOISTURE-DENSITY

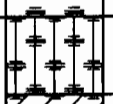
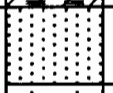
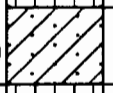
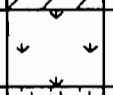
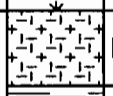
The field moisture content and dry unit weight were determined for each of the representative samples. The information was useful in providing a gross picture of the soil consistency between borings and any local variations. The dry unit weight was determined in pounds per cubic foot while the moisture content was determined as a percentage of dry weight. Samples were obtained using a 3-inch O.D. split tube sampler. Test results are shown at the appropriate depths on the Boring Logs, Plates B1 through B6.

CONSOLIDATION

Settlement predictions of the soil's behavior under load were made on the basis of consolidation test results. Test samples were 2.42 inches in diameter and 1 inch high. Porous stones were placed in contact with the top and bottom of test samples to permit addition and release of pore fluid. Loads were then applied in several increments in a geometric progression, and the resulting deformations recorded at selected time intervals. Results of tests on representative samples are plotted on the Consolidation Test Reports, Plates C1 through C3.

SHEAR TESTS

Shear tests were performed in the Direct Shear Machine which is of the strain control type. The rate of deformation was approximately 0.02 inches per minute. Each sample was sheared under varying confining loads in order to determine the Coulomb shear strength parameters, cohesion and angle of internal friction. Eighty percent of the maximum value was taken to determine the shear strength parameters. Test results are presented on Plates D1 and D2.

MAJOR DIVISIONS			GROUP SYMBOLS		TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of the material is LARGER than No. 200 sieve size.)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines.)		GW	Well graded gravels, gravel–sand mixtures, little or no fines.
				GP	Poorly graded gravels or gravel–sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines.)		GM	Silty gravels, gravel–sand–silt mixtures.
				GC	Clayey gravels, gravel–sand–clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size.)	CLEAN SANDS (Little or no fines.)		SW	Well graded sands, gravelly sands, little or no fines.
				SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines.)		SM	Silty sands, sand–silt mixtures.
				SC	Clayey sands, sand–clay mixtures.
FINE GRAINED SOILS (More than 50% of the material is SMALLER than No. 200 sieve size.)	SILTS AND CLAYS (Liquid limit LESS than 50.)			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50.)			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils.
					FRESH TO MODERATELY WEATHERED BASALT
					VOLCANIC TUFF / HIGHLY TO COMPLETELY WEATHERED BASALT
					CORAL

SAMPLE DEFINITION		
2" O.D. Standard Split Spoon Sampler	Shelby Tube	RQD Rock Quality Designation
3" O.D. Split Tube Sampler	NX / 4" Coring	Water Level

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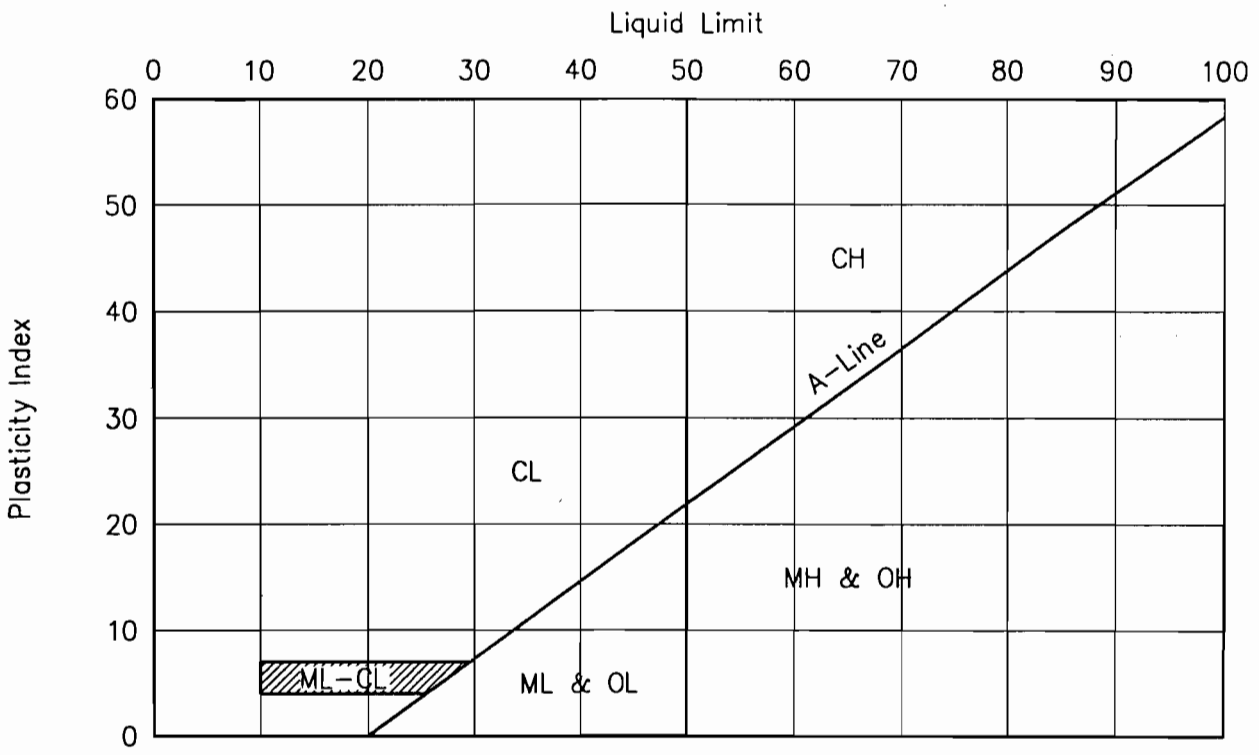
Ernest K. Hirata & Associates, Inc.	BORING LOG LEGEND Plate A1

PLASTICITY CHART



GRADATION CHART

COMPONENT DEFINITIONS BY GRADATION	
COMPONENT	SIZE RANGE
Boulders	Above 12 in.
Cobbles	3 in. to 12 in.
Gravel Coarse gravel Fine gravel	3 in. to No. 4 (4.76 mm) 3 in. to 3/4 in. 3/4 in. to No. 4 (4.76 mm)
Sand Coarse sand Medium sand Fine sand	No. 4 (4.76 mm) to No. 200 (0.074 mm) No. 4 (4.76 mm) to No. 10 (2.0 mm) No. 10 (2.0 mm) to No. 40 (0.42 mm) No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and clay	Smaller than No. 200 (0.074 mm)

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Ernest K. Hirata & Associates, Inc.	UNIFIED SOIL CLASSIFICATION SYSTEM Plate A2

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BORING LOG

W.O. 98-3000

BORING NO. B1 DRIVING WT. 140 lb. DATE OF DRILLING 3-2-98

SURFACE ELEV. 4.8±* DROP 30 in. WATER LEVEL 5.5 ft.

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0			30	90	10	Sandy SILT (SM) – Brown, moist, medium stiff, with gravel. (Fill) Covered by 1 inch of asphaltic concrete over 5 inches of base course. Cobbles at 2 feet.
5 ▽			16	98	28	Silty SAND (SM) – Gray, moist, loose, with coral fragments.
			5	Disturbed		
10			8	87	41	
15						CORAL – Tan, dense, fragmented. Begin 4" coring at 11 feet. 50% Recovery from 11 to 15 feet. Medium hard from 14 feet. 76% Recovery from 15 to 20 feet.
20						100% Recovery from 20 to 25 feet.
25						50% Recovery from 25 to 30 feet. Medium hard, with pockets of partially cemented sand.
30						

Plate B1

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BORING LOG

W.O. 98-3000

BORING NO. B1 (cont.) DRIVING WT. 140 lb. DATE OF DRILLING 3-2-98

SURFACE ELEV. 4.8±* DROP 30 in. WATER LEVEL 5.5 ft.

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						Silty SAND (SM) – Tan, medium dense, with coral fragments. 0% Recovery from 30 to 35 feet.
35			12			End 4" coring at 35 feet.
40			21			Fragments of partially cemented sand.
45						CORAL – Tan, medium hard to hard. Begin NX coring at 43 feet. 80% Recovery from 43 to 48 feet.
50						End boring at 48 feet. * Elevations based on advance print of Topographic Survey Map prepared by ControlPoint Surveying, Inc., dated January 5, 1997.
55						
60						

Plate B2

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BORING LOG

W.O. 98-3000

BORING NO. B2 DRIVING WT. 140 lb. DATE OF DRILLING 2-27-98

SURFACE ELEV. 5.4± DROP 30 in. WATER LEVEL 6.0 ft.

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0			13	78	14	Silty SAND (SM) – Light brown, moist, medium dense, with coral fragments and gravel. (Fill) Covered by 1 inch of asphaltic concrete over 4 inches of base course. Tan silty sand at 2 feet.
5 ▽			4	70	46	Sandy SILT (ML–SM) – Gray, moist, soft, with coral fragments. Sandier from 6 feet.
			7	No Recovery		
10			4/6"	Tip Recovery		
						CORAL – Tan, medium hard. Begin 4" coring at 10.5 feet. 100% Recovery from 10.5 to 15 feet.
15						100% Recovery from 15 to 20 feet. Medium hard coral with pockets of cemented sand.
20						100% Recovery from 20 to 25 feet. Fragmented, with pockets of cemented sand.
25						94% Recovery from 25 to 30 feet.
30						End 4" coring at 30 feet.

Plate B3

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BORING LOG

W.O. 98-3000

BORING NO. B2 (cont.) DRIVING WT. 140 lb. DATE OF DRILLING 3-2-98

SURFACE ELEV. 5.4± DROP 30 in. WATER LEVEL 6.0 ft.

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						Begin NX coring at 30 feet. 92% Recovery from 30 to 35 feet.
35						90% Recovery from 35 to 40 feet. Medium hard coral.
40						54% Recovery from 40 to 45 feet. Dense, fragmented from 40 feet.
45						20% Recovery from 45 to 50 feet.
50						End boring at 50 feet.
55						
60						

Plate B4

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BORING LOG

W.O. 98-3000

BORING NO. B3 DRIVING WT. 140 lb. DATE OF DRILLING 2-26-98

SURFACE ELEV. 5.4±* DROP 30 in. WATER LEVEL 5.8 ft.

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						
			75	121	13	Silty SAND (SM) – Mottled brown to grayish brown, moist, medium dense, with coral fragments. (Fill) Covered by 4 inches of top soil.
			13	93	21	Tan silty sand at 3 feet.
5 ▽			17/6"	97	16	
			8/6"			Silty SAND (SM) – Gray, loose, with coral fragments.
			4	99	28	
10			5	83	38	
			7	No Recovery		
15						
						CORAL – Tan, medium hard. Begin 4" coring at 17 feet. 90% Recovery from 17 to 22 feet.
20						
						100% Recovery from 22 to 27 feet. Medium hard coral with pockets of cemented sand.
25						
						100% Recovery from 27 to 32 feet.
30						

Plate B5

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BORING LOG

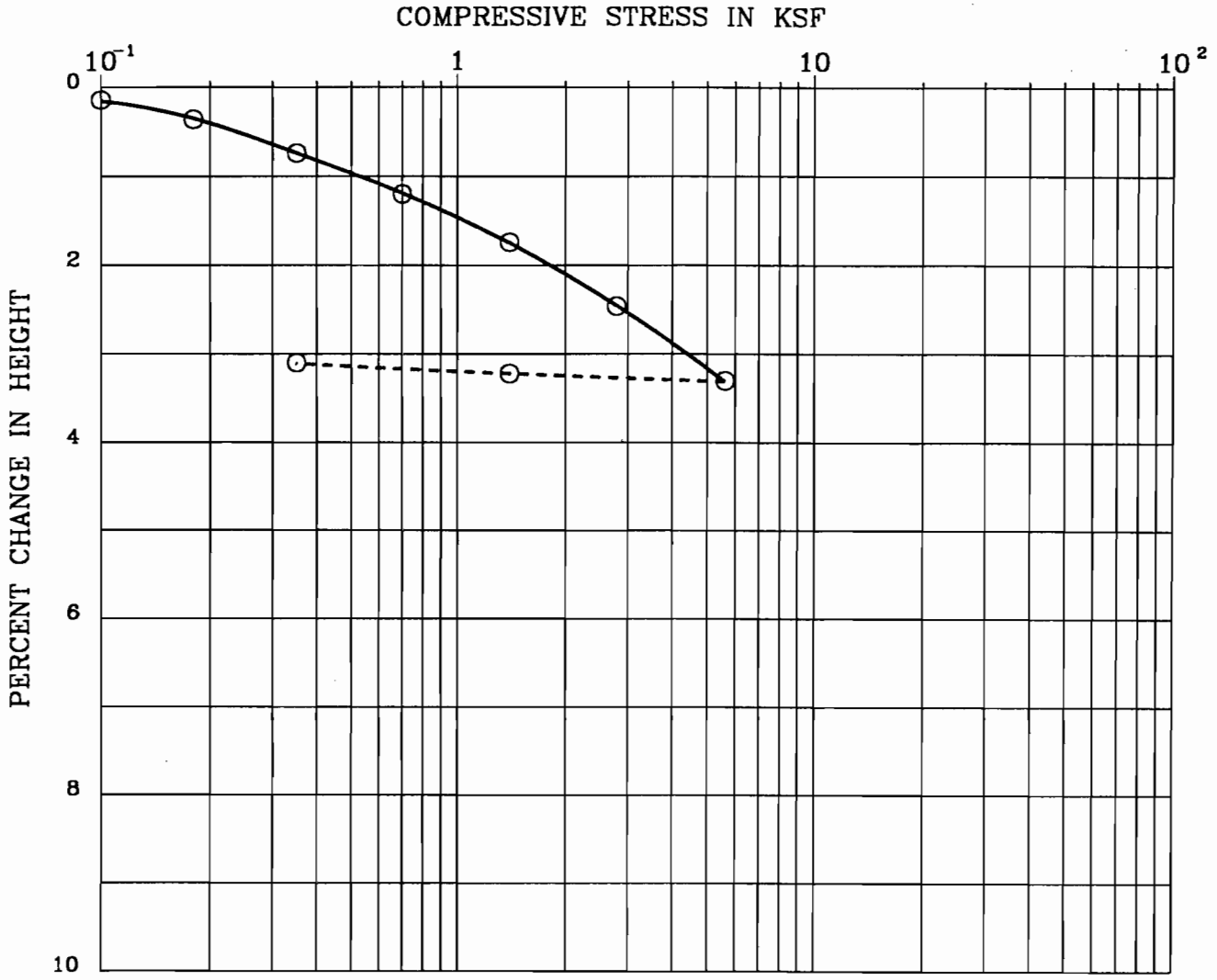
W.O. 98-3000

BORING NO. B3 (cont.) DRIVING WT. 140 lb. DATE OF DRILLING 2-27-98

SURFACE ELEV. 5.4± DROP 30 in. WATER LEVEL 5.8 ft.

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						End 4" coring and begin NX coring at 32 feet. 56% Recovery from 32 to 37 feet. Fragmented, with pockets of cemented sand.
35						
40			23			Silty SAND (SM) – Tan, dense, with coral fragments. 22% Recovery from 37 to 42 feet. End NX coring at 42 feet.
45			26/6"			Hard to medium hard at 48 feet.
50						End boring at 49.5 feet.
55						
60						

Plate B6

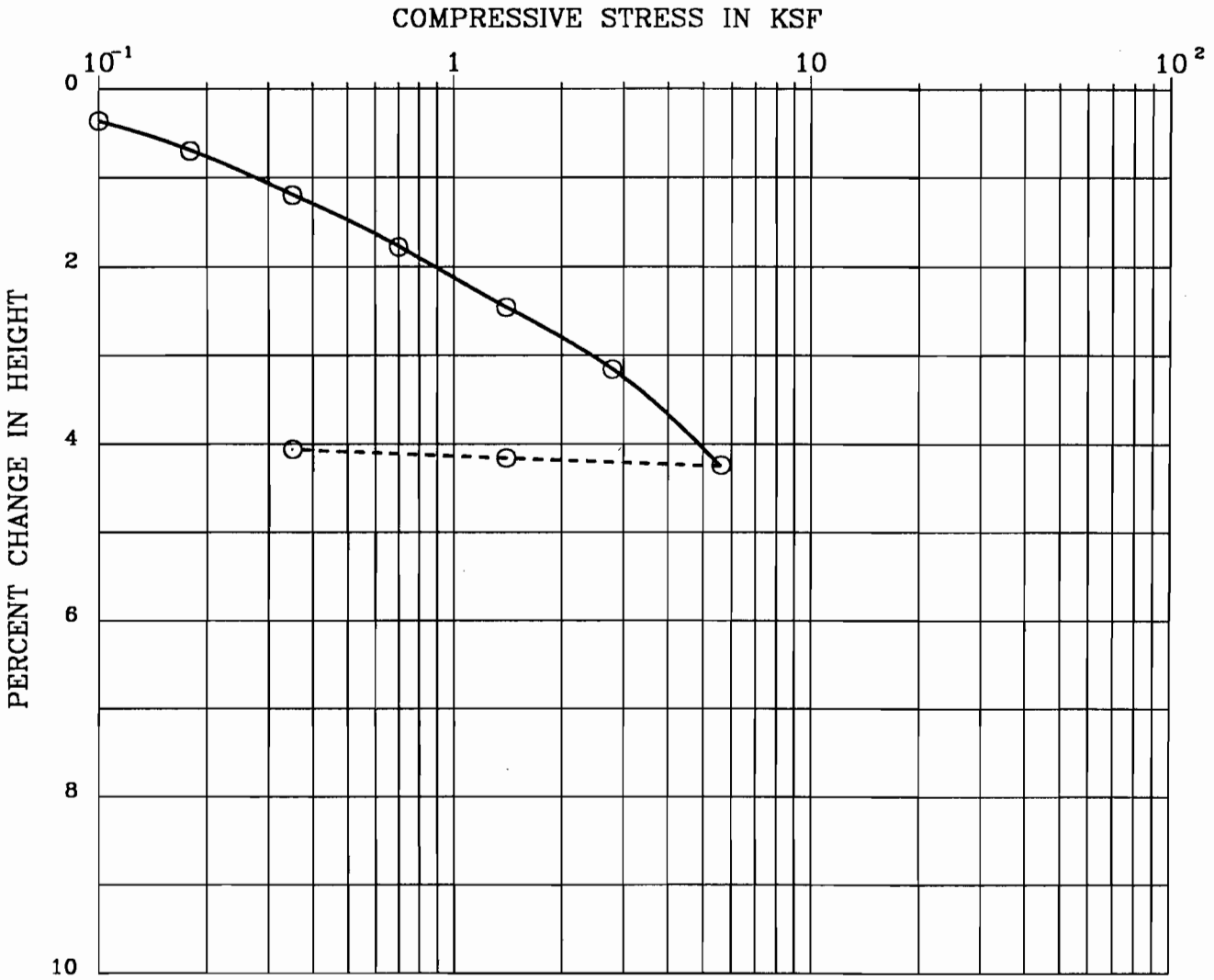


BORING	: B1	DESCRIPTION	: Gray silty sand
DEPTH (ft)	: 4'	LIQUID LIMIT	:
SPEC. GRAVITY	: 3.03	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)
INITIAL	28.1	97.5
FINAL	29.0	100.6

Remark : Date: 3/27/98 Water added at 90 psf

W.O. 98-3000	HCDA - Pohukaina School
Ernest K. Hirata & Associates, Inc.	CONSOLIDATION TEST Plate C1



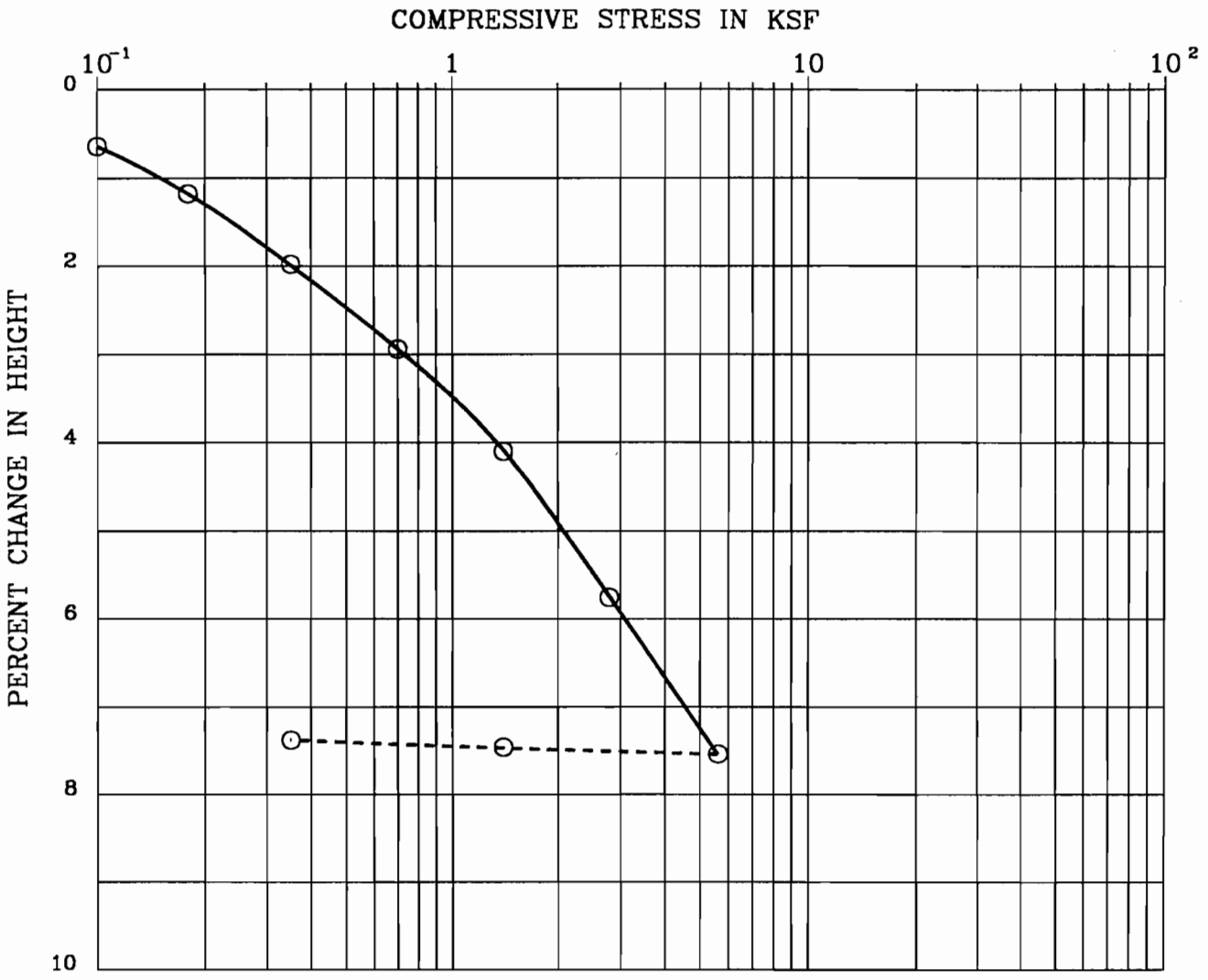
BORING : B3
DEPTH (ft) : 5'
SPEC. GRAVITY : 2.70

DESCRIPTION : Mottled brown to grayish brown silty sand
LIQUID LIMIT :
PLASTIC LIMIT :

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)
INITIAL	16.4	96.7
FINAL	18.8	100.9

Remark : Date: 3/27/98 Water added at 90 psf

W.O. 98-3000	HCDA - Pohukaina School
Ernest K. Hirata & Associates, Inc.	CONSOLIDATION TEST Plate C2



BORING	: B3	DESCRIPTION	: Gray silty sand
DEPTH (ft)	: 10'	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.89	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)
INITIAL	37.5	83.2
FINAL	34.9	89.8

Remark : Date: 3/27/98 Water added at 90 psf

W.O. 98-3000	HCDA - Pohukaina School
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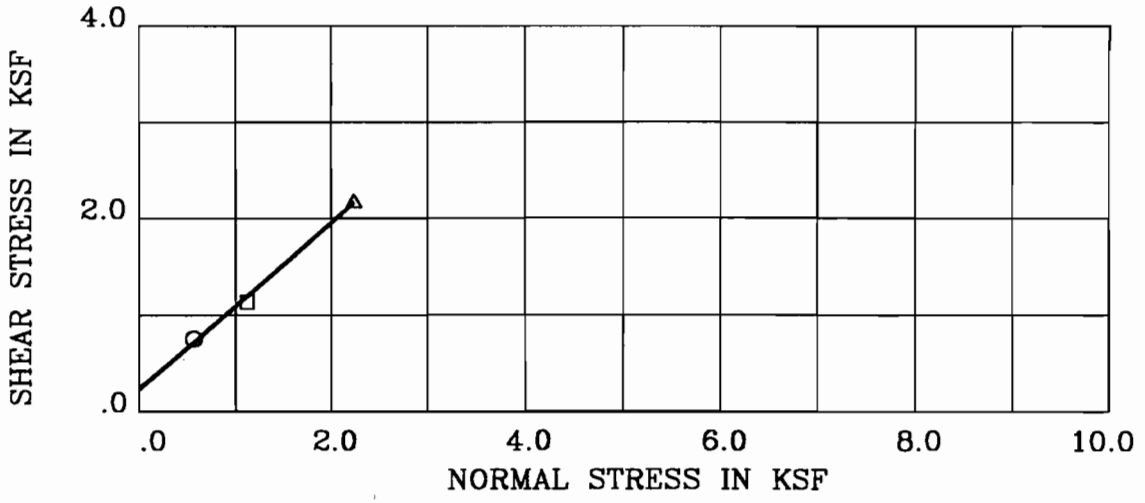

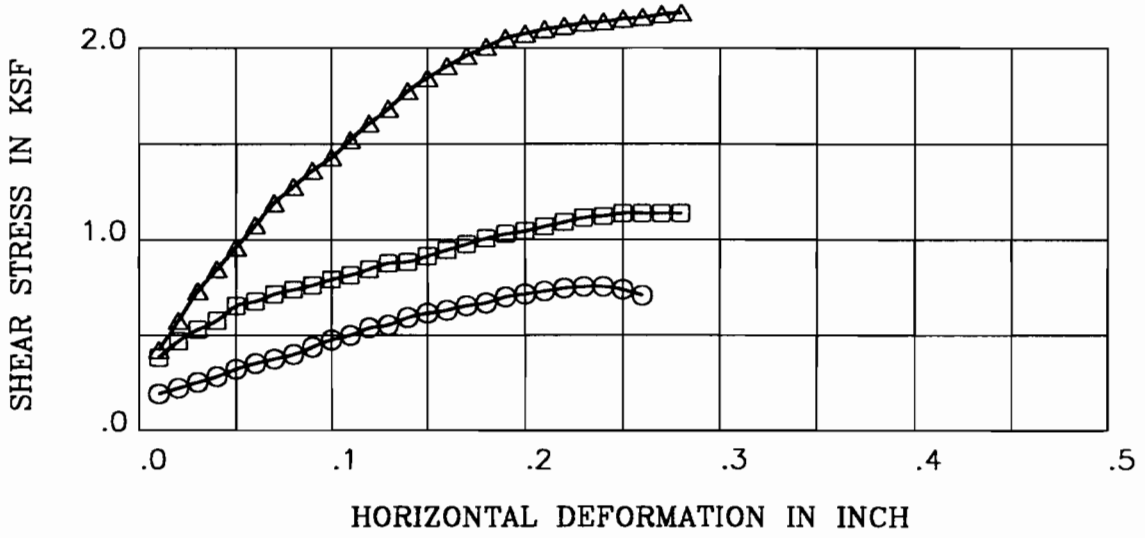

BORING/SAMPLE : B1 DEPTH (ft) : 1

DESCRIPTION : Brown sandy silt

STRENGTH INTERCEPT (C) : .233 KSF (PEAK STRENGTH)

FRICTION ANGLE (PHI) : 40.7 DEG (PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	10.0	90.0	.871	.56	.75	.71
□	10.0	90.0	.871	1.12	1.14	1.14
△	10.0	90.0	.871	2.24	2.18	2.18

Remark : Date: 3/25/98

W.O. 98-3000	HCDA - Pohukaina School
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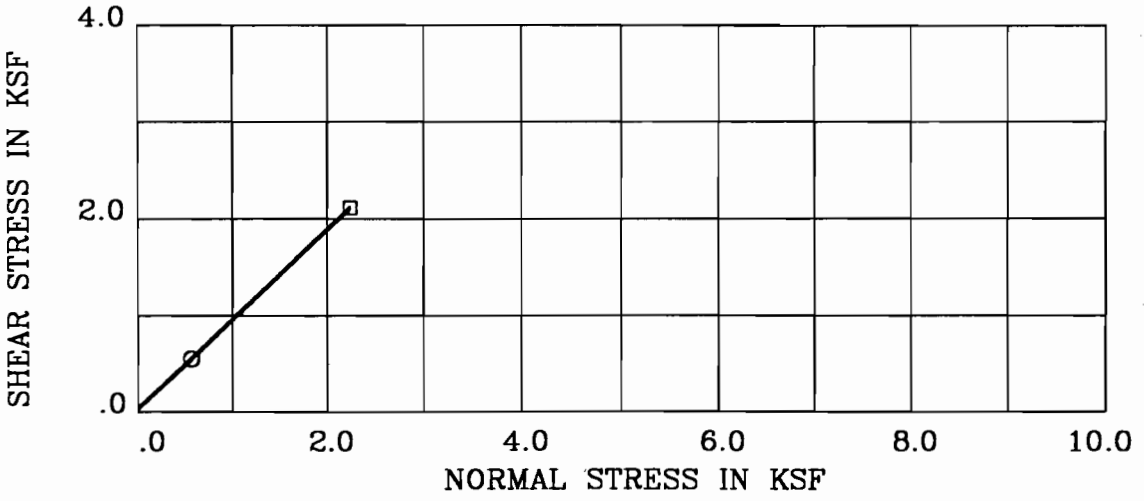
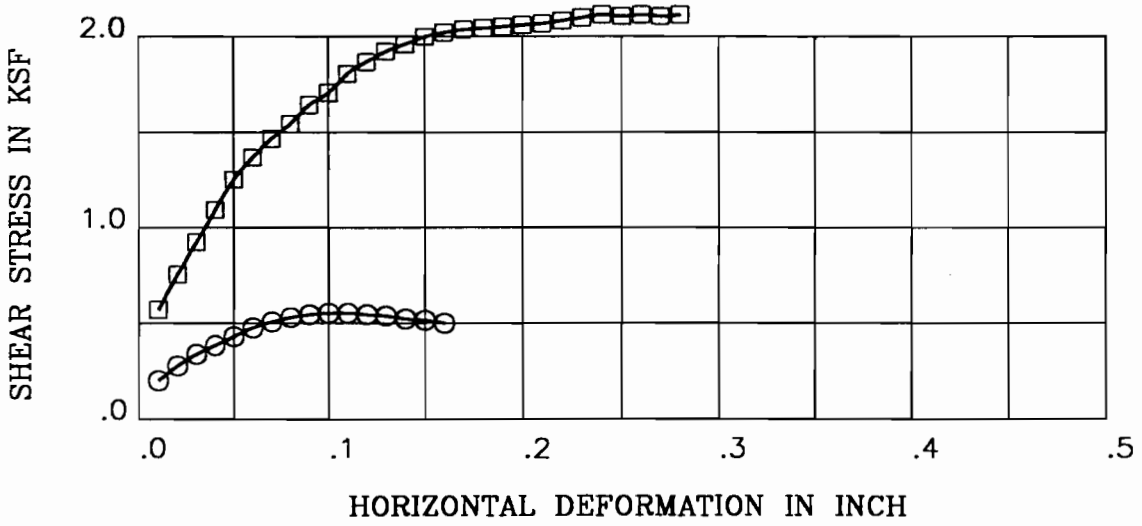


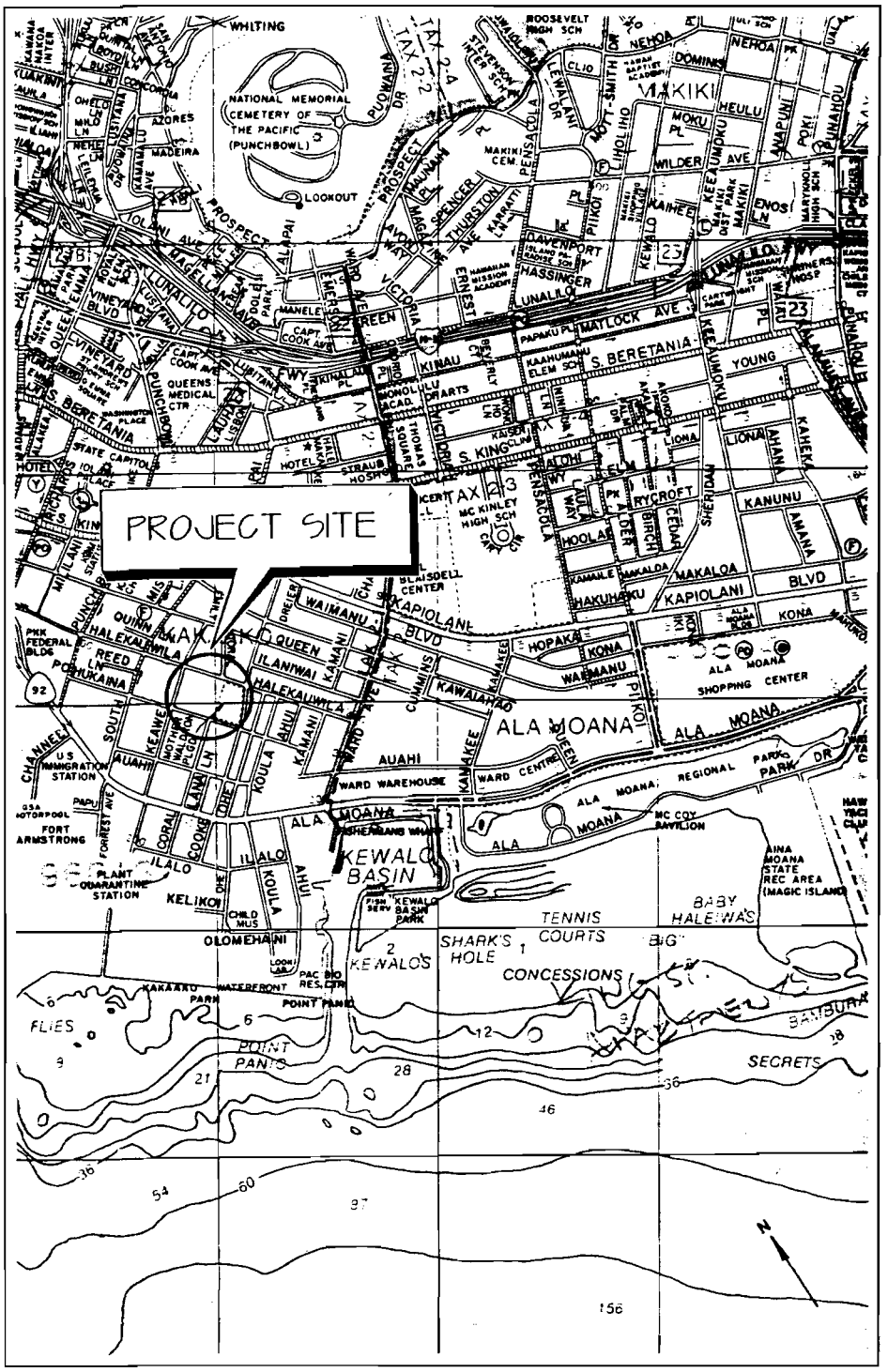


BORING/SAMPLE : B2 DEPTH (ft) : 1
DESCRIPTION : Light brown silty sand
STRENGTH INTERCEPT (C) : .035 KSF (PEAK STRENGTH)
FRICTION ANGLE (PHI) : 42.9 DEG (PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
O	13.5	78.1	1.156	.56	.55	.50
□	13.5	78.1	1.156	2.24	2.11	2.10

Remark : Date: 3/30/98

W.O. 98-3000	HCDA - Pohukaina School
Ernest K. Hirata & Associates, Inc.	DIRECT SHEAR TEST Plate D2



Reference: Bryan's Sectional Maps, 1998 Edition
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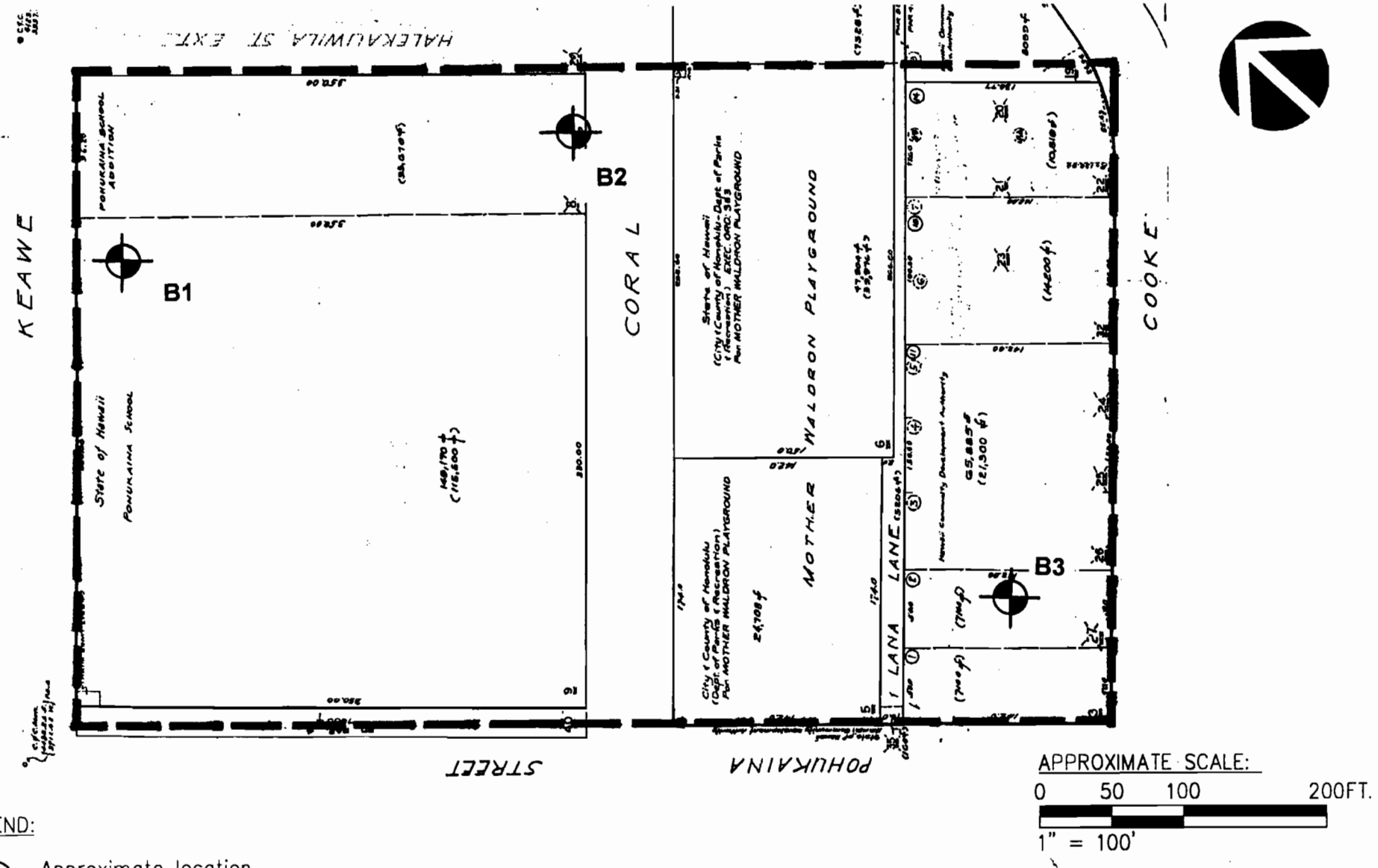
Scale: 1:24,000

W.O. 98-3000	HCDA - Pohukaina School
Ernest K. Hirata & Associates, Inc.	LOCATION MAP Plate 1



LEGEND:

Approximate location of borings

Reference:
TMK: 2-1-51

W.O. 98-3000	HCDA - Pohukaina School
Ernest K. Hirata & Associates, Inc.	BORING LOCATION PLAN Plate 2