

FINAL REPORT
VOLUME 2: APPENDICES
October 2005

DYNAMIC STABILITY ANALYSIS OF CHABOT DAM

Alameda County, California

EBMUD
Prepared for
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607

URS
URS Corporation
1333 Broadway, Suite 800
Oakland, CA 94612

26814536.G0000

F I N A L   R E P O R T

V O L U M E   2 :   A P P E N D I C E S

DYNAMIC STABILITY ANALYSIS OF CHABOT DAM

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Appendix A

Exploratory Drilling

This appendix summarizes the exploratory drilling completed as part of the dynamic stability analysis of Chabot Dam. Nine rotary wash borings were drilled for this study. The borings were numbered in the order drilled, using nomenclature and numbering consistent with borings previously drilled by the District at the site. Borings WI-61 and WI-64 were drilled from the crest of the dam. Borings WI-59 and WI-62 were drilled from the downstream bench and sloping access road. Borings WI-60, WI-63, and WI-65 were drilled in the downstream toe area. Borings WI-66 and WI-67 were drilled near the upstream toe of the dam. The borings were initially located in the field by URS based on approximate measurement from available reference points. After drilling, a hand-held Trimble GPS receiver with built-in differential correction capabilities was used to record coordinates for each boring location. Comparison measurements taken at known reference points indicate a horizontal accuracy range for the GPS coordinates of about 5 feet. For the reservoir borings drilled from the barge, the GPS unit was first used to navigate the barge to within a few feet of the target boring locations. The actual boring coordinates were then recorded once the barge anchors and borehole casing were set in place.

The rotary wash borings were drilled by Taber Consultants of Sacramento, California, between May 3rd and May 29, 2004. The land-accessed borings were drilled using a Diedrich D-128 truck-mounted drill rig. The barge-accessed borings were drilled using a CME-45 skid-mounted drill rig. The same automatic trip hammer and NWJ drill rods were used on both rigs for drive sampling. The boring logs are attached, along with a legend for the symbols and terminology used in the logs.

The rotary-wash drilling was performed in general accordance with ASTM standard D-6066. The borings were advanced with a 4-7/8-inch-diameter drag bit with side discharge. For borings WI-63, 65, 66, and 67, a 94-mm casing advancer system was used to advance the holes. This system includes a removable plug at the tip of the bit, through which SPT, Modified California, and Pitcher Barrel samples were obtained.

The soils and rock encountered were logged and classified in accordance with ASTM standards. All samples were carefully sealed, labeled, and transported to the URS Pleasant Hill laboratory for review and testing.

During drilling, care was exercised to avoid high drilling pump pressures that might damage the embankment. In general, excessive circulating fluid pressures were not observed. Occasional losses of drilling fluid were observed, but the amounts were generally small. The largest fluid loss occurred in boring WI-60 at the downstream toe, in gravelly materials. For the barge borings, casing was installed from the barge to the surface of the embankment to ensure circulation return to the mud tub without loss into the reservoir. For the land borings, casing was installed in the top few feet of each boring. Bentonite and biodegradable drilling muds were used as needed for borehole stability.

The rotary wash borings were sampled at 2.5- to 5-foot intervals depending on material type. More closely spaced samples were obtained in granular materials and in shallower borings. Prior to each sample, the boring depth was checked for possible soil disturbance or slough at the bottom. Where observed, excessive slough was removed prior to sampling.

In the upstream, crest, and downstream bench borings, a Modified California (MC) split-spoon sampler (2.5-inch-ID) was used periodically to obtain samples for material gradation testing. A 2.85-inch-ID Pitcher barrel tube sampler was used to obtain relatively undisturbed samples for density and triaxial strength testing. A standard penetration test split spoon sampler (SPT) was also used, mainly in granular materials. Pitcher barrel sampling was performed where predominantly clayey soils were encountered.

The SPT sampling was performed in general accordance with ASTM standard D-1586. A 2-ft long split barrel SPT sampler with a 1.375-inch inside diameter was used. Sand catchers were used in the sampler shoe in some instances, in an effort to improve sample recovery. The SPT sampler was driven with an automatic 140-lb trip hammer with a 30-inch drop. The blow counts were recorded at 1-inch intervals to assess potential gravel impacts. The energy delivered by the SPT hammer to the sampler was measured/calibrated at the beginning of the investigations, to allow correction of the blow counts for hammer efficiency. Records of the hammer energy measurements are included in Appendix C.

The borings were advanced a minimum of 5 to 10 feet into bedrock. Where drive sample penetration was possible, SPT samples were taken to verify the type of bedrock. More resistant rock was cored using a 4-inch OD (HQ-size) core barrel. Selected borings were drilled about 25 to 30 feet into bedrock to allow downhole geophysical measurements within the dam foundation.

After the drilling and geophysical investigations were completed, each land boring was backfilled with cement grout and the ground surface was restored to its initial elevation. The reservoir borings were backfilled with drill cuttings supplemented with coarse sand. For the borings drilled through pavement, the pavement was patched with asphaltic concrete. Excess drill cuttings and fluid from the borings were disposed of on site at locations designated by the District. The land borings were staked and/or marked for subsequent surveying.

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Key to Log of Boring

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to mean sea level (MSL).

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Sampling Resistance:** Number of blows required to advance driven sampler 12 inches beyond first 6-inch interval, or distance noted, using a 140-lb hammer with a 30-inch drop. Also, down pressure to drive Pitcher barrel or tube sampler.

6 **Recovery:** Percentage of driven or pushed sample length recovered; "NA" indicates data not recorded.

7 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

8 **Material Description:** Description of material encountered; may include density/consistency, moisture, color, and grain size.

9 **Water Content:** Water content of soil sample measured in laboratory, expressed as percentage of dry weight of specimen.

10 **Dry Unit Weight:** Dry weight per unit volume of soil measured in laboratory, expressed in pounds per cubic feet (pcf).

11 **Unconfined Compressive Strength:** Unconfined compressive strength of soil sample measured in laboratory, expressed in psf.

12 **Remarks and Other Tests:** Comments and observations regarding drilling or sampling made by driller or field personnel. Other field and laboratory test results, using the following abbreviations:

Gs	Specific gravity
HD	Hydrometer analysis, percent passing 5 microns
LL	Liquid Limit (from Atterberg Limits test), percent
PI	Plasticity Index (from Atterberg Limits test), percent
SA	Sieve analysis, percent passing #200 sieve
TX-CIU(R)	Isotropically consolidated undrained triaxial test

TYPICAL MATERIAL GRAPHIC SYMBOLS

POORLY GRADED SAND (SP)
POORLY GRADED SAND WITH SILT (SP-SM)
SILTY SAND (SM)
CLAYEY SAND (SC)
WELL-GRADED SAND (SW)
CLAY (CL)
CLAY (CH)
SILTY CLAY (CL/CL-ML)
GRAVEL (GP/GW)
SILT (ML)
SILT (MH)
CLAYEY SILT (ML)
SERPENTINITE
RHYOLITE
GABBRO
SHALE

TYPICAL SAMPLER GRAPHIC SYMBOLS

Standard Penetration Test (SPT) unlined split spoon (1.4-inch-ID)

Modified California (2.5-inch-ID) with brass liners

Grab or bulk sample from cuttings

Shelby tube (3-inch OD, thin-wall, fixed head)

Pitcher barrel with Shelby tube liner

OTHER GRAPHIC SYMBOLS

First water encountered at time of drilling and sampling (ATD)

Static water level measured after drilling and sampling completed

Change in material properties within a lithologic stratum

Inferred or transitional contact between lithologies

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Report: GEO_10B1_OAK_KEY_ROCK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 keydam

KEY TO DESCRIPTIVE TERMS FOR ROCK

ROCK WEATHERING / ALTERATION

Description	Recognition
Residual Soil	Original minerals of rock have been entirely decomposed to secondary minerals, and original rock fabric is not apparent; material can be easily broken by hand
Completely Weathered/Altered	Original minerals of rock have been almost entirely decomposed to secondary minerals, although original fabric may be intact; material can be granulated by hand
Highly Weathered/Altered	More than half of the rock is decomposed; rock is weakened so that a minimum 2-inch-diameter sample can be broken readily by hand across rock fabric
Moderately Weathered/Altered	Rock is discolored and noticeably weakened, but less than half is decomposed; a minimum 2-inch-diameter sample cannot be broken readily by hand across rock fabric
Slightly Weathered/Altered	Rock is slightly discolored, but not noticeably lower in strength than fresh rock
Fresh/Unweathered	Rock shows no discoloration, loss of strength, or other effect of weathering/alteration

ROCK STRENGTH

Description	Recognition
Extremely Weak Rock	Can be indented by thumbnail
Very Weak Rock	Can be peeled by pocket knife
Weak Rock	Can be peeled with difficulty by pocket knife
Moderately Strong Rock	Can be indented 5 mm with sharp end of pick
Strong Rock	Requires one hammer blow to fracture
Very Strong Rock	Requires many hammer blows to fracture
Extremely Strong Rock	Can only be chipped with hammer blows

ROCK SCRATCH HARDNESS

Description	Recognition
Soft	Applicable only to plastic material
Friable	Can be easily crumbled by hand or reduced to powder; too soft to cut with a pocket knife
Low Hardness	Can be gouged deeply or carved with a pocket knife
Moderately Hard	Can be readily scratched by knife blade; scratch leaves heavy trace of dust and is readily visible after powder has been blown away
Hard	Can be scratched with a pocket knife only with difficulty; scratch produces little powder; traces of knife steel may be visible
Very Hard	Cannot be scratched with a pocket knife; knife steel marks are left on surface

ROCK FRACTURING

Description	Recognition
Intensely Fractured	Fractures spaced less than 2 inches apart
Highly Fractured	Fractures spaced 2 inches to 1 foot apart
Moderately Fractured	Fractures spaced 1 foot to 3 feet apart
Slightly Fractured	Fractures spaced 3 feet to 10 feet apart
Massive	Fracture spacing greater than 10 feet

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-59

Date(s) Drilled	**5/3/04 and 5/4/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-7/8-inch drag bit**	Total Depth of Borehole	**99.0 feet**
Drill Rig Type	**Diedrich D128 (truck-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 210 feet MSL**
Groundwater Level(s)	**Not measured due to drilling method**	Sampling Method(s)	**Grab, SPT, Modified California, Pitcher Barrel**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Cement/bentonite grout**	Location	**West of paved access road at mid-slope downstream bench**		

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
210	0						Asphaltic concrete 1-1/2 inches thick				Start drilling on 5/3/04.
			1				SILTY SAND (SM) [Fill] Medium dense to dense, slightly moist, yellowish brown, trace fine gravel				
			2				SILTY SAND WITH GRAVEL (SM) [Fill] Very dense, moist, bluish gray, medium to high plasticity fines, ~20% fine subangular gravel (serpentinite fragments)				
205	5		3A	41	100						
			3B				Becomes dense, with thin layers of yellowish brown, clayey gravel	15.0	115.0		LL=71, PI=28 SA: %F=31, %G=16
			4	10	22						
200	10		5				CLAYEY SAND WITH GRAVEL (SC) [Fill] Dense, moist, brown, ~20% fine gravel				
			6	100 psi	79		CLAYEY GRAVEL WITH SAND (GC) [Fill] Moist, brown, fine to medium angular gravel (siltstone fragments)				
			7	8	33		CLAYEY SAND WITH GRAVEL (SC) [Fill] Loose to medium dense, moist, brown, medium to high plasticity fines, ~20% fine gravel (siltstone fragments)				
195	15										
			8A	19	83						
			8B					15.6	118.6		LL=37, PI=17 SA: %F=20, %G=29
			9	9	33						
190	20										
							Gravel grades fine to coarse, siltstone fragments to 2 inches				
			10	150 psi	40			19.0	112.3		SA: %F=20, %G=12
185	25										
			11	11	39						
							SILTY CLAYEY SAND (SC-SM) [Fill] Medium dense to dense, moist, grayish brown, fine-grained sand				
180	30										

Project: Dynamic Stability of Chabot Dam
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Log of Boring WI-59

Elevation feet	Depth, feet	SAMPLES: Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
180	30						SILTY CLAYEY SAND (SC-SM) [Fill] (continued)				
			12A 12B	23	72		SILTY CLAY (CL) [Fill] Very stiff, moist, yellowish brown to pale yellow				
			13	18	39		CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense to dense, slightly moist to moist, olive and olive brown, fine gravel				LL=37, PI=18 SA: %F=27, %G=8
175	35										
			14	200 psi	40		← Trace brick(?) fragments				
170	40										
							SILTY CLAYEY SAND WITH GRAVEL (SC-SM) [Fill] Dense, slightly moist, olive brown, fine-grained sand, fine gravel				
			15	46	67						SA: %F=19, %G=19 HD: 8%<5 microns
165	45										
			16A 16B	74	61		← Sand grades medium- to coarse-grained, less clayey (possibly pocket or lens)	8.3			LL=24, PI=7 SA: %F=15, %G=21
			17A 17B	34	100						
160	50						SANDY CLAY WITH GRAVEL (CL) [Fill] Hard, moist, olive brown, fine gravel (siltstone fragments)				
								19.0	106.9		Gs=2.71 LL=34, PI=17 SA: %F=53, %G=4 HD: 27%<5 microns TX-CIU(R)
			18	250 psi	75		CLAYEY SAND (SC) [Fill] Medium dense to dense, moist, olive brown, few fine to coarse gravel to 2-1/2 inches (siltstone fragments)	15.7	114.9		TX-CIU(R) LL=34, PI=16 SA: %F=29, %G=9
155	55		19	15	56						
			20A 20B	30	67						
150	60										
			21	13	67						SA: %F=32, %G=11 End drilling for 5/3/04 at 61.5 ft. Resume drilling on 5/4/04.
							CLAYEY SAND WITH GRAVEL (SC) [Fill] Dense, moist, dark yellowish brown, ~30-35% fine subangular gravel (meta-volcanic fragments)				
			22	200 psi	50						
145	65										

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Figure A-2

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-59

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
145	65		22	200 psi	50		CLAYEY SAND WITH GRAVEL (SC), dense, moist, dark yellowish brown, ~30-35% fine subangular gravel [Fill] (continued)				
			23A 23B	20	61						SA: %F=19, %G=27
140	70						POORLY GRADED GRAVEL (GP) [Fill] Medium dense, wet, gray, red, and brown to yellowish brown, meta-volcanic fragments				Drills gravelly 69-71 ft.
			24A 24B	25	67						
			25	21	33		CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense to dense, moist, bluish gray, black, and brown, high plasticity fines, with pockets or clasts of brown clay with fine gravel-size serpentinite fragments				LL=56, PI=25 SA: %F=21, %G=30
135	75										50-gallon fluid loss noted prior to drilling out to 74 ft after SPT.
			26	300 psi	67		SANDY CLAY (CL/CH) [Fill] Very stiff, moist, bluish gray, black, and olive brown, medium to high plasticity	17.0	110.7		TX-CIU(R) LL=50, PI=24 SA: %F=50, %G=4 HD: 20%<5 microns Gs=2.66
130	80		27	29	50						
							SANDY CLAY (CL/CH) [Fill] Stiff to very stiff, moist, dark brown, medium to high plasticity, fine- to medium-grained sand				50-gallon fluid loss drilling 83.5-89 ft.
			28A 28B	32	100						
125	85		29A	21	100		SANDY CLAY (CL) [Fill?] Very stiff, moist, brown, trace serpentinite fragments				APPROX. PRE-DAM GROUND SURVEY LEVEL AT 85 FEET.
			29B				Layer of yellowish brown clay				LL=35, PI=15 SA: %F=57, %G=4 HD: 25%<5 microns
120	90		30	250 psi	47		RHYOLITE [Bedrock] Gray, yellowish brown, and brownish red, highly to moderately weathered, weak to moderately strong, highly to intensely fractured (close to extremely close fracture spacing), some iron oxide staining				
			31	50/3"	56						
115	95		32								
							SERPENTINITE [Bedrock] Mottled bluish gray and olive, completely to highly weathered, weak, clayey				
			33	82/6"	50						
							Bottom of boring at 99.0 feet				End drilling on 5/4/04.
110	100										

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Figure A-2

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-60

Date(s) Drilled	**5/4/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-7/8-inch drag bit**	Total Depth of Borehole	**104.8 feet**
Drill Rig Type	**Diedrich D128 (truck-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 179 feet MSL**
Groundwater Level(s)	**Not measured due to drilling method**	Sampling Method(s)	**Grab, SPT, Modified California, Pitcher Barrel**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Cement/bentonite grout**	Location	**Downstream toe of dam east of paved access road**		

Elevation feet	Depth, feet	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0				SILTY CLAYEY SAND (SC-SM) [Fill] Medium dense, dry, yellowish brown, trace fine gravel				
		1							
175	5				Becomes olive brown with yellow, brown, and reddish brown mottles, trace to no gravel				
		2	17	33					
		3	19	56					LL=25, PI=6 SA: %F=15, %G=12
170	10	4	21	28					
		5A 5B	13	50	Gravel pocket	12.8	117.6		SA: %F=13, %G=26
					CLAYEY SAND WITH GRAVEL (SC) [Sluiced Fill] Loose, moist to very moist, olive brown, fine gravel				
165	15	6	4	22					
		7	10	50	CLAYEY SAND WITH GRAVEL (SC) [Sluiced Fill] Medium dense, moist to very moist, olive gray to olive brown, fine gravel				SA: %F=12, %G=52
160	20	8	11	22					30-gallon fluid loss drilling 19.6-22 ft.
		9	24	44		12.1			LL=33, PI=13 SA: %F=14, %G=32
155					Gravel grades fine to coarse, serpentinite fragments to 1 inch				
	25	10	18	33					
		11	24	44					
150					CLAYEY SAND WITH GRAVEL (SC) [Sluiced Fill] Medium dense, moist to very moist, olive gray to olive brown, ~20% fines				
	30	12	18	33					

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
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Log of Boring WI-60

Elevation, feet	Depth, feet	Sample Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	30	12	18	33	CLAYEY SAND WITH GRAVEL (SC), medium dense, moist to very moist, olive gray to olive brown, ~20% fines [Sluiced Fill] (continued)				SA: %F=15, %G=23
		13A 13B	150 psi	20					Pitcher sampling a bit choppy, gravelly.
145									
	35	14	16	11	← Rhyolite rock fragment approx. 1-1/4 inches diameter				Poor recovery; pushed a rock fragment at 35.5 ft.
									Hole sloughing; switch to 3.5-inch-OD casing pipe.
		15	10	0					No recovery in SPT drive. Push SPT 37-39 ft to obtain sample (2-3 inches).
140					CLAYEY SAND WITH GRAVEL (SC) [Sluiced Fill] Medium dense, moist to very moist, olive brown and brown, serpentinite and rhyolite fragments				
	40	16	16	56					LL=34, PI=13 SA: %F=22, %G=23
		17	29	6	← Rhyolite rock fragment approx. 2-1/2 x 1-1/2 inches				Poor recovery; pushed a rock fragment at 42 ft.
135					← Becomes less clayey and with few gravel				
	45	18	22	50					LL=28, PI=8 SA: %F=33, %G=7 HD: 13%<5 microns
					CLAYEY SAND WITH GRAVEL (SC) [Wagon Fill?] Medium dense, moist, olive brown with yellowish brown and gray mottling, rhyolite and serpentinite fragments				
		19	22	44					
130					← Slight decrease in clay content				
	50	20	22	50					SA: %F=19, %G=24
					← Becomes olive brown with bluish gray and yellowish brown mottling; mostly fine with trace medium gravel				
		21	22	39					SA: %F=17, %G=31
125					SILTY CLAYEY SAND (SC-SM) [Alluvium?] Medium dense, moist to very moist, bluish gray and black, ~15% fines, trace fine gravel, with decayed (burnt?) roots or wood fragments to 1-3/8 inches diameter and 5 inches long				
	55	22	27	67					
		23	13	33					
120					CLAYEY SAND WITH GRAVEL (SC) [Colluvium?] Medium dense, moist to very moist, bluish gray, shale and sandstone fragments				
	60	24	25	33					SA: %F=20, %G=21
		25	25	0	SERPENTINITE [Colluvium?] Bluish gray and white, highly to completely weathered, weak, moderately soft, moist				
115									
		26	4	11	← Wood fragment (root?)				
	65								

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Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-60

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	65		26	4	11		SERPENTINITE, bluish gray and white, highly to completely weathered, weak, moderately soft, moist [Colluvium?] (continued)				APPROX. PRE-DAM SURVEY LEVEL AT 66 FEET.
							POORLY GRADED SAND (SP) [Alluvium / Slough?] Dense, moist to very moist, brown, fine- to medium-grained sand				
			27A 27B	36	67		CLAYEY SAND WITH GRAVEL (SC) [Colluvium?] Medium dense to dense, moist, dark gray, shale fragments				SA: %F=17, %G=23
110											50-gallon fluid loss drilling 67-69.5 ft.
	70		28	11	22		Becoming POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC)				SA: %F=9, %G=68
			29	57/6"	67		SERPENTINITE, SHALE, and GABBRO [Bedrock] Bluish gray, highly weathered, weak, moderately soft to soft, clayey, moist				
105											
	75		30	55/6"	22						
100											
	80		31	100/3.5"	100						
95											
	85		32	56/6"	100						
90											
	90		33	100/5"	80		Becomes moderately soft, less clayey				
85											
	95		34	66/6"	58						
80											
	100										

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-60

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Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-60**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 4 of 4
Project Number: 26814536.C0000	

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
							SERPENTINITE, SHALE, and GABBRO, bluish gray, highly weathered, weak, moderately soft, slightly clayey, moist [Bedrock] (continued)				
75			35	100/3.5"	86						
	105						Bottom of boring at 104.8 feet				
70	110										
65	115										
60	120										
55	125										
50	130										
45	135										

Project: Dynamic Stability of Chabot Dam	Log of Boring WI-61
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 1 of 5
Project Number: 26814536.C0000	

Date(s) Drilled	**5/6/04 - 5/7/04; 5/10/04 - 5/11/04**	Logged By	**E. Ntambakwa / M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-7/8-inch drag bit; NX core bit**	Total Depth of Borehole	**166.0 feet**
Drill Rig Type	**Diedrich D128 (truck-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 250 feet MSL**
Groundwater Level(s)	**Not measured due to drilling method**	Sampling Method(s)	**Grab, SPT, Modified California, Pitcher Barrel; NX rock core barrel**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Cement/bentonite grout**	Location	**Crest of dam**		

Elevation feet	Depth, feet	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
250	0	1			Asphaltic concrete 2 inches thick				Start drilling on 5/6/04.
					CLAYEY SAND (SC) [Fill] Medium dense to dense, slightly moist, brown, few fine gravel, trace rhyolite fragments to 1-1/2 inches				
245	5	2	25	100					SA: %F=40, %G=11
		3A 3B	50	67	CLAYEY SAND (SC) [Fill] Medium dense to dense, moist, olive brown, few fine gravel	15.4	120.9		SA: %F=36, %G=13
240	10	4	17	67	With some olive gray seams				
235	15	5	150 psi	20	SANDY CLAY (CL) [Fill] Very stiff, moist, brown to yellowish brown, medium plasticity, trace gravel to 1 inch (rhyolite fragments)				
230	20	6	19	67	With clasts of gray, high plasticity clay				
		7	6	22	Medium stiff to stiff				
225	25	8A 8B	16	67		19.4	108.7	2520	LL=42, PI=26 SA: %F=64, %G=5
220	30								

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Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-61

Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-61**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 2 of 5
Project Number: 26814536.C0000	

Elevation, feet	Depth, feet	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
220	30	9	200 psi	40	SANDY CLAY (CL), very stiff, moist, brown to yellowish brown, medium plasticity, trace rhyolite gravel [Fill] (continued)				
215	35	10A 10B	21	56		19.0	110.6	2400	LL=41, PI=21
210	40	11	200 psi	80		14.5	119.8		Gs=2.70 TX-CIU(R) LL=38, PI=20 SA: %F=50, %G=7 HD: 28%<5 microns
					Decreasing sand content				
					SANDY CLAY (CL) [Fill] Stiff, moist, reddish brown, medium plasticity				
205	45	12	10	56					
200	50	13A 13B	21	61		20.5	109.6	2440	LL=37, PI=20
					CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, olive gray, fine gravel				
195	55	14	14	44					
190	60	15	200 psi	80	Gravelly	11.8	129.6		Gs=2.78 TX-CIU(R) LL=35, PI=18 SA: %F=42, %G=19 HD: 21%<5 microns End drilling for 5/6/04 at 62.5 ft. Resume drilling on 5/7/04.
185	65								

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-61

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
185	65		16	13	28		CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, dark yellowish brown, ~45% fines, ~15% fine gravel (serpentinite and rhyolite fragments)				
180	70		17A 17B	30	67		CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, olive brown to olive gray grading to brown with gray mottling at 71.5 ft, fine gravel (rhyolite fragments, trace serpentinite)	15.7	122.1		SA: %F=41, %G=20
							Grades with medium gravel				
175	75		18	200 psi	40						
			19	19	33						
170	80						SANDY CLAY (CL) [Fill] Very stiff, moist, brown, olive brown, and reddish brown				
			20A 20B	28	89			15.6	118.7		LL=34, PI=19 SA: %F=58, %G=5
165	85						CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, olive and gray, fine gravel (rhyolite with few serpentinite fragments)				
			21	18	44						SA: %F=29, %G=14
160	90						Becomes olive brown and gray; mostly fine with trace medium gravel				
			22	250 psi	23						
155	95		23	26	39						SA: %F=18, %G=25
150	100										

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Project: Dynamic Stability of Chabot Dam	Log of Boring WI-61
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 4 of 5
Project Number: 26814536.C0000	

Elevation feet	Depth, feet	Type	Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
150			24	200 psi	40	CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, olive brown and gray, mostly fine with trace medium gravel				
145	105		25	34	72	Becomes dense				
140	110		26A 26B 26C	66	100		16.7	118.2		SA: %F=30, %G=15
						CLAYEY SAND WITH GRAVEL (SC) [Wagon Fill] Dense, moist, brown, gray, and grayish brown, ~40% fines, ~20% fine gravel (serpentinite fragments)				
135	115		27	30	67					LL=41, PI=20 SA: %F=40, %G=18
130	120		28	300 psi	20					
125	125		29	32	56	Serpentinite fragments, wood chips ~1-2 mm				LL=36, PI=18 SA: %F=43, %G=20
120	130		30A 30B	48	89					No recovery on drive at 130 ft. Placed sand catcher on sampler tip and overdrove 3-5 inches to recover sample.
115	135									

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-61

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
115			31	31	33		CLAYEY SAND WITH GRAVEL (SC) [Wagon Fill?] Dense, moist, dark olive and dark bluish gray, ~40% fines, ~30% fine gravel				APPROX. PRE-DAM SURVEY LEVEL AT 135 FEET.
110	140		32	850 psi	100		RHYOLITE [Bedrock] Bluish green, slightly weathered, moderately strong, hard, intensely fractured				
			33								
											End drilling for 5/7/04 at 143 ft. Resume drilling on 5/10/04 with 4-inch-OD core barrel. Recover 2.6 ft of 3.9-ft run; RQD=0%.
105	145		Run 1		46						
			Run 2		8						Recover 1 inch of 1.0-ft run; RQD=0%.
							Completely to highly weathered, weak, clayey, carbonaceous, trace calcite				Recover 2.3 ft of 5.0-ft run; RQD=0%.
100	150		Run 3		44						
							Becomes moderately weathered, weak; most visible fractures are tight, others have minor clay infilling				
			Run 4		100						Recover 2.1 ft of 2.1-ft run; RQD=0%.
95	155										End coring for 5/10/04; resume on 5/11/04.
							55-60°, J, T, No, No, Pl				
							45-50°, J, VN, Cl, Pa, Pl-Ir, SR				
			Run 5		62		40-45°, J, T, H+No, Pl-Ir				Recover 1.8 ft of 2.9-ft run; RQD=0%.
							Becomes completely to moderately weathered, weak, soft to moderately hard				
							30-35°, J, N-MW, Cl, Pa, Ir, SR				
			Run 6		76		0°, J, MW, No, No, Ir, R				Recover 1.9 ft of 2.5-ft run; RQD=0%.
							Quartz veins to 0.1 inch wide				
90	160										
							65°, J, W, Cl, Fi, Pl-Ir, SR				
			Run 7		96		Highly to moderately weathered, weak, intensely fractured				Recover 2.4 ft of 2.5-ft run; RQD=0%.
							40°, J, W, Cl, Pa, Pl-Ir, SR; and 0°, J, T Cl, No, No, Ir				
							Very weak, soft, slightly clayey, intensely fractured				
							Becomes grayish blue to bluish gray, completely to moderately weathered, very weak, clayey				
			Run 8		32						Recover 1.0 ft of 3.1-ft run; RQD=0%.
85	165										
							Bottom of boring at 166.0 feet				End drilling on 5/11/04.
80	170										

Project: Dynamic Stability of Chabot Dam	Log of Boring WI-62
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 1 of 5
Project Number: 26814536.C0000	

Date(s) Drilled	**5/12/04 and 5/13/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-3/4-inch drag bit (side discharge)**	Total Depth of Borehole	**140.0 feet**
Drill Rig Type	**Diedrich D128 (truck-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 224 feet MSL**
Groundwater Level(s)	**Not measured due to drilling method**	Sampling Method(s)	**Grab, SPT, Modified California, Pitcher Barrel**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Cement/bentonite grout**	Location	**Downstream slope immediately west of paved access road**		

Elevation feet	Depth, feet	SAMPLES Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0				CLAYEY SAND WITH GRAVEL (SC) [Fill] Dry, grayish brown, medium plasticity fines, fine gravel				Start drilling on 5/12/04.
		1							
					CLAYEY SAND WITH GRAVEL (SC) [Fill] Dense, moist, olive brown and gray, fine gravel (serpentinite fragments)				
220									
	5	2	20	39					SA: %F=31, %G=21
					POORLY GRADED GRAVEL (GP) [Fill] Loose(?), moist, dark gray, fine angular to subangular gravel, trace fines				Drills loose, gravelly at 7 ft.
215		3A							
	10	3B / 3C	45	100	SILTY SAND WITH GRAVEL (SM) [Fill] Dense, moist, bluish gray and brown, high plasticity fines, fine gravel (serpentinite and rhyolite fragments)	11.8	128.9		LL=64, PI=22 SA: %F=24, %G=23
		4	31	39					
210									
	15	5	16	22	← Siltstone / shale fragment				
205									
	20	6	150 psi	80	CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, brown to yellowish brown with gray mottling				
		7	6	44	← Loose				LL=35, PI=15 SA: %F=26, %G=18
200									
	25								
		8	10	39					SA: %F=26, %G=19
195									
	30								

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-62

Elevation, feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	30		9	rod weight only	80	CLAY (CL) [Fill] Medium stiff, moist, grayish brown and yellowish brown				
190			10A 10B	12	67	SANDY CLAY (CL) [Fill] Stiff, moist, dark brown to olive brown, few fine gravel				SA: %F=51, %G=6
	35					Gravelly				
			11A 11B	11	61					LL=29, PI=12 SA: %F=70, %G=0 HD: 26%<5 microns
			12A 12B 12C	10	78	CLAY (CL) [Fill] Stiff, moist to very moist, brown to yellowish brown, few sand				LL=39, PI=22 SA: %F=86, %G=0
185						CLAYEY SAND (SC) [Fill] Medium dense, moist, olive brown, few fine gravel				SA: %F=28, %G=9
	40									
						With ~10-15% gravel				
180			13	150 psi	13					
	45		14	5	50	SANDY CLAY (CL) [Fill] Medium stiff, moist, olive gray to olive brown, trace gravel				LL=36, PI=20 SA: %F=57, %G=1
175										
	50		15	18	67	CLAYEY SAND (SC) [Fill] Medium dense, slightly moist to moist, finely mottled reddish brown and yellowish brown, few fine gravel (bluish gray serpentinite fragments)				SA: %F=28, %G=10
						With ~10-15% gravel				
170			16	rod weight only	67					
	55		17	17	33	Becomes bluish gray, with trace fine gravel				
165						CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, slightly moist to moist, olive brown and gray				
	60		18A 18B	34	83		15.1			LL=33, PI=13 SA: %F=18, %G=18
			19	14	39					
160										
	65									

Elevation, feet	Depth, feet	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	65				CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, olive brown and gray, medium plasticity fines, fine gravel	23.8	101.5		TX-CIU(R); LL=44, PI=22; SA: %F=52, %G=5; HD: 33%<5 microns
		20	150 psi	67					
						14.2 16.2	120.2		TX-CIU(R); LL=42, PI=21; SA: %F=27, %G=16; Gs=2.71
		21	23	39					
155									
	70								
		22A 22B	25	72					SA: %F=24, %G=17
150		23	26	44	CLAYEY SAND (SC) [Fill] Medium dense, moist, olive gray and brown with yellowish brown and red fine mottling, ~50% fines, ~5% fine gravel				
	75								
					With medium to coarse gravel (rhyolite fragments)				
145		24	150 psi 350 psi rod wt 450 psi	20					
	80								
		25A 25B 25C	41	83	CLAYEY SAND (SC) [Fill] Dense, moist, bluish gray, fine- to medium-grained sand	21.0	106.0		LL=28, PI=12; SA: %F=46, %G=0
140		26	23	50	CLAYEY SAND (SC) [Fill] Medium dense, moist, olive brown to grayish brown, trace fine gravel				SA: %F=44, %G=4
	85				CLAYEY SAND (SC) [Fill] Medium dense, moist, yellowish brown, fine- to medium-grained sand				
		27	50 psi to 100 psi	27					
135		28	25	36	SANDY CLAY (CL)				LL=31, PI=16; SA: %F=55, %G=0
	90								
		29A 29B 29C	28	89	SILTY CLAY WITH SAND (CL) [Colluvium] Stiff, moist, black, fine-grained sand				
130		30	17	50	CLAYEY SAND (SC) [Colluvium] Medium dense, moist, black, olive, and brown, trace fine gravel				LL=40, PI=20; SA: %F=46, %G=9; End for 5/12/04; resume on 5/13/04. APPROX. PRE-DAM GROUND SURVEY LEVEL AT 96 FEET.
	95								
					Bluish gray, completely weathered serpentinite fragments				Gs=2.58
			300 psi		Silty fines	15.8 17.6	112.8		TX-CIU(R); LL=46, PI=13
125		31		47					SA: %F=44, %G=4; HD: 15%<5 microns
	100		100 psi						

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-62

Elevation, feet	Depth, feet	Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
			32	32	50		SANDY CLAY (CL) [Colluvium] Very stiff to hard, moist, bluish gray and black, trace gravel				LL=32, PI=13 SA: %F=52, %G=3
							CLAYEY SAND (SC) [Colluvium] Dense, moist, bluish gray, fine- to medium-grained sand				
120	105		33A 33B	40	78		CLAYEY SAND (SC) [Alluvium] Medium dense, very moist, bluish gray, medium- to coarse-grained sand, trace fine gravel (rhyolite fragments), some pockets of clean fine- to medium-grained sand				
			34	24	67						LL=27, PI=11 SA: %F=26, %G=2
115	110		5	rod wt 400 psi	80		Rhyolite fragments, moderately weathered, moderately strong				
			36	100/3"	67		BASALT and RHYOLITE [Bedrock] Bluish gray and white, highly weathered, weak, soft, locally clayey				
110	115		37	107/2"	100						
105	120		38	127/2"	50		With some carbonate				
100	125										
95	130		39	122/3"	50		Becomes highly to moderately weathered				
90	135										Drilling hard at 134 ft.

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Figure A-5

Project: Dynamic Stability of Chabot Dam	Log of Boring WI-62
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 5 of 5
Project Number: 26814536.C0000	

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
							BASALT and RHYOLITE, bluish gray and white, highly to moderately weathered, weak, soft, locally clayey, some carbonate [Bedrock] (continued)				
85			40				SERPENTINITE(?) [Bedrock]				Very hard drilling at 139 ft.
	140						Bottom of boring at 140.0 feet				Refusal encountered at 140 ft; terminate hole on 5/13/04.
80											
	145										
75											
	150										
70											
	155										
65											
	160										
60											
	165										
55											
	170										

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-63

Date(s) Drilled	**5/14/04 and 5/15/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-3/4-inch drag bit (side discharge)**	Total Depth of Borehole	**67.9 feet**
Drill Rig Type	**Diedrich D128 (truck-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 172 feet MSL**
Groundwater Level(s)	**Not measured due to drilling method**	Sampling Method(s)	**Grab, SPT, Modified California, Pitcher Barrel**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Cement/bentonite grout**	Location	**Downstream toe of dam east of paved access road**		

Elevation feet	Depth, feet	Samples: Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0				CLAYEY SAND WITH SILT AND GRAVEL (SC) [Fill] Medium dense, dry to slightly moist, yellowish brown, ~20% fines, ~15-20% fine gravel (rhyolite fragments)				Start drilling on 5/14/04.
170		1							
	5	2A, 2B	24	78	CLAYEY SAND WITH GRAVEL (SC) [Sluiced Fill] Medium dense, moist, olive to olive brown with yellowish brown and bluish gray fine mottles, ~15-20% fines, ~20-25% fine gravel				
165		3	12	33	Increase in gravel size and content (rhyolite and shale fragments up to 1 inch)				
160	10	4	10	33					SA: %F=18, %G=19
		5A, 5B	9	72	GRAVEL WITH CLAY AND SAND (GP-GC) [Fill] Loose, very moist, reddish brown, ~45-55% fine to coarse gravel to 2 inches (gap-graded), medium- to coarse-grained sand, ~5-10% fines				
	15				CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, reddish brown with yellowish brown and gray mottling				
155		6	16	50					
		7	16	39					SA: %F=16, %G=25
150	20	8	20	39	Becomes brown with yellowish brown and gray fine mottles				
		9A, 9B	19	56					LL=31, PI=12 SA: %F=20, %G=18 HD: 10%<5 microns
145	25	10	14	39	Less clayey; mostly fine with trace medium gravel				
		11	13	28	Becomes brown to reddish brown				SA: %F=16, %G=23
	30								

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-63

Project: Dynamic Stability of Chabot Dam **Project Location: Lake Chabot Dam, San Leandro, California** **Project Number: 26814536.C0000**	**Log of Boring WI-63** Sheet 2 of 3

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Sampling Resistance, blows / foot	SAMPLES Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	30						CLAYEY SAND WITH GRAVEL (SC), medium dense, moist, brown to reddish brown [Fill] (continued)				
			12	14	44						
140							GRAVEL WITH CLAY AND SAND (GP-GC) [Fill] Medium dense, very moist to wet, reddish brown to grayish brown, ~45-50% fine to medium gravel, ~10-15% fines				
			13	15	22						
	35						CLAYEY SAND WITH GRAVEL (SC) [Fill] Loose, moist to very moist, grayish brown to brown				
			14	9	44						SA: %F=20, %G=21
135											
							CLAY WITH SAND (CH) [Sluiced Fill?] Medium stiff, moist, brown and gray				
			15	5	44						LL=60, PI=36 SA: %F=81, %G=0 HD: 50%<5 microns End drilling for 5/14/04. Resume drilling on 5/15/04.
	40						CLAYEY SAND WITH GRAVEL (SC) [Sluiced Fill?] Loose, moist to very moist, brown to grayish brown, well-graded sand, fine subangular gravel (rhyolite fragments)				
			16	150 psi to 200 psi	77			16.8			LL=39, PI=18 SA: %F=18, %G=13
130											
			17A				◄— Trace carbonate				
			17B	4	72		SILTY CLAY (CL-ML) [Sluiced Fill?] Soft, moist, very dark gray and olive, trace fine-grained sand				
	45						CLAYEY SAND WITH GRAVEL (SC) [Fill?] Medium dense, moist, brown to olive brown with yellowish brown and reddish brown mottles				
			18	22	28						SA: %F=18, %G=31
125											
							Increase in gravel size and content (pushed 1-1/2-inch rhyolite gravel during sampling)				
			19	18	14						
	50						SILTY SAND (SM) [Weathered Bedrock?] Loose(?), moist, bluish gray to black, trace fine gravel (serpentinite and rhyolite fragments to 1/4 inch), organic odor (completely weathered serpentinite)				
			20	6	33						
120											
							SERPENTINITE [Bedrock] Bluish gray, olive, and white, completely to highly weathered, very weak to weak, very soft to soft, clayey, slightly moist to moist				
			21	22	22						
	55										
			22	23	50						
115											
											APPROX. PRE-DAM GROUND SURVEY LEVEL AT 59 FEET.
	60										
							Becomes completely weathered				
			23	33	50						
110											
	65										

Project: Dynamic Stability of Chabot Dam **Project Location: Lake Chabot Dam, San Leandro, California** **Project Number: 26814536.C0000**	**Log of Boring WI-63** Sheet 3 of 3

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	65						SERPENTINITE, bluish gray, olive, and white, completely weathered, very weak to weak, very soft to soft, clayey, slightly moist to moist [Bedrock] (continued)				
105			24	100/4.5"	67		GABBRO [Bedrock] Bluish gray and white, more competent than above, carbonaceous				
							Bottom of boring at 67.9 feet				End drilling on 5/15/04.
	70										
100											
	75										
95											
	80										
90											
	85										
85											
	90										
80											
	95										
75											
	100										

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-63

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Figure A-6

Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-64**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 1 of 5
Project Number: 26814536.C0000	

Date(s) Drilled	**5/17/04 through 5/19/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-3/4-inch drag bit (side discharge)**	Total Depth of Borehole	**140.1 feet**
Drill Rig Type	**Diedrich D128 (truck-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 250 feet MSL**
Groundwater Level(s)	**Not measured due to drilling method**	Sampling Method(s)	**Grab, SPT, Modified California, Pitcher Barrel**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Cement/bentonite grout**	Location	**Crest of dam about 2/3 point east**		

Elevation, feet	Depth, feet	Samples: Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
250	0				Asphaltic concrete 2 inches thick CLAYEY SAND WITH GRAVEL (SC) [Fill] Dense, moist, yellowish brown, fine to medium gravel				Start drilling on 5/17/04.
		1							
					CLAYEY SAND WITH GRAVEL (SC) [Fill] Dense, slightly moist, grayish brown with yellowish brown and reddish brown gravel, ~20% fines, ~35% fine gravel (rhyolite and serpentinite fragments)				
245	5	2	32	50					
240	10				Becomes olive brown, slightly more clayey				
		3A 3B	34	78					Drilling more clayey 10-15 ft.
					SANDY CLAY WITH GRAVEL (CL) [Fill] Medium stiff to stiff, moist, brown with gray and grayish brown mottling				
235	15	4	8	50					
230	20				Becomes grayish brown; gravel grades fine to medium (shale fragments)				
		5	150 psi	77		19.9 22.9	107.3		TX-CIU(R) LL=44, PI=23 SA: %F=59, %G=12 HD: 37%<5 microns Gs=2.69
225	25				Becomes stiff, olive brown and gray, slightly less clayey				
		6	12	50					
220	30								

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-64

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Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-64**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 2 of 5
Project Number: 26814536.C0000	

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
220	30		7A 7B	19	72		SANDY CLAY WITH GRAVEL (CL), stiff, moist, olive brown and gray with black clay clasts [Fill] (continued)				End drilling for 5/17/04 at 31.5 ft. Resume drilling on 5/18/04.
215	35		8A 8B	9	50		SANDY CLAY (CL) [Fill] Stiff, moist, bluish gray to olive black, ~60% medium plasticity fines, ~10-15% fine to coarse gravel (serpentinite fragments to 1-3/8 inches)				
210	40		9	150 psi	67			18.6 20.0	109.9		TX-CIU(R) LL=42, PI=21 SA: %F=49, %G=11 HD: 31%<5 microns Gs=2.66
205	45		10	15	61						Drills easy and smooth 45-50 ft.
200	50		11A 11B 11C	17	100		Becomes reddish brown and yellow, with trace medium gravel and clasts of black clay; ~60-65% fines, ~10-15% gravel Becomes grayish brown				
195	55		12	11	61		CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, grayish brown				LL=41, PI=21 SA: %F=30, %G=20
190	60		13	200 psi	77		Trace coarse gravel (rhyolite fragments to 1-1/4 inches)				
185	65										

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-64

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Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-64

Elevation feet	Depth, feet	Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
185	65		14	13	50		CLAYEY SAND WITH GRAVEL (SC), medium dense, moist, grayish brown, trace coarse gravel to 1-1/4 inches [Fill] (continued)				Drills easy to moderately easy 65-70 ft.
180	70		15A 15B 15C	32	100		Pocket of black, sandy clay with gravel CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, yellowish brown with gray and olive mottling, fine gravel (mostly serpentinite fragments)	13.0			LL=33, PI=16 SA: %F=17, %G=25
175	75		16	29	33		Black siliceous shale fragment with calcite filling in fractures				SA: %F=18, %G=19 Harder drilling at 78 ft.
170	80		17	150 psi 500 psi	79		Serpentinite cobble(?), highly weathered, weak, soft, clayey				Easier drilling at 79.5 ft. Pitcher barrel would not advance beyond 82 ft. Drilling under rod weight 80-85 ft following Pitcher sampling.
165	85		18	15	44		CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, moist, olive brown and dark gray				Drilling firm, then harder at 88.5 ft.
160	90		19A 19B 19C	41	67		Becomes dense	16.6			LL=43, PI=22 SA: %F=24, %G=15
155	95		20	25	39						SA: %F=19, %G=10
150	100										

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-64

Elevation, feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
150			21	200 psi 500 psi	29		CLAYEY SAND WITH GRAVEL (SC) [Fill] Dense, moist, olive gray, fine to coarse gravel (rhyolite fragments >2.85 inches)				Drills rocky to 105 ft (rhyolite fragments).
145	105		22	32	33						APPROX. PRE-DAM GROUND SURVEY LEVEL AT 105 FEET. Drills under weight of rod 105-110 ft. No recovery in Mod Cal drive; use sand catcher and 6-inch overdrive to recover 15 inches.
140	110		23A 23B 23C	37	83		CLAYEY SAND WITH GRAVEL (SC) [Fill] Dense, moist, olive brown, brown, dark gray, and bluish gray, fine gravel (some bluish gray serpentinite fragments)	22.3			LL=41, PI=21 SA: %F=44, %G=15
135	115		24A 24B	24	33		CLAYEY SAND WITH GRAVEL (SC) [Fill?] Medium dense, slightly moist to moist, very dark gray to black, fine-grained sand, homogeneous, trace serpentinite fragments, scattered wood fragments				SA: %F=27, %G=20 Drills very easy 115-120 ft; wood fragments observed throughout interval.
			25				SILTY CLAYEY SAND (SC-SM) [Puddled Fill?] Medium dense, slightly moist to moist, olive brown with flecks of gray, fine-grained sand, homogeneous				
130	120		26	100 psi	100						
125	125		27	12	44		Becomes bluish gray with black burnt(?) wood fragments				SA: %F=44, %G=4 End drilling for 5/18/04 at 126.5 ft. Resume drilling on 5/19/04. Drills hard 128-130 ft.
							RHYOLITE [Bedrock] Brown to yellowish brown, moderately to slightly weathered, weak to moderately strong, hard, very close fracture spacing, tight fractures				
120	130		28	50/2"	75						
							Becomes olive brown, reddish brown, and white, highly weathered, slightly clayey				
115	135										

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Figure A-7

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-64

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
115			29	51/6"	50		RHYOLITE, olive brown, reddish brown, and white, highly weathered, weak to moderately strong, hard, slightly clayey, very close fracture spacing, tight fractures [Bedrock] (continued)				
							Becomes bluish gray and white				Very hard drilling at 139 ft.
110	140		30 31	100/1"	100						
							Bottom of boring at 140.1 feet				End drilling on 5/19/04.
105	145										
100	150										
95	155										
90	160										
85	165										
80	170										

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-64

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Figure A-7

Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-65**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 1 of 3
Project Number: 26814536.C0000	

Date(s) Drilled	**5/19/04 and 5/20/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-1/2-in.-OD bit, 2-5/8-in.-OD internal bit in 94-mm casing advancer system**	Total Depth of Borehole	**65.3 feet**
Drill Rig Type	**Diedrich D128 (truck-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 168 feet MSL**
Groundwater Level(s)	**Not measured due to drilling method**	Sampling Method(s)	**Grab, SPT, Modified California, Pitcher Barrel**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Cement/bentonite grout**	Location	**Downstream toe of dam about 60 ft east of paved access road**		

Elevation, feet	Depth, feet	Samples: Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0				CLAYEY SAND WITH GRAVEL (SC) [Fill] Slightly moist, yellowish brown, ~35-40% fines, ~25% gravel				Start drilling on 5/19/04.
		1							
165									
		2			Becomes moist, olive brown, less clayey; ~15-20% fines, ~15-20% fine subangular to subrounded gravel				
	5				Medium dense				
		3	22	61					
					Increase in gravel content (rhyolite fragments)				
160		4	30	44					
	10				CLAYEY SAND (SC) [Fill] Medium dense, moist, olive brown with yellowish brown and bluish gray mottling, few fine gravel				
		5	17	44					SA: %F=18, %G=11
155		6A 6B	11	78	SILTY SAND (SM) [Fill] Loose, wet, brown, ~15% fines				
					CLAY (CH) [Sluiced Fill] Medium stiff, moist, brown and gray, high plasticity				
	15				Becomes soft, yellowish brown to olive				
		7	4	33					
					Becomes medium stiff, reddish brown and gray				
150		8	5	67					LL=60, PI=38 SA: %F=97, %G=0
	20				CLAY (CL) [Sluiced Fill] Soft to medium stiff, moist, olive brown, trace pockets of fine- to medium-grained sand (layers to 2 inches thick)				
		9	100 psi	60					
									End drilling for 5/19/04 at 21.5 ft. Resume drilling on 5/20/04.
145		10	push; no blow count	33	Lamination with seams of brown and olive, silty sand and silty clay				SA: %F=86, %G=0 HD: 33%<5 microns
	25				Layer 2-1/2 inches thick of brown to olive brown, silty clay				
		11	5	67					
					CLAY WITH SAND (CL/CH) [Fill] Very stiff, moist to very moist, olive, medium to high plasticity				
140		12A 12B	19	67					
					CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, slightly moist, yellowish brown				SA: %F=28, %G=21
	30								

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	30		13A 13B 13C	21	67		CLAYEY SAND WITH GRAVEL (SC), medium dense, slightly moist, yellowish brown [Fill] (continued)				No recovery on drive at 30 ft; use sand catcher to recover 12 inches (disturbed).
135			14	9	44		Becomes loose, less clayey, with trace medium gravel				SA: %F=16, %G=31
	35		15	15	39		Becomes medium dense				
130			16	16	50		Becomes brown				
	40		17A 17B	21	50		Decrease in gravel content				Cuttings are sharper below 42 ft.
125			18	8	33		CLAYEY GRAVEL WITH SAND (GC) [Fill?] Loose, very moist, grayish brown, brown and bluish gray, ~35-40% fine to medium, angular to subangular gravel (rhyolite fragments, trace serpentinite), ~25-30% fines				APPROX. PRE-DAM GROUND SURVEY LEVEL AT 43 FEET.
	45		19	19	56		CLAYEY SAND WITH GRAVEL (SC) [Fill?] Medium dense, very moist, olive, rhyolite fragments				SA: %F=15, %G=23 Increased drill chatter 46-47.5 ft.
120			20	12	17						50-gallon fluid loss drilling 47.5-50 ft.
	50		21A 21B	20	100						No recovery on initial drive at 50 ft; redrive sampler with sand catcher.
115			22	13	28						SA: %F=23, %G=26
	55		23	10	67		CLAYEY SAND (SC) [Alluvium] Loose to medium dense, moist to wet, gray and brown, fine- to medium-grained sand				SA: %F=18, %G=0
			24				Black (burnt?) wood fragments				80-gallon fluid loss drilling 55-57.5 ft.
110			25	9	67		CLAYEY SAND WITH GRAVEL (SC) [Alluvium] Loose, moist to wet, gray and brown, fine- to medium-grained sand, with wood fragments, angular shale fragments to 1/4 inch				SA: %F=19, %G=23
	60		26	75/6"	50		Rhyolite gravel 3 inches diameter				
105			27	164/11"	53		GABBRO [Bedrock] Greenish gray and white, highly to moderately weathered, weak to moderately strong, intensely fractured, with calcite and carbonate				
	65										

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-65

Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-65**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 3 of 3
Project Number: 26814536.C0000	

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	65		28	100/4"	100		GABBRO, highly to moderately weathered [Bedrock] (continued)				
							Bottom of boring at 65.3 feet				End drilling on 5/20/04.
100											
	70										
95											
	75										
90											
	80										
85											
	85										
80											
	90										
75											
	95										
70											
	100										

Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-66**
Project Location: Lake Chabot Dam, San Leandro, California	
Project Number: 26814536.C0000	

Date(s) Drilled	**5/25/04 through 5/27/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-1/2-in.-OD bit, 2-5/8-in.-OD internal bit in 94-mm casing advancer system**	Total Depth of Borehole	**65.5 feet**
Drill Rig Type	**CME-45 (barge-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 179 feet MSL**
Groundwater Level(s)	**Not measured**	Sampling Method(s)	**SPT, Modified California, Pitcher Barrel, Shelby Tube (push)**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Soil cuttings 65.5-38 feet, medium aquarium sand 38-10 feet**	Location	**Upstream side of dam toward left (east) abutment**		

Mudline at ~46 ft below reservoir water level (el. 225.3 ft on 5/28/04)

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						SILTY CLAY / CLAY (CH) [Reservoir Sediment] Very soft, wet, dark gray to black, high plasticity, trace fine- to medium-grained sand				Start drilling on 5/25/04. Drilling from deck of barge approx. 1 ft above water line. Mudline is considered 0 depth for this log of boring.
			1	rod weight only	33						
175											
	5										
							CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, very moist, olive to olive brown, gray, and yellowish brown, fine to medium gravel (shale and rhyolite fragments), mixed texture				
			2A 2B	24	72			20.2			LL=37, PI=19 SA: %F=37, %G=14
			3	16	44		Becomes less clayey				
170											
	10										
							Increasing fine to coarse angular gravel (shale and rhyolite fragments to 2 inches)				No recovery in Pitcher barrel. Use Mod Cal sampler with sand catcher to retrieve sample at 14 ft.
				200 psi	0						
165			4		100						
	15		5A 5B	13	67		SANDY CLAY (CL) [Fill] Very stiff, moist, black				SA: %F=73, %G=1
160							With pockets of bluish gray, clayey sand, trace medium gravel (rhyolite fragments)				
	20		6A 6B 6C	16	67						
							Becomes bluish gray, with silt				
			7	25	67						End drilling for 5/25/04 at 22 ft. Resume drilling on 5/26/04. Drills soft 23-24 ft.
							SANDY CLAY (CL) [Fill] Stiff to very stiff, moist, black				Gs=2.65 SA: %F=58, %G=0
155								17.3	112.1		TX-CIU(R)
	25		8	500 psi	96			17.2 12.5 22.4	122.4		LL=27, PI=10 TX-CIU(R) LL=28, PI=11
			9	15	67		With angular, black siliceous shale fragments to 1 inch, trace wood fragments				SA: %F=42, %G=16 HD: 19%<5 microns
			10								Drills gravelly 27-30 ft.
150											
	30										

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-66

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	30		11	36	0		CLAYEY SAND (SC) [Fill] Medium dense, wet, gray to bluish gray, fine-grained sand, ~20-25% fines				No recovery on drive at 30 ft. Push sampler back down to 31.6 ft with sand catcher and recover 2 inches (disturbed sample).
			12	--	40						
							CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, wet, olive gray, fine-grained sand, shale fragments, trace clasts of reddish brown, sandy clay				
145			13	22	33						SA: %F=17, %G=38
	35		14								
			15	34	22		SANDY CLAY (CL) [Colluvium?] Very stiff, moist to very moist, gray with bluish gray mottling, ~50-60% low to medium plasticity fines, ~10-15% fine gravel (shale fragments)				APPROX. PRE-DAM GROUND SURVEY LEVEL AT 37 FEET.
140			16A 16B	26	61						LL=28, PI=10 SA: %F=51, %G=1
	40										
							SANDY CLAY WITH GRAVEL (CL) [Colluvium / Alluvium?] Very stiff, moist to very moist, reddish brown to grayish brown, fine to medium, angular to subrounded gravel (quartz, rhyolite, and shale fragments); pocket of fine angular gravel at 43.2 ft				
135			17A 17B	500 psi	0*						No recovery in Shelby tube at 42.5 ft. Use Mod Cal sampler with sand catcher to recover 11 inches.
	45										
			18	19	39						LL=36, PI=19 SA: %F=62, %G=8
130											
	50		19A 19B	86	78		CLAYEY SAND WITH GRAVEL (SC) [Alluvium] Very dense, moist, grayish brown, ~30-35% fines, ~25% fine to medium, subangular to subrounded gravel				
			20	60/6"	58		Becomes yellowish brown, with sandstone and rhyolite fragments				
125											
	55		21	59/6"	42		SHALE [Bedrock] Olive brown, highly weathered, moderately strong, slightly clayey, intensely fractured (extremely close fracture spacing)				
120											
	60						Becomes differentially weathered, weak, clayey				
			22	51	22						
											End drilling for 5/26/04 at 61.5 ft. Resume drilling on 5/27/04.
115							Becomes completely to highly weathered				
	65										

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Project: Dynamic Stability of Chabot Dam	**Log of Boring WI-66**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 3 of 3
Project Number: 26814536.C0000	

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	65		23	118/6"	83		SHALE, completely to highly weathered, weak [Bedrock] (continued)				
							Bottom of boring at 65.5 feet				End drilling on 5/27/04.
110	70										
105	75										
100	80										
95	85										
90	90										
85	95										
80	100										

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-66

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Figure A-9

Log of Boring WI-67

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Date(s) Drilled	**5/27/04 through 5/29/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Rotary Wash**	Drill Bit Size/Type	**4-1/2-in.-OD bit, 2-5/8-in.-OD internal bit in 94-mm casing advancer system**	Total Depth of Borehole	**67.1 feet**
Drill Rig Type	**CME-45 (barge-mounted)**	Drilling Contractor	**Taber Consultants**	Surface Elevation	**approx. 174 feet MSL**
Groundwater Level(s)	**Not measured**	Sampling Method(s)	**SPT, Modified California, Pitcher Barrel, Shelby Tube (push)**	Hammer Data	**Automatic hammer; 140 lbs, 30-inch drop**
Borehole Backfill	**Soil cuttings 67.1-40 feet, medium aquarium sand 40-10 feet**	Location	**Upstream side of dam toward right (west) abutment**		

Mudline at ~51 ft below reservoir water level (el. 225.3 ft on 5/28/04)

Elevation feet	Depth, feet	Sample Number	Sampling Resistance, blows / foot	Recovery, %	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0				SILT WITH CLAY (ML) [Reservoir Sediment] Very soft, wet, black				Start drilling on 5/27/04. Drilling from deck of barge approx. 1 ft above water line. Mudline is considered 0 depth for this log of boring.
170									
	5				CLAYEY SILT (ML) [Reservoir Sediment] Very soft, wet, gray				
		1	rod weight only	93	SANDY CLAY (CH) [Fill?] Very soft, very moist, gray and bluish gray, high plasticity, some clasts of brown, sandy clay, scattered shale fragments				
165					CLAY WITH SAND (CL) [Fill?] Very soft, very moist, gray, homogeneous, trace fibrous wood or roots				
	10	2	rod weight only	60					LL=44, PI=23 SA: %F=81, %G=0 HD: 49%<5 microns
		3			POORLY GRADED SAND (SP) [Fill?] Loose(?), wet, olive gray, fine- to medium-grained sand, trace silt				
160									
	15	4	14	22	CLAYEY SAND WITH GRAVEL (SC) [Fill] Loose, moist to very moist, yellowish brown and bluish gray, ~25% fines, ~30% fine to medium gravel (shale fragments)				
		5	2	33	Becomes olive brown to grayish brown, more clayey				When trying to sample at 16 ft with SPT, hole collapses below 14.5 ft. Drill out to resample.
					SANDY CLAY WITH GRAVEL (CL) [Fill] Soft to medium stiff, very moist, gray with olive and yellowish brown mottling, fine to medium, angular to subangular gravel (shale fragments)				
155									Gs=2.66
	20	6A 6B	250 psi	96		28.6 22.4	92.8		TX-CIU(R) LL=37, PI=19 SA: %F=64, %G=8 HD: 36%<5 microns
					Becomes very soft, yellowish brown				
		7	0	56	CLAYEY SAND WITH GRAVEL (SC) [Fill] Loose, very moist, gray and olive brown				SA: %F=16, %G=29
									End drilling for 5/27/04 at 22 ft. Resume drilling on 5/28/04.
150									
	25				2-inch shale fragments				
		8A 8B	17	67	CLAYEY SILT (ML) [Fill] Stiff, moist, black, trace fine-grained sand				
		9A	17	78	CLAYEY SAND WITH GRAVEL (SC) [Fill] Medium dense, very moist, gray, with bluish gray gravel				SA: %F=32, %G=15
		9B			CLAYEY SAND WITH GRAVEL (SC) [Wagon Fill] Medium dense, moist, mottled olive, brown, gray and yellowish brown				
145									
	30								

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.C0000

Log of Boring WI-67

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance, blows / foot	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	30						POORLY GRADED GRAVEL (GP) [Fill] Loose(?), wet, gray, fine to medium angular gravel (shale fragments), trace clasts of brown, sandy clay				
			10	100 psi	25						No recovery in Pitcher sampling at 30.5 ft. Use Mod Cal with sand catcher to recover 6 inches.
140			11				Angular shale fragments, no fines				
	35		12A 12B 12C	38	78		SANDY CLAY WITH GRAVEL (CL) [Fill?] Very stiff, moist to very moist, grayish brown, ~50-60% fines, ~25% fine gravel				
							CLAYEY SAND WITH GRAVEL (SC) [Wagon Fill] Medium dense, moist, gray and olive brown, shale fragments				
			13	15	22						
135											
	40										
			14A 14B	49	83			16.7			LL=34, PI=14 SA: %F=32, %G=28
			15	18	39						
130											
	45						Becomes gray; decrease in gravel content, with trace yellowish brown grasses				
			16A 16B 16C	28	83		SANDY CLAY (CL) [Fill] Very stiff, moist, black to very dark gray, ~30% fine-grained sand, homogeneous				
			17	18	67						
125											
	50						SANDY CLAY (CL) [Fill] Very stiff, moist, grayish brown, trace fine to medium gravel				
			18A 18B	30	47		Becomes dark gray	20.7			LL=32, PI=16 SA: %F=69, %G=0
							Becomes olive gray (in alternating layers)				
			19	24	67						
120											
	55						CLAYEY SAND WITH GRAVEL (SC) [Fill?] Medium dense, very moist, olive gray, ~15% clay, ~20% fine to medium gravel (shale fragments)				
			20	200 psi 500 psi	83						
			21A 21B	27	33		POORLY GRADED SAND (SP) [Alluvium] Medium dense, moist to very moist, gray, fine- to medium-grained sand, trace silt				End drilling for 5/28/04 at 58 ft. Resume drilling on 5/29/04.
115											Drills gravelly 59.5-61.5 ft.
	60						SHALE (CLAYSTONE / SILTSTONE?) [Bedrock] Olive brown and gray, highly weathered, weak, moderately brittle to friable, slightly clayey, moist, intensely fractured (extremely close fracture spacing), some calcite				APPROX. PRE-DAM GROUND SURVEY LEVEL AT 60 FEET.
			22								
			23	74/6"	67						
											500 psi down pressure to drill 63-66.5 ft.
110											
	65										

Project: Dynamic Stability of Chabot Dam	Log of Boring WI-67
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 3 of 3
Project Number: 26814536.C0000	

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Sampling Resistance, blows / foot	SAMPLES Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	65						SHALE (CLAYSTONE / SILTSTONE?), olive brown and gray, highly weathered, weak, moderately brittle to friable, slightly clayey, moist, intensely fractured, some calcite [Bedrock] (continued)				
			24 25	100/0.5"	100		Becomes black				Drills softer 66.5-67 ft.
							Bottom of boring at 67.1 feet				End drilling on 5/29/04.
105	70										
100	75										
95	80										
90	85										
85	90										
80	95										
75	100										

Report: GEO_10B1_OAK; File: OAK_CHABOTDAM.GPJ; 8/8/2004 WI-67

Appendix B

Becker Penetration Testing

Appendix B
Becker Penetration Testing

This appendix presents the results of the Becker Hammer Penetration Test (BPT) borings completed as part of the Chabot Dam dynamic stability analysis.

The purpose of the BPT borings was to obtain more reliable blow count data for gravelly soils present at the downstream toe of the dam. The BPT borings were drilled at adjacent locations by Great West Drilling of Fontana, California, on June 7 and 8, 2004. The Becker Penetration Tests were performed using an AP-1000 drill rig and a 6.5-inch-OD closed crowd-out bit, in accordance with the guidelines presented by Harder and Seed (1986). Blow counts and bounce chamber pressures were recorded for every foot of penetration. Re-drive tests were performed at about 20-foot intervals to allow corrections for casing friction losses. The Becker Hammer boring logs are attached.

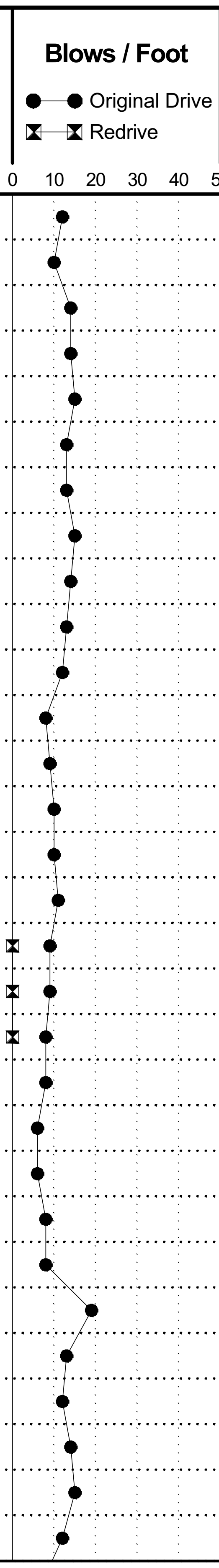
Energy transfer measurements were performed continuously during the Becker hammer testing. The results of the energy measurements are included in Appendix D.

Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.J0000

Becker Penetration Test BPT-1

Date(s) Drilled	**6/7/04**	Logged By	**S. Gambino**	Checked By	**T. Feldsher**
Drilling Method	**Becker Hammer Drill**	Drill Bit Size/Type	**6-5/8-inch-OD closed crowd-out bit**	Total Depth of Borehole	**79.5 feet**
Drill Rig Type	**AP-1000 (truck-mounted)**	Drilling Contractor	**Great West Drilling**	Surface Elevation	**approx. 179 feet MSL**
Groundwater Level(s)	**Not measured**	Hammer and Throttle	**Linkbelt 180, full throttle**		
Borehole Backfill	**Cement grout**	Location	**Downstream toe of dam, near WI-60**		

Elevation feet	Depth, feet	Time, 24-hr clock	Bounce Pressure, psig	Blows/foot (Nb)	Comments	REDRIVE Time, 24-hr clock	REDRIVE Bounce Pressure, psig	REDRIVE Blows/foot (Nb)
	0	1054	10	12	Positioned rig over test location at 0940; mast up and casings on rig by 1030.			
			12	10				
			13	14				
			15	14				
175			15	15				
	5		14	13				
			14	13				
			15	15				
		1056	15	14				
170		1113	14	13				
	10		15	12				
			13	8				
			12	9				
			15	10				
165			15	10				
	15		15	11				
			15	9	Pulled casing back for redrive, but hole would not support weight of casing.	1119	--	0
			14	9			--	0
		1114	13	8			--	0
160		1126	10	8				
	20		12	6				
			12	6				
			13	8				
			15	8				
155			16	19				
	25		15	13				
			15	12				
			16	14				
			14	15				
150		1135	15	12				
	30							



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Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.J0000

Becker Penetration Test BPT-1

Elevation feet	Depth, feet	Time, 24-hr clock	Bounce Pressure, psig	Blows/foot (Nb)	Comments	REDRIVE Time, 24-hr clock	REDRIVE Bounce Pressure, psig	REDRIVE Blows/foot (Nb)
	30		14	7				
			14	8				
			15	8				
			15	9				
145			14	7				
	35		15	9				
			15	10	For redrive, used float switch to lower casings without applying pressure; no wall friction.	1142	--	0
			15	7			--	0
			15	7	For redrive, seating blow only.		--	1
140		1152	10	8				
	40		13	6				
			13	6				
			13	7				
			15	7				
135			14	7				
	45		14	6				
			16	8				
			17	11				
		1155	15	12				
130		1202	16	12				
	50		18	10				
			17	13				
			16	14				
			17	16				
125			17	17				
	55		17	19				
			18	17		1207	--	0
			17	17			12	4
		1205	17	17		1208	12	8
120		1215	15	16				
	60		17	16				
			19	18				
			18	13				
			20	26				
115			20	25				
	65							

Blows / Foot: ● Original Drive; ⧗ Redrive (0–50)

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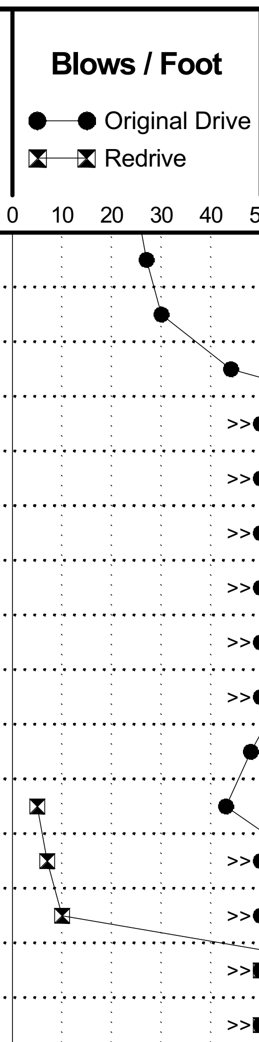
Project: Dynamic Stability of Chabot Dam
Project Location: Lake Chabot Dam, San Leandro, California
Project Number: 26814536.J0000

Becker Penetration Test BPT-1



Time, 24-hr clock	Bounce Pressure, psig	Blows/foot (Nb)	Comments	REDRIVE Time, 24-hr clock	REDRIVE Bounce Pressure, psig	REDRIVE Blows/foot (Nb)
	19	27				
	21	30				
	21	44				
1218	23	83				
1226	23	134				
	24	119				
	23	59				
	24	56				
	23	54				
	23	48				
	23	43		1248	12	5
	24	59			12	7
	25	69			15	10
	26	253	Casing started vibrating at 78 ft.	1250	18	75
1240	27	252/6"	**Bottom of BPT-1 at 79.5 feet.**		--	105/6"

Elevation, feet: 110, 105, 100, 95, 90, 85, 80
Depth, feet: 65, 70, 75, 80, 85, 90, 95, 100

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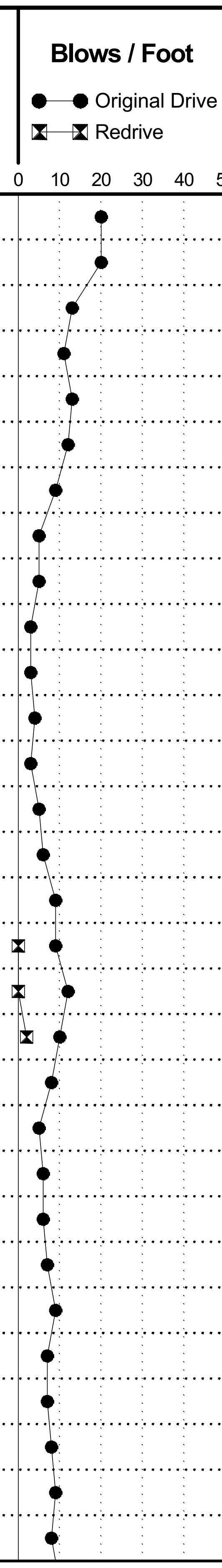
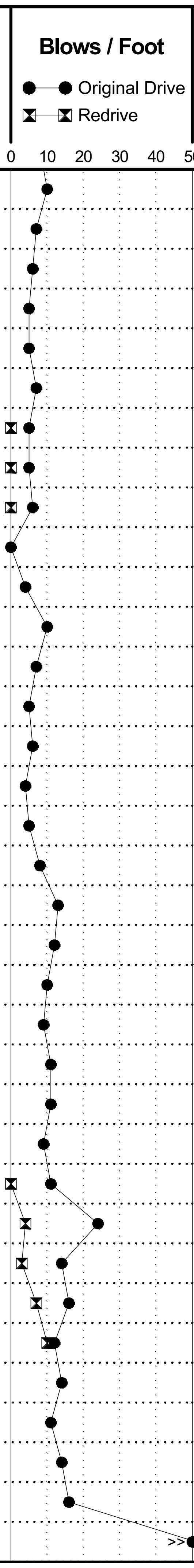
Project: Dynamic Stability of Chabot Dam	**Becker Penetration Test BPT-2**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 1 of 2
Project Number: 26814536.J0000	

Date(s) Drilled	**6/8/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Becker Hammer Drill**	Drill Bit Size/Type	**6-5/8-inch-OD closed crowd-out bit**	Total Depth of Borehole	**64.5 feet**
Drill Rig Type	**AP-1000 (truck-mounted)**	Drilling Contractor	**Great West Drilling**	Surface Elevation	**approx. 172 feet MSL**
Groundwater Level(s)	**Not measured**	Hammer and Throttle	**Linkbelt 180, full throttle**		
Borehole Backfill	**Cement grout**	Location	**Downstream toe of dam, near WI-63**		



Elevation, feet	Depth, feet	Time, 24-hr clock	Bounce Pressure, psig	Blows/foot (Nb)	Comments	REDRIVE Time, 24-hr clock	REDRIVE Bounce Pressure, psig	REDRIVE Blows/foot (Nb)
	0	0810	15	20				
			16	20				
170			17	13				
			16	11				
			16	13				
	5		17	12				
			15	9				
165			14	5				
		0812	13	5	Stopped to add one section of casing.			
		0836	~11	3	Half throttle used from 9 to 12 ft. Hammer would not fire. Bounce pressure varied between 10 and 14 psig, but was so transient that the pressure was difficult to read precisely.			
	10		~11	3				
			~12	4				
160			14	3				
			14	5				
			11	6				
	15		14	9				
			16	9		0848	--	0
155			16	12			--	0
		0839	15	10	For redrive, seating blows only.		--	2
		0900	14	8				
	20		15	5				
			14	6				
150			15	6				
			14	7				
			15	9				
	25		19	7				
			14	7				
145			15	8				
		0903	15	9				
		0904	15	8				
	30							

Project: Dynamic Stability of Chabot Dam	Becker Penetration Test BPT-2
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 2 of 2
Project Number: 26814536.J0000	



Elevation feet	Depth, feet	Time, 24-hr clock	Bounce Pressure, psig	Blows/foot (Nb)	Comments	REDRIVE Time, 24-hr clock	REDRIVE Bounce Pressure, psig	REDRIVE Blows/foot (Nb)
	30		14	10				
			14	7				
140			14	6				
			14	5				
			13	5				
	35		12	7				
			12	5		0916	--	0
135			12	5			--	0
		0915	13	6	Stopped to perform redrive and add casing.		--	0
		0928	--	0	Dropped slowly under casing and hammer weight.			
	40		14	4				
			10	10				
130			12	7				
			12	5				
			13	6				
	45		12	4				
			12	5				
125			12	8				
			14	13	Stopped to add one section of casing.			
		0933	16	12				
	50	0942	17	10				
			16	9				
120			16	11				
			17	11				
			16	9				
	55		17	11		0946	12	0
			18	24			12	4
115			18	14			12	3
			18	16			16	7
		0944	18	12	Stopped to perform redrive and add casing.	0948	14	10
	60	0955	18	14				
			17	11				
110			18	14				
			18	16				
		1000	27	300/6"	**Bottom of BPT-2 at 64.5 feet.**			
	65							

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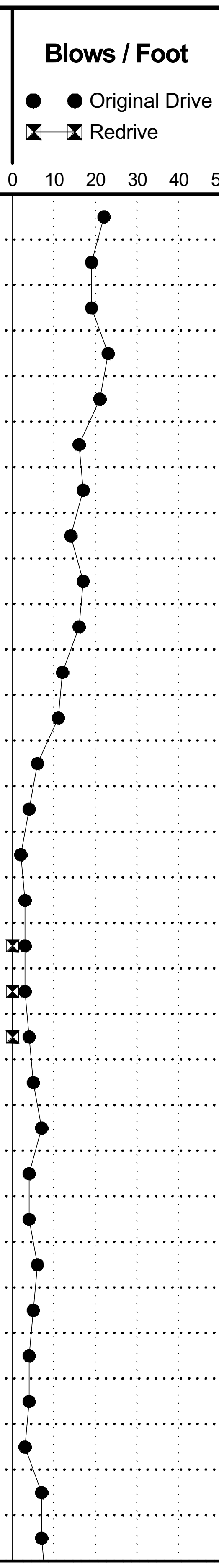
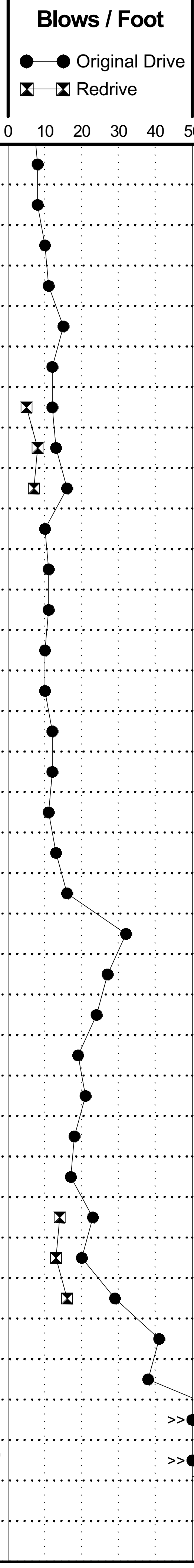
Project: Dynamic Stability of Chabot Dam	**Becker Penetration Test BPT-3**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 1 of 2
Project Number: 26814536.J0000	

Date(s) Drilled	**6/8/04**	Logged By	**M. McKee**	Checked By	**T. Feldsher**
Drilling Method	**Becker Hammer Drill**	Drill Bit Size/Type	**6-5/8-inch-OD closed crowd-out bit**	Total Depth of Borehole	**62.9 feet**
Drill Rig Type	**AP-1000 (truck-mounted)**	Drilling Contractor	**Great West Drilling**	Surface Elevation	**approx. 170 feet MSL**
Groundwater Level(s)	**Not measured**	Hammer and Throttle	**Linkbelt 180, full throttle**		
Borehole Backfill	**Cement grout**	Location	**Downstream toe of dam, near WI-65**		



Elevation feet	Depth, feet	Time, 24-hr clock	Bounce Pressure, psig	Blows/foot (Nb)	Comments	REDRIVE Time, 24-hr clock	REDRIVE Bounce Pressure, psig	REDRIVE Blows/foot (Nb)
170	0	1340	13	22				
			18	19				
			17	19				
			18	23				
			20	21				
165	5		21	16				
			21	17				
			18	14				
		1343	18	17	Stopped to add one section of casing.			
		1355	18	16				
160	10		18	12				
			16	11				
			10	6				
			11	4				
			10	2				
155	15		8	3				
			8	3		1357	--	0
			8	3			--	0
		1356	8	4	Stopped to perform redrive and add casing.		--	0
		1409	12	5				
150	20		12	7				
			14	4				
			14	4				
			15	6				
			12	5				
145	25		12	4				
			14	4				
			12	3				
		1410	14	7	Stopped to add one section of casing.			
		1422	7	7				
140	30							

Project: Dynamic Stability of Chabot Dam	**Becker Penetration Test BPT-3**
Project Location: Lake Chabot Dam, San Leandro, California	Sheet 2 of 2
Project Number: 26814536.J0000	



Elevation feet	Depth, feet	Time, 24-hr clock	Bounce Pressure, psig	Blows/foot (Nb)	Comments	REDRIVE Time, 24-hr clock	REDRIVE Bounce Pressure, psig	REDRIVE Blows/foot (Nb)
140	30		16	8				
			16	8				
			16	10				
			15	11				
			15	15				
135	35		16	12				
			16	12		1426	8	5
			17	13			12	8
		1424	17	16	Stopped to perform redrive and add casing.		14	7
		1434	20	10				
130	40		17	11				
			19	11				
			19	10				
			19	10				
			18	12				
125	45		19	12				
			19	11				
			20	13				
		1437	21	16	Stopped to add one section of casing.			
		1448	22	32				
120	50		21	27				
			20	24				
			18	19				
			19	21				
			20	18				
115	55		20	17				
			20	23		1452	15	14
			20	20			16	13
		1450	22	29	Stopped to perform redrive and add casing.		17	16
		1501	18	41				
110	60		20-22	38				
			23	64				
		1508	24-28	200/11"				
					Bottom of BPT-3 at 62.9 feet.			
105	65							

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Appendix C
SPT Energy Measurements

ABE Engineering

2230 Lariat Lane, Walnut Creek, CA 94596
PHONE: 925-944-6363 FAX: 925-476-1588
EMAIL: SA@AbeEngineering.com

May 17, 2004

Taber Consultants
3911 W. Capital Ave
West Sacramento, CA 95691

Attn: Mr. Andy Taber

Re: SPT Energy Measurements
Chabot Reservoir
Castro Valley, California
May 2, 2004

Job No. 04020

Dear Andy,

This report presents the results of SPT (Standard Penetration Test) energy measurements obtained for the project referenced above on May 2, 2004. Dynamic measurements were made with a PDA (Pile Driving Analyzer) during SPT sampling for soil boring DH3 at depths ranging from 10 ft to 60 ft. The objective of the dynamic measurements was to determine the energy transfer ratio (ETR) or efficiency of the SPT systems, which is used to normalize the SPT N values to a standard efficiency of 60% (N_{60}).

DYNAMIC TESTING AND FIELD DETAILS

Drill Rig and SPT Hammer Description

The Drilling and SPT sampling was performed by Taber Consulting. The SPT hammer was a Diedrich automatic hammer, which has a 140 lb, rams and, 30-inch nominal drop heights, and theoretical potential energies of 350 ft-lbs. The SPT rod was NW-J rod supplied in 5-ft lengths and standard split spoon and Cal-modified samplers were used. Further details regarding the SPT equipment are beyond the scope of this report and should be obtained from the driller.

Dynamic Test Instrumentation

Dynamic measurements of strain and acceleration were taken on a 2-ft long section of NW rod, which was attached to the top of the sample rod string just below the hammer. The rod section was instrumented with two strain bridges and two piezoresistive accelerometers. By averaging the measurements taken from opposite sides of the rod, the effects of non-uniform hammer impacts to the recorded signals were minimized.

Strain and acceleration signals were conditioned and converted to force and velocity records by a PAK Model, Pile Driving Analyzer® (PDA). This dynamic testing equipment is the same equipment that is routinely used for conventional pile driving analysis. The dynamic force and velocity records were the basis of the computed energy results presented in this report. In the field the force and velocity records from the PDA were viewed on a graphic LCD screen to evaluate data quality. A representative sample of the force and velocity records was also digitally stored on disc for back up.

DISCUSSION OF DYNAMIC TEST RESULTS

Calculation of Energy Transfer

The energy transferred to the instrumented rod section was computed from the dynamic force and velocity records by the EFV method, which uses both the force and velocity records to calculate the maximum transferred energy as:

$$EFV = \int F(t)\, V(t)\, dt$$

The integration is performed over the time period from which the energy transfer begins (non-zero) and terminates at the time when the energy transfer reaches a maximum value. This method is theoretically correct for all rod lengths regardless of the 2L/c stress wave travel time (L is the rod length and c is the stress wave speed in the rod) and the number of non-uniform rod corrections. This calculation is the method we use to compute the energy transfer ratio, ETR, which is computed as:

$$ETR = EFV / \text{Rated Hammer Energy}$$

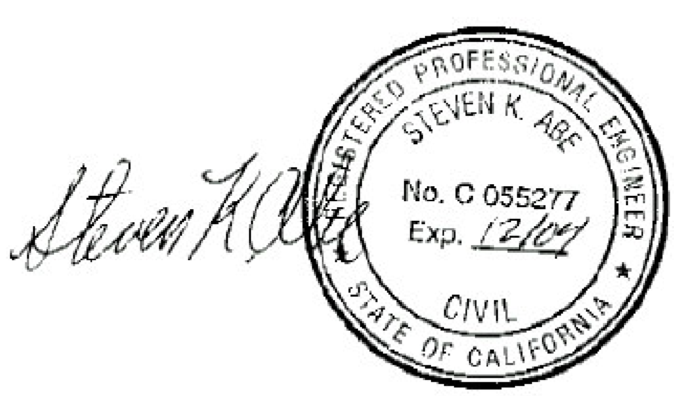
Dynamic Test Results

The PDA calculated results are given in Appendix A and include the energy transfer (EFV), the energy transfer ratio (ETR), the hammer blow rate (BPM), the maximum impact force (FMX), and the maximum rod velocity (VMX). For each sample depth interval, the average, maximum, minimum and standard deviation of each value are given in Appendix A. Other information includes the sample depth interval, the total number of blows for the reported depth interval, and the equivalent blow count for the depth interval (not the same as the N Value). The ETR for the automatic hammer averaged 84% for a total of 359 sample blows and ranged from 71% to 87% for the various depth intervals.

I appreciate the opportunity to be of assistance to you on this project. Please contact me if you have any questions regarding this report, or if I may be of further service.

Very truly yours,
ABE Engineering

Steven K. Abe, P.E.



APPENDIX A

Dynamic Measurement Results

Pile: B4 Proj: Chabot Reservoir Pg1

Info: Taber-DIEDRICH/NW

ETR: Energy Transfer Ratio
EFV: Max Transferred Energy
FMX: Max Measured Force
VMX: Max Measured Velocity
EF2: Energy by F^2 Method
BPM: Blows Per Minute

BL# end	bl/ft depth ft	TYPE	#Bls	ETR %	EFV ft-lb	FMX kips	VMX ft/sec	EF2 ft-lb	BPM bl/min
13	12.50- 14.00	AVG	12	71	249	39.5	12.7	195	35.2
		STD	12	3	10	0.6	0.3	6	0.4
		MAX	12	76	266	40.5	13.1	207	36.0
		MIN	12	66	234	38.4	12.3	186	34.8
36	16.50- 18.00	AVG	22	79	277	38.5	12.8	214	36.6
		STD	22	2	8	0.9	0.3	6	0.4
		MAX	22	82	287	40.2	13.1	222	37.3
		MIN	22	74	262	36.8	12.1	199	35.5
50	18.00- 19.50	AVG	14	79	279	41.1	13.1	216	35.8
		STD	14	2	9	0.8	0.3	7	0.4
		MAX	14	82	287	42.4	13.6	223	36.5
		MIN	14	75	263	39.2	12.6	202	35.2
66	25.00- 26.50	AVG	15	80	281	41.7	12.5	219	36.1
		STD	15	3	9	0.6	0.2	6	0.4
		MAX	15	83	292	42.8	12.9	230	37.2
		MIN	15	74	261	40.6	12.1	205	35.7
96	30.00- 31.50	AVG	29	79	277	42.1	12.9	229	34.7
		STD	29	2	9	0.9	0.3	8	1.4
		MAX	29	82	290	44.0	13.4	242	36.0
		MIN	29	72	255	39.9	12.3	209	28.7
113	31.50- 33.00	AVG	17	81	286	41.4	12.8	217	35.9
		STD	17	2	7	0.6	0.2	5	0.3
		MAX	17	83	292	42.4	13.0	223	36.4
		MIN	17	75	264	39.6	12.2	201	35.2
181	43.00- 44.50	AVG	67	85	297	42.3	13.0	226	34.9
		STD	67	3	10	1.2	0.2	7	0.4
		MAX	67	89	311	45.2	13.4	239	36.8
		MIN	67	77	272	39.0	12.5	204	34.2
253	47.00- 48.50	AVG	71	87	305	40.9	13.2	224	35.7
		STD	71	4	14	2.4	0.4	12	0.7
		MAX	71	92	323	43.9	13.9	243	37.8
		MIN	71	68	239	34.5	11.7	176	34.9
295	48.50- 50.00	AVG	42	89	312	42.3	13.5	223	36.0
		STD	42	3	12	1.0	0.3	9	0.5
		MAX	42	93	327	43.8	14.0	237	37.6
		MIN	42	78	274	38.8	12.6	196	35.2

Pile: B4 Proj: Chabot Reservoir Pg2

Info: Taber-DIEDRICH/NW

BL# end	depth bl/ft	ft	TYPE	#Bls	ETR %	EFV ft-lb	FMX kips	VMX ft/sec	EF2 ft-lb	BPM bl/min
320	54.50-	56.00	AVG	24	85	299	39.7	13.2	208	35.7
			STD	24	5	19	1.4	0.4	14	0.4
			MAX	24	91	318	41.6	13.9	227	37.0
			MIN	24	66	233	35.5	11.9	169	35.2
359	58.50-	60.00	AVG	38	87	305	39.4	13.7	217	34.8
			STD	38	4	13	1.0	0.3	8	0.3
			MAX	38	93	326	41.6	14.3	230	35.7
			MIN	38	74	260	37.8	12.6	191	34.0

SATISTICS FOR ALL DATA

	ETR %	EFV ft-lb	FMX kips	VMX ft/sec	EF2 ft-lb	BPM bl/min
AVG	84	294	41.0	13.1	220	35.4
STD	5	19	1.9	0.4	12	2.0
MAX	93	327	45.2	14.3	243	37.8
MIN	66	233	34.5	11.7	169	0.0
#BLS	359	359	359	359	359	359

DRIVEN (2004-May-03 : B4.Q02)

Appendix D

BPT Energy Measurements

ABE Engineering

2230 Lariat Lane, Walnut Creek, CA 94596
PHONE: 925-944-6363 FAX: 925-476-1588
EMAIL: SA@AbeEngineering.com

Dynamic Pile Test Report

Company:	Great West Drilling, Inc. 15777 Valley Blvd. Fontana, CA 92335	**Date:**	June 28, 2004
Attn:	Mr. Jim Benson	**From:**	Steve Abe
Re:	Becker Penetration Testing Chabot Dam Castro Valley, CA June 7-8, 2004		ABE Job No. 04028

This report presents dynamic measurement results obtained for three BPT (Becker Penetration Test) borings performed for the project referenced above on June 7 and 8, 2004. The primary test objective was to measure the energy transfer or efficiency of the Becker Hammer. The dynamic testing was performed with a Model PAK Pile Driving Analyzer (PDA) according to the ASTM D4945 test standard. During dynamic monitoring, PDA calculations for soil resistance and hammer performance were made according to the Case Method.

Drill System and Becker Hammer Details

Great West Drilling, Inc. performed the Becker drilling. The hammer was an ICE model 180 double acting diesel hammer that has a maximum rated energy of 8,130 ft-lbs and a ram weight of 1,730 lbs. The hammer is equipped with a pressure gage to display the bounce chamber pressure, which provides a crude approximation of the hammer energy based on charts provided by the hammer manufacturer.

The BPT drill pipe consists of 10-ft long sections of 6.625- inch O.D. by 0.625-inch wall pipe with threaded connections. The hammer impact, and stress wave propagation, occurs only on the outer pipe. The inner pipe floats inside the outer pipe and the annular space between the inner and outer pipes acts as a conductor for compressed air to bring drill spoils to the surface during open bit drilling. These BPT tests were performed with a closed end bit.

DYNAMIC TEST RESULTS

The following PDA computed Case Method results were computed for each BPT boring. The results are summarized for all borings in Table 1 and complete printed and plotted results are attached as Appendix A.

- EMX- The Maximum energy transfer to the pile/drill pipe.
- ETR- The energy transfer ration (EMX / maximum rated hammer energy)
- FMX- The maximum impact force.
- RX9- The static soil resistance estimate for a damping value of 0.90.
- RTL- The total soil resistance (static and dynamic) not reduced for damping.
- BPM- The hammer blow rate.

For each 1-ft penetration increment, the average, maximum, minimum, and standard deviations of the above Case Method calculations are printed. The printed results also include blow counts, which were computed by the PDA based on penetration depths, which were entered as I observed them during driving. These blow counts will likely differ from those recorded by others and were not reentered to agree with filed logs taken by others.

Table 1: Summary of PDA Results

BPT1

	EFV Ft-Lbs.	ETR %	RX9 Kips	RTL Kips	FMX Kips	BPM Bl./Min.
AVG	347	42	101	145	151	93.3
STD	54	7	57	66	40	6.4
MAX	455	56	190	231	226	103.9
MIN	153	18	0	1	37	46.5
#BLS	2168	2168	2168	2168	2168	2168

BPT2

	EFV Ft-Lbs.	ETR %	RX9 Kips	RTL Kips	FMX Kips	BPM Bl./Min.
AVG	301	37	83	86	122	95.3
STD	75	9	85	72	56	2.6
MAX	433	53	228	212	216	111.2
MIN	98	12	0	0	16	64.4
#BLS	902	902	902	902	902	902

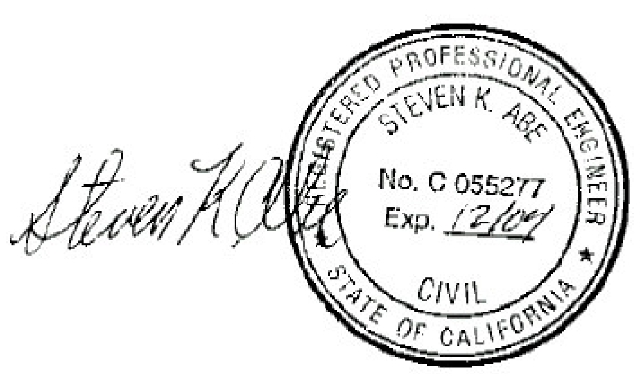
BPT3

	EFV Ft-Lbs.	ETR %	RX9 Kips	RTL Kips	FMX Kips	BPM Bl./Min.
AVG	350	43	73	131	149	94.6
STD	58	7	49	58	49	1.6
MAX	466	57	184	213	239	104.0
MIN	121	14	0	0	42	88.0
#BLS	1136	1136	1136	1136	1136	1136

I appreciate the opportunity to assist you with this project. Please contact me if you have any questions regarding these results, or if we may be of further service.

Very truly yours,
ABE Engineering

Steve Abe, P.E.

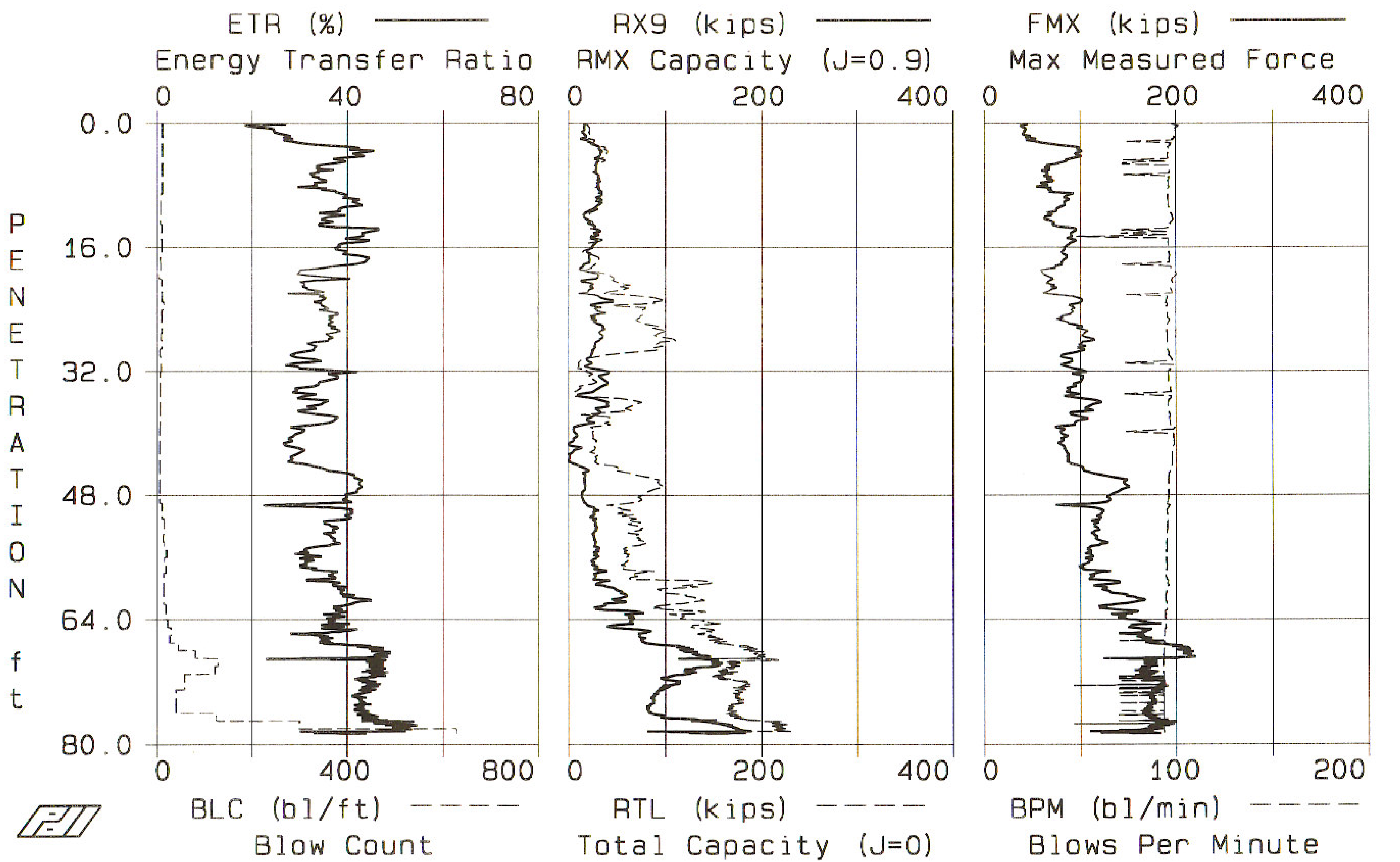


APPENDIX A

PDA Case Method Results

ABE Engineering 2004-Jun-07

CHABOT DAM, BPT1, BECKER HAMMER



Info: BECKER HAMMER

EFV: Max Transferred Energy
ETR: Energy Transfer Ratio
RX9: RMX Capacity (J=0.9)
RTL: Total Capacity (J=0)
FMX: Max Measured Force
BPM: Blows Per Minute

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
105	11	9.00	AVG	105	274	33	26	29	68	94.5
			STD	105	51	6	7	6	19	10.5
			MAX	105	387	47	35	42	105	101.3
			MIN	105	153	18	11	15	37	47.7
129	8	12.00	AVG	24	324	40	27	28	80	96.3
			STD	24	20	3	7	5	8	0.9
			MAX	24	353	43	35	36	91	98.3
			MIN	24	273	33	15	19	62	94.7
136	7	13.00	AVG	7	286	35	19	22	68	97.7
			STD	7	14	2	3	3	6	1.0
			MAX	7	304	37	25	26	75	98.5
			MIN	7	269	33	15	17	59	96.0
146	10	14.00	AVG	10	341	42	28	27	87	91.2
			STD	10	46	6	4	4	11	15.3
			MAX	10	398	49	36	33	98	99.0
			MIN	10	268	33	23	21	71	47.9
155	9	15.00	AVG	9	350	43	26	26	90	79.6
			STD	9	25	3	4	6	4	23.8
			MAX	9	387	47	34	38	97	96.4
			MIN	9	319	39	20	21	86	47.8
165	10	16.00	AVG	10	324	40	27	25	89	95.9
			STD	10	21	3	3	7	4	0.3
			MAX	10	358	44	34	36	95	96.4
			MIN	10	296	36	23	16	85	95.3
175	10	17.00	AVG	10	322	39	21	19	83	96.2
			STD	10	22	3	4	5	3	0.3
			MAX	10	351	43	25	27	88	96.7
			MIN	10	285	35	15	14	79	95.8
182	7	18.00	AVG	7	358	44	21	31	83	96.4
			STD	7	9	1	0	1	2	0.5
			MAX	7	371	45	22	32	87	97.0
			MIN	7	342	42	21	28	80	95.6
190	8	19.00	AVG	8	291	36	13	23	72	91.3
			STD	8	38	5	2	4	9	17.4
			MAX	8	357	44	16	29	83	99.6
			MIN	8	229	28	10	15	57	48.3
193	3	20.00	AVG	3	281	34	36	42	64	99.5
			STD	3	79	10	20	19	9	3.8
			MAX	3	355	43	48	60	70	103.9
			MIN	3	197	24	13	22	53	96.7

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
203	10	21.00	AVG	10	261	32	18	52	69	97.6
			STD	10	29	4	6	10	4	1.0
			MAX	10	309	38	26	67	76	99.5
			MIN	10	215	26	11	36	64	96.3
214	11	22.00	AVG	11	261	32	20	49	68	97.5
			STD	11	24	3	7	11	6	0.5
			MAX	11	303	37	33	72	84	98.5
			MIN	11	208	25	10	29	57	96.9
225	11	23.00	AVG	11	282	34	36	83	94	91.1
			STD	11	10	1	9	15	10	13.7
			MAX	11	298	36	50	104	105	96.3
			MIN	11	257	31	20	52	70	49.7
239	14	24.00	AVG	14	285	35	30	72	93	95.0
			STD	14	10	1	6	24	5	0.4
			MAX	14	299	36	42	96	103	95.6
			MIN	14	265	32	22	17	87	94.1
259	10	26.00	AVG	20	300	37	28	74	86	95.6
			STD	20	7	1	5	4	6	0.7
			MAX	20	316	39	39	84	95	97.2
			MIN	20	288	35	21	68	74	94.6
270	11	27.00	AVG	11	306	37	34	94	102	95.2
			STD	11	12	1	3	7	8	0.6
			MAX	11	328	40	39	105	112	96.1
			MIN	11	287	35	27	78	86	94.4
279	9	28.00	AVG	9	297	36	33	98	107	95.4
			STD	9	11	1	3	11	9	0.3
			MAX	9	315	38	36	118	123	95.6
			MIN	9	278	34	29	85	96	94.9
290	11	29.00	AVG	11	270	33	28	94	102	95.5
			STD	11	12	1	2	8	6	0.2
			MAX	11	295	36	32	110	114	96.0
			MIN	11	255	31	24	81	91	95.3
296	6	30.00	AVG	6	249	30	24	65	94	96.0
			STD	6	20	3	6	31	12	0.6
			MAX	6	280	34	31	99	109	97.0
			MIN	6	225	27	18	33	80	95.3
304	8	31.00	AVG	8	257	31	21	16	87	91.4
			STD	8	21	3	7	7	5	17.2
			MAX	8	284	35	35	27	93	98.0
			MIN	8	229	28	14	7	79	48.9

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
313	9	32.00	AVG	9	260	32	25	13	90	97.7
			STD	9	40	5	10	6	9	1.3
			MAX	9	332	41	44	27	103	99.1
			MIN	9	210	26	15	8	78	95.6
366	7	39.00	AVG	53	278	34	29	34	99	95.5
			STD	53	32	4	10	23	13	6.6
			MAX	53	352	43	47	77	126	97.5
			MIN	53	192	23	4	1	70	48.6
420	6	47.00	AVG	54	270	33	9	44	99	96.7
			STD	54	48	6	7	26	25	6.7
			MAX	54	367	45	27	104	156	99.8
			MIN	54	211	26	0	17	67	49.3
426	6	48.00	AVG	6	337	41	15	82	138	96.0
			STD	6	10	1	2	6	7	0.2
			MAX	6	350	43	19	93	148	96.3
			MIN	6	321	39	13	73	127	95.8
432	6	49.00	AVG	6	326	40	15	73	129	95.8
			STD	6	13	2	1	3	3	0.2
			MAX	6	341	42	16	77	132	96.0
			MIN	6	311	38	13	69	125	95.6
455	11	51.00	AVG	23	305	37	24	56	114	95.3
			STD	23	48	6	4	11	15	1.1
			MAX	23	346	42	33	77	130	98.0
			MIN	23	183	22	16	34	69	91.3
485	15	53.00	AVG	30	300	37	27	68	116	95.3
			STD	30	13	2	3	9	4	0.1
			MAX	30	331	40	32	79	121	95.6
			MIN	30	278	34	20	47	109	95.0
498	13	54.00	AVG	13	303	37	26	73	118	95.1
			STD	13	8	1	1	5	5	0.2
			MAX	13	320	39	28	80	124	95.5
			MIN	13	288	35	25	65	108	94.9
514	16	55.00	AVG	16	286	35	29	69	116	95.0
			STD	16	24	3	3	10	9	0.1
			MAX	16	321	39	34	82	129	95.2
			MIN	16	246	30	24	52	104	94.9
535	21	56.00	AVG	21	259	32	28	59	109	94.8
			STD	21	18	2	3	4	5	0.2
			MAX	21	312	38	36	67	119	95.2
			MIN	21	232	28	22	53	102	94.4

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
551	16	57.00	AVG	16	259	31	26	59	108	94.8
			STD	16	9	1	2	3	4	0.2
			MAX	16	278	34	31	65	116	95.3
			MIN	16	242	29	22	54	102	94.4
571	20	58.00	AVG	20	274	34	31	65	108	94.8
			STD	20	23	3	6	12	12	0.4
			MAX	20	316	39	45	91	132	95.6
			MIN	20	231	28	23	52	90	94.1
630	14	62.00	AVG	59	317	39	43	110	134	94.9
			STD	59	27	3	13	29	19	0.5
			MAX	59	377	46	62	163	170	96.4
			MIN	59	211	26	23	60	104	94.3
671	20	64.00	AVG	41	312	38	53	112	139	94.6
			STD	41	13	2	17	17	12	0.6
			MAX	41	335	41	78	143	160	96.1
			MIN	41	280	34	23	83	117	93.8
694	23	65.00	AVG	23	303	37	56	139	162	94.1
			STD	23	15	2	11	11	10	0.3
			MAX	23	341	42	72	160	187	94.6
			MIN	23	277	34	38	126	149	93.6
723	29	66.00	AVG	29	293	36	72	143	162	94.0
			STD	29	35	4	11	8	10	0.3
			MAX	29	348	42	87	155	176	94.9
			MIN	29	212	26	42	123	135	93.4
750	27	67.00	AVG	27	288	35	76	151	169	92.0
			STD	27	10	1	3	6	7	9.0
			MAX	27	306	37	80	166	181	94.0
			MIN	27	272	33	70	137	156	46.9
795	45	68.00	AVG	45	352	43	109	179	199	93.5
			STD	45	34	4	16	13	13	0.2
			MAX	45	395	48	130	196	216	93.8
			MIN	45	280	34	76	151	169	93.3
876	81	69.00	AVG	81	378	46	134	196	211	93.2
			STD	81	21	3	9	5	5	0.1
			MAX	81	412	50	148	208	226	93.4
			MIN	81	288	35	117	184	196	93.1
1005	129	70.00	AVG	129	366	45	151	179	170	92.6
			STD	129	35	4	7	17	10	4.1
			MAX	129	410	50	162	225	186	93.6
			MIN	129	176	21	110	143	122	46.6

Info: BECKER HAMMER

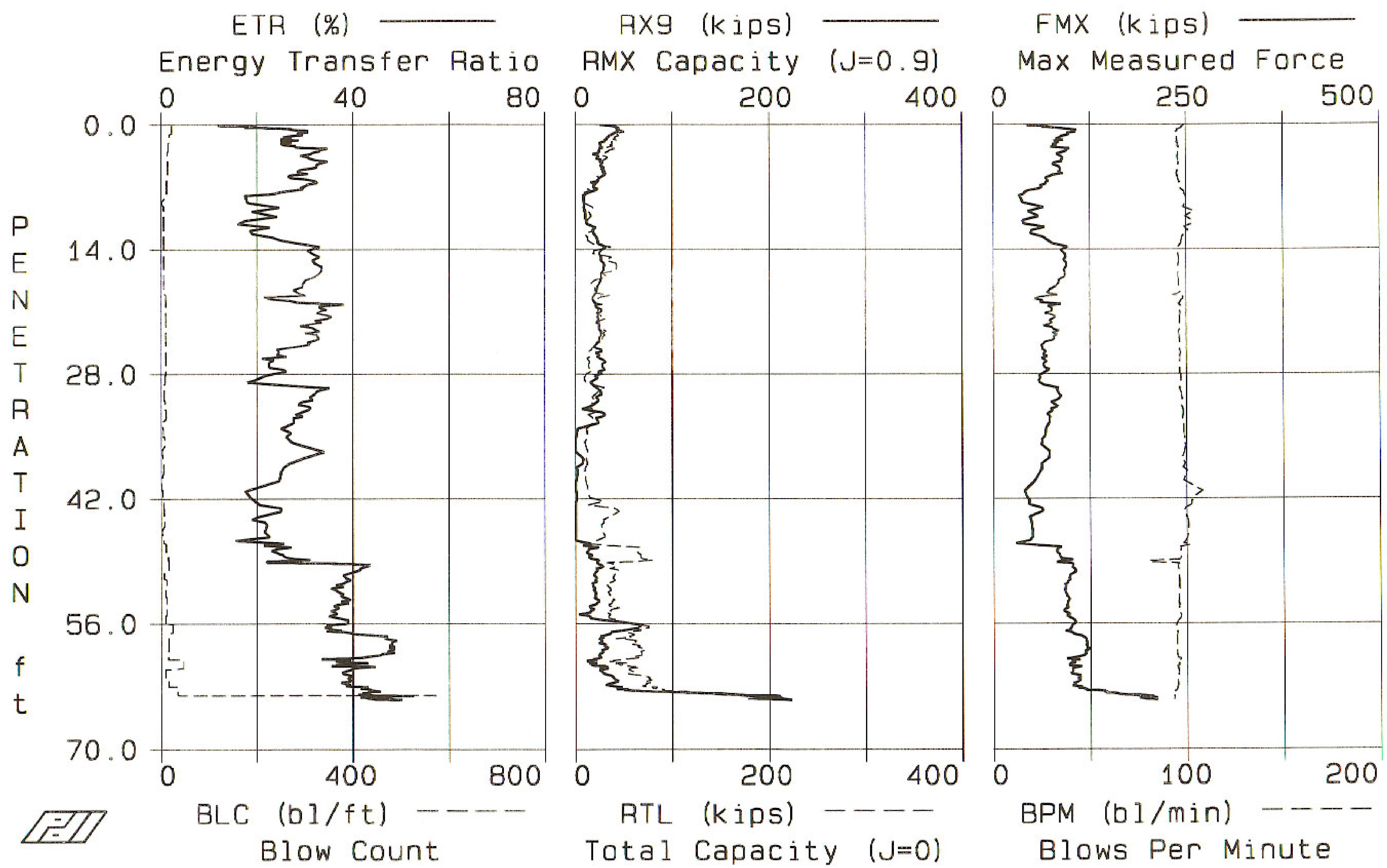
BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
1128	123	71.00	AVG	123	375	46	129	164	168	93.1
			STD	123	12	1	7	6	6	0.1
			MAX	123	404	49	151	180	186	93.3
			MIN	123	335	41	118	150	153	93.0
1245	58	73.00	AVG	117	364	45	105	172	177	89.3
			STD	117	12	2	7	13	9	13.1
			MAX	117	403	49	121	190	192	93.4
			MIN	117	326	40	91	143	152	46.5
1367	40	76.00	AVG	122	351	43	87	173	174	91.0
			STD	122	10	1	4	6	5	10.1
			MAX	122	376	46	98	184	185	93.4
			MIN	122	327	40	80	157	160	46.5
1492	125	77.00	AVG	125	364	45	108	177	175	92.6
			STD	125	14	2	19	10	7	5.9
			MAX	125	405	50	159	203	194	93.4
			MIN	125	330	40	84	156	157	46.6
1791	299	78.00	AVG	299	410	50	161	216	182	92.6
			STD	299	19	2	11	6	8	5.4
			MAX	299	455	56	177	228	204	93.6
			MIN	299	360	44	128	188	162	46.5
2168	628	78.60	AVG	377	372	46	158	186	160	93.2
			STD	377	46	6	27	39	16	2.4
			MAX	377	439	54	190	231	187	94.1
			MIN	377	228	28	81	99	101	46.6

BL#	COMMENTS
366	pull up
584	pull up

DRIVEN (2004-Jun-07 : BPT1.MDF)

ABE Engineering 2004-Jun-08

CHABOT DAM, BPT2, BECKER HAMMER



Pile: BPT2 Proj: CHABOT DAM Pg1

Info: BECKER HAMMER

EFV: Max Transferred Energy
ETR: Energy Transfer Ratio
RX9: RMX Capacity (J=0.9)
RTL: Total Capacity (J=0)
FMX: Max Measured Force
BPM: Blows Per Minute

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
22	22	1.00	AVG	21	204	25	42	42	87	96.4
			STD	21	52	6	3	8	21	1.5
			MAX	21	257	31	46	53	110	99.3
			MIN	21	98	12	34	18	40	94.4
39	17	2.00	AVG	17	220	27	32	41	88	95.1
			STD	17	15	2	3	3	7	0.2
			MAX	17	251	31	37	45	100	95.6
			MIN	17	194	24	26	35	77	94.9
53	14	3.00	AVG	14	244	30	25	36	86	95.5
			STD	14	31	4	1	3	10	0.5
			MAX	14	284	35	29	41	99	97.2
			MIN	14	206	25	24	30	66	94.9
65	12	4.00	AVG	12	254	31	23	31	87	95.6
			STD	12	15	2	3	2	5	0.2
			MAX	12	283	34	27	33	92	96.0
			MIN	12	228	28	15	26	75	95.3
78	13	5.00	AVG	13	268	33	27	27	83	95.8
			STD	13	14	2	3	1	7	0.8
			MAX	13	294	36	30	30	90	97.0
			MIN	13	252	31	22	25	71	94.3
91	13	6.00	AVG	13	229	28	28	27	80	95.3
			STD	13	12	1	2	4	8	0.2
			MAX	13	253	31	31	32	90	95.6
			MIN	13	215	26	24	21	68	95.0
102	11	7.00	AVG	11	254	31	20	21	67	96.3
			STD	11	10	1	3	3	4	0.4
			MAX	11	267	33	25	25	71	96.9
			MIN	11	237	29	16	15	59	95.5
113	11	8.00	AVG	11	202	25	15	11	45	98.4
			STD	11	35	4	6	4	10	1.1
			MAX	11	246	30	23	16	61	100.1
			MIN	11	130	16	8	4	33	96.9
115	2	9.00	AVG	2	148	18	9	9	38	99.7
			STD	2	4	0	1	1	3	0.1
			MAX	2	151	18	9	9	40	99.8
			MIN	2	145	18	8	8	36	99.6
169	5	19.00	AVG	52	224	27	22	23	74	97.5
			STD	52	48	6	7	11	19	2.7
			MAX	52	287	35	34	44	99	105.8
			MIN	52	102	12	7	1	33	95.5

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
248	9	27.00	AVG	79	241	29	24	22	71	96.4
			STD	79	39	5	3	6	9	0.9
			MAX	79	313	38	33	44	95	99.5
			MIN	79	164	20	15	11	48	91.7
257	9	28.00	AVG	9	200	24	27	14	67	96.5
			STD	9	17	2	3	3	6	0.3
			MAX	9	233	28	31	18	76	96.9
			MIN	9	177	21	23	9	59	96.1
265	8	29.00	AVG	8	165	20	19	9	59	97.0
			STD	8	12	2	4	2	2	0.2
			MAX	8	178	22	23	12	62	97.2
			MIN	8	144	17	14	7	56	96.7
271	6	30.00	AVG	6	253	31	22	25	77	96.5
			STD	6	65	8	8	5	13	0.4
			MAX	6	296	36	34	33	86	97.0
			MIN	6	129	16	15	20	51	95.8
277	6	31.00	AVG	6	258	32	24	19	85	97.4
			STD	6	13	2	4	2	5	0.5
			MAX	6	277	34	31	21	88	98.0
			MIN	6	239	29	19	16	77	96.7
285	8	32.00	AVG	8	244	30	15	16	78	97.5
			STD	8	17	2	6	3	5	0.3
			MAX	8	260	32	23	20	85	98.0
			MIN	8	209	25	4	9	70	97.0
295	10	33.00	AVG	10	237	29	25	17	73	98.0
			STD	10	8	1	8	3	3	0.1
			MAX	10	248	30	38	21	77	98.3
			MIN	10	222	27	11	11	66	97.8
298	3	34.00	AVG	3	221	27	17	15	71	98.0
			STD	3	13	2	12	6	2	0.1
			MAX	3	234	28	25	20	73	98.1
			MIN	3	208	25	4	9	70	98.0
302	4	35.00	AVG	4	216	26	0	12	67	98.5
			STD	4	6	1	1	3	2	0.3
			MAX	4	220	27	1	15	69	98.8
			MIN	4	207	25	0	9	65	98.1
309	7	36.00	AVG	7	224	27	0	11	63	98.8
			STD	7	10	1	0	2	3	0.5
			MAX	7	239	29	0	14	66	99.3
			MIN	7	209	25	0	7	59	98.1

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
311	2	37.00	AVG	2	282	34	0	13	73	98.7
			STD	2	1	0	0	2	4	0.2
			MAX	2	283	34	0	14	75	98.8
			MIN	2	281	34	0	11	70	98.5
314	3	38.00	AVG	3	233	28	10	12	67	98.0
			STD	3	33	4	9	2	7	1.3
			MAX	3	271	33	16	13	72	99.5
			MIN	3	211	26	0	10	59	97.0
319	5	39.00	AVG	5	211	26	1	10	62	98.9
			STD	5	30	4	2	2	3	1.4
			MAX	5	247	30	4	12	66	101.0
			MIN	5	169	20	0	8	59	97.0
322	1	41.00	AVG	3	187	23	0	11	49	102.5
			STD	3	27	3	0	2	9	7.6
			MAX	3	206	25	0	13	59	111.2
			MIN	3	156	19	0	10	41	96.9
325	3	42.00	AVG	3	146	18	0	14	42	103.9
			STD	3	15	2	1	1	3	0.7
			MAX	3	157	19	1	14	45	104.5
			MIN	3	129	16	0	13	39	103.2
330	5	43.00	AVG	5	171	21	0	22	46	102.1
			STD	5	13	2	0	13	4	1.2
			MAX	5	189	23	0	42	51	103.6
			MIN	5	152	18	0	7	42	100.5
336	6	44.00	AVG	6	197	24	0	43	60	98.8
			STD	6	17	2	0	7	13	0.7
			MAX	6	223	27	0	53	81	99.6
			MIN	6	176	21	0	33	45	97.7
343	7	45.00	AVG	7	169	21	0	29	48	100.5
			STD	7	14	2	0	3	2	0.3
			MAX	7	182	22	0	34	50	100.8
			MIN	7	146	18	0	26	45	100.0
345	2	46.00	AVG	2	181	22	0	28	50	100.7
			STD	2	6	1	0	3	1	0.1
			MAX	2	185	22	0	30	51	100.8
			MIN	2	177	21	0	26	49	100.6
350	5	47.00	AVG	5	152	18	2	26	47	100.0
			STD	5	31	4	4	5	4	0.6
			MAX	5	190	23	8	30	54	100.8
			MIN	5	126	15	0	20	42	99.5

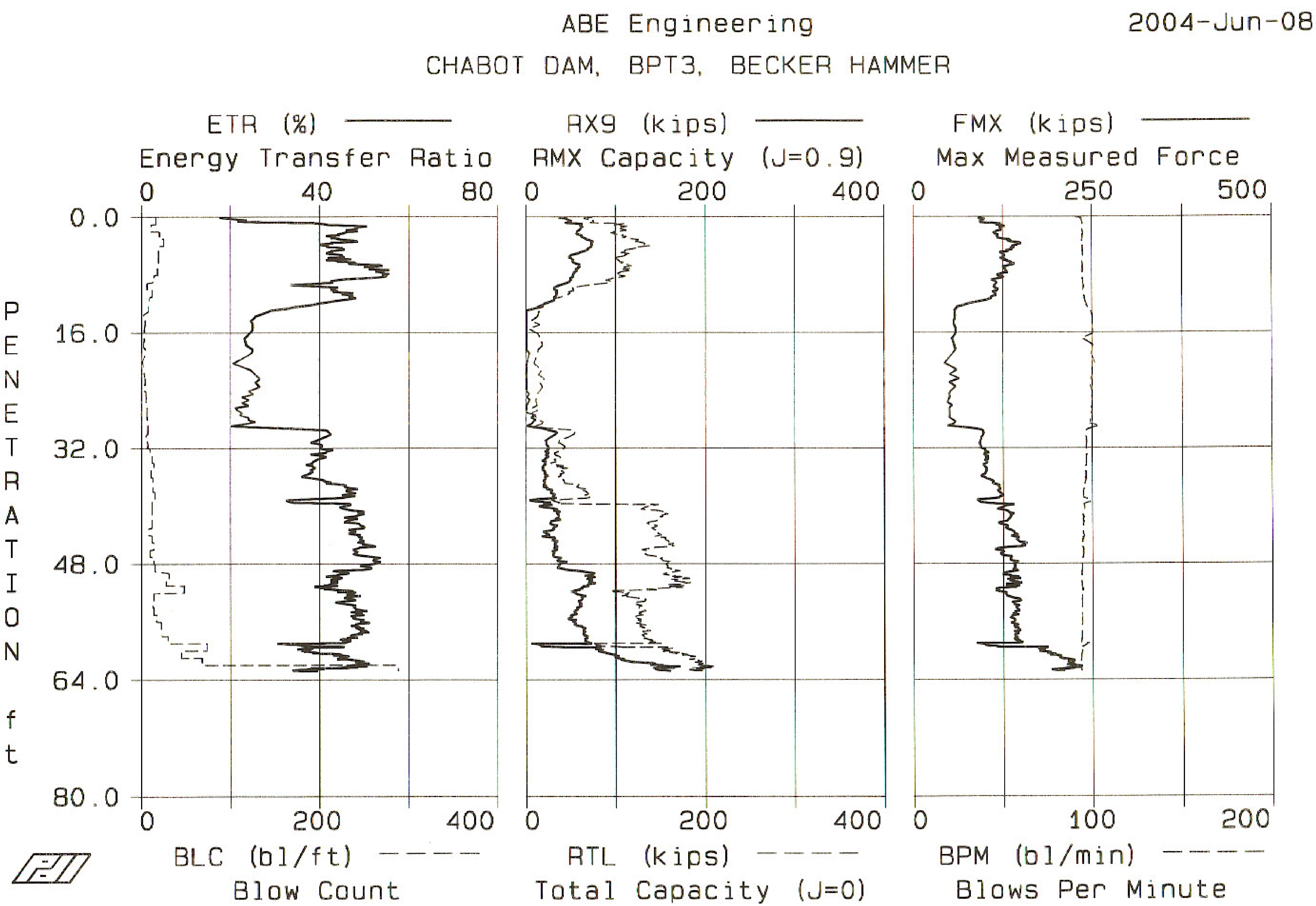
BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
360	10	48.00	AVG	10	207	25	15	52	71	97.5
			STD	10	37	5	8	25	24	3.1
			MAX	10	297	36	25	70	92	106.0
			MIN	10	157	19	0	0	16	95.3
374	14	49.00	AVG	14	215	26	17	70	88	96.5
			STD	14	23	3	5	8	9	0.5
			MAX	14	269	33	27	90	108	97.0
			MIN	14	185	22	10	63	77	95.3
389	15	50.00	AVG	15	310	38	24	38	97	91.4
			STD	15	70	9	4	4	11	11.0
			MAX	15	371	45	31	44	106	97.5
			MIN	15	150	18	16	27	70	64.4
395	6	51.00	AVG	6	318	39	20	41	100	95.7
			STD	6	8	1	2	4	4	0.1
			MAX	6	333	41	24	45	106	95.8
			MIN	6	312	38	17	34	95	95.5
406	11	52.00	AVG	11	310	38	19	35	94	96.0
			STD	11	11	1	3	5	3	0.2
			MAX	11	325	40	26	42	99	96.3
			MIN	11	287	35	16	29	88	95.6
415	9	53.00	AVG	9	304	37	20	35	92	95.8
			STD	9	9	1	3	3	2	0.2
			MAX	9	318	39	25	40	96	96.1
			MIN	9	294	36	16	32	90	95.5
426	11	54.00	AVG	11	313	38	21	37	96	95.7
			STD	11	12	1	4	3	2	0.2
			MAX	11	330	40	27	40	98	96.1
			MIN	11	293	36	15	33	93	95.3
437	11	55.00	AVG	11	297	36	13	37	93	96.1
			STD	11	7	1	6	5	3	0.3
			MAX	11	307	38	22	46	99	96.4
			MIN	11	284	35	0	30	89	95.6
446	9	56.00	AVG	9	307	38	31	42	101	95.7
			STD	9	14	2	18	9	5	1.0
			MAX	9	328	40	61	58	108	97.0
			MIN	9	284	35	14	32	94	94.4
470	24	57.00	AVG	24	294	36	57	67	99	94.5
			STD	24	13	2	11	8	3	0.2
			MAX	24	321	39	69	79	103	95.2
			MIN	24	279	34	35	51	90	94.1

Info: BECKER HAMMER

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
486	16	58.00	AVG	16	371	46	29	56	113	94.7
			STD	16	25	3	4	8	7	0.1
			MAX	16	397	49	38	64	120	94.9
			MIN	16	327	40	24	31	101	94.6
501	15	59.00	AVG	15	393	48	29	66	120	94.5
			STD	15	7	1	3	5	2	0.1
			MAX	15	403	49	34	74	124	94.7
			MIN	15	382	47	23	53	117	94.4
515	14	60.00	AVG	14	358	44	25	64	112	95.0
			STD	14	45	6	5	12	10	1.0
			MAX	14	404	49	29	76	121	98.5
			MIN	14	226	27	8	26	86	94.4
561	46	61.00	AVG	46	325	40	21	48	103	95.6
			STD	46	21	3	7	9	5	0.6
			MAX	46	370	45	37	67	114	96.7
			MIN	46	274	33	10	33	94	94.3
570	9	62.00	AVG	9	318	39	30	62	104	95.2
			STD	9	10	1	6	10	7	0.3
			MAX	9	329	40	39	77	114	95.6
			MIN	9	301	37	23	52	97	94.7
585	15	63.00	AVG	15	318	39	39	74	107	95.0
			STD	15	6	1	5	4	4	0.2
			MAX	15	328	40	46	81	112	95.5
			MIN	15	307	37	28	68	99	94.7
619	34	64.00	AVG	34	352	43	89	108	134	93.9
			STD	34	12	2	49	25	21	0.7
			MAX	34	377	46	176	155	171	95.3
			MIN	34	327	40	40	71	102	92.8
905	572	64.50	AVG	286	376	46	205	187	198	93.2
			STD	286	18	2	8	11	8	0.1
			MAX	286	433	53	228	212	216	93.4
			MIN	286	314	38	172	155	172	93.0

BL#	COMMENTS
534	58'

DRIVEN (2004-Jun-08 : BPT2.MDF)


ABE Engineering
2004-Jun-08
CHABOT DAM, BPT3, BECKER HAMMER
ETR (%)
Energy Transfer Ratio
0 40 80
RX9 (kips)
RMX Capacity (J=0.9)
0 200 400
FMX (kips)
Max Measured Force
0 250 500
PENETRATION ft
0.0
16.0
32.0
48.0
64.0
80.0
0 200 400
BLC (bl/ft)
Blow Count
0 200 400
RTL (kips)
Total Capacity (J=0)
0 100 200
BPM (bl/min)
Blows Per Minute

Pile: BPT3 Proj: CHABOT DAM Pg1

Info: BECKER HAMMER

EFV: Max Transferred Energy
ETR: Energy Transfer Ratio
RX9: RMX Capacity (J=0.9)
RTL: Total Capacity (J=0)
FMX: Max Measured Force
BPM: Blows Per Minute

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
16	16	1.00	AVG	15	219	27	49	77	98	93.9
			STD	15	72	9	6	14	10	0.9
			MAX	15	378	46	63	110	122	94.7
			MIN	15	151	18	43	61	89	91.0
27	11	2.00	AVG	11	387	47	60	106	121	94.5
			STD	11	30	4	2	8	7	0.3
			MAX	11	435	53	64	117	132	94.9
			MIN	11	335	41	56	97	114	94.0
47	20	3.00	AVG	20	361	44	60	104	116	94.6
			STD	20	15	2	4	8	4	0.2
			MAX	20	387	47	66	118	124	95.0
			MIN	20	325	40	54	91	111	94.3
72	25	4.00	AVG	25	360	44	72	128	139	94.3
			STD	25	24	3	3	7	9	0.2
			MAX	25	397	49	76	140	154	94.7
			MIN	25	320	39	67	114	119	94.0
110	19	6.00	AVG	38	356	44	59	111	130	94.7
			STD	38	20	2	9	10	7	0.3
			MAX	38	395	48	74	133	143	95.5
			MIN	38	317	39	47	94	117	94.0
129	19	7.00	AVG	19	400	49	56	110	134	94.5
			STD	19	30	4	4	5	6	0.2
			MAX	19	449	55	61	122	142	94.9
			MIN	19	345	42	51	100	123	94.1
147	18	8.00	AVG	18	436	54	55	108	127	94.6
			STD	18	20	2	2	7	5	0.2
			MAX	18	466	57	60	119	138	95.0
			MIN	18	397	49	51	98	119	94.1
161	14	9.00	AVG	14	401	49	50	99	118	94.6
			STD	14	43	5	2	8	7	0.2
			MAX	14	465	57	53	112	135	94.9
			MIN	14	332	41	46	86	108	94.3
167	6	10.00	AVG	6	324	40	36	64	114	95.0
			STD	6	64	8	9	18	4	0.2
			MAX	6	372	46	48	89	120	95.2
			MIN	6	197	24	27	51	110	94.6
179	12	11.00	AVG	12	367	45	34	47	114	95.2
			STD	12	20	2	2	4	3	0.2
			MAX	12	405	50	36	53	117	95.6
			MIN	12	340	42	31	41	107	94.9

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
188	9	12.00	AVG	9	361	44	28	30	96	95.9
			STD	9	28	4	5	4	12	0.3
			MAX	9	406	50	35	37	111	96.6
			MIN	9	319	39	19	23	75	95.5
196	8	13.00	AVG	8	275	34	11	13	62	97.5
			STD	8	30	4	8	3	6	1.0
			MAX	8	309	38	19	18	76	99.3
			MIN	8	215	26	0	9	55	96.4
198	2	14.00	AVG	2	210	26	0	13	58	100.1
			STD	2	1	1	0	6	1	0.1
			MAX	2	211	26	0	17	59	100.1
			MIN	2	209	25	0	8	57	100.0
202	4	15.00	AVG	4	203	25	0	10	56	100.0
			STD	4	8	1	0	7	1	0.5
			MAX	4	213	26	0	18	57	100.6
			MIN	4	194	24	0	0	55	99.3
204	3	15.67	AVG	2	203	25	0	3	59	100.0
			STD	2	4	0	0	4	1	0.0
			MAX	2	206	25	0	6	60	100.0
			MIN	2	200	25	0	0	58	100.0
208	3	17.00	AVG	3	190	23	0	16	54	96.3
			STD	3	10	1	0	1	2	7.2
			MAX	3	197	24	0	17	56	100.5
			MIN	3	179	22	0	15	52	88.0
210	2	18.00	AVG	2	197	24	0	18	57	100.3
			STD	2	6	1	0	4	1	1.1
			MAX	2	201	24	0	21	57	101.1
			MIN	2	193	23	0	15	56	99.6
213	4	18.75	AVG	3	205	25	0	10	60	100.0
			STD	3	2	0	0	6	3	0.0
			MAX	3	206	25	0	16	63	100.0
			MIN	3	203	25	0	5	58	100.0
215	1	20.00	AVG	1	156	19	0	5	42	101.8
217	2	21.00	AVG	2	180	22	0	13	48	100.5
			STD	2	1	0	0	3	5	0.7
			MAX	2	181	22	0	15	51	101.0
			MIN	2	179	22	0	11	44	100.0
220	3	22.00	AVG	3	214	26	0	15	56	99.8
			STD	3	6	1	0	3	11	0.4
			MAX	3	221	27	0	19	69	100.1
			MIN	3	209	25	0	13	49	99.3

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
224	4	23.00	AVG	4	214	26	0	18	57	99.3
			STD	4	15	2	0	4	12	0.7
			MAX	4	231	28	0	23	74	99.8
			MIN	4	197	24	0	15	48	98.3
227	3	24.00	AVG	3	210	26	0	16	55	99.3
			STD	3	12	2	0	3	6	0.6
			MAX	3	220	27	0	18	60	100.0
			MIN	3	197	24	0	12	49	98.8
232	5	25.00	AVG	5	196	24	1	13	51	99.6
			STD	5	14	2	2	3	2	0.4
			MAX	5	212	26	5	17	54	100.1
			MIN	5	173	21	0	9	49	99.1
237	5	26.00	AVG	5	195	24	2	11	49	100.3
			STD	5	9	1	3	1	3	0.7
			MAX	5	206	25	7	13	54	101.0
			MIN	5	183	22	0	10	46	99.5
243	6	27.00	AVG	6	182	22	0	9	51	99.5
			STD	6	11	1	0	4	2	0.4
			MAX	6	192	23	0	13	53	100.1
			MIN	6	166	20	0	5	47	99.1
249	6	28.00	AVG	6	192	23	7	10	51	99.1
			STD	6	12	1	4	2	2	0.8
			MAX	6	210	25	11	12	54	100.5
			MIN	6	174	21	0	7	48	98.1
256	7	29.00	AVG	7	189	23	5	15	54	100.4
			STD	7	25	3	6	4	6	2.6
			MAX	7	213	26	13	19	62	104.0
			MIN	7	152	19	0	8	44	98.0
263	7	30.00	AVG	7	318	39	27	45	91	97.2
			STD	7	50	6	9	17	11	1.7
			MAX	7	362	44	39	59	104	100.6
			MIN	7	219	27	16	13	69	96.0
268	5	31.00	AVG	5	333	41	25	44	94	96.4
			STD	5	11	1	5	6	1	0.2
			MAX	5	346	42	31	51	96	96.7
			MIN	5	317	39	20	36	92	96.1
275	7	32.00	AVG	7	324	39	23	40	92	96.5
			STD	7	10	1	3	5	2	0.2
			MAX	7	337	41	27	46	94	96.7
			MIN	7	312	38	19	32	89	96.3

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
285	10	33.00	AVG	10	337	41	23	37	100	96.6
			STD	10	16	2	3	7	3	0.2
			MAX	10	365	45	28	46	108	96.9
			MIN	10	313	38	19	26	96	96.3
297	12	34.00	AVG	12	325	40	21	34	102	96.5
			STD	12	11	1	3	6	3	0.1
			MAX	12	346	42	28	46	106	96.7
			MIN	12	312	38	16	24	95	96.3
311	14	35.00	AVG	14	314	38	19	36	100	96.2
			STD	14	8	1	2	8	3	0.3
			MAX	14	322	39	24	48	103	96.7
			MIN	14	300	37	16	19	95	95.8
322	11	36.00	AVG	11	307	37	21	39	98	96.2
			STD	11	11	1	4	2	4	0.2
			MAX	11	322	39	28	43	104	96.4
			MIN	11	290	35	16	35	91	96.0
335	13	37.00	AVG	13	334	41	20	43	107	95.9
			STD	13	18	2	3	6	5	0.3
			MAX	13	364	44	26	61	112	96.3
			MIN	13	299	37	15	37	97	95.2
348	13	38.00	AVG	13	379	46	24	61	119	95.1
			STD	13	11	1	5	5	2	0.2
			MAX	13	397	49	29	70	121	95.5
			MIN	13	362	44	16	51	114	94.7
363	15	39.00	AVG	15	379	46	30	69	122	94.9
			STD	15	17	2	3	4	3	0.2
			MAX	15	415	51	35	75	126	95.2
			MIN	15	360	44	24	62	116	94.6
413	12	43.00	AVG	50	372	45	28	124	123	95.4
			STD	50	48	6	10	44	16	1.4
			MAX	50	463	57	42	160	141	99.0
			MIN	50	255	31	0	23	81	94.0
421	8	44.00	AVG	8	389	48	26	146	137	94.9
			STD	8	11	2	6	3	5	0.2
			MAX	8	409	50	31	148	141	95.3
			MIN	8	371	45	18	140	130	94.6
433	12	45.00	AVG	12	401	49	28	154	144	94.7
			STD	12	11	1	6	6	5	0.4
			MAX	12	414	51	37	160	150	95.3
			MIN	12	382	47	17	138	132	94.0

Info: BECKER HAMMER

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
447	14	46.00	AVG	14	409	50	32	153	143	94.5
			STD	14	14	2	3	14	17	0.3
			MAX	14	442	54	37	169	159	95.0
			MIN	14	391	48	27	126	111	93.8
457	10	47.00	AVG	10	397	48	31	136	123	94.8
			STD	10	11	2	3	6	6	0.5
			MAX	10	414	51	37	146	134	95.5
			MIN	10	379	46	27	128	115	94.0
471	14	48.00	AVG	14	429	53	37	154	138	94.3
			STD	14	9	1	5	5	5	0.2
			MAX	14	442	54	48	163	147	94.7
			MIN	14	416	51	28	147	131	94.0
486	15	49.00	AVG	15	404	50	41	160	141	94.1
			STD	15	31	4	8	5	4	0.2
			MAX	15	434	53	59	175	150	94.4
			MIN	15	300	37	35	153	135	93.8
517	31	50.00	AVG	23	362	44	73	163	133	93.8
			STD	23	14	2	4	9	8	0.1
			MAX	23	394	48	82	181	150	94.1
			MIN	23	329	40	64	150	123	93.7
545	28	51.00	AVG	28	352	43	71	171	140	93.8
			STD	28	11	1	3	8	7	0.1
			MAX	28	373	46	80	184	152	94.1
			MIN	28	332	41	67	158	126	93.7
593	48	52.00	AVG	48	354	43	60	138	125	94.2
			STD	48	24	3	5	30	12	0.3
			MAX	48	399	49	73	185	152	94.7
			MIN	48	311	38	50	90	109	93.7
607	14	53.00	AVG	14	385	47	61	118	135	94.0
			STD	14	13	2	4	11	9	0.2
			MAX	14	409	50	66	134	152	94.3
			MIN	14	359	44	51	102	124	93.7
620	13	54.00	AVG	13	377	46	60	126	143	94.1
			STD	13	14	2	3	5	5	0.1
			MAX	13	401	49	66	134	148	94.3
			MIN	13	352	43	57	118	133	93.8
634	14	55.00	AVG	14	396	49	55	128	143	94.0
			STD	14	10	1	2	4	4	0.1
			MAX	14	414	51	60	134	150	94.1
			MIN	14	378	46	53	121	136	93.8

Info: BECKER HAMMER

BL# end	bl/ft	depth ft	TYPE	#Bls	EFV ft-lb	ETR %	RX9 kips	RTL kips	FMX kips	BPM bl/min
651	17	56.00	AVG	17	396	48	50	125	139	94.1
			STD	17	10	1	3	5	4	0.1
			MAX	17	411	50	57	136	149	94.3
			MIN	17	380	47	45	117	133	94.0
673	22	57.00	AVG	22	399	49	58	129	141	93.9
			STD	22	12	2	5	5	5	0.1
			MAX	22	417	51	66	139	152	94.1
			MIN	22	377	46	52	119	133	93.7
696	23	58.00	AVG	23	399	49	65	133	144	93.8
			STD	23	11	2	2	4	4	0.1
			MAX	23	414	51	69	141	153	94.0
			MIN	23	379	46	62	127	137	93.7
726	30	59.00	AVG	30	376	46	68	138	144	93.7
			STD	30	21	3	2	6	4	0.1
			MAX	30	398	49	73	153	154	93.8
			MIN	30	279	34	64	129	138	93.4
800	74	60.00	AVG	74	306	37	50	117	140	94.9
			STD	74	30	4	32	40	40	1.3
			MAX	74	392	48	87	170	192	99.0
			MIN	74	226	27	0	51	74	93.6
845	45	61.00	AVG	45	346	42	94	173	193	93.7
			STD	45	29	4	7	12	10	0.2
			MAX	45	391	48	104	189	208	94.0
			MIN	45	294	36	80	150	173	93.4
913	68	62.00	AVG	68	394	48	121	191	216	93.4
			STD	68	17	2	14	5	6	0.1
			MAX	68	418	51	146	200	228	93.6
			MIN	68	355	43	100	179	202	93.2
1144	288	62.80	AVG	231	344	42	153	195	217	93.3
			STD	231	41	5	7	7	12	0.1
			MAX	231	424	52	184	213	239	93.6
			MIN	231	275	33	139	176	189	93.1

BL#	COMMENTS
214	REDRIVE 16-19'
363	REDRIVE 36-39
726	REDRIVE 56-59'

DRIVEN (2004-Jun-08 : BPT3.MDF)

Appendix E

Downhole Geophysical Surveys

geophysical services
a division of Blackhawk Geometrics

CHABOT DAM

BOREHOLES WI-59, WI-60, WI-61 AND WI-62

SUSPENSION P & S VELOCITIES

May 28, 2004

CHABOT DAM

BOREHOLES WI-59, WI-60, WI-61 AND WI-62

SUSPENSION P & S VELOCITIES

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May 28, 2004
Report 4309-02

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APPENDIX A TABLES

INTRODUCTION

OYO suspension velocity measurements were performed in four land boreholes on and adjacent to the Lake Chabot Dam near San Leandro, California, as a component of the evaluation of the dynamic stability of Chabot Dam. Suspension logging data acquisition was performed between May 4 and 13, 2004 by Rob Steller and Tony Martin of GEOVision. The work was performed under subcontract with Robert Y. Chew Geotechnical, Inc., with Mark McKee as the field liaison for Robert Chew.

This report describes the field measurements, data analysis, and results of this work.

SCOPE OF WORK

This report presents the results of suspension velocity measurements collected between May 4 and 13, 2004, in the uncased boreholes designated WI-59 through WI-62, as detailed below. The purpose of these studies was to supplement stratigraphic information obtained during Robert Chew's soil sampling program and to acquire shear wave velocities and compressional wave velocities as a function of depth, which, in turn, can be used to characterize ground response to earthquake motion.

BOREHOLE DESIGNATION	DATE LOGGED	GENERAL LOCATION	HANDHELD GPS COORDINATES	
WI-59	5/4/04	MIDDLE OF DOWNSTREAM SLOPE	37.729198 N	122.122340 W
WI-60	5/6/04	BOTTOM OF DOWNSTREAM SLOPE, SOUTH SIDE	37.728865 N	122.122282 W
WI-61	5/11/04	CREST OF DAM	37.729580 N	122.122206 W
WI-62	5/13/04	BOTTOM OF DOWNSTREAM SLOPE, NORTH SIDE	37.729285 N	122.122020 W

Table 1. Borehole locations and logging dates

The OYO Model 170 Suspension Logging Recorder and Suspension Logging Probe were used to obtain in-situ horizontal shear and compressional wave velocity measurements at 1.64 ft intervals. The acquired data was analyzed and a profile of velocity versus depth was produced for both compressional and horizontally polarized shear waves.

A detailed reference for the velocity measurement techniques used in this study is:

> Guidelines for Determining Design Basis Ground Motions, Report TR-102293, Electric Power Research Institute, Palo Alto, California, November 1993, Sections 7 and 8.

SUSPENSION INSTRUMENTATION

Suspension soil velocity measurements were performed using the Model 170 Suspension Logging system, manufactured by OYO Corporation. This system directly determines the average velocity of a 3.28 ft high segment of the soil column surrounding the borehole of interest by measuring the elapsed time between arrivals of a wave propagating upward through the soil column. The receivers that detect the wave, and the source that generates the wave, are moved as a unit in the borehole producing relatively constant amplitude signals at all depths.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave source (S_H) and compressional-wave source (P), joined to two biaxial receivers by a flexible isolation cylinder, as shown in Figure 1. The separation of the two receivers is 3.28 ft, allowing average wave velocity in the region between the receivers to be determined by inversion of the wave travel time between the two receivers. The total length of the probe as used in this survey is 19 ft, with the center point of the receiver pair 12.1 ft above the bottom end of the probe. The probe receives control signals from, and sends the amplified receiver signals to, instrumentation on the surface via an armored 7 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data.

The entire probe is suspended by the cable and centered in the borehole by nylon "whiskers", therefore, source motion is not coupled directly to the borehole walls; rather, the source motion creates a horizontally propagating impulsive pressure wave in the fluid filling the borehole and surrounding the source. This pressure wave is converted to P and S_H-waves in the surrounding soil and rock as it impinges upon the borehole wall. These waves propagate through the soil and rock surrounding the borehole, in turn causing a pressure wave to be generated in the fluid surrounding the receivers as the soil waves pass their location. Separation of the P and S_H-waves at the receivers is performed using the following steps:

1. Orientation of the horizontal receivers is maintained parallel to the axis of the source, maximizing the amplitude of the recorded S_H -wave signals.
2. At each depth, S_H-wave signals are recorded with the source actuated in opposite directions, producing S_H-wave signals of opposite polarity, providing a characteristic S_H-wave signature distinct from the P-wave signal.
3. The 7.02 ft separation of source and receiver 1 permits the P-wave signal to pass and damp significantly before the slower S_H-wave signal arrives at the receiver. In faster soils or rock, the isolation cylinder is extended to allow greater separation of the P- and S_H-wave signals.
4. In saturated soils, the received P-wave signal is typically of much higher frequency than the received S_H-wave signal, permitting additional separation of the two signals by low pass filtering.
5. Direct arrival of the original pressure pulse in the fluid is not detected at the receivers because the wavelength of the pressure pulse in fluid is significantly greater than the dimension of the fluid annulus surrounding the probe (foot versus inch scale), preventing significant energy transmission through the fluid medium.

In operation, a distinct, repeatable pattern of impulses is generated at each depth as follows:

1. The source is fired in one direction producing dominantly horizontal shear with some vertical compression, and the signals from the horizontal receivers situated parallel to the axis of motion of the source are recorded.
2. The source is fired again in the opposite direction and the horizontal receiver signals are recorded.
3. The source is fired again and the vertical receiver signals are recorded. The repeated source pattern facilitates the picking of the P and S_H-wave arrivals; reversal of the source changes the polarity of the S_H-wave pattern but not the P-wave pattern.

The data from each receiver during each source activation is recorded as a different channel on the recording system. The Model 170 has six channels (two simultaneous recording channels), each with a 12 bit 1024 sample record. The recorded data is displayed on a CRT display and on paper tape output as six channels with a common time scale. Data is stored on 3.5 inch floppy diskettes for further processing. Up to 8 sampling sequences can be summed to improve the signal to noise ratio of the signals.

Review of the displayed data on the CRT or paper tape allows the operator to set the gains, filters, delay time, pulse length (energy), sample rate, and summing number to optimize the quality of the data before recording. Verification of the calibration of the Model 170 digital recorder is performed every twelve months using a NIST traceable frequency source and counter, as outlined in Appendix B.

SUSPENSION MEASUREMENT PROCEDURES

All four boreholes were logged as uncased boreholes filled with bentonite or polymer based drilling fluid. The borehole probe was positioned with the mid-point of the receiver spacing at grade, and the mechanical and electronic depth counters were set to zero. The probe was lowered to the bottom of the borehole, then returned to the surface, stopping at 1.64 ft intervals to collect data, as summarized below.

At each measurement depth the measurement sequence of two opposite horizontal records and one vertical record was performed, and the gains were adjusted as required. The data from each depth was printed on paper tape, checked, and recorded on diskette before moving to the next depth.

Upon completion of the measurements, the probe zero depth indication at grade was verified prior to removal from the borehole.

BOREHOLE NUMBER	RUN NUMBER	DEPTH RANGE (FEET)	DEPTH AS DRILLED (FEET)	LOST TO SLOUGH/COLLAPSE (FEET)	SAMPLE INTERVAL (FEET)	DATE LOGGED
WI-59	1	85.3 – 8.2	98	0.6	1.64	5/4/04
WI-59	2	13.1 – 1.6	98	NA	1.64	5/4/04
WI-60	1	91.9 – 75.5	105	1.0	1.64	5/6/04
WI-60	2	62.3 – 11.5	105	NA	1.64	5/6/04
WI-60	3	1.6 –19.7	105	NA	1.64	5/6/04
WI-60	4	78.7 – 57.4	105	NA	1.64	5/6/04
WI-61	1	152.6 – 24.6	166	1.3	1.64	5/11/04
WI-61	2	24.3 – 1.6	166	NA	1.64	5/11/04
WI-62	1	126.8 –12.0	140	1.1	1.64	5/13/04
WI-62	2	9.8 –1.6	140	1.1	1.64	5/13/04

Table 2. Logging dates and depth ranges

SUSPENSION DATA ANALYSIS

The recorded digital records were analyzed to locate the first minima on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between receiver 1 and receiver 2 (R1-R2) arrivals was used to calculate the P-wave velocity for that 3.28 ft segment of the soil column. When observable, P-wave arrivals on the horizontal axis records were used to verify the velocities determined from the vertical axis data.

The P-wave velocity calculated from the travel time over the 7.02 ft interval from source to receiver 1 (S-R1) was calculated and plotted for quality assurance of the velocity derived from the travel time between receivers. In this analysis, the depth values as recorded were increased by 5.15 ft to correspond to the mid-point of the 7.02 ft S-R1 interval, as illustrated in Figure 1. Travel times were obtained by picking the first break of the P-wave signal at receiver 1 and subtracting 3.9 milliseconds, the calculated and experimentally verified delay from source trigger pulse (beginning of record) to source impact. This delay corresponds to the duration of acceleration of the solenoid before impact.

The recorded digital records were studied to establish the presence of clear S_H-wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the S_H-wave signals from the 'normal' and 'reverse' source pulses are very nearly inverted images of each other. Digital FFT - IFFT lowpass filtering was used to remove the higher frequency P-wave signal from the S_H-wave signal. Different filter cutoffs were used to separate P- and S_H-waves at different depths, ranging from 700 Hz in the slowest zones to 2000 Hz in the regions of highest velocity. At each depth, the filter frequency was selected to be at least twice the fundamental frequency of the S_H-wave signal being filtered.

Generally, the first maxima was picked for the 'normal' signals and the first minima for the 'reverse' signals, although other points on the waveform were used if the first pulse was distorted. The absolute arrival time of the 'normal' and 'reverse' signals may vary by +/- 0.2 milliseconds, due to differences in the actuation time of the solenoid source caused by constant mechanical bias in the source or by borehole inclination. This variation does not affect the R1-R2 velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity value is the average of the values obtained from the 'normal' and 'reverse' source actuations.

As with the P-wave data, S_H-wave velocity calculated from the travel time over the 7.02 ft interval from source to receiver 1 was calculated and plotted for verification of the velocity derived from the travel time between receivers. In this analysis, the depth values were increased by 5.15 ft to correspond to the mid-point of the 7.02 ft S-R1 interval. Travel times were obtained by picking the first break of the S_H-wave signal at the near receiver and subtracting 3.9 milliseconds, the calculated and experimentally verified delay from the beginning of the record at the source trigger pulse to source impact.

Figure 2 shows an example of R1 - R2 measurements on a sample filtered suspension record. In Figure 2, the time difference over the 3.28 ft interval of 1.88 milliseconds for the horizontal signals is equivalent to an S_H-wave velocity of 1745 ft/sec. Whenever possible, time differences were determined from several phase points on the S_H-waveform records to verify the data obtained from the first arrival of the S_H-wave pulse. Figure 3 displays the same record before filtering of the S_H-waveform record with an 1400 Hz FFT - IFFT digital lowpass filter, illustrating the presence of higher frequency P-wave energy at the beginning of the record, and distortion of the lower frequency S_H-wave by residual P-wave signal.

SUSPENSION RESULTS

Suspension R1-R2 P- and S_H-wave velocities are plotted in Figures 4 through 7. The suspension velocity data presented in these figures are presented in Tables 3 through 6. P- and S_H-wave velocity data from R1-R2 analysis and quality assurance analysis of S-R1 data are plotted together in Figures A1 through A4 to aid in visual comparison. It must be noted that R1-R2 data is an average velocity over a 3.28 ft segment of the soil column; S-R1 data is an average over 7.02 ft, creating a significant smoothing relative to the R1-R2 plots. S-R1 data are presented in Tables A1 to A4. Good correspondence between the shape of the P- and S_H-wave velocity curves is observed for both these data sets. The velocities derived from S-R1 and R1-R2 data are in excellent agreement, providing verification of the higher resolution R1-R2 data.

Calibration procedures and records for the suspension measurement system are presented in Appendix B.

SUMMARY

Discussion of Suspension Results

Both P- and S_H-wave velocities were measured using the OYO Suspension Method in four uncased land borings at depths up to 152.6 ft below grade on Chabot Dam near San Leandro, California. All boreholes were located in a rural environment, and no significant signal contamination from cultural vibration was observed.

All four borings were within several hundred feet of each other, but the velocity profiles are quite different. Saturated soil, as indicated by a Vp above 5400 ft/sec, is seen in all borings, though there are indications of perched water tables and drain zones in several of the borings. The basement rock encountered in three of the borings is quite variable in it's S_H-wave velocities, both within a boring and between borings, indicating significant weathering.

Quality Assurance

These velocity measurements were performed using industry-standard or better methods for both measurements and analyses. All work was performed under GEOVision quality assurance procedures, which include:

- Use of NIST-traceable calibrations, where applicable, for field and laboratory instrumentation
- Use of standard field data logs
- Use of independent verification of data by comparison of receiver-to-receiver and source-to-receiver velocities
- Independent review of calculations and results by a registered professional engineer, geologist, or geophysicist.

Data Reliability

P- and S_H-wave velocity measurement using the Suspension Method gives average velocities over a 3.28 ft interval of depth. This high resolution results in the scatter of values shown in the graphs. Individual measurements are very reliable with estimated precision of +/- 5%. Standardized field procedures and quality assurance checks add to the reliability of these data.

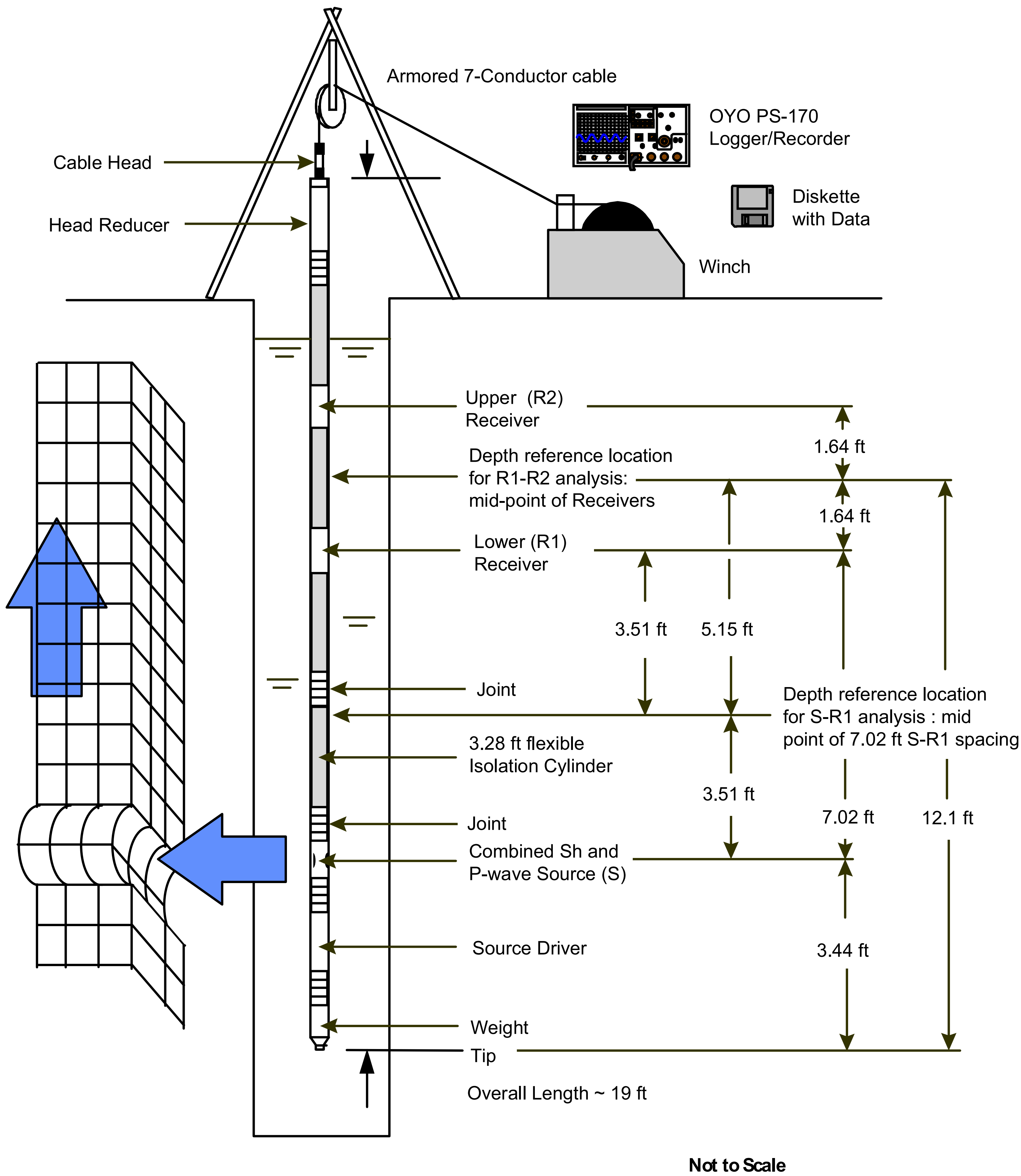

Figure 1. Concept illustration of P-S logging system

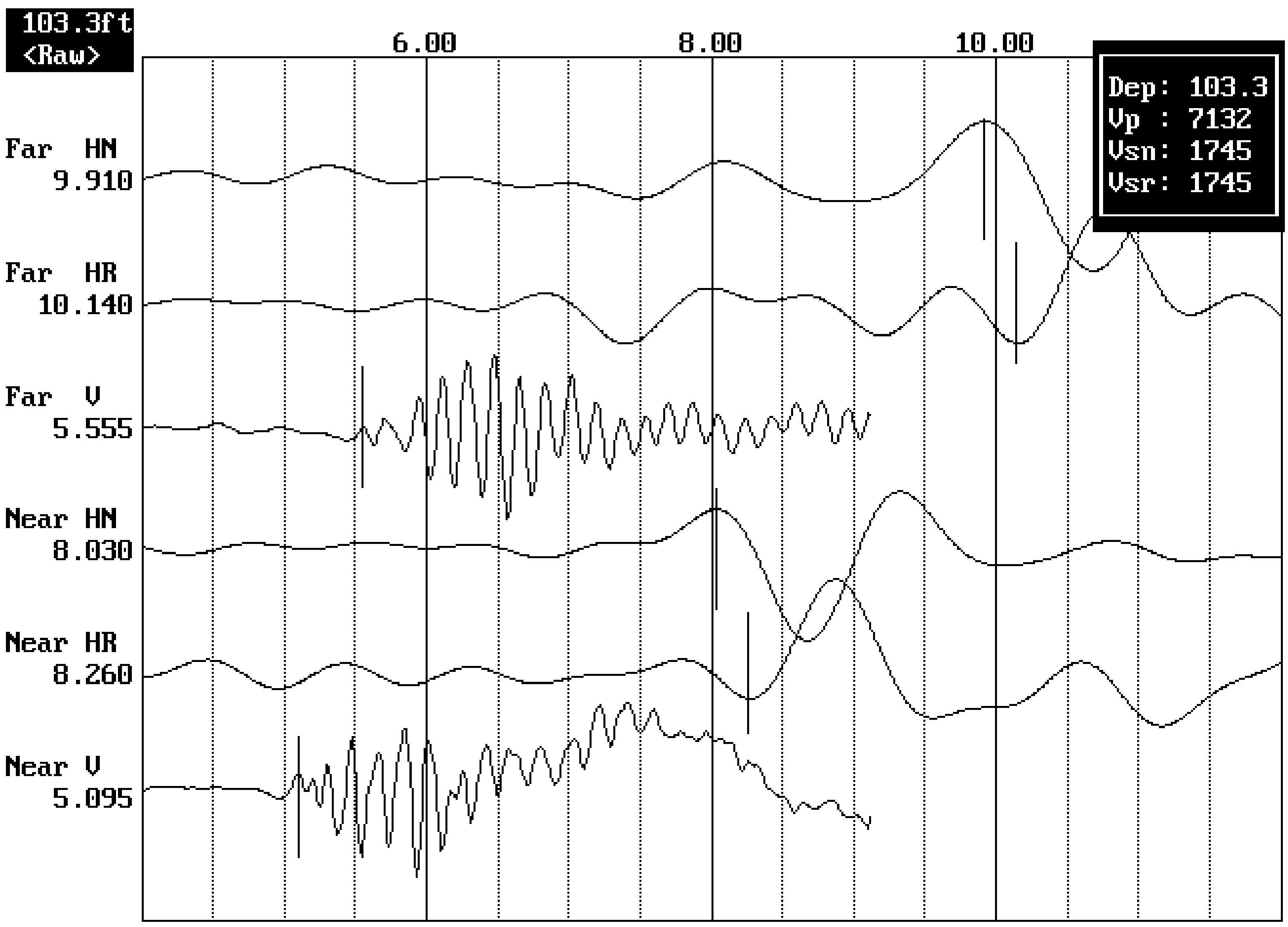

Figure 2. Example of filtered (1400 Hz lowpass) record

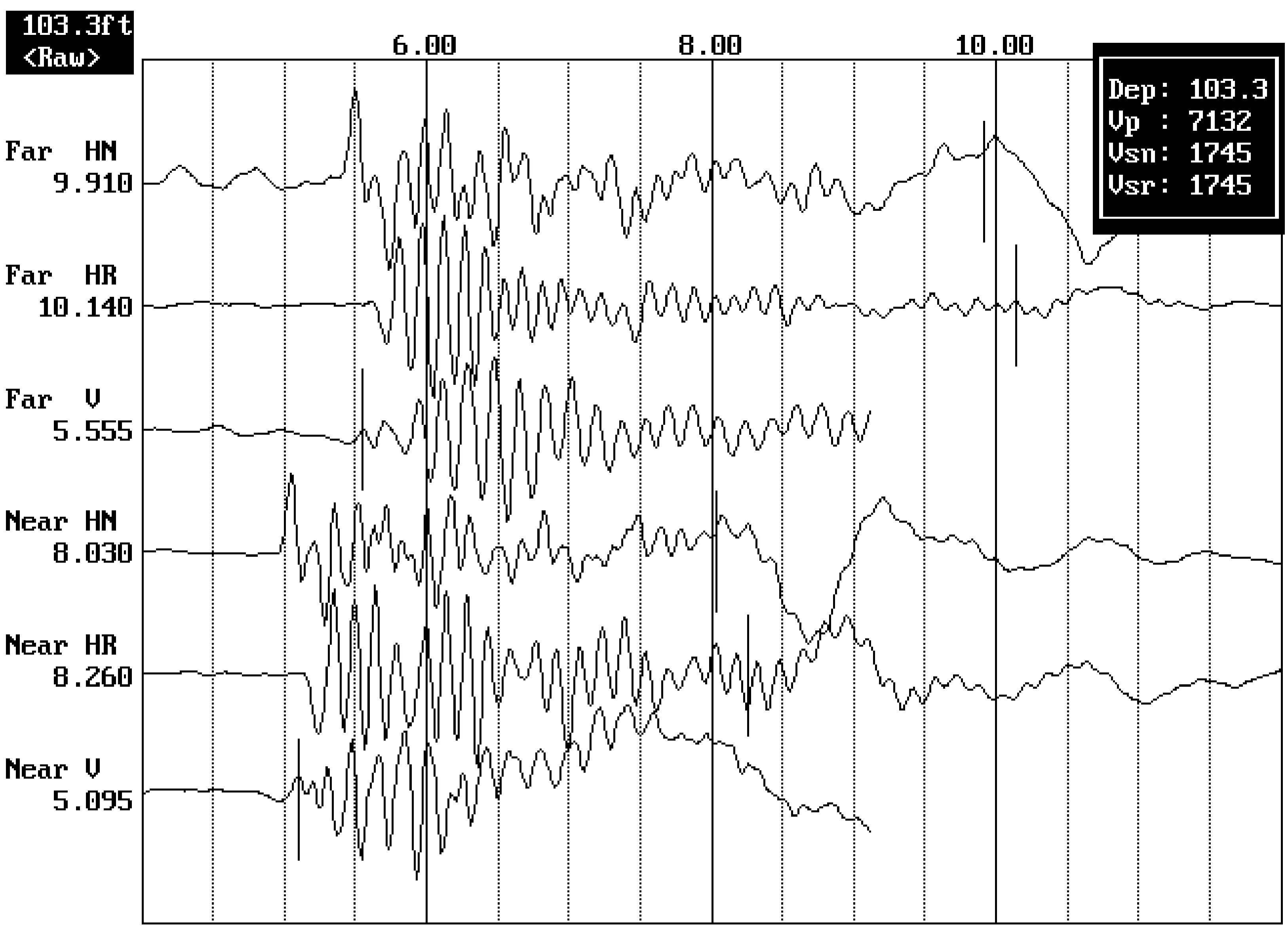

Figure 3. Example of unfiltered record

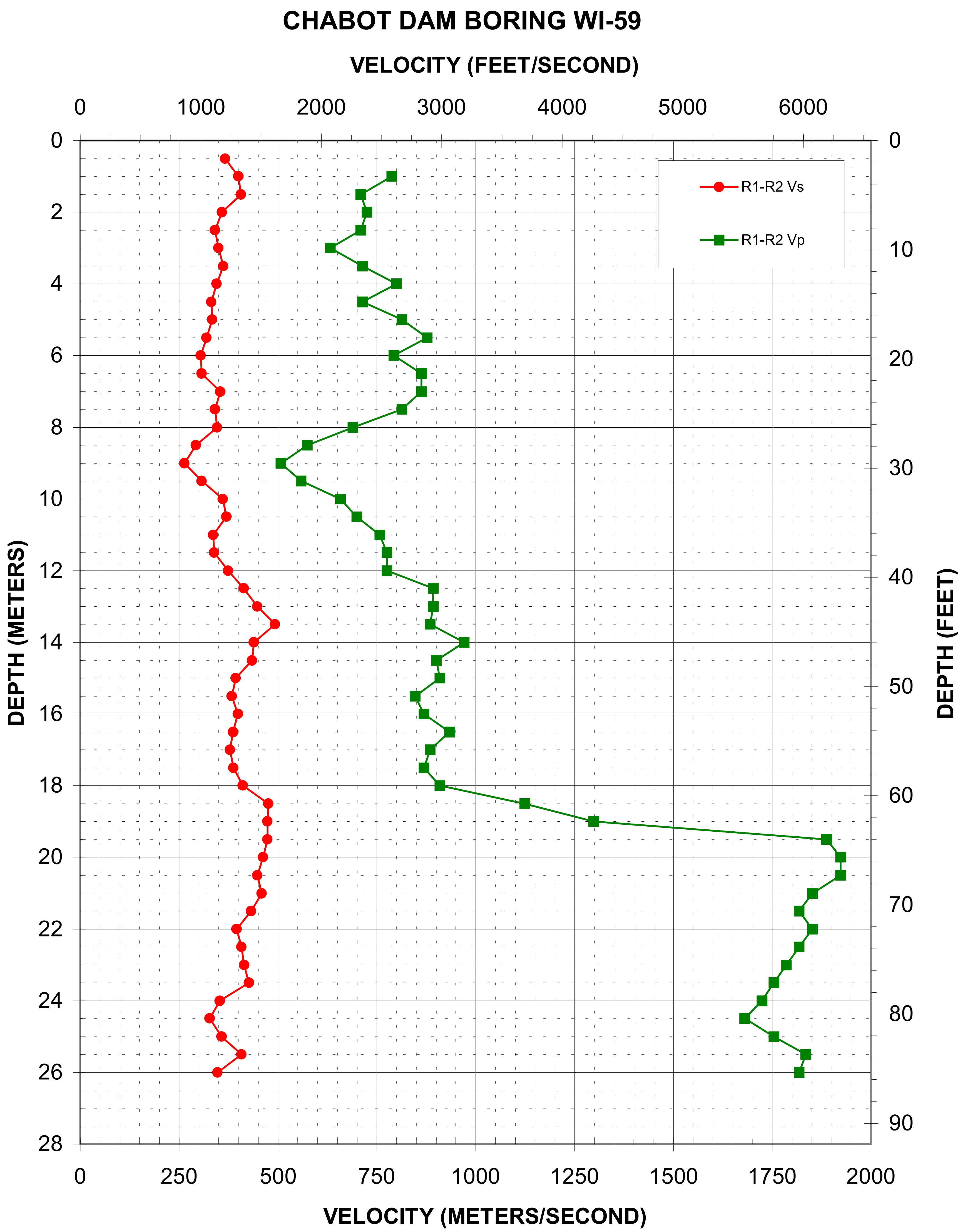

Figure 4. Borehole WI-59, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	V-S_H (m/sec)	V-P (m/sec)	V-S_H (ft/sec)	V-P (ft/sec)
0.5	1.6	11.96	12.48		9.32	9.66	7.12	366		1202	
1.0	3.3	11.82	12.06	8.55	9.48	9.40	7.28	400	787	1312	2583
1.5	4.9	12.48	12.32	8.59	10.18	9.70	7.18	407	709	1334	2327
2.0	6.6	12.84	12.68	8.59	9.98	9.96	7.21	358	725	1176	2377
2.5	8.2	12.96	13.28	8.50	10.02	10.36	7.09	341	709	1120	2327
3.0	9.8	13.02	13.06	8.45	10.08	10.28	6.87	350	633	1147	2076
3.5	11.5	13.60	13.56	8.50	10.90	10.74	7.10	362	714	1189	2343
4.0	13.1	13.46	13.54	8.18	10.56	10.64	6.93	345	800	1131	2625
4.5	14.8	13.40	13.26	8.25	10.30	10.34	6.85	332	714	1090	2343
5.0	16.4	13.22	13.14	8.18	10.14	10.24	6.95	334	813	1097	2667
5.5	18.0	13.10	13.38	7.95	10.08	10.14	6.81	319	877	1048	2878
6.0	19.7	13.00	13.08	8.18	9.66	9.86	6.92	305	794	1000	2604
6.5	21.3	13.36	13.32	8.53	10.16	10.00	7.37	307	862	1006	2828
7.0	23.0	13.36	13.34	8.57	10.50	10.56	7.41	355	862	1163	2828
7.5	24.6	13.28	13.10	8.65	10.16	10.36	7.42	341	813	1120	2667
8.0	26.2	13.14	13.18	8.91	10.20	10.34	7.46	346	690	1135	2263
8.5	27.9	13.16	13.12	8.99	9.68	9.78	7.25	293	575	962	1886
9.0	29.5	13.34	13.40	9.01	9.56	9.60	7.04	264	508	866	1665
9.5	31.2	12.86	12.88	8.75	9.56	9.66	6.96	307	559	1006	1833
10.0	32.8	12.32	12.36	8.38	9.50	9.64	6.86	361	658	1184	2158
10.5	34.4	12.08	12.10	8.18	9.34	9.44	6.75	370	699	1215	2294
11.0	36.1	11.82	11.90	7.99	8.84	8.94	6.67	337	758	1105	2485
11.5	37.7	11.50	11.60	7.89	8.56	8.64	6.60	339	775	1112	2543
12.0	39.4	11.06	11.18	7.78	8.40	8.50	6.49	375	775	1229	2543
12.5	41.0	10.90	11.02	7.63	8.48	8.60	6.51	413	893	1356	2929
13.0	42.7	10.86	10.96	7.61	8.62	8.74	6.49	448	893	1471	2929
13.5	44.3	10.76	10.92	7.64	8.74	8.88	6.51	493	885	1616	2903
14.0	45.9	11.04	11.14	7.46	8.74	8.88	6.43	439	971	1439	3185
14.5	47.6	11.40	11.42	7.55	9.04	9.18	6.44	435	901	1426	2956
15.0	49.2	11.56	11.64	7.54	9.00	9.12	6.44	394	909	1292	2983
15.5	50.9	11.68	11.76	7.70	9.06	9.16	6.52	383	847	1257	2780
16.0	52.5	11.38	11.44	7.40	8.84	8.96	6.25	398	870	1307	2853
16.5	54.1	11.16	11.24	7.19	8.56	8.66	6.12	386	935	1267	3066
17.0	55.8	10.98	11.10	7.05	8.34	8.46	5.92	379	885	1243	2903
17.5	57.4	10.68	10.74	6.69	8.08	8.18	5.54	388	870	1272	2853
18.0	59.1	10.62	10.66	6.44	8.16	8.26	5.34	412	909	1350	2983
18.5	60.7	10.34	10.34	6.06	8.18	8.30	5.17	476	1124	1562	3686
19.0	62.3	10.34	10.42	5.94	8.20	8.34	5.17	474	1299	1555	4261
19.5	64.0	10.56	10.66	5.70	8.46	8.54	5.17	474	1887	1555	6190
20.0	65.6	10.66	10.76	5.70	8.52	8.58	5.18	463	1923	1519	6309
20.5	67.3	10.86	10.90	5.70	8.62	8.68	5.18	448	1923	1471	6309
21.0	68.9	11.00	11.08	5.74	8.80	8.92	5.20	459	1852	1505	6076
21.5	70.5	11.20	11.30	5.74	8.90	8.98	5.19	433	1818	1420	5965
22.0	72.2	11.86	11.88	5.77	9.32	9.36	5.23	395	1852	1297	6076
22.5	73.8	11.90	12.02	5.80	9.48	9.54	5.25	408	1818	1339	5965
23.0	75.5	12.10	12.12	5.83	9.66	9.74	5.27	415	1786	1361	5859
23.5	77.1	11.90	12.00	5.81	9.60	9.62	5.24	427	1754	1402	5756
24.0	78.7	12.42	12.48	5.84	9.60	9.64	5.26	353	1724	1159	5657
24.5	80.4	12.43	12.52	5.84	9.36	9.48	5.24	327	1681	1074	5514
25.0	82.0	11.99	12.10	5.80	9.20	9.29	5.23	357	1754	1172	5756
25.5	83.7	11.04	11.14	5.82	8.61	8.66	5.27	407	1835	1336	6020
26.0	85.3	10.28	10.26	5.72	7.34	7.44	5.17	347	1818	1139	5965

Table 3. Borehole WI-59, Suspension R1-R2 depth, pick times, and velocities

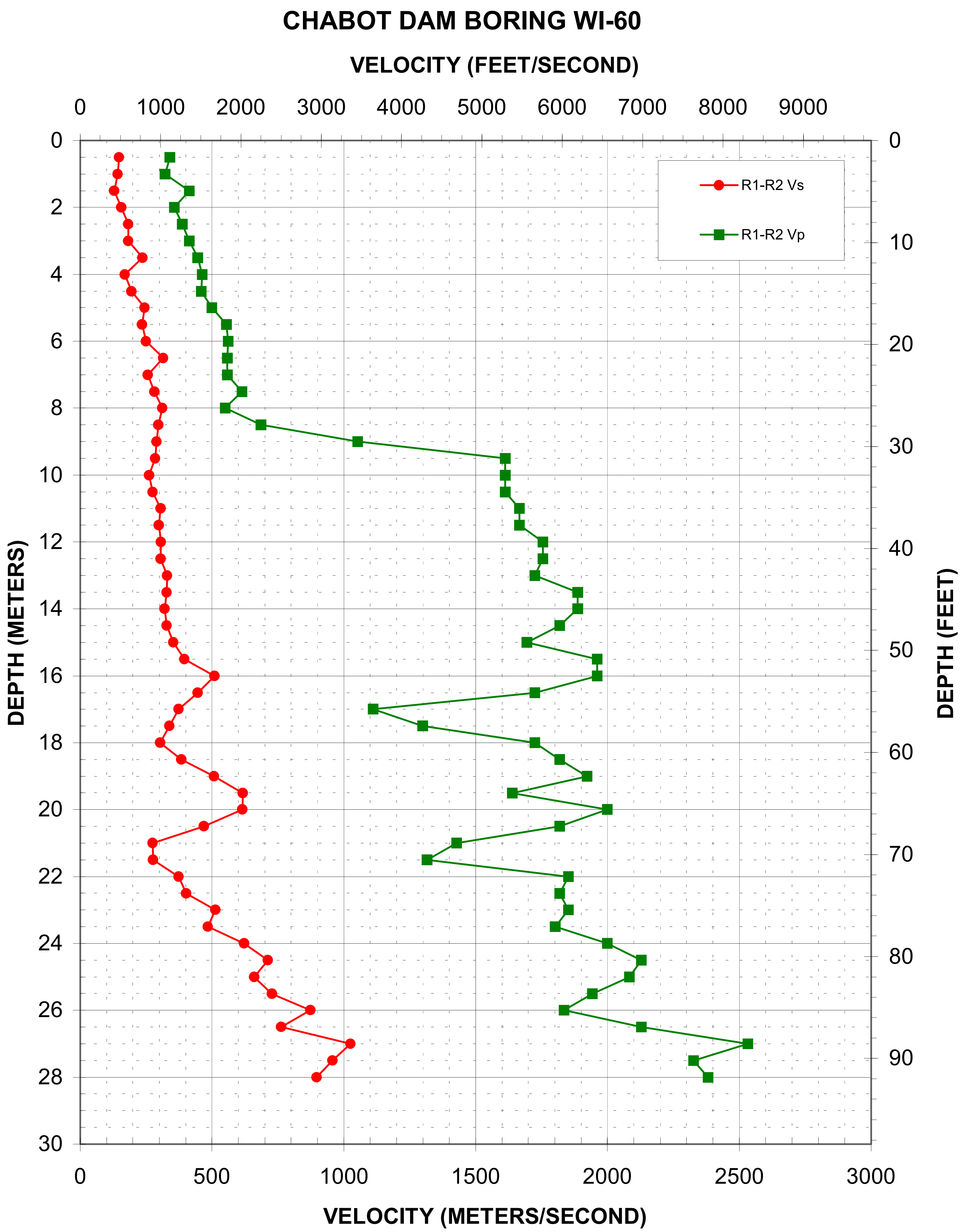

Figure 5. Borehole WI-60, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	V-S_H (m/sec)	V-P (m/sec)	V-S_H (ft/sec)	V-P (ft/sec)
0.5	1.6	21.90	21.60	12.66	15.15	14.80	9.72	148	340	484	1116
1.0	3.3	21.75	21.55	12.74	14.75	14.45	9.64	142	323	465	1058
1.5	4.9	22.60	22.55	11.58	14.95	14.75	9.16	129	413	425	1356
2.0	6.6	22.00	21.35	11.68	15.20	15.25	8.88	155	357	509	1172
2.5	8.2	21.10	21.05	11.08	15.75	15.45	8.50	183	388	599	1272
3.0	9.8	19.95	19.30	10.80	14.35	13.95	8.38	183	413	599	1356
3.5	11.5	18.65	18.45	10.38	14.30	14.35	8.14	237	446	777	1465
4.0	13.1	20.05	19.30	10.26	13.95	13.60	8.10	169	463	556	1519
4.5	14.8	18.45	18.90	10.18	13.25	13.80	8.00	194	459	637	1505
5.0	16.4	15.55	15.60	9.78	11.50	11.45	7.78	244	500	800	1640
5.5	18.0	17.40	17.65	9.72	13.00	13.50	7.92	234	556	767	1823
6.0	19.7	17.05	17.30	9.64	13.15	13.20	7.86	250	562	820	1843
6.5	21.3	14.14	14.24	9.51	11.08	10.94	7.72	314	559	1032	1833
7.0	23.0	14.14	14.68	8.88	10.16	10.88	7.09	257	559	843	1833
7.5	24.6	14.36	14.38	8.11	10.90	10.74	6.48	282	613	924	2013
8.0	26.2	14.36	14.24	7.71	11.20	10.98	5.89	312	549	1022	1803
8.5	27.9	14.46	14.68	7.09	11.16	11.24	5.63	297	685	974	2247
9.0	29.5	14.54	14.64	6.49	11.08	11.22	5.54	291	1053	954	3454
9.5	31.2	14.18	14.46	6.10	10.70	10.94	5.48	286	1613	937	5292
10.0	32.8	13.96	15.38	6.06	10.22	11.46	5.44	261	1613	857	5292
10.5	34.4	14.04	14.04	6.07	10.40	10.40	5.45	275	1613	901	5292
11.0	36.1	13.50	13.26	6.08	9.92	10.28	5.48	305	1667	1000	5468
11.5	37.7	13.42	13.50	6.01	10.04	10.16	5.41	298	1667	976	5468
12.0	39.4	13.44	13.24	5.92	10.06	10.10	5.35	307	1754	1006	5756
12.5	41.0	13.16	13.24	5.98	9.98	9.88	5.41	306	1754	1003	5756
13.0	42.7	12.66	12.94	6.00	9.78	9.76	5.42	330	1724	1083	5657
13.5	44.3	12.58	12.56	5.94	9.54	9.52	5.41	329	1887	1079	6190
14.0	45.9	12.58	12.66	6.21	9.50	9.48	5.68	319	1887	1048	6190
14.5	47.6	12.34	12.40	6.42	9.16	9.50	5.87	329	1818	1079	5965
15.0	49.2	12.12	12.06	6.20	9.24	9.28	5.61	353	1695	1159	5561
15.5	50.9	12.02	12.06	6.12	9.52	9.50	5.61	395	1961	1297	6433
16.0	52.5	11.58	11.76	6.25	9.54	9.88	5.74	510	1961	1674	6433
16.5	54.1	11.16	11.44	6.16	8.84	9.28	5.58	446	1724	1465	5657
17.0	55.8	11.40	11.28	6.33	8.74	8.58	5.43	373	1111	1224	3645
17.5	57.4	11.16	11.20	6.10	8.08	8.38	5.33	339	1299	1112	4261
18.0	59.1	11.52	12.32	6.22	8.24	9.00	5.64	303	1724	994	5657
18.5	60.7	10.64	12.24	6.34	8.04	9.62	5.79	383	1818	1257	5965
19.0	62.3	11.32	11.50	6.16	9.40	9.48	5.64	508	1923	1665	6309
19.5	64.0	14.44	14.40	6.29	12.72	12.88	5.68	617	1639	2025	5378
20.0	65.6	13.85	13.95	6.16	12.30	12.25	5.66	615	2000	2019	6562
20.5	67.3	13.94	13.86	6.01	11.72	11.82	5.46	469	1818	1540	5965
21.0	68.9	13.82	13.94	6.09	10.20	10.28	5.39	275	1429	901	4687
21.5	70.5	11.28	12.00	6.18	7.68	8.36	5.42	276	1316	906	4317
22.0	72.2	10.02	10.72	5.93	7.34	8.04	5.39	373	1852	1224	6076
22.5	73.8	9.78	9.71	5.97	7.34	7.18	5.42	402	1818	1320	5965
23.0	75.5	9.10	9.15	6.04	7.12	7.23	5.50	513	1852	1682	6076
23.5	77.1	8.88	8.88	5.87	6.76	6.87	5.32	484	1802	1589	5911
24.0	78.7	8.20	8.88	5.75	6.58	7.28	5.25	621	2000	2038	6562
24.5	80.4	7.70	7.67	5.66	6.33	6.23	5.19	712	2128	2335	6981
25.0	82.0	7.74	7.86	5.58	6.28	6.29	5.10	660	2083	2166	6835

Table 4. Borehole WI-60, Suspension R1-R2 depth,
pick times, and velocities

Depth		Pick Times						Velocity			
		Far-Hn	Far-Hr	Far-V	Near-Hn	Near-Hr	Near-V	V-S_H	V-P	V-S_H	V-P
(m)	(feet)	(millisec)	(millisec)	(millisec)	(millisec)	(millisec)	(millisec)	(m/sec)	(m/sec)	(ft/sec)	(ft/sec)
25.5	83.7	7.41	7.43	5.65	6.06	6.03	5.13	727	1942	2386	6371
26.0	85.3	7.12	7.35	5.64	5.96	6.22	5.09	873	1835	2865	6020
26.5	86.9	7.10	7.07	5.58	5.74	5.81	5.11	763	2128	2504	6981
27.0	88.6	7.11	7.19	5.46	6.15	6.20	5.06	1026	2532	3365	8306
27.5	90.2	7.10	7.12	5.46	6.07	6.06	5.03	957	2326	3140	7630
28.0	91.9	7.08	7.14	5.42	5.91	6.08	5.00	897	2381	2942	7812

Table 4, continued. Borehole WI-60, Suspension R1-R2 depth, pick times, and velocities

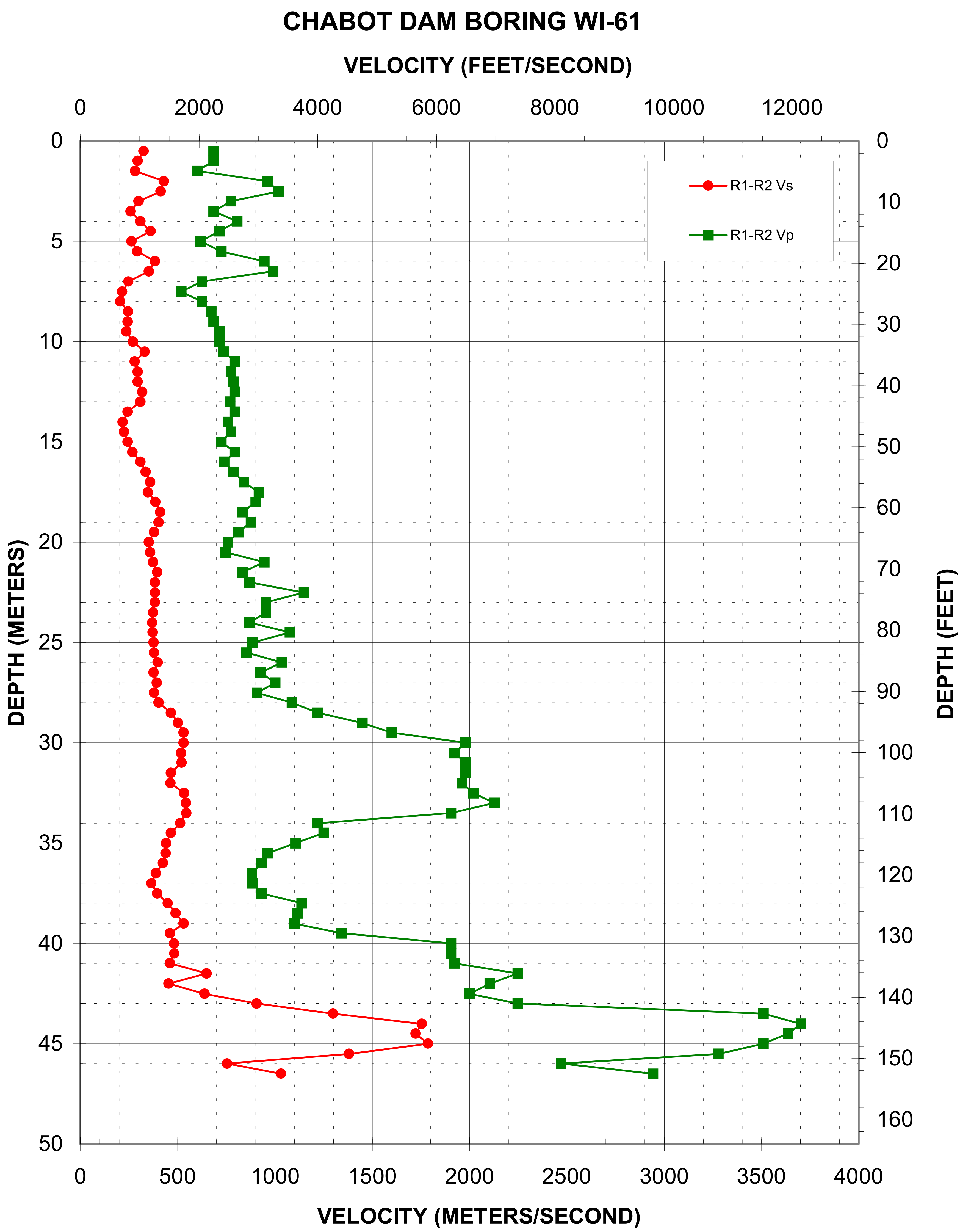

Figure 6. Borehole WI-61, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	V-S_H (m/sec)	V-P (m/sec)	V-S_H (ft/sec)	V-P (ft/sec)
0.5	1.6	12.90	15.28	8.94	9.70	12.34	7.48	326	685	1069	2247
1.0	3.3	13.82	13.90	9.08	10.36	10.60	7.62	296	685	971	2247
1.5	4.9	16.70	16.86	9.08	13.16	13.28	7.42	281	602	922	1976
2.0	6.6	14.30	15.02	8.52	12.36	12.30	7.48	429	962	1408	3155
2.5	8.2	14.04	15.18	8.49	11.66	12.72	7.51	413	1020	1356	3348
3.0	9.8	15.88	16.02	8.80	12.60	12.62	7.51	299	775	982	2543
3.5	11.5	16.30	16.50	9.11	12.34	12.76	7.65	260	685	852	2247
4.0	13.1	16.45		9.00	13.20		7.76	308	806	1009	2646
4.5	14.8	16.35	17.25	8.94	13.70	14.35	7.54	360	714	1182	2343
5.0	16.4	17.15	18.60	9.12	13.65	14.50	7.50	263	617	863	2025
5.5	18.0	15.95	16.40	8.86	12.65	12.85	7.48	292	725	958	2377
6.0	19.7	16.55	17.05	8.86	13.85	14.55	7.80	385	943	1262	3095
6.5	21.3	16.80	17.76	9.05	14.18	14.70	8.04	352	990	1155	3248
7.0	23.0	17.20	18.32	9.36	13.38	14.08	7.76	248	625	814	2051
7.5	24.6	17.62	17.86	9.47	13.08	13.10	7.54	215	518	706	1700
8.0	26.2	16.80	17.00	9.22	11.92	12.10	7.62	204	625	671	2051
8.5	27.9	14.96	15.90	8.66	11.18	11.50	7.17	244	671	802	2202
9.0	29.5	14.48	15.28	8.49	10.54	11.02	7.03	244	685	800	2247
9.5	31.2	14.62	14.70	8.46	10.56	10.32	7.06	237	714	777	2343
10.0	32.8	14.08	14.18	8.35	10.34	10.54	6.95	271	714	889	2343
10.5	34.4	12.96	13.72	8.24	9.98	10.68	6.88	332	735	1090	2412
11.0	36.1	14.06	13.96	8.04	10.32	10.56	6.78	280	794	919	2604
11.5	37.7	14.64	14.22	8.04	10.98	11.10	6.75	295	775	968	2543
12.0	39.4	15.42	14.90	7.99	11.88	11.64	6.72	294	787	965	2583
12.5	41.0	15.36	15.40	8.04	12.22	12.26	6.78	318	794	1045	2604
13.0	42.7	15.90	15.54	8.02	12.48	12.48	6.72	309	769	1013	2524
13.5	44.3	16.04	15.82	8.04	11.88	11.72	6.78	242	794	794	2604
14.0	45.9	15.60	15.82	7.96	11.06	11.16	6.64	217	758	713	2485
14.5	47.6	14.72	14.98	7.79	10.26	10.52	6.50	224	775	736	2543
15.0	49.2	13.82	13.82	7.85	9.78	9.62	6.47	243	725	796	2377
15.5	50.9	13.22	13.26	7.76	9.48	9.52	6.50	267	794	877	2604
16.0	52.5	12.42	12.38	7.71	9.12	9.20	6.36	309	741	1013	2430
16.5	54.1	11.90	11.86	7.59	8.90	8.92	6.32	337	787	1105	2583
17.0	55.8	11.62	11.66	7.56	8.74	8.96	6.37	358	840	1176	2757
17.5	57.4	11.76	11.68	7.49	8.84	8.86	6.40	348	917	1143	3010
18.0	59.1	11.70	11.78	7.65	9.10	9.20	6.54	386	901	1267	2956
18.5	60.7	11.74	11.58	7.77	9.22	9.22	6.57	410	833	1345	2734
19.0	62.3	11.64	11.72	7.68	9.22	9.16	6.54	402	877	1318	2878
19.5	64.0	11.74	11.68	7.74	9.08	9.08	6.51	380	813	1247	2667
20.0	65.6	11.66	11.70	7.76	8.78	8.90	6.44	352	758	1155	2485
20.5	67.3	11.64	11.62	7.71	8.80	8.88	6.37	358	746	1176	2448
21.0	68.9	11.42	11.52	7.29	8.76	8.84	6.23	375	943	1229	3095
21.5	70.5	11.52	11.44	7.49	8.96	8.94	6.29	395	833	1297	2734
22.0	72.2	11.56	11.64	7.45	9.00	8.98	6.30	383	870	1257	2853
22.5	73.8	11.62	11.66	6.09	9.00	9.06	5.22	383	1149	1257	3771
23.0	75.5	11.50	11.64	6.72	8.94	9.00	5.67	385	952	1262	3125
23.5	77.1	11.36	11.42	7.16	8.66	8.78	6.11	375	952	1229	3125
24.0	78.7	11.34	11.42	6.18	8.66	8.68	5.03	369	870	1211	2853
24.5	80.4	11.32	11.34	6.11	8.68	8.60	5.18	372	1075	1220	3528
25.0	82.0	11.18	11.28	7.26	8.56	8.60	6.13	377	885	1238	2903

Table 5. Borehole WI-61, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	V-S_H (m/sec)	V-P (m/sec)	V-S_H (ft/sec)	V-P (ft/sec)
25.5	83.7	11.28	11.32	7.33	8.64	8.69	6.16	380	855	1245	2804
26.0	85.3	11.05	11.01	7.10	8.51	8.52	6.14	398	1036	1305	3400
26.5	86.9	10.82	10.87	7.03	8.18	8.20	5.95	377	926	1236	3038
27.0	88.6	10.52	10.51	6.69	7.93	8.02	5.69	394	1000	1292	3281
27.5	90.2	10.19	10.27	6.51	7.54	7.65	5.41	380	909	1245	2983
28.0	91.9	9.96	10.05	6.26	7.46	7.58	5.34	402	1087	1320	3566
28.5	93.5	9.69	9.81	6.00	7.55	7.66	5.18	466	1220	1530	4001
29.0	95.1	9.50	9.61	5.79	7.49	7.63	5.10	501	1449	1645	4755
29.5	96.8	9.64	9.72	5.74	7.74	7.86	5.11	532	1600	1745	5249
30.0	98.4	9.54	9.66	5.73	7.66	7.78	5.23	532	1980	1745	6497
30.5	100.1	9.60	9.72	5.72	7.65	7.81	5.20	518	1923	1700	6309
31.0	101.7	9.59	9.72	5.73	7.66	7.80	5.22	519	1980	1704	6497
31.5	103.3	9.63	9.78	5.71	7.49	7.63	5.20	466	1980	1530	6497
32.0	105.0	9.79	9.93	5.72	7.64	7.76	5.21	463	1961	1519	6433
32.5	106.6	9.83	9.87	5.88	7.94	8.01	5.38	533	2020	1750	6628
33.0	108.3	10.01	10.06	6.04	8.15	8.24	5.57	543	2128	1783	6981
33.5	109.9	10.26	10.31	6.46	8.43	8.47	5.94	545	1905	1788	6249
34.0	111.5	10.55	10.62	7.06	8.61	8.66	6.24	513	1220	1682	4001
34.5	113.2	11.04	11.06	6.35	8.90	8.90	5.55	465	1250	1526	4101
35.0	114.8	11.25	11.33	7.17	8.99	9.06	6.26	442	1105	1448	3625
35.5	116.5	11.19	11.27	7.20	8.93	8.96	6.16	438	962	1436	3155
36.0	118.1	11.14	11.20	7.22	8.80	8.82	6.14	424	930	1390	3052
36.5	119.8	11.03	11.07	7.13	8.45	8.49	6.00	388	881	1272	2891
37.0	121.4	10.88	10.91	6.97	8.16	8.15	5.84	365	885	1197	2903
37.5	123.0	10.62	10.71	6.71	8.13	8.15	5.64	396	930	1299	3052
38.0	124.7	10.25	10.30	6.47	8.04	8.06	5.59	449	1136	1475	3728
38.5	126.3	10.27	10.26	6.24	8.18	8.27	5.35	490	1117	1608	3666
39.0	128.0	10.37	10.39	6.04	8.40	8.59	5.13	531	1099	1740	3605
39.5	129.6	10.46	10.55	5.88	8.29	8.38	5.14	461	1342	1512	4404
40.0	131.2	10.84	10.94	5.68	8.77	8.86	5.16	482	1905	1581	6249
40.5	132.9	10.69	10.77	5.56	8.66	8.67	5.03	484	1905	1589	6249
41.0	134.5	8.67	8.64	5.46	6.46	6.51	4.94	461	1923	1512	6309
41.5	136.2	8.19	8.31	5.35	6.67	6.75	4.90	649	2247	2130	7373
42.0	137.8	9.46		5.26	7.26		4.78	455	2105	1491	6907
42.5	139.4	6.96		5.10	5.39		4.60	637	2000	2090	6562
43.0	141.1	6.95	6.96	5.02	5.78	5.92	4.57	905	2247	2969	7373
43.5	142.7	6.16	6.29	5.03	5.43	5.48	4.75	1299	3509	4261	11512
44.0	144.4	6.36	6.39	5.06	5.81	5.80	4.79	1754	3704	5756	12151
44.5	146.0	6.46	6.99	5.08	5.89	6.40	4.80	1724	3636	5657	11930
45.0	147.6	6.71	7.00	5.08	6.15	6.44	4.79	1786	3509	5859	11512
45.5	149.3	6.61	6.74	5.09	5.91	5.99	4.78	1379	3279	4525	10757
46.0	150.9	6.98	7.11	5.15	5.65	5.79	4.74	755	2469	2476	8101
46.5	152.6	6.32	6.50	5.13	5.36	5.52	4.79	1031	2941	3382	9650

Table 5, continued. Borehole WI-61, Suspension R1-R2 depth, pick times, and velocities

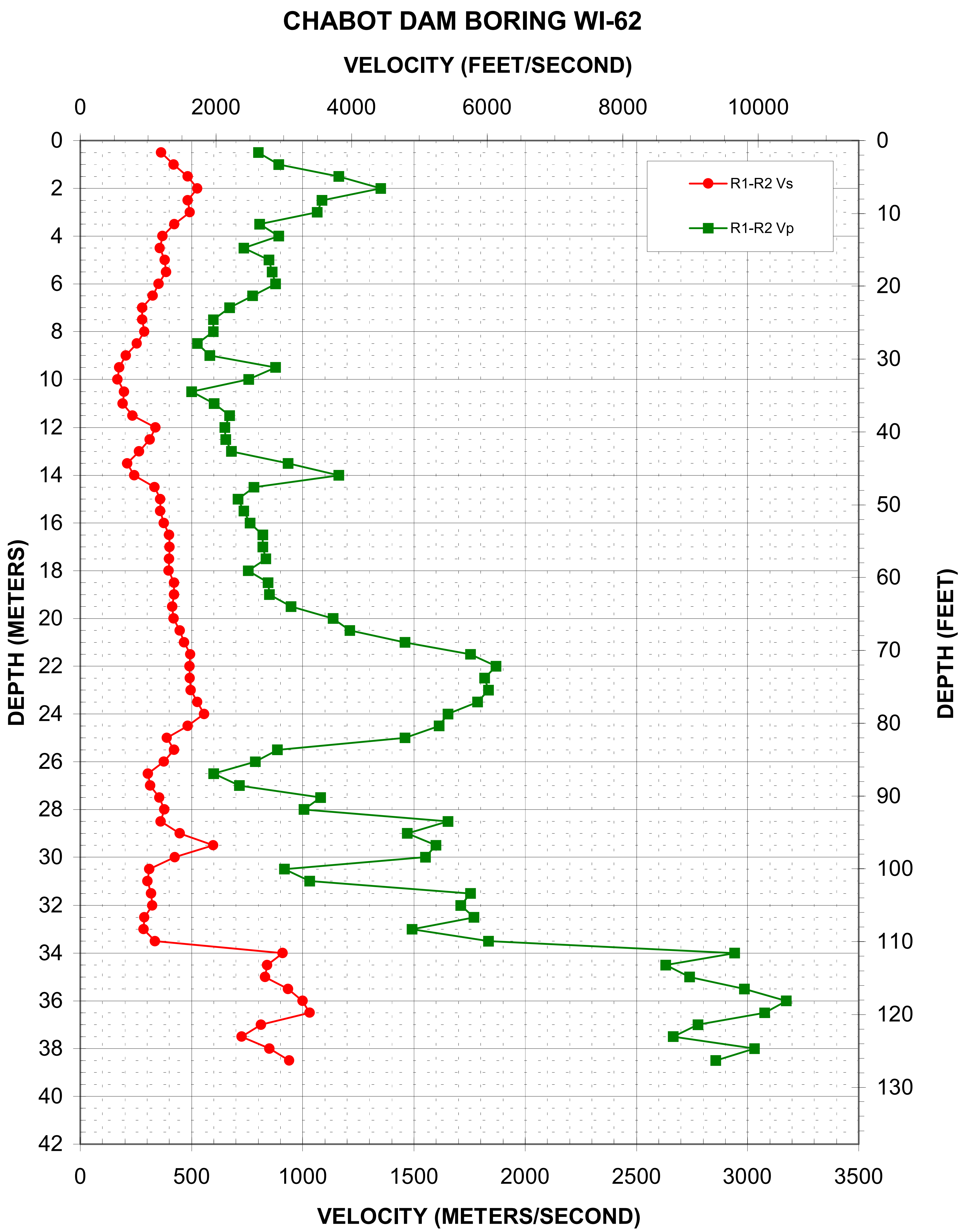

Figure 7. Borehole WI-62, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	V-S_H (m/sec)	V-P (m/sec)	V-S_H (ft/sec)	V-P (ft/sec)
0.5	1.6	10.56	10.54	7.83	7.70	7.90	6.58	364	800	1193	2625
1.0	3.3	10.18	10.16	7.61	7.70	7.86	6.49	418	893	1373	2929
1.5	4.9	10.34	10.42	7.51	8.32	8.30	6.65	483	1163	1585	3815
2.0	6.6	10.28	10.54	7.64	8.32	8.70	6.90	526	1351	1727	4434
2.5	8.2	10.88	10.90	7.89	8.74	8.90	6.97	483	1087	1585	3566
3.0	9.8	11.18	11.24	8.13	9.16	9.20	7.19	493	1064	1616	3490
3.5	11.5	11.72	11.68	8.36	9.44	9.24	7.12	424	806	1390	2646
4.0	13.1	12.26	12.36	7.97	9.52	9.68	6.85	369	893	1211	2929
4.5	14.8	12.42	12.58	8.43	9.70	9.72	7.07	358	735	1176	2412
5.0	16.4	12.70	12.92	8.59	10.18	10.18	7.41	380	847	1247	2780
5.5	18.0	13.28	13.20	8.91	10.78	10.52	7.75	386	862	1267	2828
6.0	19.7	13.56	13.32	8.97	10.46	10.72	7.83	351	877	1151	2878
6.5	21.3	14.06	14.34	9.45	11.20	11.06	8.16	326	775	1069	2543
7.0	23.0	16.04	17.26	9.37	12.34	13.76	7.88	278	671	911	2202
7.5	24.6	17.28	17.38	9.07	13.64	13.84	7.40	279	599	914	1965
8.0	26.2	17.86	17.92	8.96	14.34	14.50	7.29	288	599	945	1965
8.5	27.9	18.66	18.80	9.18	14.76	14.82	7.28	254	526	833	1727
9.0	29.5	19.44	19.56	8.83	14.62	14.58	7.11	204	581	670	1907
9.5	31.2	18.76	18.68	8.49	13.06	13.00	7.35	176	877	577	2878
10.0	32.8	17.96	17.98	8.59	11.88	12.04	7.27	166	758	546	2485
10.5	34.4	16.28	16.46	9.08	11.28	11.32	7.08	197	500	647	1640
11.0	36.1	16.16	16.14	8.77	10.94	10.86	7.11	190	602	625	1976
11.5	37.7	16.10	16.14	8.06	11.82	11.88	6.57	234	671	768	2202
12.0	39.4	14.68	14.72	8.12	11.72	11.74	6.58	337	649	1105	2130
12.5	41.0	14.56	14.68	8.11	11.36	11.46	6.58	312	654	1022	2144
13.0	42.7	14.34	14.54	7.96	10.66	10.64	6.49	264	680	866	2232
13.5	44.3	14.20	14.22	7.95	9.42	9.46	6.88	210	935	688	3066
14.0	45.9	13.48	13.56	7.80	9.32	9.46	6.94	242	1163	794	3815
14.5	47.6	12.20	12.25	8.07	9.20	9.24	6.79	333	781	1092	2563
15.0	49.2	11.86	11.94	8.11	9.10	9.14	6.70	360	709	1180	2327
15.5	50.9	11.66	11.70	8.02	8.84	8.96	6.66	360	735	1180	2412
16.0	52.5	11.56	11.56	7.97	8.88	8.90	6.66	375	763	1229	2504
16.5	54.1	11.42	11.44	7.85	8.92	8.94	6.63	400	820	1312	2689
17.0	55.8	11.32	11.42	7.71	8.82	8.94	6.49	402	820	1318	2689
17.5	57.4	11.28	11.36	7.58	8.76	8.86	6.38	398	833	1307	2734
18.0	59.1	11.20	11.36	7.53	8.70	8.82	6.20	397	755	1302	2476
18.5	60.7	10.98	11.06	7.22	8.58	8.72	6.04	422	844	1384	2769
19.0	62.3	10.72	10.88	7.00	8.34	8.52	5.83	422	851	1384	2792
19.5	64.0	10.52	10.62	6.69	8.10	8.20	5.63	413	948	1356	3110
20.0	65.6	10.34	10.36	6.26	7.90	8.02	5.38	418	1136	1373	3728
20.5	67.3	10.00	10.02	6.20	7.72	7.82	5.38	446	1212	1465	3977
21.0	68.9	9.78	9.76	5.97	7.58	7.68	5.28	467	1460	1533	4790
21.5	70.5	9.48	9.56	5.86	7.44	7.56	5.29	495	1754	1624	5756
22.0	72.2	9.64	9.70	5.74	7.58	7.68	5.20	490	1869	1608	6132
22.5	73.8	9.98	10.18	5.91	7.98	8.12	5.36	493	1818	1616	5965
23.0	75.5	10.24	10.34	5.97	8.26	8.30	5.42	498	1835	1632	6020
23.5	77.1	10.44	10.54	6.21	8.54	8.64	5.65	526	1786	1727	5859
24.0	78.7	11.16	11.30	6.66	9.38	9.48	6.05	556	1653	1823	5423
24.5	80.4	11.70	11.76	6.94	9.62	9.70	6.32	483	1613	1585	5292
25.0	82.0	12.44	12.44	7.28	9.84	9.90	6.60	389	1460	1277	4790

Table 6. Borehole WI-62, Suspension R1-R2 depth,
pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	V-S_H (m/sec)	V-P (m/sec)	V-S_H (ft/sec)	V-P (ft/sec)
25.5	83.7	12.32	12.38	7.70	9.92	10.02	6.57	420	885	1379	2903
26.0	85.3	12.28	12.38	7.53	9.62	9.70	6.26	375	787	1229	2583
26.5	86.9	12.32	12.40	7.38	9.04	9.12	5.71	305	601	1000	1970
27.0	88.6	11.80	11.86	6.95	8.58	8.72	5.55	314	714	1032	2343
27.5	90.2	11.16	11.36	6.37	8.36	8.54	5.45	356	1081	1168	3547
28.0	91.9	11.26	11.40	6.52	8.60	8.76	5.52	377	1005	1238	3297
28.5	93.5	11.72	11.72	6.22	8.92	9.00	5.62	362	1653	1189	5423
29.0	95.1	11.66	11.66	6.28	9.38	9.46	5.60	446	1471	1465	4825
29.5	96.8	11.66	11.76	6.26	9.98	10.10	5.64	599	1600	1965	5249
30.0	98.4	12.72	12.80	6.42	10.38	10.44	5.78	426	1550	1396	5087
30.5	100.1	13.54	13.58	6.55	10.30	10.36	5.46	310	917	1016	3010
31.0	101.7	13.60	13.54	6.38	10.20	10.30	5.41	301	1031	988	3382
31.5	103.3	12.36	12.66	5.72	9.12	9.60	5.15	317	1754	1042	5756
32.0	105.0	11.60	11.72	5.83	8.64	8.52	5.25	325	1709	1065	5608
32.5	106.6	11.94	12.02	5.76	8.44	8.56	5.19	287	1770	943	5807
33.0	108.3	10.06	11.08	5.69	6.54	7.54	5.02	283	1493	929	4897
33.5	109.9	10.77	10.87	5.58	7.84	7.85	5.03	336	1835	1103	6020
34.0	111.5		7.96	5.20	7.29	6.86	4.86	909	2941	2983	9650
34.5	113.2	7.47	7.99	5.22	6.37	6.71	4.84	840	2632	2757	8634
35.0	114.8	7.32	7.36	5.21	6.08	6.19	4.85	830	2740	2723	8989
35.5	116.5	7.36	7.16	5.17	6.24	6.14	4.84	935	2985	3066	9794
36.0	118.1		7.56	5.16		6.56	4.85	1000	3175	3281	10415
36.5	119.8	6.76	7.34	5.15	5.84	6.32	4.82	1031	3077	3382	10095
37.0	121.4	7.35	7.60	5.15	6.12	6.37	4.79	813	2778	2667	9113
37.5	123.0	7.59	7.72	5.15	6.15	6.40	4.78	725	2667	2377	8749
38.0	124.7	7.78	7.98	5.20	6.71	6.70	4.87	851	3030	2792	9942
38.5	126.3	7.09	7.43	5.26	6.12	6.27	4.91	939	2857	3081	9374

Table 6, continued. Borehole WI-62, Suspension R1-R2 depth, pick times, and velocities

APPENDIX A

SUSPENSION VELOCITY MEASUREMENT QUALITY ASSURANCE SUSPENSION SOURCE TO RECEIVER ANALYSIS RESULTS

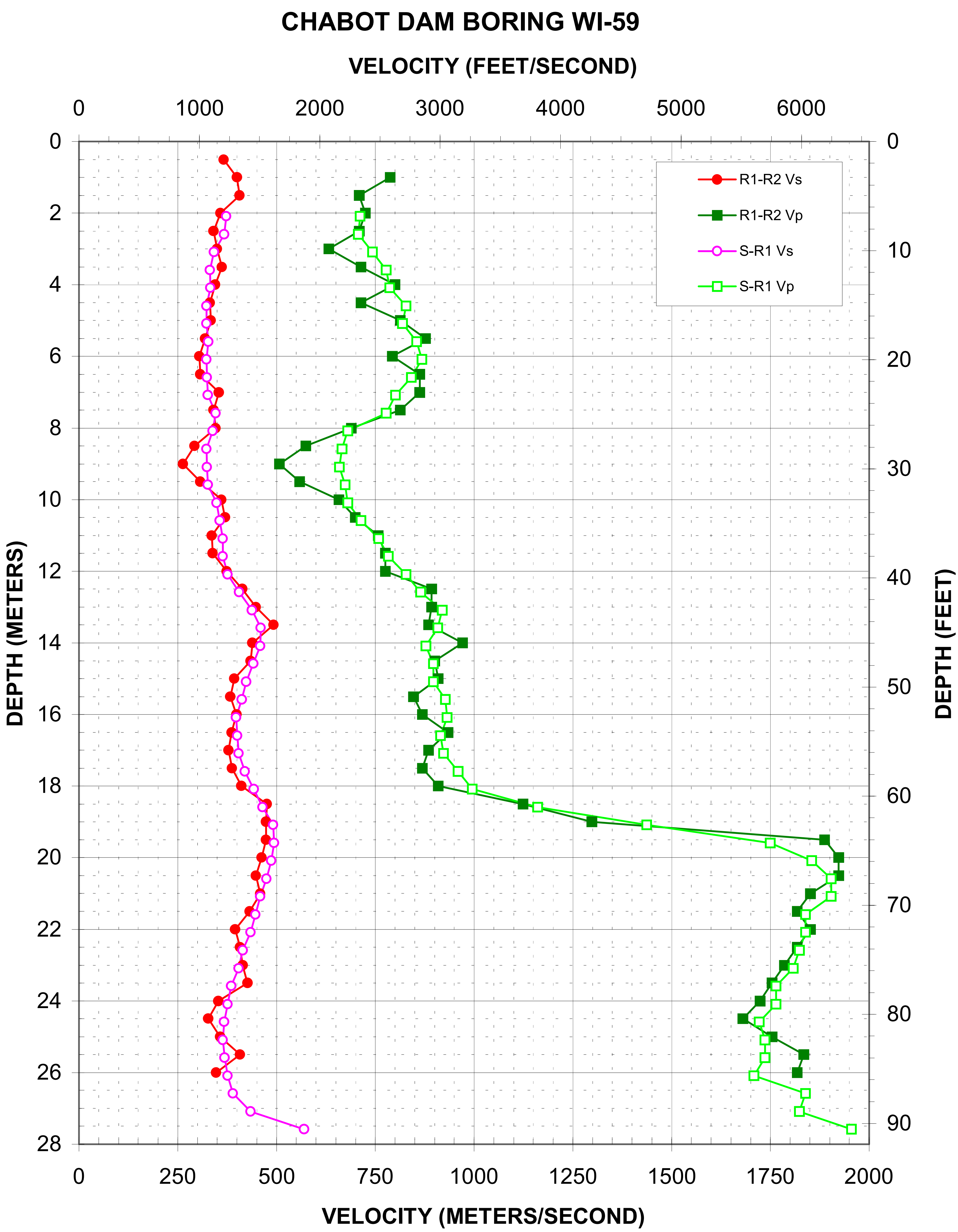

Figure A-1. Borehole WI-59, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
2.1	373	711	6.8	1225	2334
2.6	367	707	8.5	1205	2319
3.1	342	743	10.1	1123	2438
3.6	331	778	11.8	1087	2552
4.1	333	786	13.4	1094	2580
4.6	322	828	15.0	1058	2717
5.1	323	819	16.7	1061	2687
5.6	327	854	18.3	1074	2803
6.1	322	868	20.0	1058	2848
6.6	324	841	21.6	1064	2759
7.1	326	801	23.2	1071	2627
7.6	346	778	24.9	1135	2552
8.1	339	680	26.5	1111	2232
8.6	322	666	28.2	1058	2184
9.1	324	660	29.8	1064	2164
9.6	326	674	31.4	1071	2211
10.1	348	680	33.1	1143	2232
10.6	356	714	34.7	1169	2342
11.1	365	759	36.4	1197	2489
11.6	365	783	38.0	1197	2570
12.1	376	828	39.6	1234	2717
12.6	406	865	41.3	1331	2836
13.1	438	919	42.9	1438	3017
13.6	461	908	44.6	1512	2979
14.1	459	879	46.2	1505	2882
14.6	441	897	47.9	1447	2942
15.1	423	897	49.5	1388	2942
15.6	412	927	51.1	1351	3042
16.1	398	931	52.8	1306	3056
16.6	401	916	54.4	1316	3004
17.1	404	923	56.1	1326	3030
17.6	420	960	57.7	1377	3150
18.1	442	995	59.3	1450	3266
18.6	465	1160	61.0	1525	3807
19.1	492	1437	62.6	1614	4715
19.6	494	1750	64.3	1622	5741
20.1	488	1855	65.9	1600	6085
20.6	475	1904	67.5	1558	6245
21.1	459	1904	69.2	1505	6245
21.6	447	1839	70.8	1468	6033

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
22.1	435	1839	72.5	1427	6033
22.6	415	1824	74.1	1361	5983
23.1	404	1808	75.7	1326	5933
23.6	385	1764	77.4	1265	5788
24.1	376	1764	79.0	1234	5788
24.6	367	1722	80.7	1205	5650
25.1	365	1736	82.3	1197	5696
25.6	369	1736	83.9	1211	5696
26.1	376	1709	85.6	1234	5606
26.6	390	1839	87.2	1280	6033
27.1	435	1824	88.9	1427	5983
27.6	570	1955	90.5	1869	6414

Table A-1. Borehole WI-59, S - R1 quality assurance analysis P- and S_H-wave data

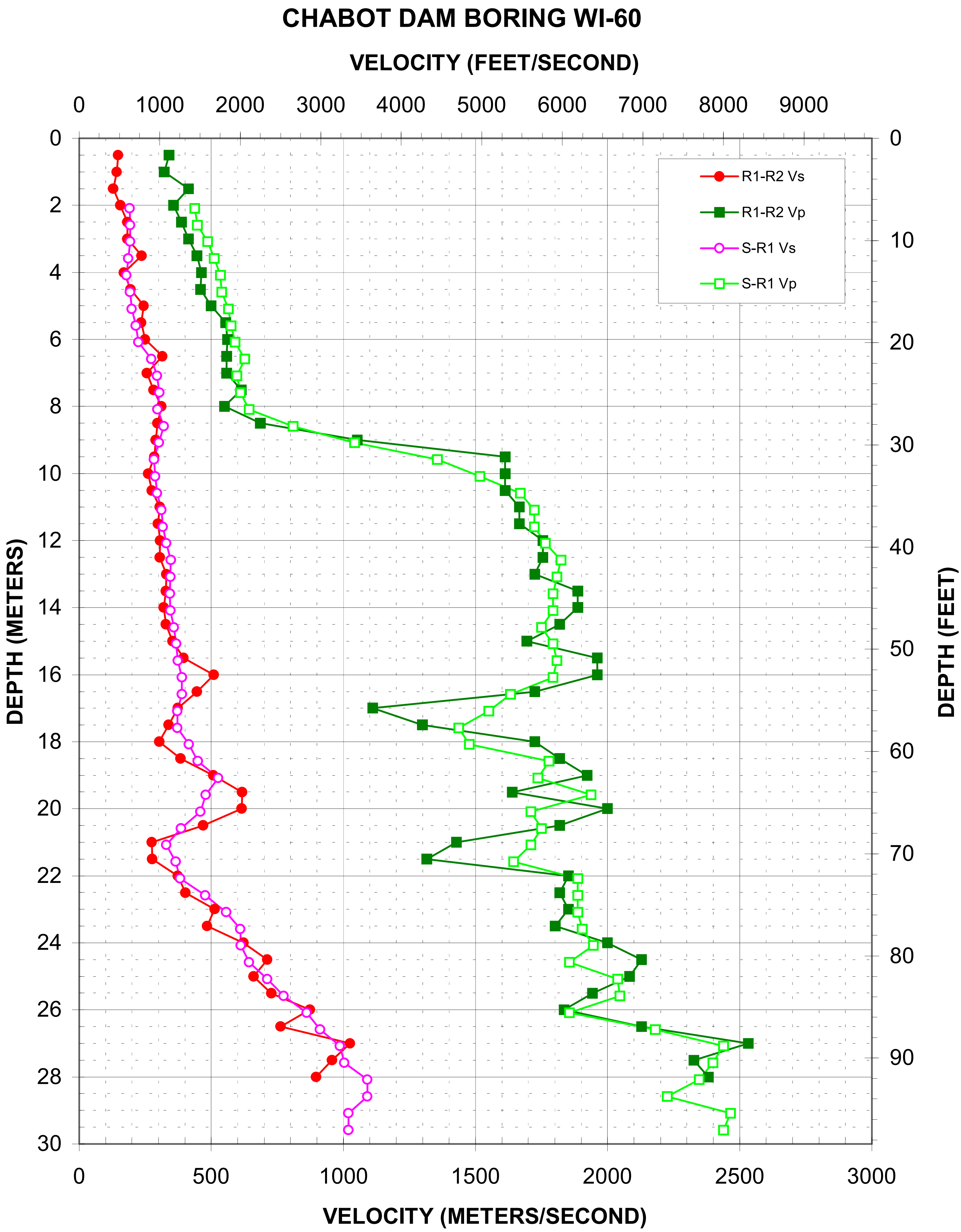

Figure A-2. Borehole WI-60, R1 - R2 high resolution analysis and S-R1 quality assurance analysis

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
2.1	190	438	6.8	625	1435
2.6	192	447	8.5	630	1468
3.1	193	487	10.1	633	1596
3.6	186	511	11.8	611	1675
4.1	179	534	13.4	588	1754
4.6	192	540	15.0	630	1771
5.1	199	565	16.7	653	1854
5.6	214	574	18.3	701	1883
6.1	225	590	20.0	738	1935
6.6	273	627	21.6	896	2058
7.1	295	596	23.2	969	1956
7.6	304	610	24.9	997	2000
8.1	297	644	26.5	975	2113
8.6	320	810	28.2	1050	2657
9.1	302	1043	29.8	992	3423
9.6	284	1356	31.4	932	4450
10.1	288	1517	33.1	944	4979
10.6	295	1669	34.7	967	5476
11.1	312	1722	36.4	1023	5650
11.6	316	1722	38.0	1038	5650
12.1	330	1764	39.6	1082	5788
12.6	347	1824	41.3	1137	5983
13.1	346	1808	42.9	1134	5933
13.6	343	1793	44.6	1126	5884
14.1	346	1793	46.2	1134	5884
14.6	359	1750	47.9	1179	5741
15.1	368	1793	49.5	1207	5884
15.6	374	1808	51.1	1227	5933
16.1	389	1793	52.8	1276	5884
16.6	389	1632	54.4	1276	5353
17.1	373	1550	56.1	1223	5085
17.6	373	1437	57.7	1223	4715
18.1	416	1476	59.3	1364	4843
18.6	448	1779	61.0	1471	5836
19.1	527	1736	62.6	1728	5696
19.6	480	1938	64.3	1575	6357
20.1	460	1709	65.9	1508	5606
20.6	386	1750	67.5	1267	5741
21.1	330	1709	69.2	1082	5606
21.6	365	1644	70.8	1197	5394
22.1	382	1887	72.5	1253	6191
22.6	478	1887	74.1	1568	6191
23.1	556	1887	75.7	1825	6191
23.6	610	1904	77.4	2000	6245
24.1	611	1946	79.0	2005	6385
24.6	644	1855	80.7	2113	6085
25.1	711	2038	82.3	2334	6685
25.6	775	2047	83.9	2543	6716
26.1	861	1855	85.6	2825	6085
26.6	912	2181	87.2	2991	7155
27.1	986	2438	88.9	3236	7999
27.6	1005	2398	90.5	3296	7867
28.1	1090	2346	92.1	3578	7697
28.6	1090	2226	93.8	3578	7302
29.1	1019	2466	95.4	3342	8090
29.6	1019	2438	97.1	3342	7999

Table A-2. Borehole WI-60, S - R1 quality assurance analysis P- and S_H-wave data

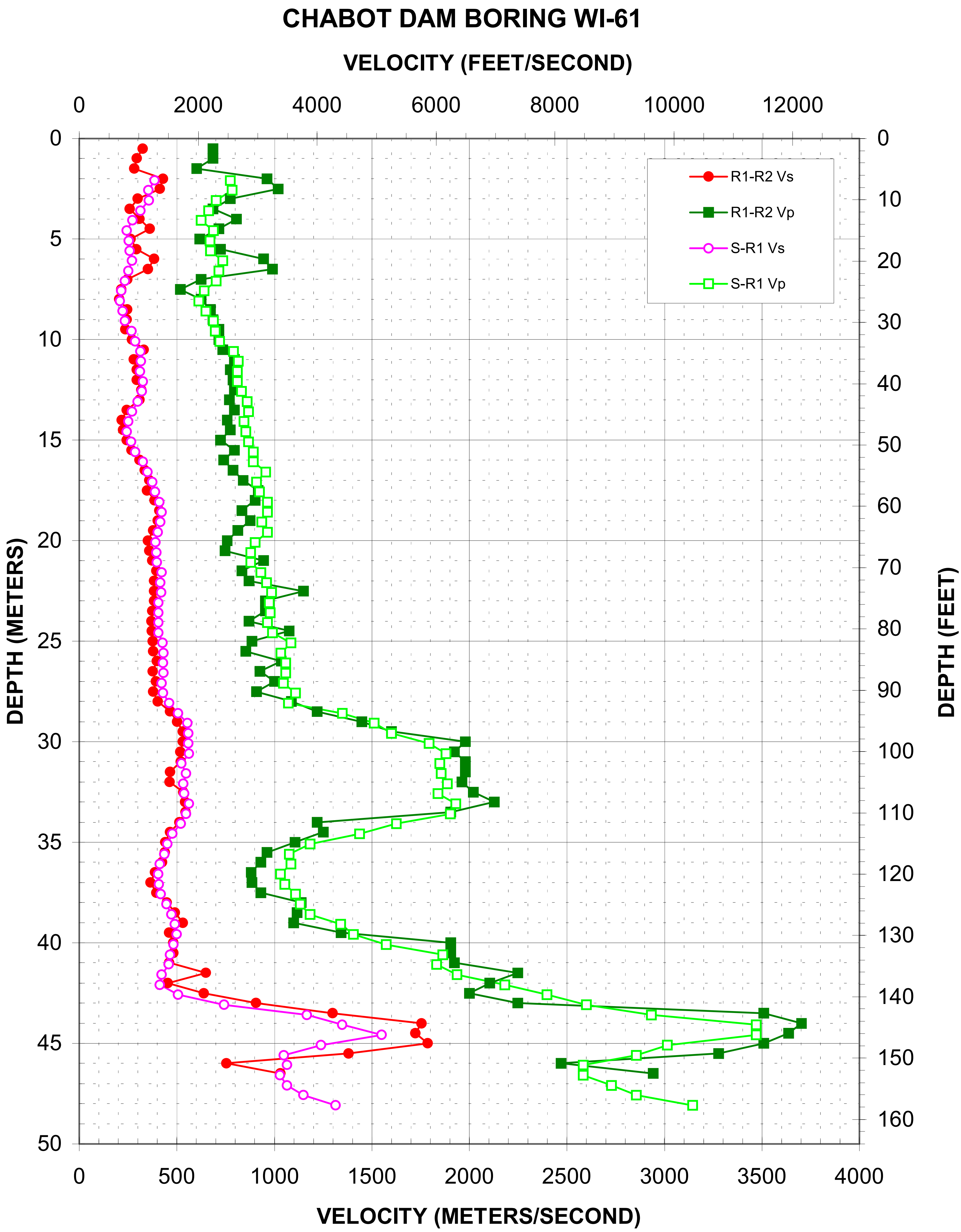

Figure A-3. Borehole WI-61, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
2.1	387	775	6.8	1269	2543
2.6	354	783	8.5	1161	2570
3.1	356	702	10.1	1169	2304
3.6	312	664	11.8	1024	2177
4.1	273	625	13.4	896	2052
4.6	242	689	15.0	794	2260
5.1	254	670	16.7	833	2197
5.6	258	672	18.3	848	2204
6.1	270	736	20.0	884	2413
6.6	252	716	21.6	828	2350
7.1	235	702	23.2	770	2304
7.6	215	640	24.9	705	2100
8.1	210	613	26.5	688	2011
8.6	223	650	28.2	730	2132
9.1	234	689	29.8	766	2260
9.6	269	698	31.4	882	2289
10.1	286	719	33.1	938	2357
10.6	312	789	34.7	1024	2589
11.1	316	816	36.4	1036	2676
11.6	310	810	38.0	1019	2657
12.1	326	810	39.6	1071	2657
12.6	321	831	41.3	1052	2728
13.1	300	861	42.9	985	2825
13.6	270	868	44.6	884	2848
14.1	251	844	46.2	823	2770
14.6	244	854	47.9	799	2803
15.1	265	868	49.5	869	2848
15.6	286	893	51.1	938	2930
16.1	326	893	52.8	1071	2930
16.6	350	956	54.4	1148	3136
17.1	373	908	56.1	1225	2979
17.6	388	923	57.7	1274	3030
18.1	412	964	59.3	1351	3164
18.6	423	964	61.0	1388	3164
19.1	415	935	62.6	1361	3069
19.6	401	964	64.3	1316	3164
20.1	391	900	65.9	1283	2954
20.6	395	879	67.5	1297	2882
21.1	398	879	69.2	1306	2882
21.6	423	931	70.8	1388	3056

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
22.1	417	960	72.5	1366	3150
22.6	420	986	74.1	1377	3236
23.1	406	973	75.7	1331	3193
23.6	406	977	77.4	1331	3207
24.1	406	964	79.0	1331	3164
24.6	406	991	80.7	1331	3251
25.1	426	1085	82.3	1399	3560
25.6	431	1033	83.9	1415	3390
26.1	430	1059	85.6	1410	3473
26.6	431	1059	87.2	1415	3473
27.1	423	1046	88.9	1388	3431
27.6	429	1107	90.5	1407	3632
28.1	461	1072	92.1	1513	3516
28.6	507	1348	93.8	1663	4422
29.1	554	1512	95.4	1816	4961
29.6	559	1601	97.1	1833	5254
30.1	559	1793	98.7	1833	5884
30.6	564	1879	100.3	1849	6164
31.1	525	1847	102.0	1724	6059
31.6	548	1855	103.6	1798	6085
32.1	534	1887	105.3	1754	6191
32.6	538	1839	106.9	1767	6033
33.1	564	1929	108.5	1849	6328
33.6	548	1904	110.2	1798	6245
34.1	520	1625	111.8	1707	5333
34.6	476	1437	113.5	1561	4715
35.1	451	1183	115.1	1480	3880
35.6	435	1077	116.7	1427	3533
36.1	414	1085	118.4	1359	3560
36.6	403	1031	120.0	1323	3382
37.1	409	1053	121.7	1341	3456
37.6	417	1107	123.3	1369	3632
38.1	447	1133	125.0	1468	3718
38.6	472	1183	126.6	1548	3880
39.1	491	1340	128.2	1611	4395
39.6	499	1405	129.9	1637	4608
40.1	483	1572	131.5	1586	5159
40.6	465	1863	133.2	1525	6111
41.1	458	1831	134.8	1502	6008
41.6	423	1938	136.4	1388	6357

Table A-3. Borehole WI-61, S - R1 quality assurance analysis P- and S_H-wave data

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
42.1	414	2181	138.1	1359	7155
42.6	507	2398	139.7	1663	7867
43.1	743	2599	141.4	2438	8526
43.6	1167	2932	143.0	3828	9621
44.1	1348	3472	144.6	4422	11391
44.6	1550	3472	146.3	5085	11391
45.1	1240	3014	147.9	4068	9888
45.6	1048	2855	149.6	3439	9368
46.1	1064	2583	151.2	3490	8476
46.6	1028	2583	152.8	3374	8476
47.1	1064	2730	154.5	3490	8955
47.6	1148	2855	156.1	3767	9368
48.1	1315	3145	157.8	4315	10318

Table A-3, continued. Borehole WI-61, S - R1 quality assurance analysis P- and S_H-wave data

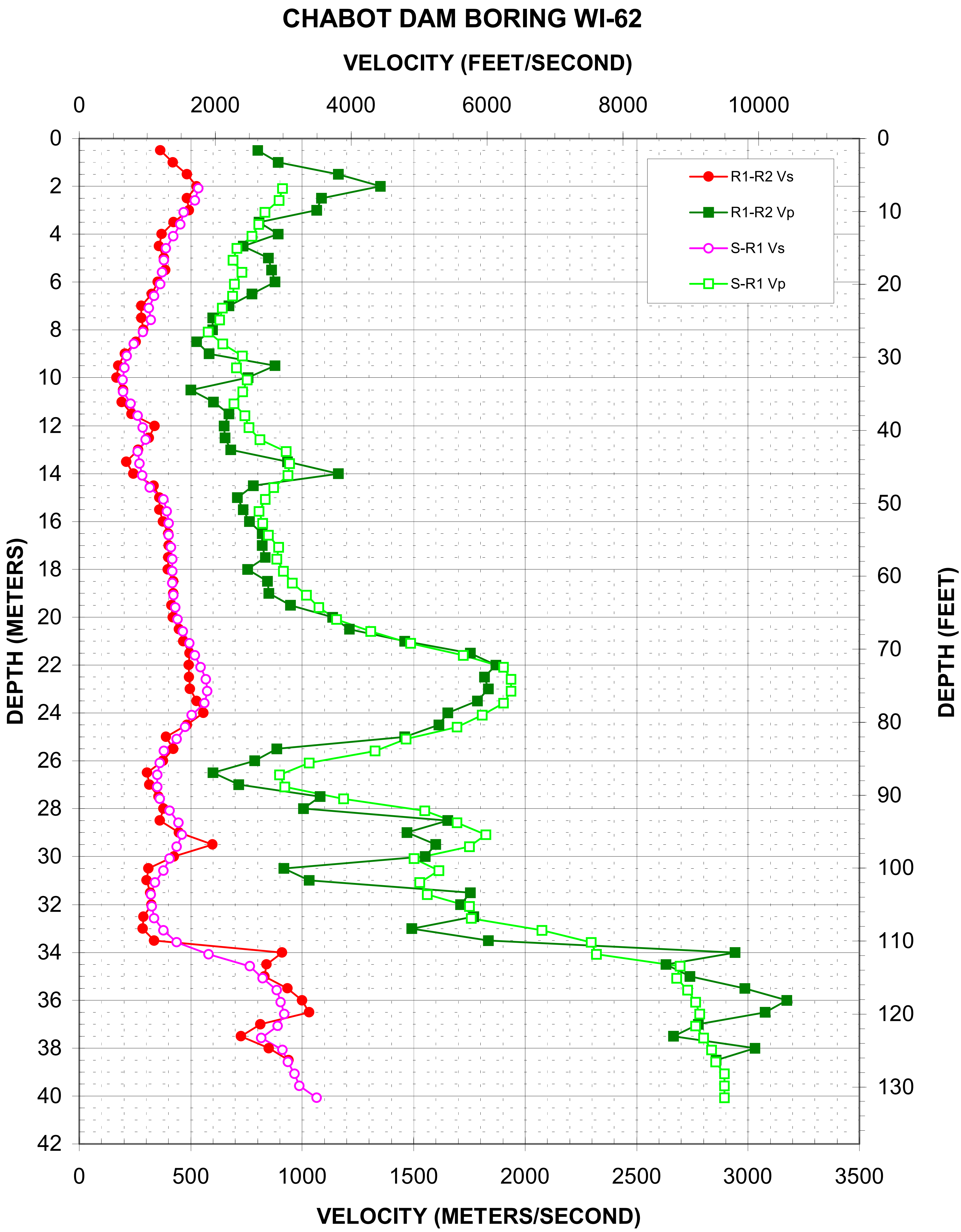

Figure A-4. Borehole WI-62, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
2.1	534	912	6.8	1754	2991
2.6	519	897	8.5	1703	2942
3.1	469	831	10.1	1538	2728
3.6	452	804	11.8	1483	2637
4.1	421	775	13.4	1380	2543
4.6	390	707	15.0	1280	2319
5.1	379	689	16.7	1245	2260
5.6	372	728	18.3	1219	2389
6.1	364	696	20.0	1195	2282
6.6	335	687	21.6	1099	2253
7.1	311	642	23.2	1020	2106
7.6	322	629	24.9	1056	2064
8.1	286	577	26.5	939	1893
8.6	244	644	28.2	802	2113
9.1	213	731	29.8	698	2397
9.6	202	705	31.4	663	2312
10.1	194	753	33.1	637	2472
10.6	197	733	34.7	646	2405
11.1	230	693	36.4	754	2275
11.6	263	743	38.0	862	2438
12.1	283	761	39.6	929	2498
12.6	299	810	41.3	981	2657
13.1	261	927	42.9	858	3042
13.6	271	943	44.6	888	3095
14.1	282	935	46.2	925	3069
14.6	317	871	47.9	1039	2859
15.1	377	835	49.5	1236	2738
15.6	393	807	51.1	1290	2647
16.1	402	822	52.8	1318	2697
16.6	402	848	54.4	1318	2781
17.1	411	893	56.1	1348	2930
17.6	417	886	57.7	1369	2906
18.1	417	916	59.3	1369	3004
18.6	417	956	61.0	1369	3136
19.1	424	1019	62.6	1391	3342
19.6	431	1074	64.3	1413	3524
20.1	441	1154	65.9	1447	3787
20.6	466	1307	67.5	1528	4289
21.1	495	1486	69.2	1625	4876
21.6	519	1722	70.8	1703	5650

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
22.1	545	1904	72.5	1789	6245
22.6	568	1938	74.1	1864	6357
23.1	574	1938	75.7	1883	6357
23.6	562	1904	77.4	1844	6245
24.1	505	1808	79.0	1656	5933
24.6	474	1695	80.7	1554	5562
25.1	438	1466	82.3	1435	4810
25.6	379	1327	83.9	1245	4354
26.1	361	1031	85.6	1186	3382
26.6	350	899	87.2	1148	2948
27.1	350	921	88.9	1148	3023
27.6	361	1186	90.5	1186	3890
28.1	405	1550	92.1	1328	5085
28.6	445	1695	93.8	1459	5562
29.1	462	1824	95.4	1515	5983
29.6	438	1750	97.1	1435	5741
30.1	405	1502	98.7	1328	4927
30.6	377	1613	100.3	1236	5293
31.1	339	1528	102.0	1112	5014
31.6	322	1561	103.6	1056	5122
32.1	326	1750	105.3	1069	5741
32.6	335	1757	106.9	1099	5765
33.1	377	2077	108.5	1236	6813
33.6	438	2296	110.2	1435	7534
34.1	580	2321	111.8	1904	7614
34.6	764	2696	113.5	2507	8844
35.1	822	2679	115.1	2697	8789
35.6	886	2730	116.7	2906	8955
36.1	904	2764	118.4	2966	9069
36.6	919	2782	120.0	3017	9127
37.1	889	2764	121.7	2918	9069
37.6	816	2800	123.3	2676	9186
38.1	912	2837	125.0	2991	9306
38.6	935	2855	126.6	3069	9368
39.1	964	2893	128.2	3164	9493
39.6	986	2893	129.9	3236	9493
40.1	1064	2893	131.5	3490	9493

Table A-4. Borehole WI-62, S - R1 quality assurance analysis P- and S_H-wave data

APPENDIX B

OYO 170 VELOCITY LOGGING SYSTEM

NIST TRACEABLE

CALIBRATION PROCEDURE

TABLE B1

GEOVISION VELOCITY LOGGING EQUIPMENT DESCRIPTION AND CALIBRATION PROCEDURES

EQUIPMENT	FUNCTION	CALIBRATION REQUIREMENTS	MAINTENANCE REQUIREMENTS
OYO Model 170 Suspension Logging Data Logger	Records data from probe and sends control signals to probe	Every twelve months, calibrate sample clock using an NTIS-traceable external signal counter and signal generator per attached procedure. (see Attachment B2)	Diagnose and repair by manufacturer's authorized representative if sample clock is out of specification or instrument fails.
OYO Model 170 Suspension Logging Probe	Suspended in borehole to provide both seismic source and sense wave arrivals at two locations 1 meter apart	No sensor calibration is necessary, as amplitude is not important to the velocity measurement.	Repair as needed by manufacturer-trained personnel.
Winch System (several interchangeable models available)	The winch and cable suspend the probe in the borehole and connect it to the data logger	No calibration required	Repair as needed. Lubricate moving parts frequently, and keep cable clean.

ATTACHMENT B2

CALIBRATION PROCEDURE FOR GEOVISION'S VELOCITY LOGGING SYSTEM

1.0 OYO Model 170 Data Logger Unit

1.1 Purpose

The purpose of this calibration procedure is to verify that the sample clock of the OYO Model 170 is accurate to within 1%.

1.2 Calibration Frequency

The calibration described in this procedure shall be performed every twelve months minimum.

1.3 Test Equipment

- Function Generator, Krohn Hite 5400B or equivalent
- Frequency Counter, HP 5315A or equivalent, current NIST traceable calibration
- Test cable, function generator to OYO 170 Data Logger input channels

1.4 Procedure

- Connect function generator to OYO Model 170 data logger using test cable
- Set up function generator to produce a 100.0 Hz, 0.250 volt peak square wave
- Record a data record with 100 microsecond sample period
- Measure the square wave frequency in the digital data using the data logger's screen display or utility software

1.5 Calibration Criteria

The measured square wave frequency in the digital data must fall between 99.0 and 101.0 Hz to be deemed acceptable. If outside this range, the data logger must be repaired and retested.

Calibration Report

MICRO PRECISION CALIBRATION INC.
11562 Knott Avenue. Suite 3, Garden Grove, CA 92841
Ph. (714) 901-5659 Fax (714) 901-5649

Customer: GEOVISION Corona CA 92882

Account: 15214

Instrument: BB9414 Digital Universal Test Center

Mfg: Tenma	Model: 72-5085	Serial #: MB00006378
Size:	Resltn:	Location:

Cust Ctrl:	Dept:	P.O.:
Job Number: L19625	Report Number: 146108	Report Date: 081903

Work Performed: Inspected, cleaned, and calibrated. Page 1 of 1

Parts Replaced: None

Received Condition: In tolerance Returned Condition: In tolerance

Function Tested	
Multimeter	Function Generator cont'
AC/DC Volts & Current	Amplitude
Resistance & Capacitance	Sine wave distortion& flatness
Power Supply	Square wave symmetry, rise & fall time
Voltage	Triangle wave linearity
Current	TTL rise & fall time, output level
Ripple	
Frequency Counter	
Frequency range & Accuracy	
Input Sensitivity	
Function Generator	
Frequency	

Ctrl #	Manufacture, Model #, & Description of standards used for calibration	Due Date	Traceability
T1300	Hewlett Packard 33120A Arbitary Waveform Ge	011704	83836
J8300	Hewlett Packard 8657A Signal Generator	052704	137792
P5300	Tektronix THS710 Oscilloscope w/DMM	030504	133387
L1600	Hewlett Packard 34401A Multimeter	121803	97906

Services provided conform to ANSI/NCSL Z540-1-1994, ISO 10012-1:1992 or ISO/IEC 17025 as applicable.
All work performed complies with MPC Quality System QM 540-94, Rev 1e.

Environmental: 73 Deg F / 45% Rh

Uncertainty: Accuracy Ratio > 4:1

Cal Procedure: Manufacture Man

Technician: HOMERO E. CARDONA

Test Date: 081903

Cycle: 12

Due Date: 081904

Quality Approval: QC 3

Form Cert 2-25-02

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SEISMOGRAPH CALIBRATION DATA SHEET REV 7/11/02

INSTRUMENT DATA

SYSTEM MFR: OYO — MODEL NO.: 3331
SERIAL NO.: 12004 — CALIBRATION DATE: 8/21/03
BY: R. STELLER — DUE DATE: 8/21/04

COUNTER MFR: TENMA — MODEL NO.: 72-5085
SERIAL NO.: MB00006378 — CALIBRATION DATE: 8/19/03
BY: MICROPRECISION CAL — DUE DATE: 8/19/04

FCTN GEN MFR: TENMA — MODEL NO.: 72-5085
SERIAL NO.: MB00006378 — CALIBRATION DATE: 8/19/03
BY: MICROPRECISION CAL — DUE DATE: 8/19/04

SYSTEM SETTINGS:

GAIN: 10
FILTER: 20 KHZ
RANGE: 100 MSEC
DELAY: 0
STACK: 1 (STD) 1
PULSE: 1.6 MSEC
DISPLAY: VARIABLE
SYSTEM DATE = CORRECT DATE & TIME 8/21/03 4:29 PM

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISKETTE AND PAPER TAPE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	001	100.0	90.0	90.0	90.0	100.0
SQUARE	002	100.0	90.0	90.0	90.0	100.0
SINE	003	100.0	90.0	90.0	90.0	100.0
SINE	004	100.0	90.0	90.0	90.0	100.0

CALIBRATED BY: ROBERT STELLER — 8/21/03 — [signature]
NAME — DATE — SIGNATURE

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SEISMOGRAPH CALIBRATION DATA SHEET REV 7/11/02

INSTRUMENT DATA

SYSTEM MFR: OYO | MODEL NO.: 3331
SERIAL NO.: 15014 | CALIBRATION DATE: 8/21/03
BY: R. STELLER | DUE DATE: 8/21/04

COUNTER MFR: TENMA | MODEL NO.: 72 - 5085
SERIAL NO.: MB 00006378 | CALIBRATION DATE: 8/19/03
BY: MICROPRECISION CAL | DUE DATE: 8/19/04

FCTN GEN MFR: TENMA | MODEL NO.: 72 - 5085
SERIAL NO.: MB 00006378 | CALIBRATION DATE: 8/19/03
BY: MICROPRECISION CAL | DUE DATE: 8/19/04

SYSTEM SETTINGS:

GAIN: 10
FILTER: 20 KHz
RANGE: 100 msec
DELAY: 0
STACK: 1 (STD) 1
PULSE: 1.6 msec
DISPLAY: VARIABLE
SYSTEM: DATE = CORRECT DATE & TIME 8/21/04 4:13 pm

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISKETTE AND PAPER TAPE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	101	100.0	90.0	90.0	90.0	100.0
SQUARE	102	100.0	90.0	90.0	90.0	100.0
SINE	103	100.0	90.1	90.0	90.0	100.0
SINE	104	100.0	90.0	90.0	89.9	100.0

CALIBRATED BY: ROBERT STELLER 8/21/03 [signature]
NAME DATE SIGNATURE

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SEISMOGRAPH CALIBRATION DATA SHEET REV 7/11/02

INSTRUMENT DATA

SYSTEM MFR: OYO — MODEL NO.: 3331
SERIAL NO.: 19029 — CALIBRATION DATE: 8/21/03
BY: R. STELLER — DUE DATE: 8/21/04

COUNTER MFR: TENMA — MODEL NO.: 72-5085
SERIAL NO.: MB00006378 — CALIBRATION DATE: 8/19/03
BY: MICROPRECISION CAL — DUE DATE: 8/19/04

FCTN GEN MFR: TENMA — MODEL NO.: 72-5085
SERIAL NO.: MB00006378 — CALIBRATION DATE: 8/19/03
BY: MICROPRECISION CAL — DUE DATE: 8/19/04

SYSTEM SETTINGS:

GAIN: 10
FILTER: 20 KHZ
RANGE: 100 MSEC
DELAY: 0
STACK: 1 (STD) 1
PULSE: 1.6 MSEC
DISPLAY: VARIABLE
SYSTEM: DATE = CORRECT DATE & TIME 8/21/03 4:39 pm

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISKETTE AND PAPER TAPE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	201	100.0	90.0	90.0	90.0	100.0
SQUARE	202	100.0	90.0	90.0	90.0	100.0
SINE	203	100.0	90.1	90.0	90.0	100.0
SINE	204	100.0	90.0	90.0	90.1	100.0

CALIBRATED BY: ROBERT STELLER 8/21/03 [signature]
NAME DATE SIGNATURE

Appendix F

Laboratory Testing

This appendix presents the results of laboratory tests completed as part of the Chabot Dam dynamic stability analysis.

The laboratory tests were conducted at the URS Pleasant Hill Laboratory. Prior to conducting the tests, the soil and rock samples were visually inspected in the laboratory. Appropriate tests were selected to assist in subsequent evaluation of material properties for use in the dynamic stability analyses. The types of tests performed are listed below, along with the ASTM standard procedure designations.

- In-Situ Moisture-density (ASTM D2216, D2937)
- Sieve analysis (ASTM D422)
- Hydrometer analysis (ASTM D422)
- Atterberg Limits (ASTM D4318)
- Consolidated-undrained (CIU) triaxial strength with pore pressure measurements (ASTM D4267).
- Unconfined compressive strength (ASTM D2166)

The laboratory tests were generally conducted in accordance with the noted ASTM standards. Consolidation pressures for the CIU tests were selected based on estimated overburden pressures at each sample depth and location. The test results are summarized in Table F-1. Summary plots of plasticity data are presented in Figures F-1 through F-5. Summary plots of gradation data are presented in Figures F-6 through F-25. The detailed lab sheets for the shear strength tests are also attached. Abbreviated test results for each sample are also included in the boring logs at the appropriate depths.

TABLE F-1
SUMMARY OF LABORATORY TEST DATA

Sample Information				USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	Sieve / Hydrometer				Atterberg Limits			Triaxial CIU		G_s	Unconfined Compressive Strength, psf
Boring Number	Sample Number	Depth, feet	Elevation, feet				Gravel, %	Sand, %	<#200, %	<5μ, %	LL	PL	PI	Max. Shear Stress, psi	Effective Confining Pressure, psi		
WI-59	3B	6-6.5	204.0	SM	15.0	115.0	16	54	31		71	43	28				
WI-59	8B	17.5-18	192.5	SC	15.6	118.6	29	51	20		37	20	17				
WI-59	10	22.5-25	186.5	SC	19.0	112.3	12	67	20								
WI-59	13	31.5-33	178.0	SC			8	65	27		37	19	18				
WI-59	15	43-44.5	166.5	SC-SM			19	62	19	8							
WI-59	16B	48-48.5	162.0	SC-SM	8.3		21	64	15		24	17	7				
WI-59	18T	52.5-53.5	157.5	CL	19.0	106.9	4	43	53	27	34	17	17	27.5	41.7	2.71	
WI-59	18B	53.5-54.5	156.5	SC	15.7	114.9	9	63	29		34	18	16	72.0	83.3		
WI-59	21	60-61.5	149.5	SC			11	58	32								
WI-59	23B	67-68	143.0	SC			27	54	19								
WI-59	25	72.5-74	137.0	SM			30	49	21		56	31	25				
WI-59	26B	78-79	132.0	CL/CH	17.0	110.7	4	46	50	20	50	26	24	87.2	111.1	2.66	
WI-59	29B	86-86.5	124.0	CL			4	40	57	25	35	20	15				
WI-60	3	7-8.5	171.5	SC-SM			12	73	15		25	19	6				
WI-60	5B	12.5-13	166.5	SC-SM	12.8	117.6	26	60	13								
WI-60	7	17-18.5	161.5	GC			52	36	12								
WI-60	9	22-23.5	156.5	SC	12.1		32	54	14		33	20	13				
WI-60	12	29.5-31	149.0	SC			23	62	15								
WI-60	16	39.5-41	139.0	SC			23	55	22		34	21	13				
WI-60	18	44.5-46	134.0	SC			7	60	33	13	28	20	8				
WI-60	20	49.5-51	129.0	SC			24	57	19								
WI-60	21	52-53.5	126.5	SC			31	52	17								
WI-60	24	59.5-61	119.0	SC			21	59	20								
WI-60	27B	67.5-68.5	111.5	SC			23	61	17								
WI-60	28	69.5-71	109.0	GP-GC			68	23	9								
WI-61	2	5-6.5	244.5	SC			11	49	40								
WI-61	3A	8-8.5	242.0	SC	15.4	120.9	13	51	36								
WI-61	8B	26-56.5	224.0	CL	19.4	108.7	5	31	64		42	16	26				2,520
WI-61	10B	36-36.5	214.0	CL	19.0	110.6					41	20	21				2,400

TABLE F-1
SUMMARY OF LABORATORY TEST DATA

Sample Information				USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	Sieve / Hydrometer				Atterberg Limits			Triaxial CIU		G_s	Unconfined Compressive Strength, psf
Boring Number	Sample Number	Depth, feet	Elevation, feet				Gravel, %	Sand, %	<#200, %	<5μ, %	LL	PL	PI	Max. Shear Stress, psi	Effective Confining Pressure, psi		
WI-61	11B	41-42.5	209.0	CL	14.5	119.8	7	43	50	28	38	18	20	21.8	27.8	2.70	
WI-61	13B	51-51.5	199.0	CL	20.5	109.6					37	17	20				2,440
WI-61	15B	61-62.5	189.0	SC	11.8	129.6	19	39	42	21	35	17	18	33.0	55.6	2.78	
WI-61	17B	71-71.5	179.0	SC	15.7	122.1	20	38	41								
WI-61	20B	81-81.5	169.0	CL	15.6	118.7	5	36	58		34	15	19				
WI-61	21	85-86.5	164.5	SC			14	56	29								
WI-61	23	95-96.5	154.5	SC			25	57	18								
WI-61	26C	111-111.5	139.0	SC	16.7	118.2	15	55	30								
WI-61	27	115-116.5	134.5	SC			18	43	40		41	21	20				
WI-61	29	125-126.5	124.5	SC			20	37	43		36	18	18				
WI-62	2	5-6.5	218.5	SC			21	47	31								
WI-62	3C	10-10.5	214.0	SM	11.8	128.9	23	52	24		64	42	22				
WI-62	7	21.5-23	202.0	SC			18	56	26		35	20	15				
WI-62	8	26-27.5	197.5	SC			19	55	26								
WI-62	10B	33-33.5	191.0	CL			6	43	51								
WI-62	11B	37-37.5	187.0	CL			0	30	70	26	29	17	12				
WI-62	12A	37.5-38	186.5	CL			0	14	86		39	17	22				
WI-62	12C	38.5-39	185.5	SC			9	62	28								
WI-62	14	45-46.5	178.5	CL			1	42	57		36	16	20				
WI-62	15	49-50.5	174.5	SC			10	63	28								
WI-62	18B	61-61.5	163.0	SC	15.1		18	65	18		33	20	13				
WI-62	20T	65-66	159.0	CL	23.8	101.5	5	43	52	33	44	22	22	34.4	55.6	2.71	
WI-62	20B	66.5-67.5	157.0	SC	14.2	120.2	16	57	27					57.9	138.9		
WI-62	20B	66.5-67.5	157.0	SC	16.2						42	21	21				
WI-62	22B	73-73.5	151.0	SC			17	59	24								
WI-62	25C	81.5-82	142.5	SC	21.0	106.0	0	54	46		28	16	12				
WI-62	26	83-84.5	140.5	SC			4	51	44								
WI-62	28	88.5-90	135.0	CL			0	44	55		31	15	16				
WI-62	30	93.5-95	130.0	SC			9	45	46		40	20	20				

TABLE F-1
SUMMARY OF LABORATORY TEST DATA

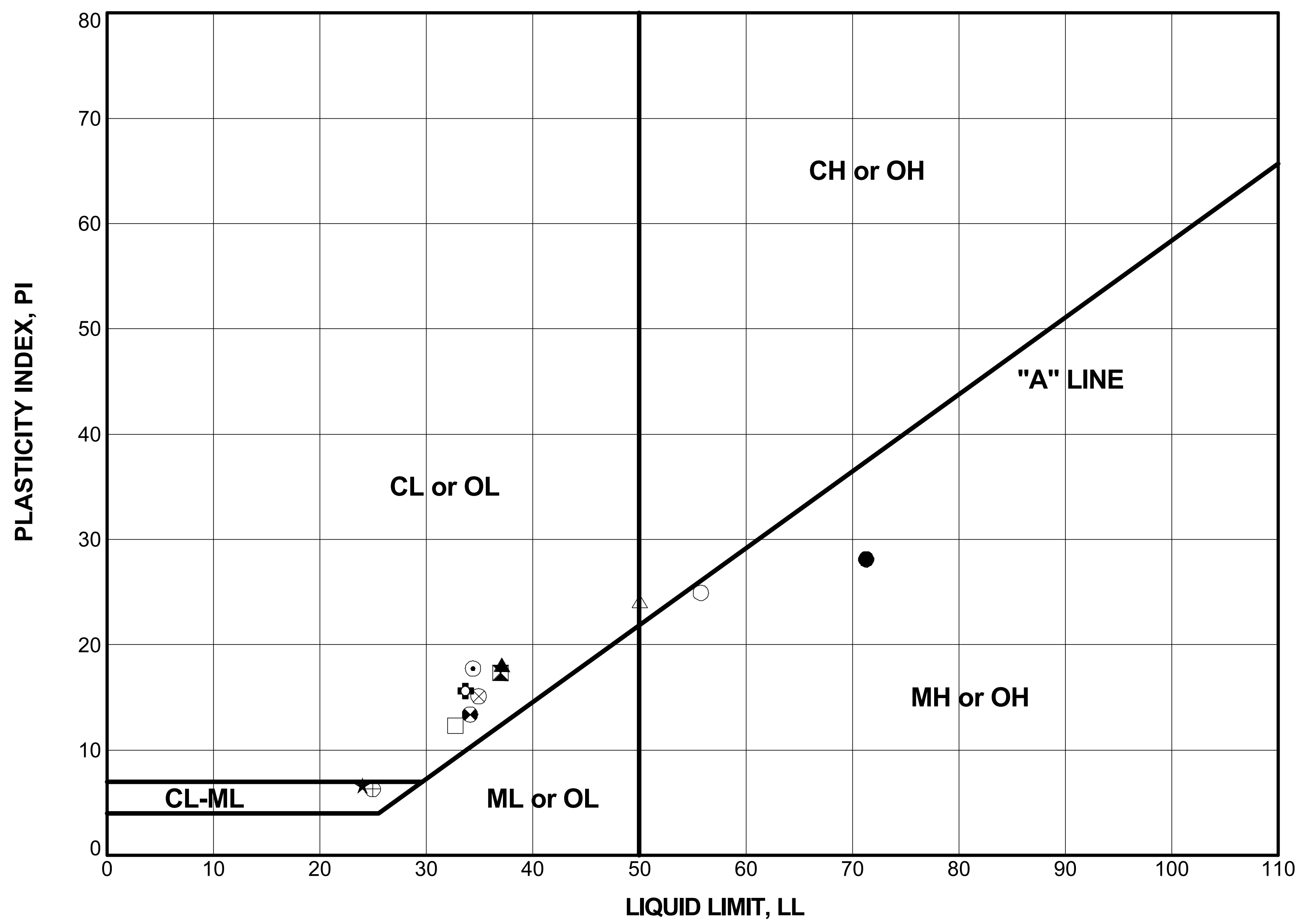
Sample Information				USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	Sieve / Hydrometer				Atterberg Limits			Triaxial CIU		G_s	Unconfined Compressive Strength, psf
Boring Number	Sample Number	Depth, feet	Elevation, feet				Gravel, %	Sand, %	<#200, %	<5μ, %	LL	PL	PI	Max. Shear Stress, psi	Effective Confining Pressure, psi		
WI-62	31B	97.5-100	126.5	SM	15.8	112.8	4	52	44	15				79.2	83.3	2.58	
WI-62	31B	97.5-100	126.5	SM	17.6						46	33	13				
WI-62	32	100-101.5	123.5	CL			3	45	52		32	19	13				
WI-62	34	105.5-107	118.0	SC			2	72	26		27	16	11				
WI-63	4	10.5-12	161.0	SC			19	63	18								
WI-63	7	18-19.5	153.5	SC			25	59	16								
WI-63	9B	24-24.5	148.0	SC			18	61	20	10	31	19	12				
WI-63	11	28-29.5	143.5	SC			23	61	16								
WI-63	14	35.5-37	136.0	SC			21	60	20								
WI-63	15	38-39.5	133.5	CH			0	19	81	50	60	24	36				
WI-63	16	40-42.5	131.0	SC	16.8		13	69	18		39	21	18				
WI-63	18	45.5-47	126.0	SC			31	51	18								
WI-64	5B	20-22.5	229.0	CL	19.9	107.3	12	29	59	37				11.0	13.9	2.69	
WI-64	5B	20-22.5	229.0	CL	22.9						44	21	23				
WI-64	9B	40-42.5	209.0	SC	18.6	109.9	11	40	49	31				36.0	83.3	2.66	
WI-64	9B	40-42.5	209.0	SC	20.0						42	21	21				
WI-64	12	55-56.5	194.5	SC			20	50	30		41	20	21				
WI-64	15C	71-71.5	179.0	SC	13.0		25	58	17		33	17	16				
WI-64	16	75-76.5	174.5	SC			19	62	18								
WI-64	19B	90.5-91	159.5	SC	16.6		15	61	24		43	21	22				
WI-64	20	95-96.5	154.5	SC			10	71	19								
WI-64	23C	111-111.5	139.0	SC	22.3		15	40	44		41	20	21				
WI-64	24B	115.5-116	134.5	SC			20	53	27								
WI-64	27	125-126.5	124.5	SC-SM			4	52	44								
WI-65	5	10-11.5	157.5	SC			11	70	18								
WI-65	8	17.5-19	150.0	CH			0	3	97		60	22	38				
WI-65	10	22.5-24.5	144.7	CL			0	14	86	33							
WI-65	12B	28-29	140.0	SC			21	51	28								
WI-65	14	32.5-34	135.0	SC			31	53	16								

TABLE F-1
SUMMARY OF LABORATORY TEST DATA

Sample Information				USCS Group Symbol	In Situ Water Content, %	In Situ Dry Unit Weight, pcf	Sieve / Hydrometer				Atterberg Limits			Triaxial CIU		G_s	Unconfined Compressive Strength, psf
Boring Number	Sample Number	Depth, feet	Elevation, feet				Gravel, %	Sand, %	<#200, %	<5μ, %	LL	PL	PI	Max. Shear Stress, psi	Effective Confining Pressure, psi		
WI-65	19	45-46.5	122.5	SC			23	62	15								
WI-65	22	52.5-54	115.0	SC			26	51	23								
WI-65	23	55-56.5	112.5	SC			0	82	18								
WI-65	25	57.5-59	110.0	SC			23	58	19								
WI-66	2B	7-7.5	172.0	SC	20.2		14	49	37		37	18	19				
WI-66	5B	15.5-16.5	163.5	CL			1	27	73								
WI-66	8T	24-25	155.0	CL	17.3	112.1	0	42	58					30.8	13.9	2.65	
WI-66	8T	24-25	155.0	CL	17.2						27	17	10				
WI-66	8B	25-26	154.0	SC	12.5	122.4	16	42	42	19				32.9	27.8		
WI-66	8B	25-26	154.0	SC	22.4						28	17	11				
WI-66	13	33-34.5	145.5	SC			38	45	17								
WI-66	16B	39-40	140.0	CL			1	48	51		28	18	10				
WI-66	18	46-47.5	132.5	CL			8	30	62		36	17	19				
WI-67	2	10-12.5	163.0	CL			0	19	81	49	44	21	23				
WI-67	6A	19.5-21	154.5	CL	28.6	92.8	8	27	64	36				15.0	55.6	2.66	
WI-67	6A	19.5-21	154.5	CL	22.4						37	18	19				
WI-67	7	21.5-23	152.0	SC			29	55	16								
WI-67	9A	26.5-27.5	147.5	SC			15	53	32								
WI-67	14B	41-41.5	133.0	SC	16.7		28	40	32		34	20	14				
WI-67	18A	50.5-51	123.5	CL	20.7		0	31	69		32	16	16				

NOTE: The laboratory tests were performed in general accordance with the following standards:

Moisture Content - ASTM Test Method D2216 or D2937
Dry Unit Weight - ASTM Test Method D2937
Particle Size Distribution Analysis by Mechanical Sieving and Hydrometer - ASTM Test Method D422
Atterberg Limits Test - ASTM D4318
Isotropically Consolidated Undrained Triaxial Test - ASTM Test Method D4267
Specific Gravity (G_s) - ASTM Test Method D854
Unconfined Compressive Strength Test - ASTM Test Method D2166



Boring Number	Sample Number	Depth (feet)	Test Symbol	Water Content (%)	LL	PL	PI	Classification
WI-59	3B	6-6.5	●	15	71	43	28	Silty Sand with Gravel (SM)
WI-59	8B	17.5-18	⧗	16	37	20	17	Clayey Sand with Gravel (SC)
WI-59	13	31.5-33	▲	12	37	19	18	Clayey Sand (SC)
WI-59	16B	48-49.5	★	8	24	17	7	Silty Clayey Sand with Gravel (SC-SM)
WI-59	18T	52.5-53.5	⊙	19	34	17	17	Sandy Clay (CL)
WI-59	18B	53.5-54.5	✿	16	34	18	16	Clayey Sand (SC)
WI-59	25	72.5-74	○	15	56	31	25	Silty Sand with Gravel (SM)
WI-59	26B	78-79	△	17	50	26	24	Sandy Clay (CL/CH)
WI-59	29B	86-86.5	⊗		35	20	15	Sandy Clay (CL)
WI-60	3	7-8.5	⊕	9	25	19	6	Silty Clayey Sand (SC-SM)
WI-60	9	22-23.5	□	12	33	20	13	Clayey Sand with Gravel (SC)
WI-60	16	39.5-41	⧓	16	34	21	13	Clayey Sand with Gravel (SC)

Report: ATTERBERG_PLOT_12 PTS; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-60

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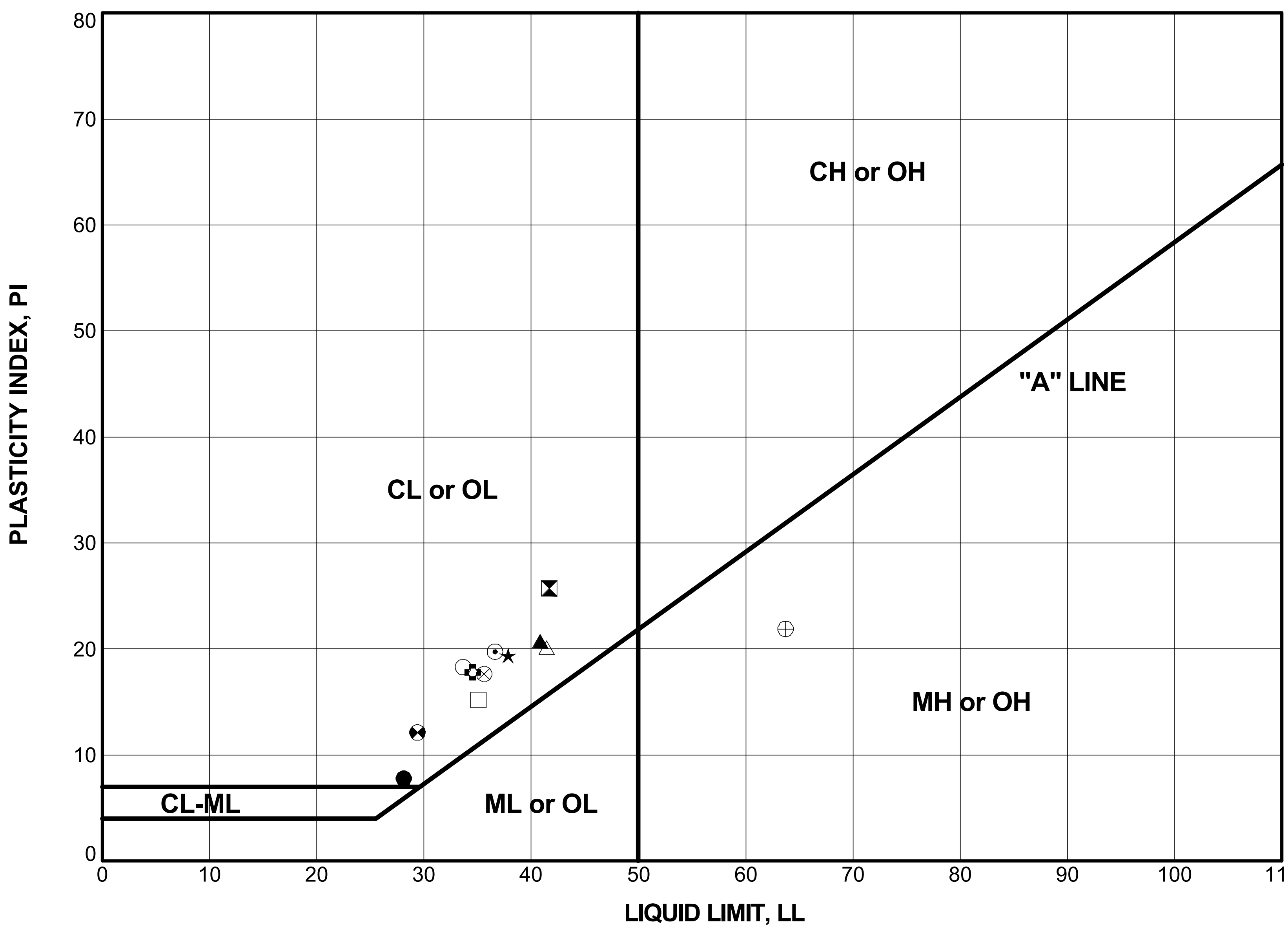
26814536.C0000

PLASTICITY CHART

URS

Figure F-1



Boring Number	Sample Number	Depth (feet)	Test Symbol	Water Content (%)	LL	PL	PI	Classification
WI-60	18	44.5-46	●		28	20	8	Clayey Sand (SC)
WI-61	8B	26-56.5	⧗	19	42	16	26	Sandy Clay (CL)
WI-61	10B	36-36.5	▲	19	41	20	21	Sandy Clay (CL)
WI-61	11B	41-42.5	★	15	38	18	20	Sandy Clay (CL)
WI-61	13B	51-51.5	⊙	20	37	17	20	Sandy Clay (CL)
WI-61	15B	61-62.5	✡	12	35	17	18	Clayey Sand with Gravel (SC)
WI-61	20B	81-81.5	○	16	34	15	19	Sandy Clay (CL)
WI-61	27	115-116.5	△	16	41	21	20	Clayey Sand with Gravel (SC)
WI-61	29	125-126.5	⊗	12	36	18	18	Clayey Sand with Gravel (SC)
WI-62	3C	10-10.5	⊕	12	64	42	22	Silty Sand with Gravel (SM)
WI-62	7	21.5-23	□	15	35	20	15	Clayey Sand with Gravel (SC)
WI-62	11B	37-37.5	⊛		29	17	12	Sandy Clay (CL)

Report: ATTERBERG_PLOT_12 PTS; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-62

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
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PLASTICITY CHART

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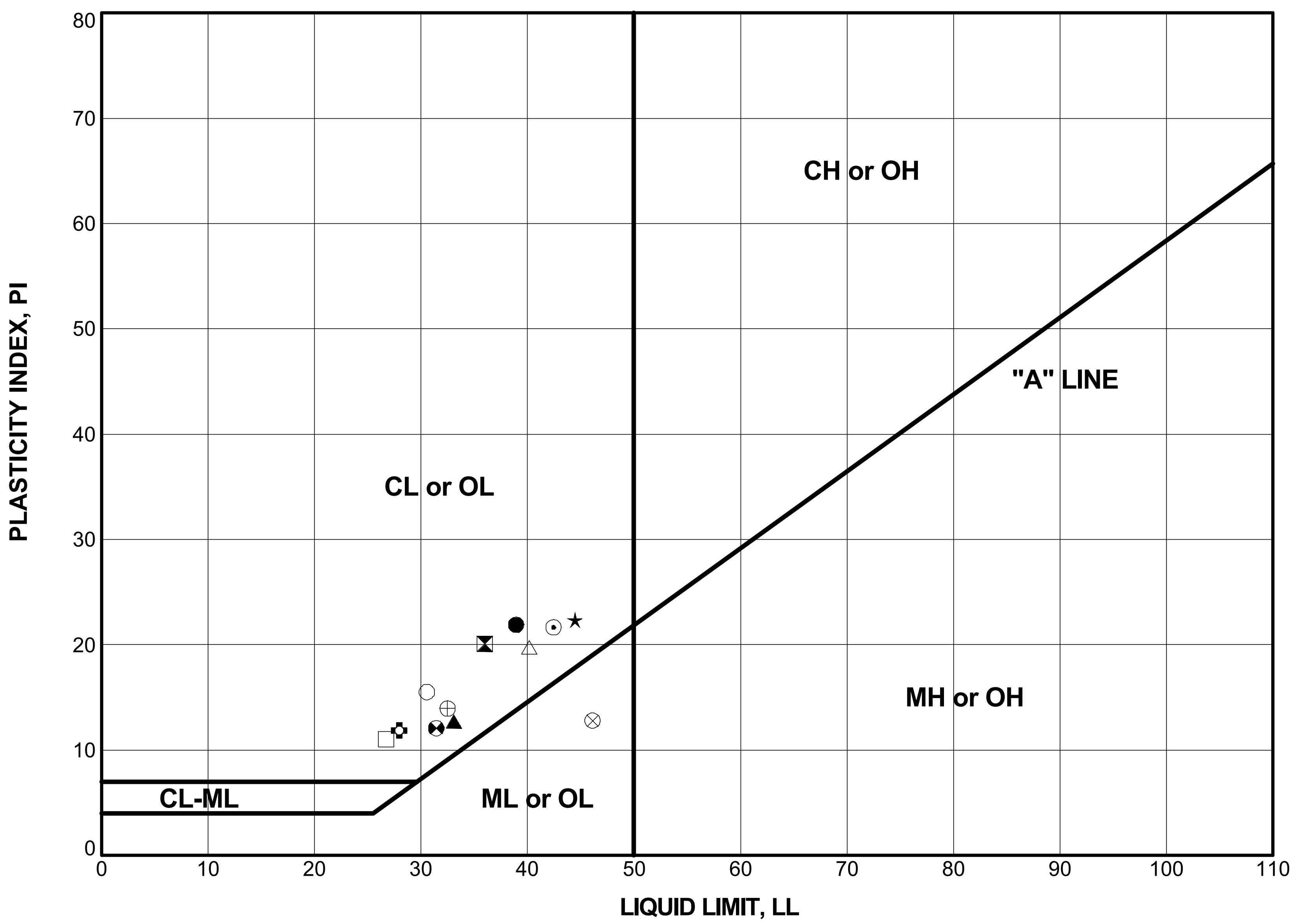
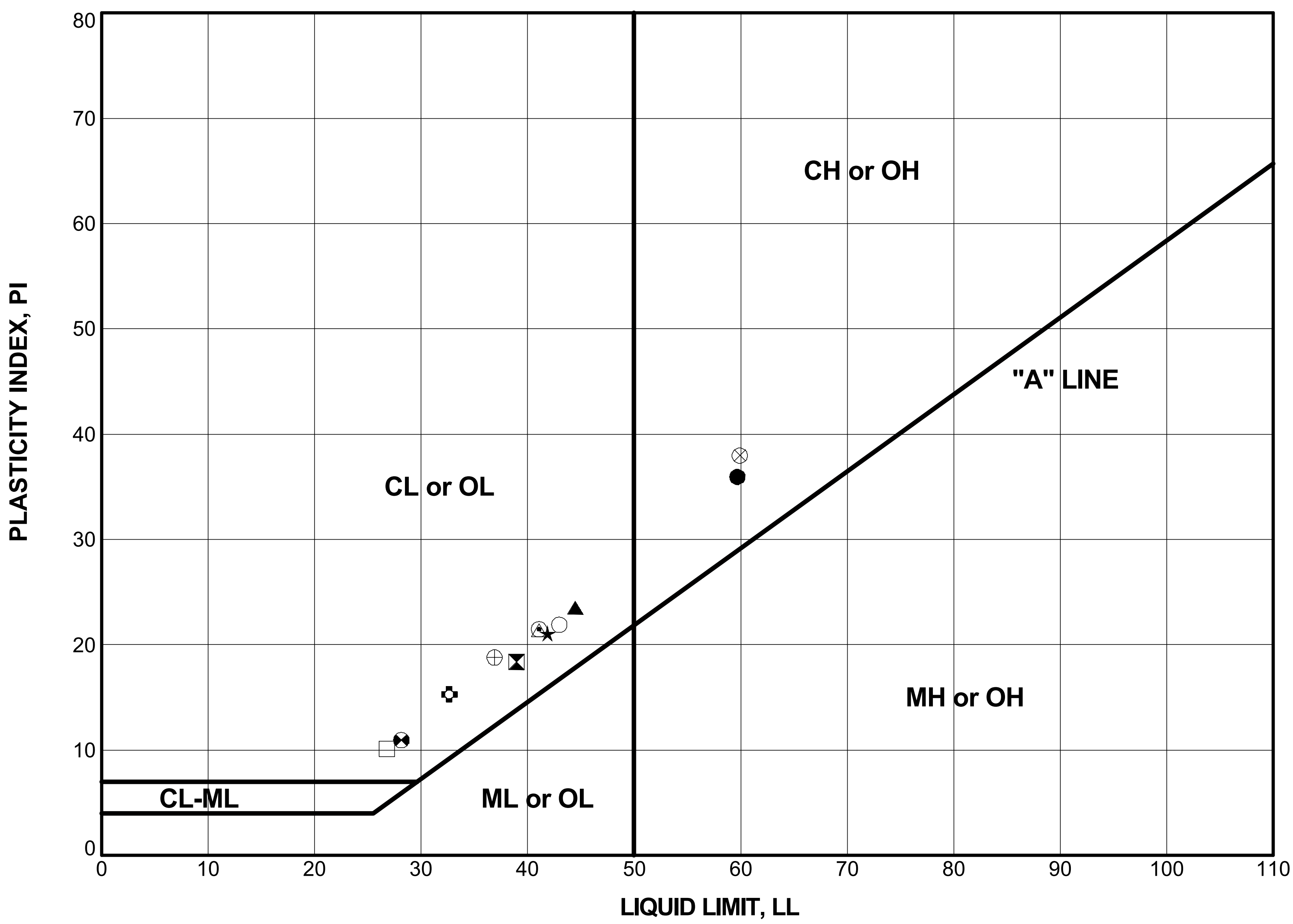
Figure F-2



Boring Number	Sample Number	Depth (feet)	Test Symbol	Water Content (%)	LL	PL	PI	Classification
WI-62	12A	37.5-38	●	28	39	17	22	Clay (CL)
WI-62	14	45-46.5	⧗	22	36	16	20	Sandy Clay (CL)
WI-62	18B	61-61.5	▲	15	33	20	13	Clayey Sand with Gravel (SC)
WI-62	20T	65-66	★	24	44	22	22	Sandy Clay (CL)
WI-62	20B	66.5-67.5	⊙	16	42	21	21	Clayey Sand with Gravel (SC)
WI-62	25C	81.5-82	✿	21	28	16	12	Clayey Sand (SC)
WI-62	28	88.5-90	○	15	31	15	16	Sandy Clay (CL)
WI-62	30	93.5-95	△	19	40	20	20	Clayey Sand (SC)
WI-62	31B	97.5-100	⊗	18	46	33	13	Silty Sand (SM)
WI-62	32	100-101.5	⊕	18	33	19	14	Sandy Clay (CL)
WI-62	34	105.5-107	□	15	27	16	11	Clayey Sand (SC)
WI-63	9B	24-24.5	⋈		31	19	12	Clayey Sand with Gravel (SC)



Boring Number	Sample Number	Depth (feet)	Test Symbol	Water Content (%)	LL	PL	PI	Classification
WI-63	15	38-39.5	●		60	24	36	Clay with Sand (CH)
WI-63	16	40-42.5	⧗	17	39	21	18	Clayey Sand (SC)
WI-64	5B	20-22.5	▲	23	44	21	23	Sandy Clay (CL)
WI-64	9B	40-42.5	★	20	42	21	21	Clayey Sand (SC)
WI-64	12	55-56.5	⊙	17	41	20	21	Clayey Sand with Gravel (SC)
WI-64	15C	71-71.5	✿	13	33	17	16	Clayey Sand with Gravel (SC)
WI-64	19B	90.5-91	○	17	43	21	22	Clayey Sand with Gravel (SC)
WI-64	23C	111-111.5	△	22	41	20	21	Clayey Sand with Gravel (SC)
WI-65	8	17.5-19	⊗	36	60	22	38	Clay (CH)
WI-66	2B	7-7.5	⊕	20	37	18	19	Clayey Sand (SC)
WI-66	8T	24-25	□	17	27	17	10	Sandy Clay (CL)
WI-66	8B	25-26	◉	22	28	17	11	Clayey Sand with Gravel (SC)

Report: ATTERBERG_PLOT_12 PTS; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-66

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PLASTICITY CHART

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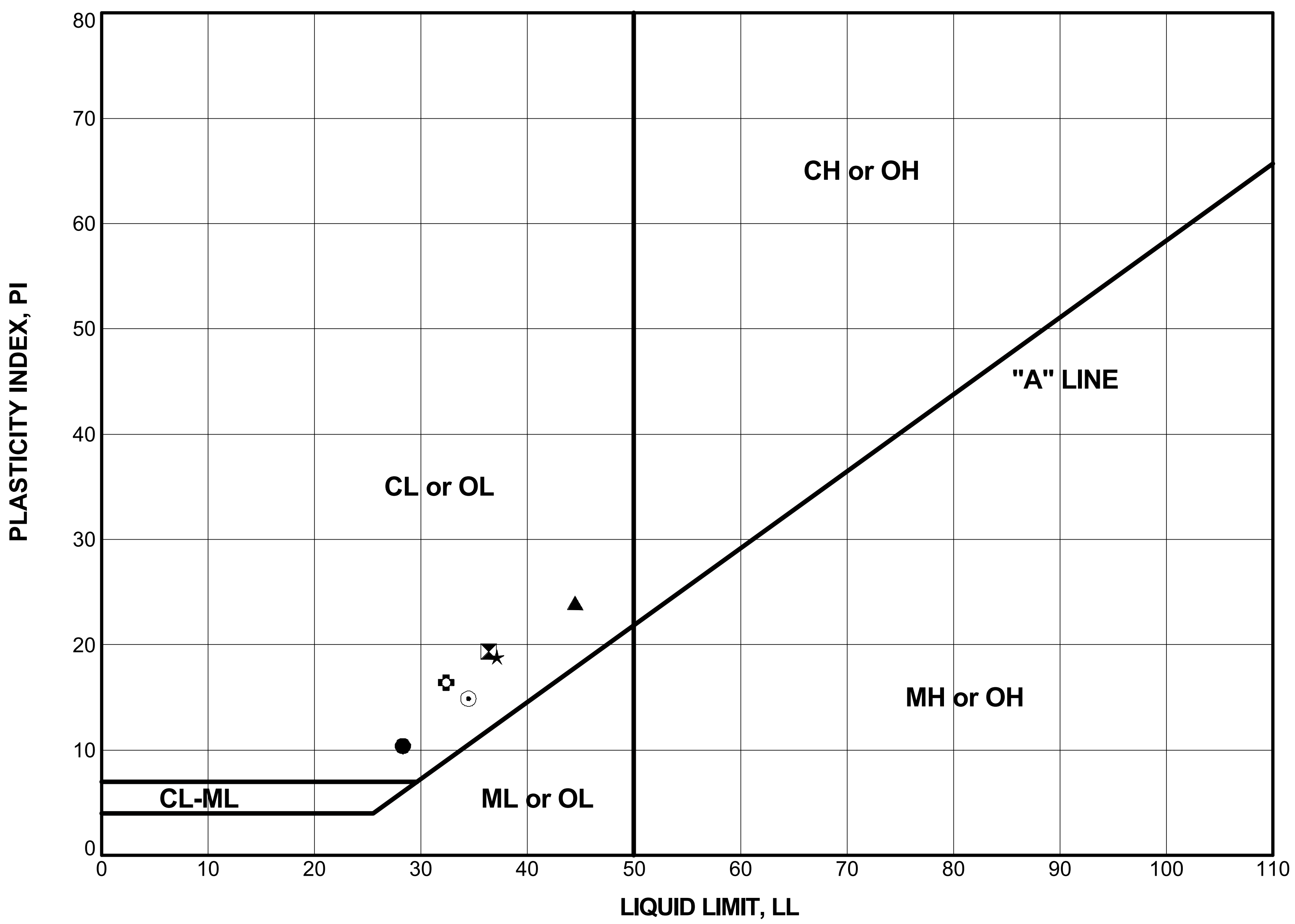
Figure F-4



Boring Number	Sample Number	Depth (feet)	Test Symbol	Water Content (%)	LL	PL	PI	Classification
WI-66	16B	39-40	●	17	28	18	10	Sandy Clay (CL)
WI-66	18	46-47.5	⧗	17	36	17	19	Sandy Clay (CL)
WI-67	2	10-12.5	▲		44	21	23	Clay with Sand (CL)
WI-67	6A	19.5-21	★	22	37	18	19	Sandy Clay (CL)
WI-67	14B	41-41.5	⊙	17	34	20	14	Clayey Sand with Gravel (SC)
WI-67	18A	50.5-51	✿	21	32	16	16	Sandy Clay (CL)

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PLASTICITY CHART

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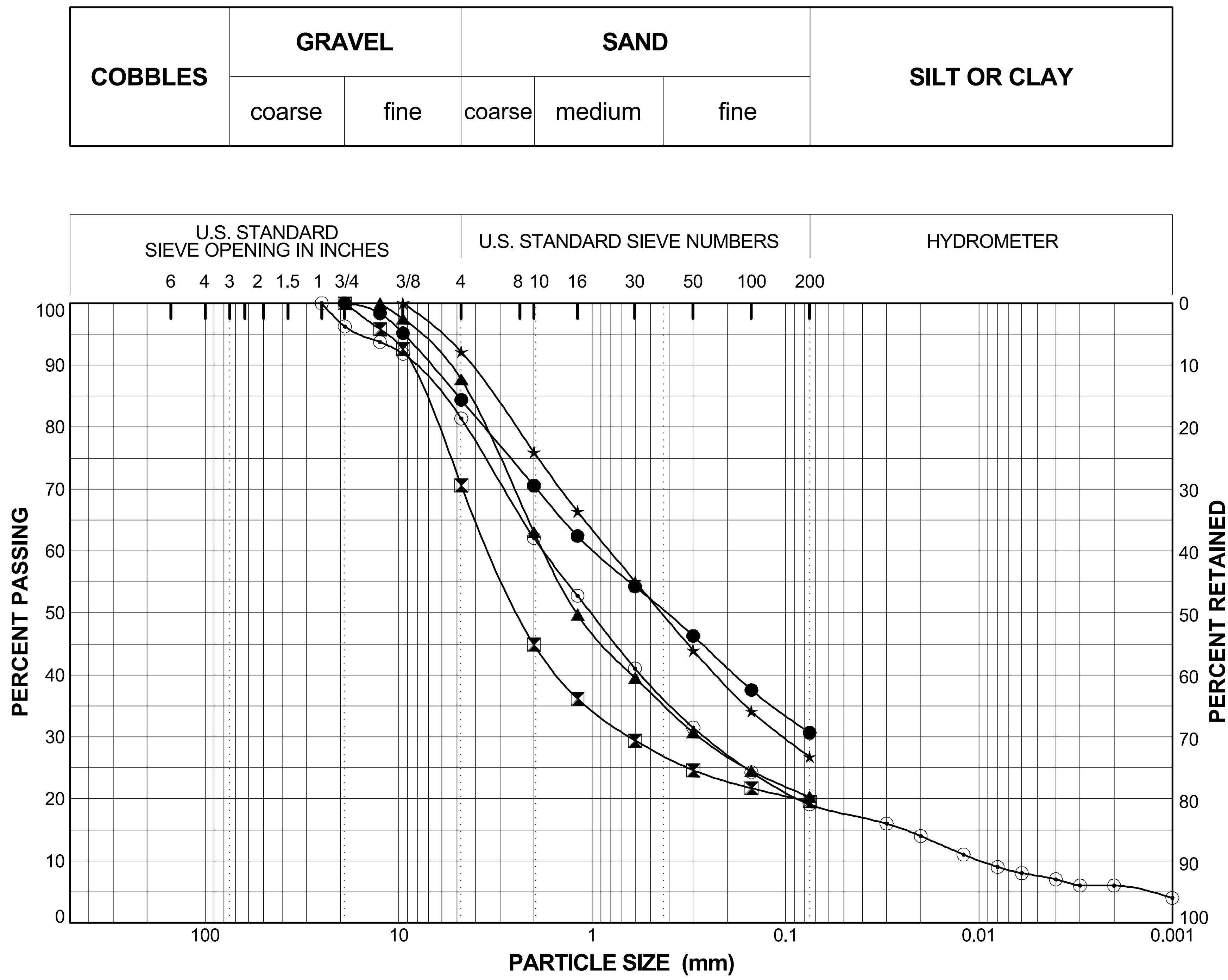
Figure F-5



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-59	3B	6-6.5	●	71	28	Silty Sand with Gravel (SM)
WI-59	8B	17.5-18	⧗	37	17	Clayey Sand with Gravel (SC)
WI-59	10	22.5-25	▲			Clayey Sand (SC)
WI-59	13	31.5-33	★	37	18	Clayey Sand (SC)
WI-59	15	43-44.5	⊙			Silty Clayey Sand with Gravel (SC-SM)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-59

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PARTICLE SIZE DISTRIBUTION CURVES

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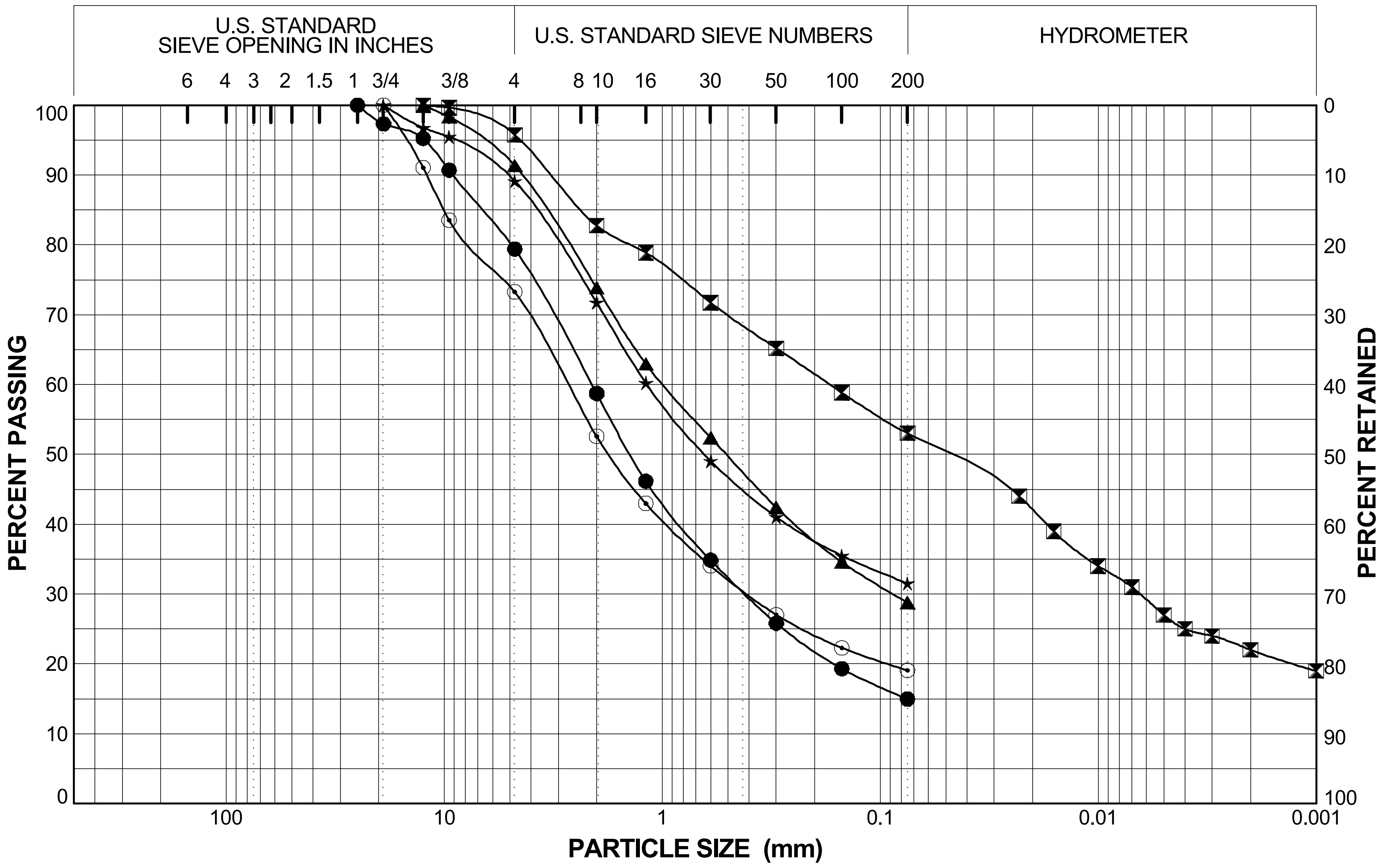
Figure F-6

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-59	16B	48-49.5	●	24	7	Silty Clayey Sand with Gravel (SC-SM)
WI-59	18T	52.5-53.5	⧗	34	17	Sandy Clay (CL)
WI-59	18B	53.5-54.5	▲	34	16	Clayey Sand (SC)
WI-59	21	60-61.5	★			Clayey Sand (SC)
WI-59	23B	67-68	⊙			Clayey Sand with Gravel (SC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-59

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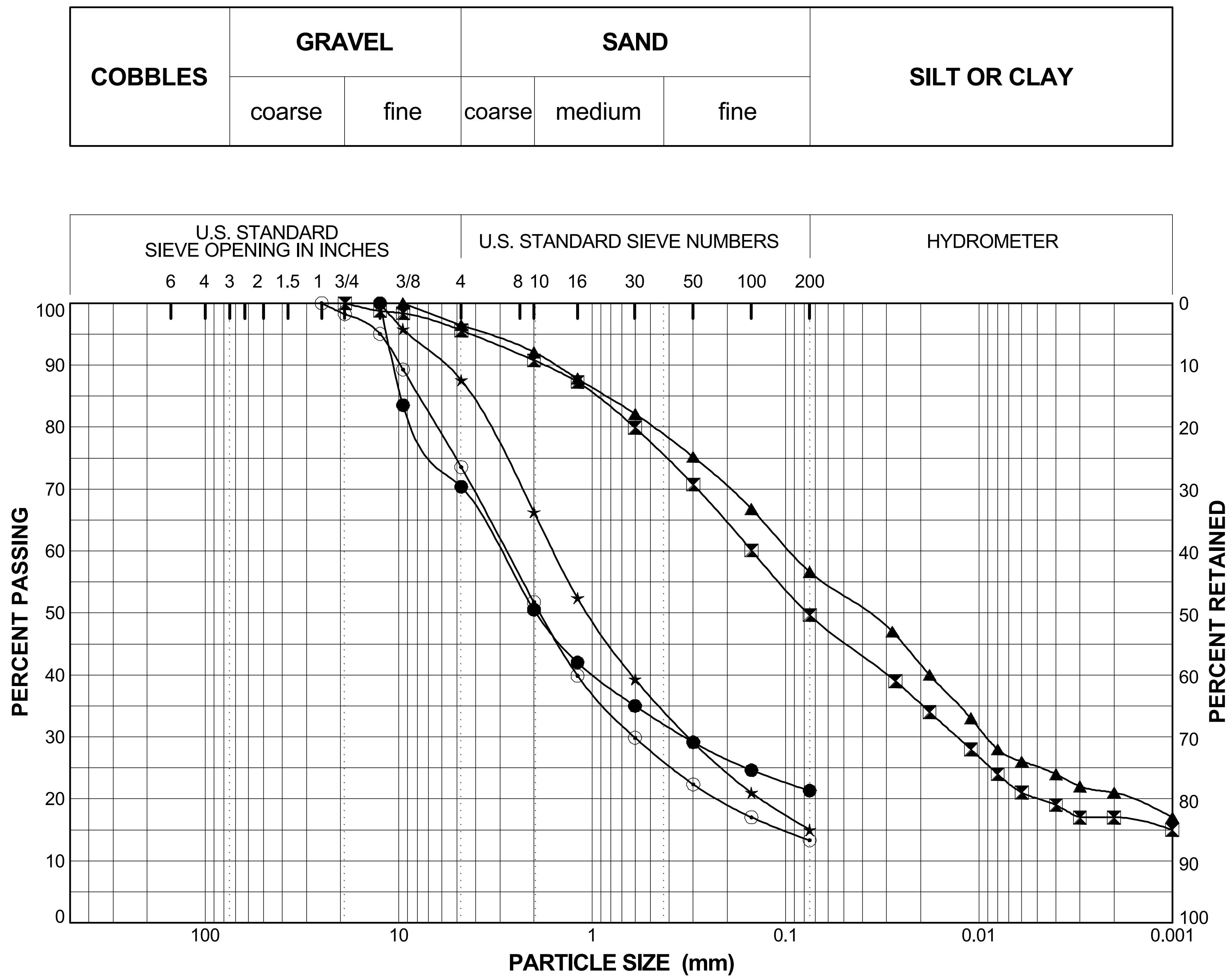
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-7



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-59	25	72.5-74	●	56	25	Silty Sand with Gravel (SM)
WI-59	26B	78-79	⧗	50	24	Sandy Clay (CL/CH)
WI-59	29B	86-86.5	▲	35	15	Sandy Clay (CL)
WI-60	3	7-8.5	★	25	6	Silty Clayey Sand (SC-SM)
WI-60	5B	12.5-13	⊙			Silty Clayey Sand with Gravel (SC-SM)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-60

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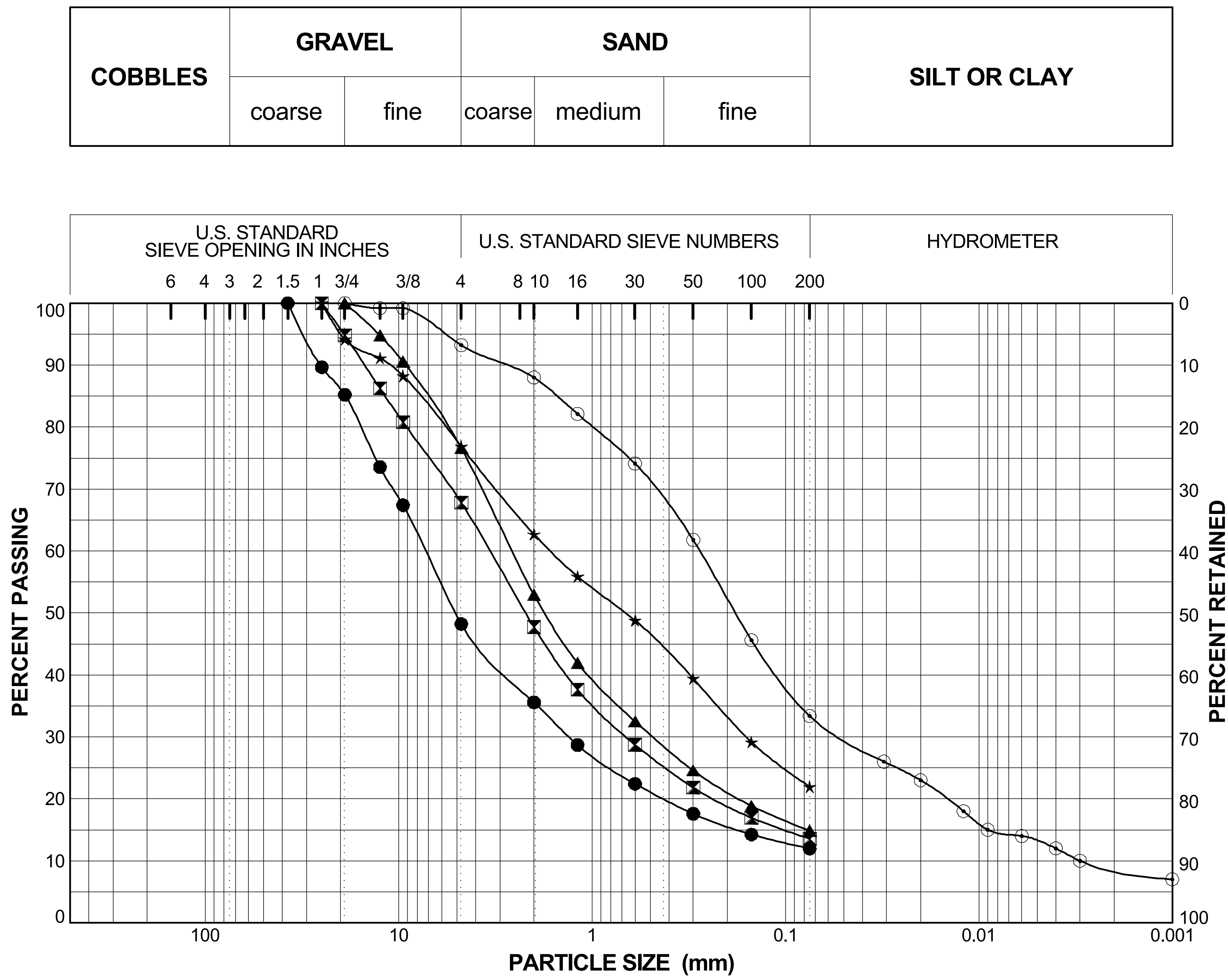
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

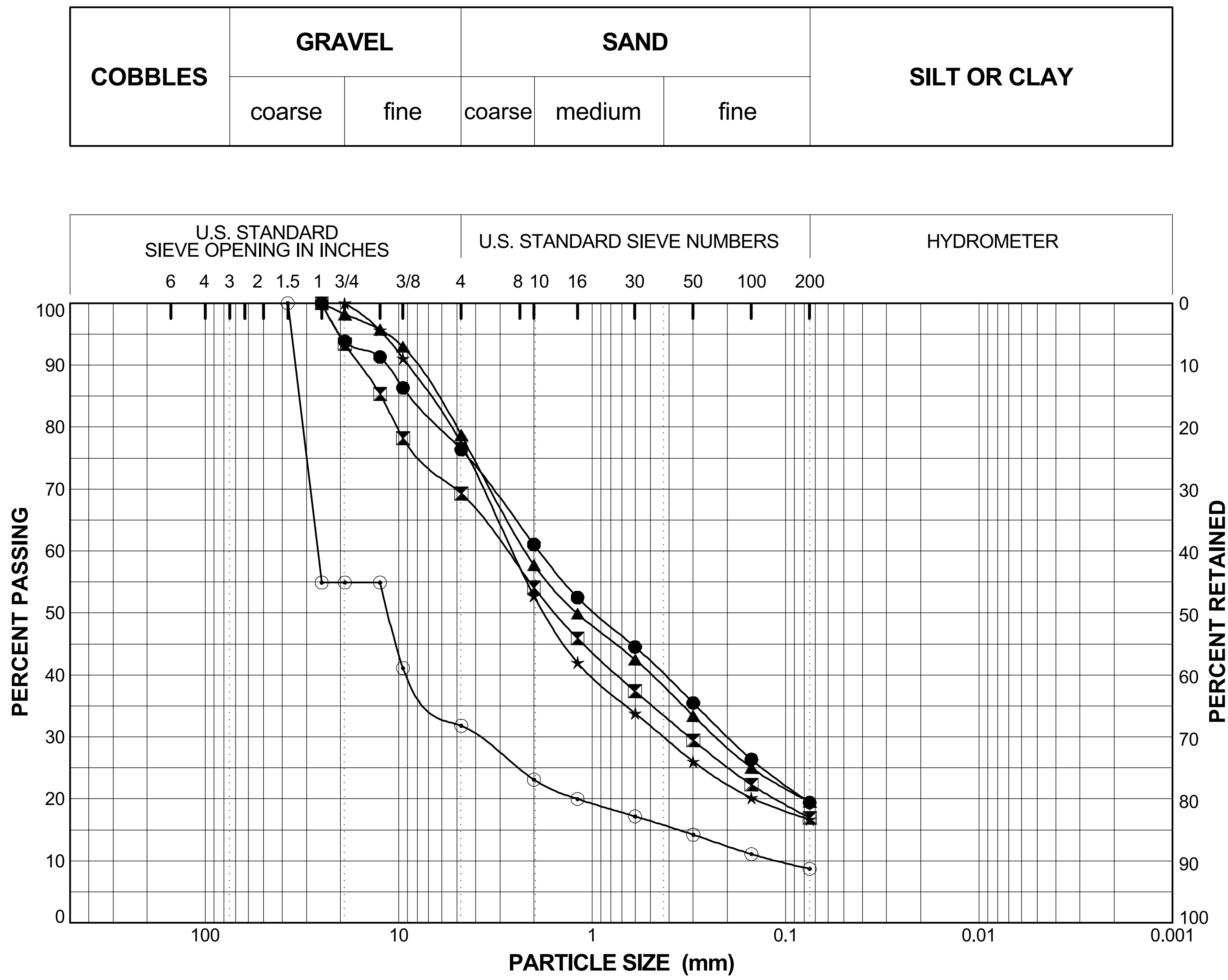
Figure F-8



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-60	7	17-18.5	●			Clayey Gravel with Sand (GC)
WI-60	9	22-23.5	⧗	33	13	Clayey Sand with Gravel (SC)
WI-60	12	29.5-31	▲			Clayey Sand with Gravel (SC)
WI-60	16	39.5-41	★	34	13	Clayey Sand with Gravel (SC)
WI-60	18	44.5-46	⊙	28	8	Clayey Sand (SC)

PARTICLE SIZE DISTRIBUTION CURVES

Figure F-9



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-60	20	49.5-501	●			Clayey Sand with Gravel (SC)
WI-60	21	52-53.5	⧗			Clayey Sand with Gravel (SC)
WI-60	24	59.5-61	▲			Clayey Sand with Gravel (SC)
WI-60	27B	67.5-68.5	★			Clayey Sand with Gravel (SC)
WI-60	28	69.5-71	⊙			Poorly Graded Gravel with Clay (GP-GC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-60

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PARTICLE SIZE DISTRIBUTION CURVES

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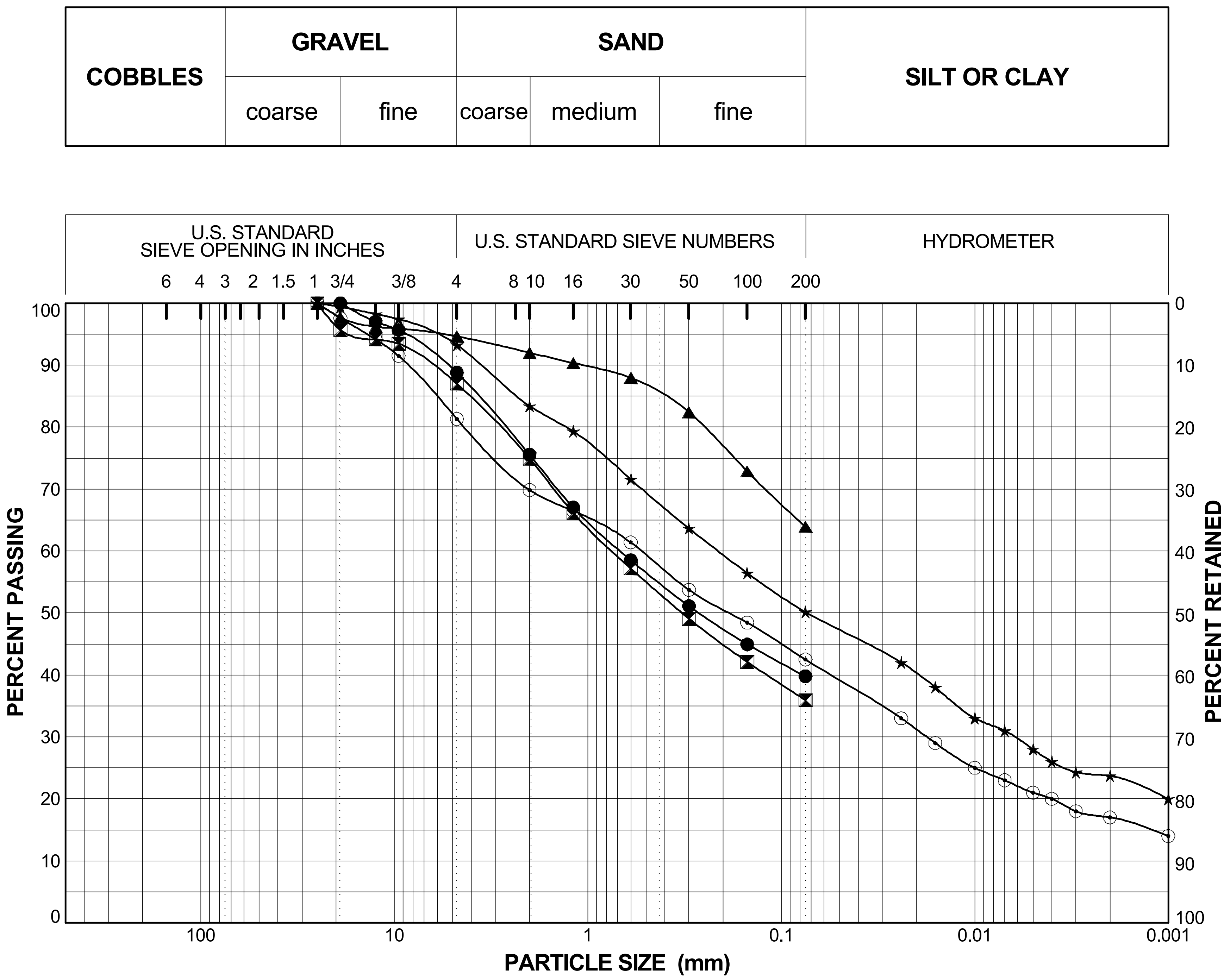
Figure F-10



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-61	2	5-6.5	●			Clayey Sand (SC)
WI-61	3A	8-8.5	⧗			Clayey Sand (SC)
WI-61	8B	26-56.5	▲	42	26	Sandy Clay (CL)
WI-61	11B	41-42.5	★	38	20	Sandy Clay (CL)
WI-61	15B	61-62.5	⊙	35	18	Clayey Sand with Gravel (SC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-61

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PARTICLE SIZE DISTRIBUTION CURVES

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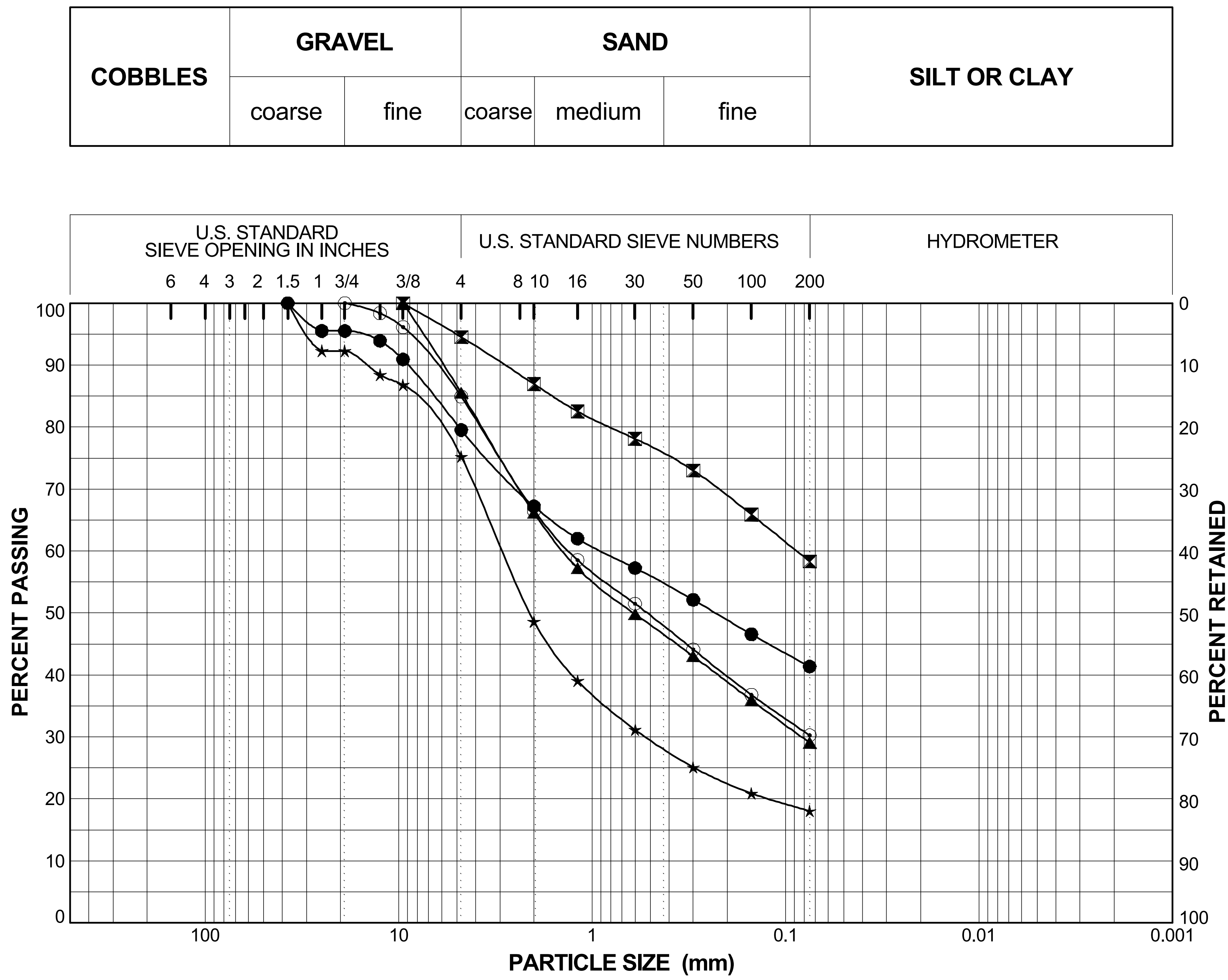
Figure F-11



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-61	17B	71-71.5	●			Clayey Sand with Gravel (SC)
WI-61	20B	81-81.5	⧗	34	19	Sandy Clay (CL)
WI-61	21	85-86.5	▲			Clayey Sand (SC)
WI-61	23	95-96.5	★			Clayey Sand with Gravel (SC)
WI-61	26C	111-111.5	⊙			Clayey Sand with Gravel (SC)

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PARTICLE SIZE DISTRIBUTION CURVES

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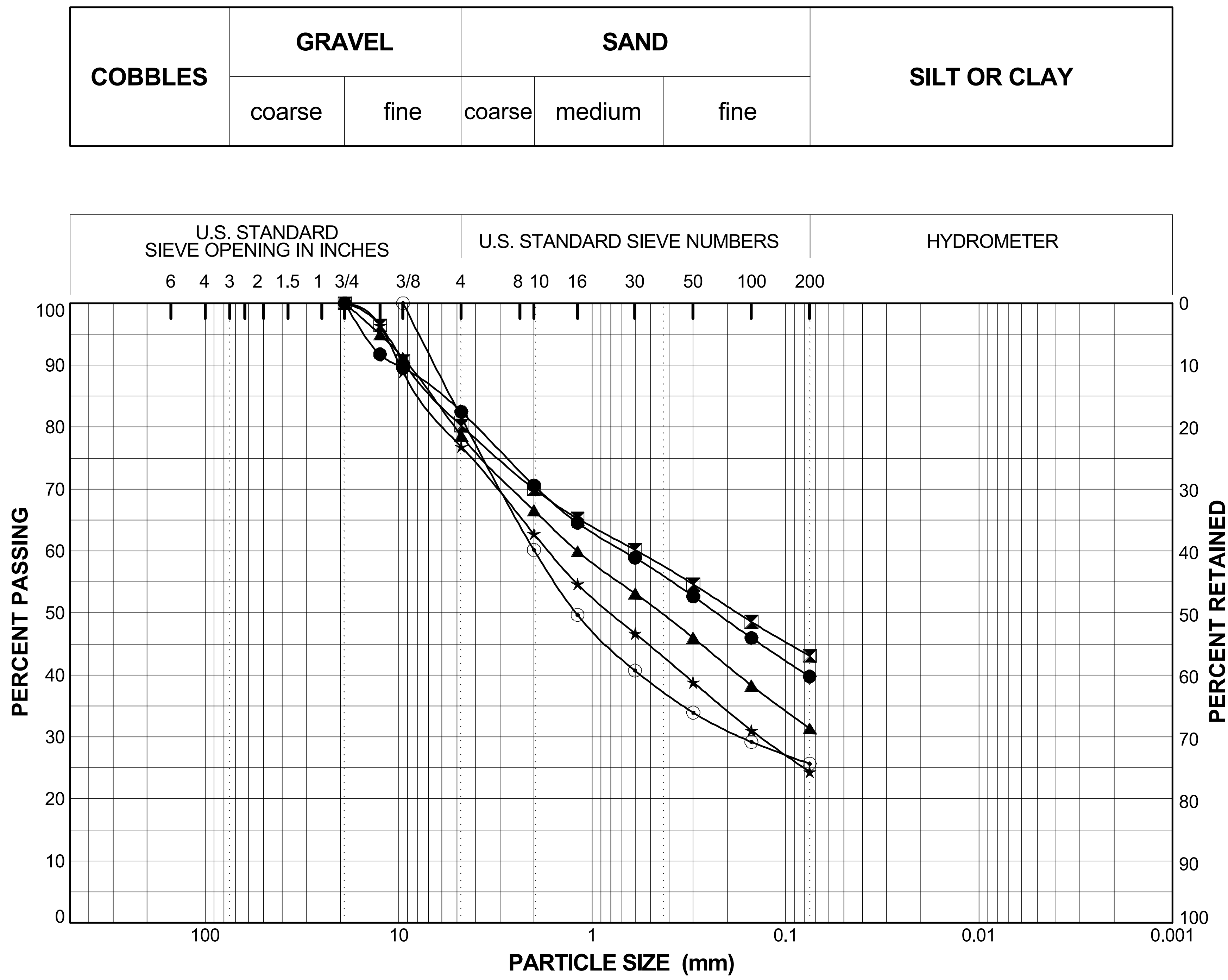
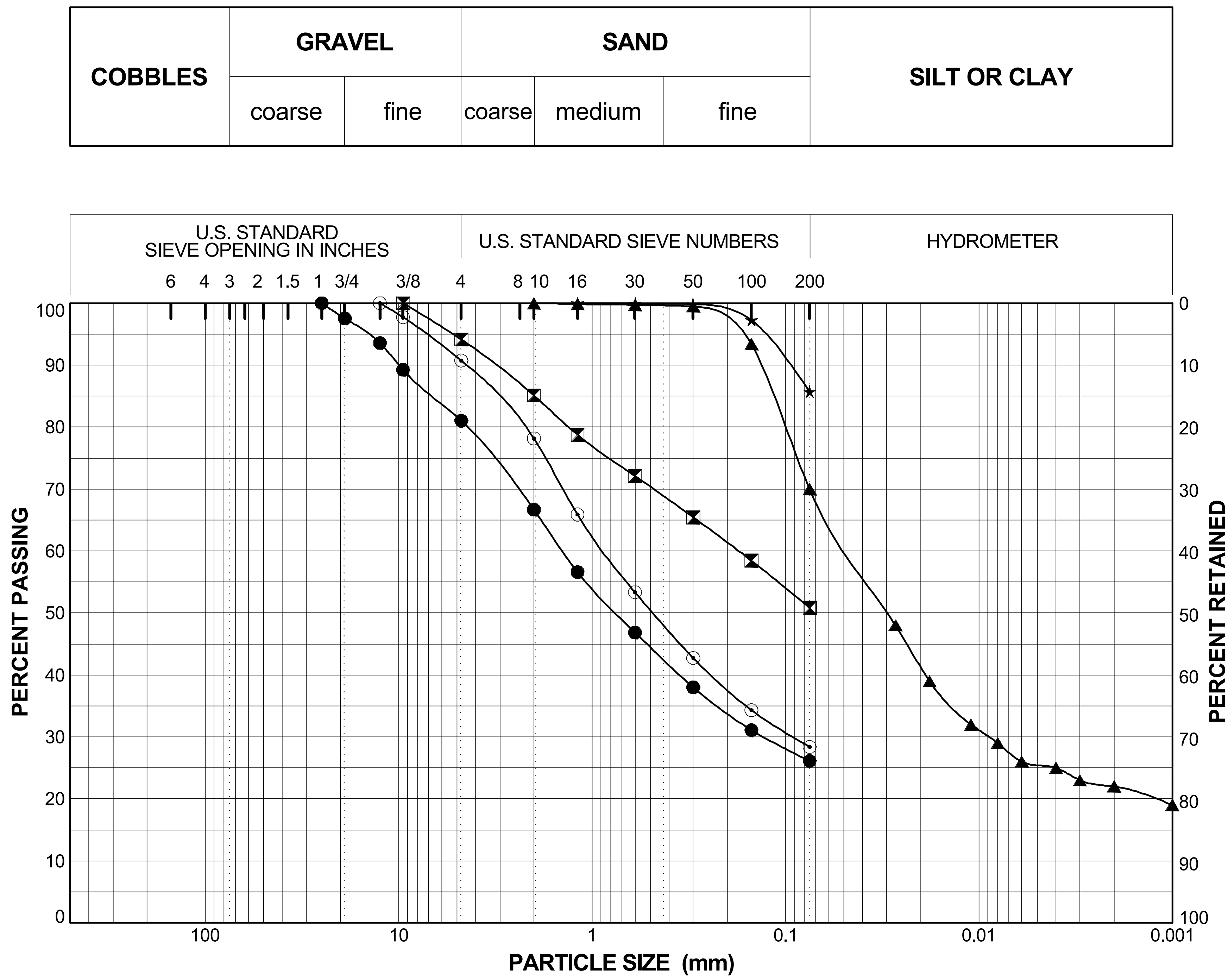
Figure F-12



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-61	27	115-116.5	●	41	20	Clayey Sand with Gravel (SC)
WI-61	29	125-126.5	⧗	36	18	Clayey Sand with Gravel (SC)
WI-62	2	5-6.5	▲			Clayey Sand with Gravel (SC)
WI-62	3C	10-10.5	★	64	22	Silty Sand with Gravel (SM)
WI-62	7	21.5-23	⊙	35	15	Clayey Sand with Gravel (SC)



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-62	8	26-27.5	●			Clayey Sand with Gravel (SC)
WI-62	10B	33-33.5	⧗			Sandy Clay (CL)
WI-62	11B	37-37.5	▲	29	12	Sandy Clay (CL)
WI-62	12A	37.5-38	★	39	22	Clay (CL)
WI-62	12C	38.5-39	⊙			Clayey Sand (SC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-62

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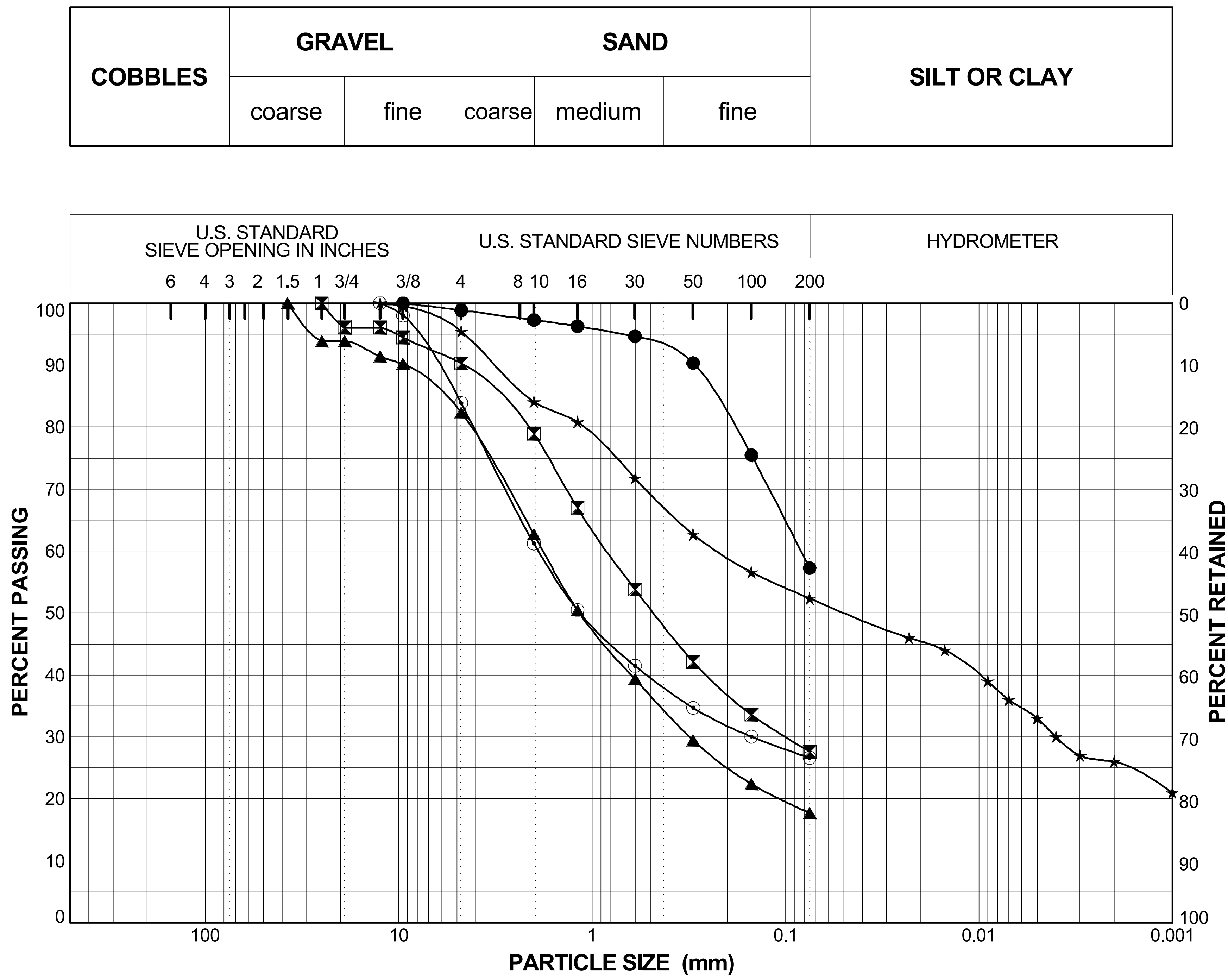
PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-14



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-62	14	45-46.5	●	36	20	Sandy Clay (CL)
WI-62	15	49-50.5	⧗			Clayey Sand (SC)
WI-62	18B	61-61.5	▲	33	13	Clayey Sand with Gravel (SC)
WI-62	20T	65-66	★	44	22	Sandy Clay (CL)
WI-62	20B	66.5-67.5	⊙			Clayey Sand with Gravel (SC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-62

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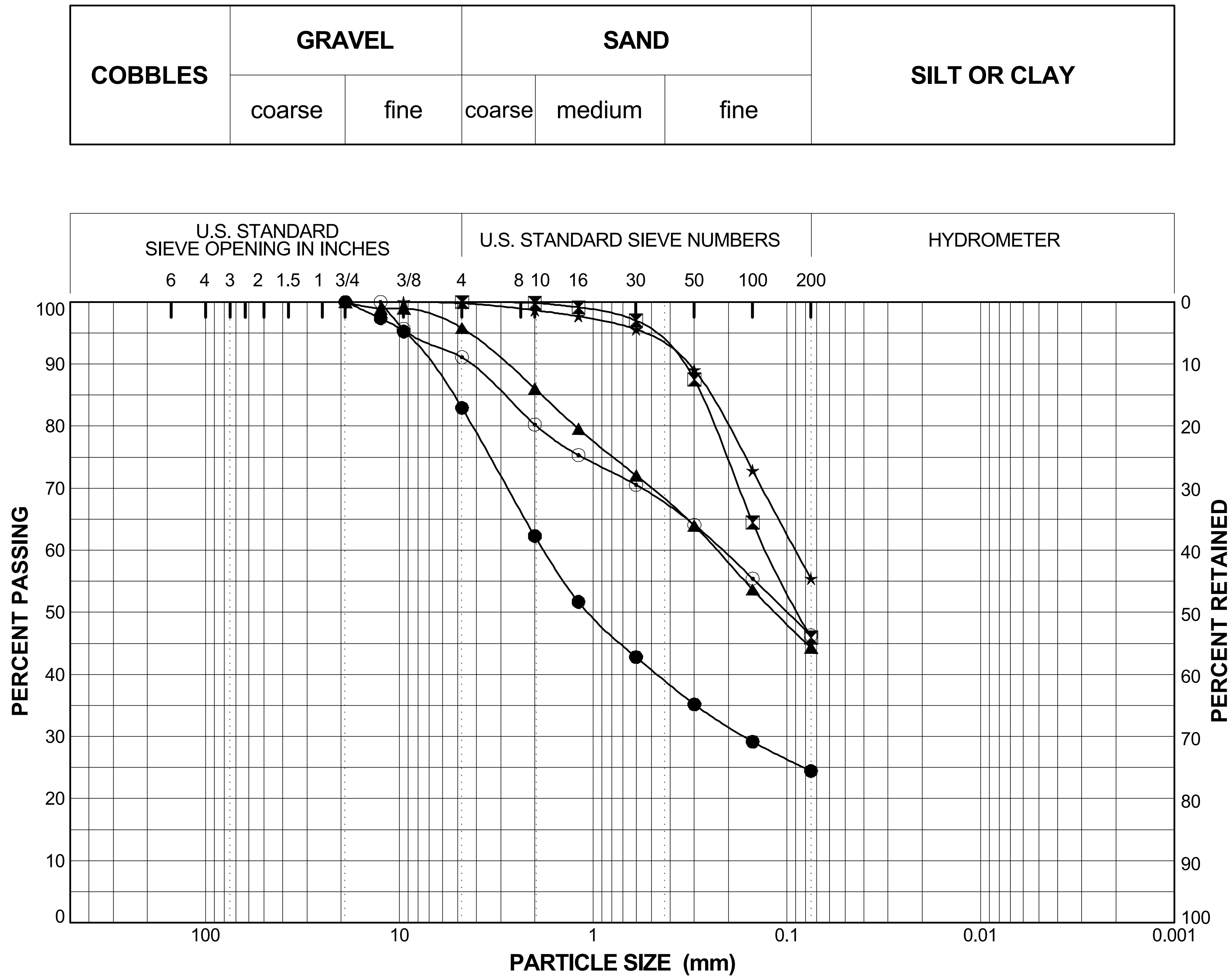
PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-15



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-62	22B	73-73.5	●			Clayey Sand with Gravel (SC)
WI-62	25C	81.5-82	⧗	28	12	Clayey Sand (SC)
WI-62	26	83-84.5	▲			Clayey Sand (SC)
WI-62	28	88.5-90	★	31	16	Sandy Clay (CL)
WI-62	30	93.5-95	⊙	40	20	Clayey Sand (SC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-62

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PARTICLE SIZE DISTRIBUTION CURVES

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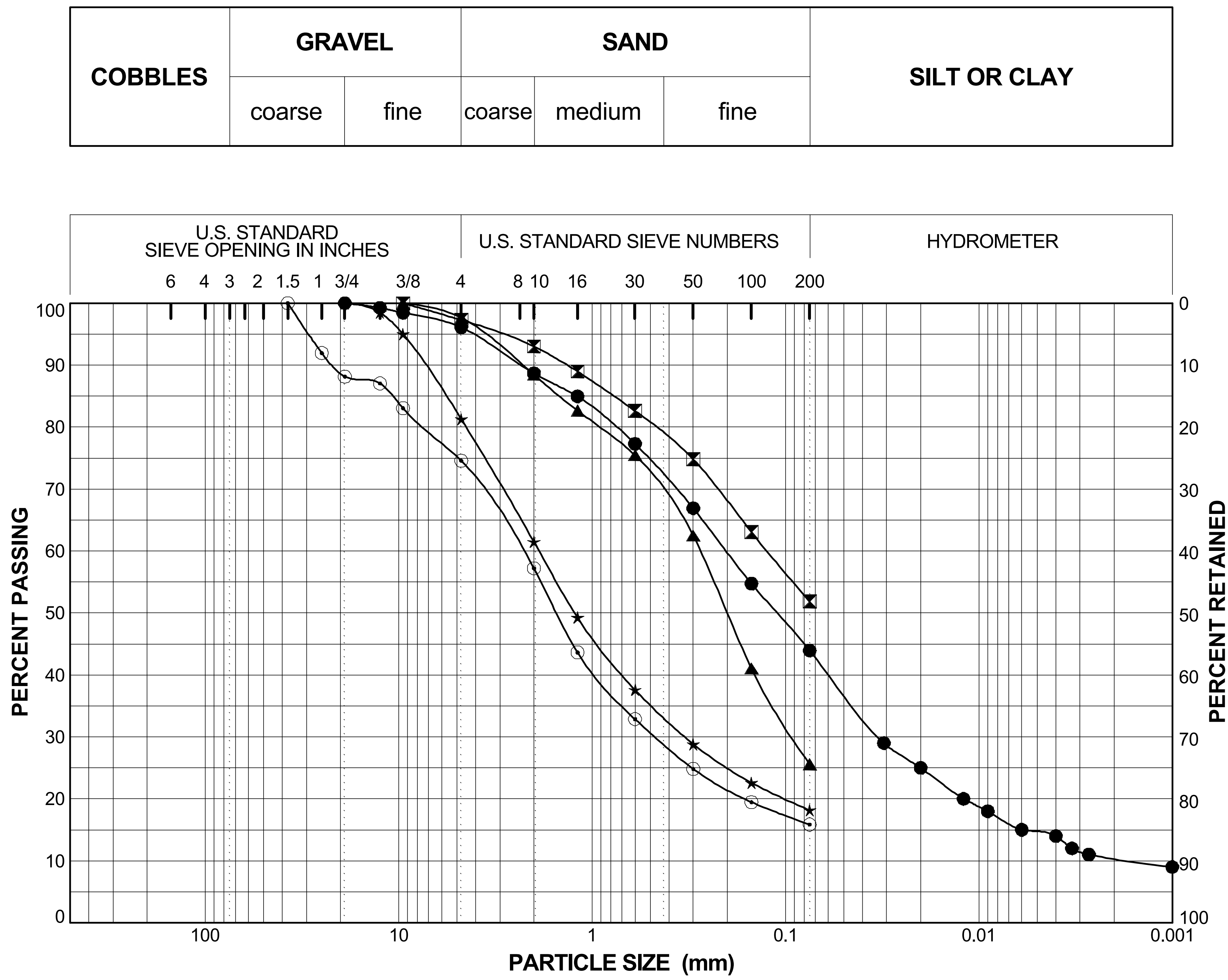
Figure F-16



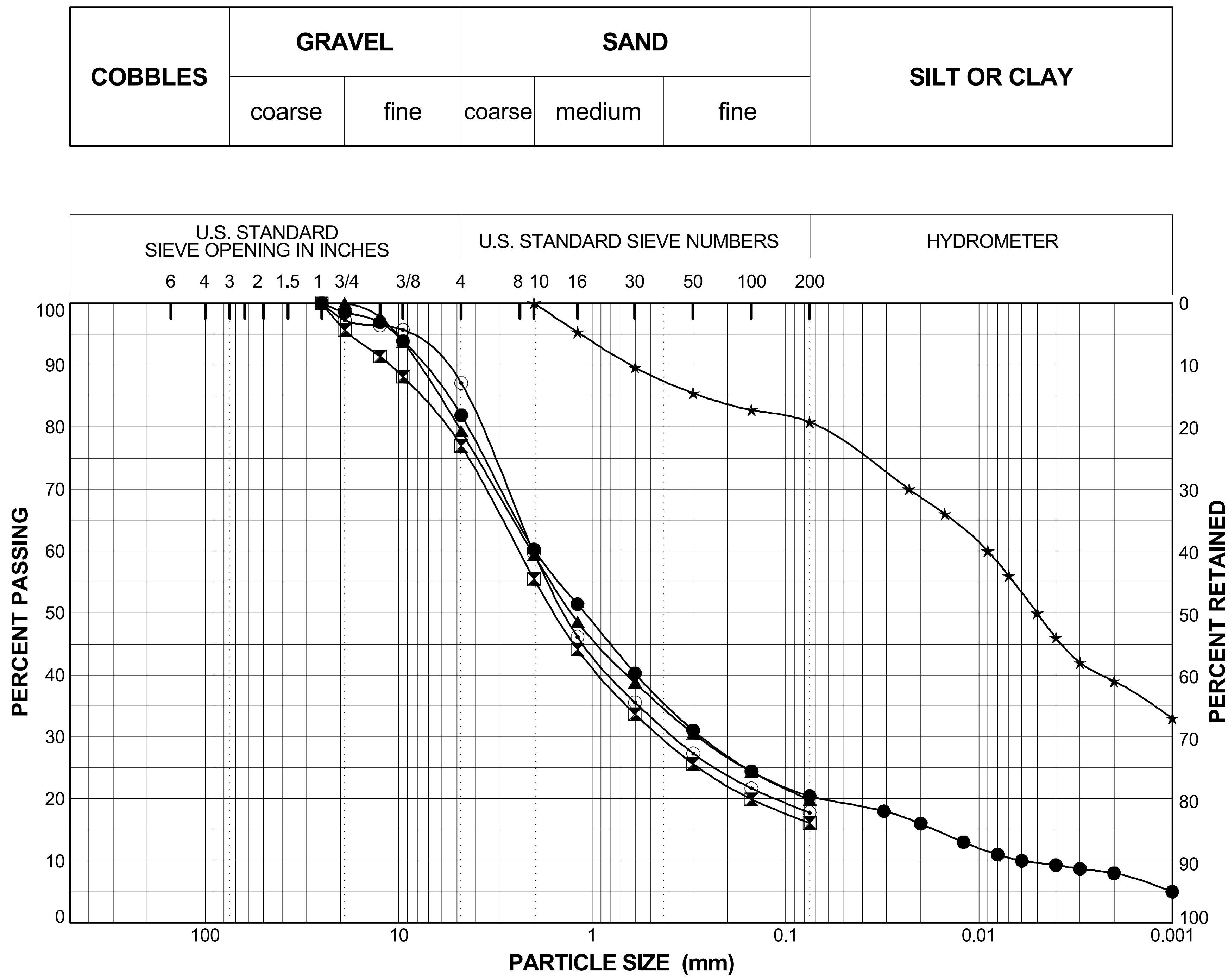
Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-62	31B	97.5-100	●			Silty Sand (SM)
WI-62	32	100-101.5	⧗	32	13	Sandy Clay (CL)
WI-62	34	105.5-107	▲	27	11	Clayey Sand (SC)
WI-63	4	10.5-12	★			Clayey Sand with Gravel (SC)
WI-63	7	18-19.5	⊙			Clayey Sand with Gravel (SC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-63

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

Figure F-17



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-63	9B	24-24.5	●	31	12	Clayey Sand with Gravel (SC)
WI-63	11	28-29.5	⧗			Clayey Sand with Gravel (SC)
WI-63	14	35.5-37	▲			Clayey Sand with Gravel (SC)
WI-63	15	38-39.5	★	60	36	Clay with Sand (CH)
WI-63	16	40-42.5	⊙	39	18	Clayey Sand (SC)

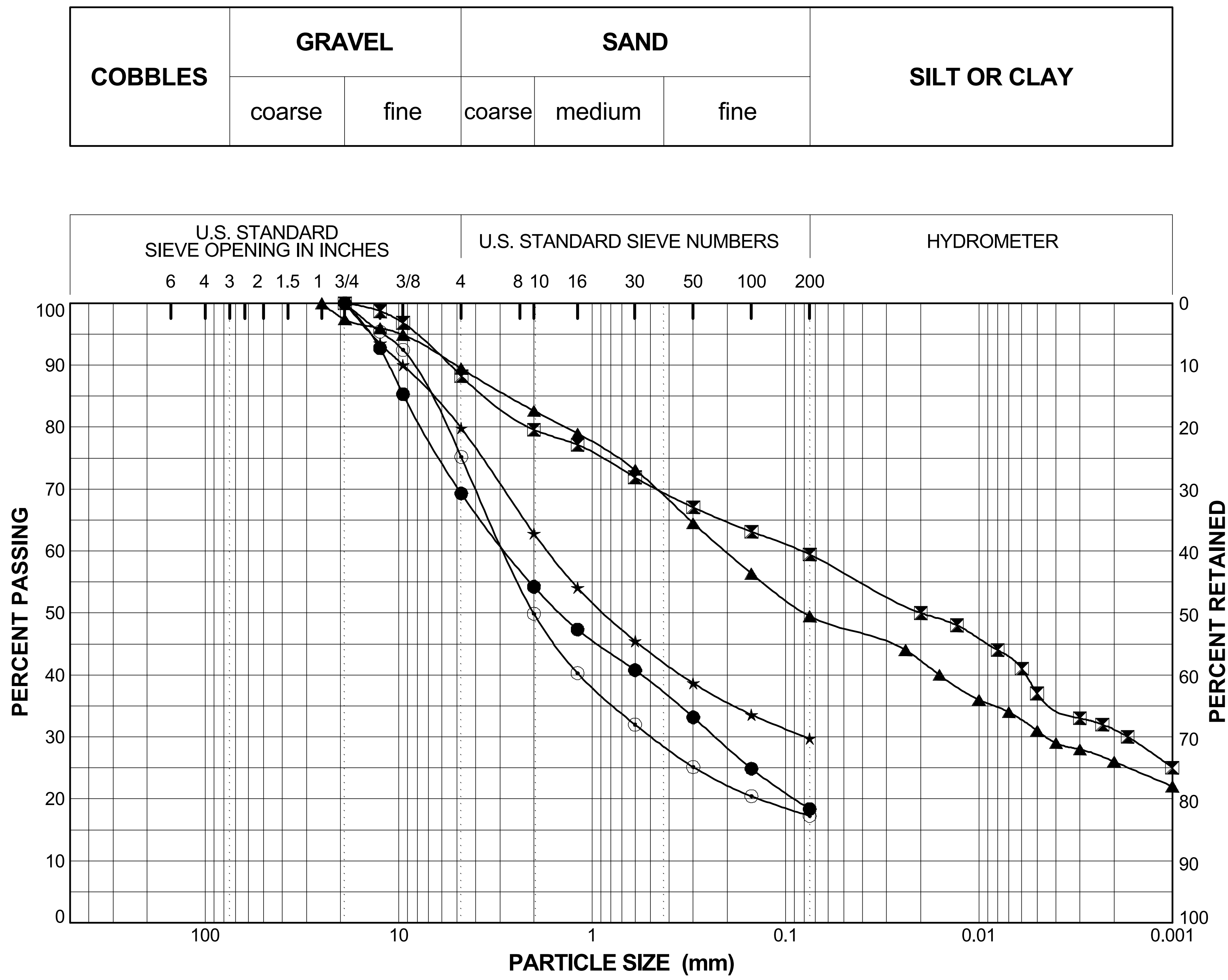
Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-63

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-18



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-63	18	45.5-47	●			Clayey Sand with Gravel (SC)
WI-64	5B	20-22.5	⧗			Sandy Clay (CL)
WI-64	9B	40-42.5	▲			Clayey Sand (SC)
WI-64	12	55-56.5	★	41	21	Clayey Sand with Gravel (SC)
WI-64	15C	71-71.5	⊙	33	16	Clayey Sand with Gravel (SC)

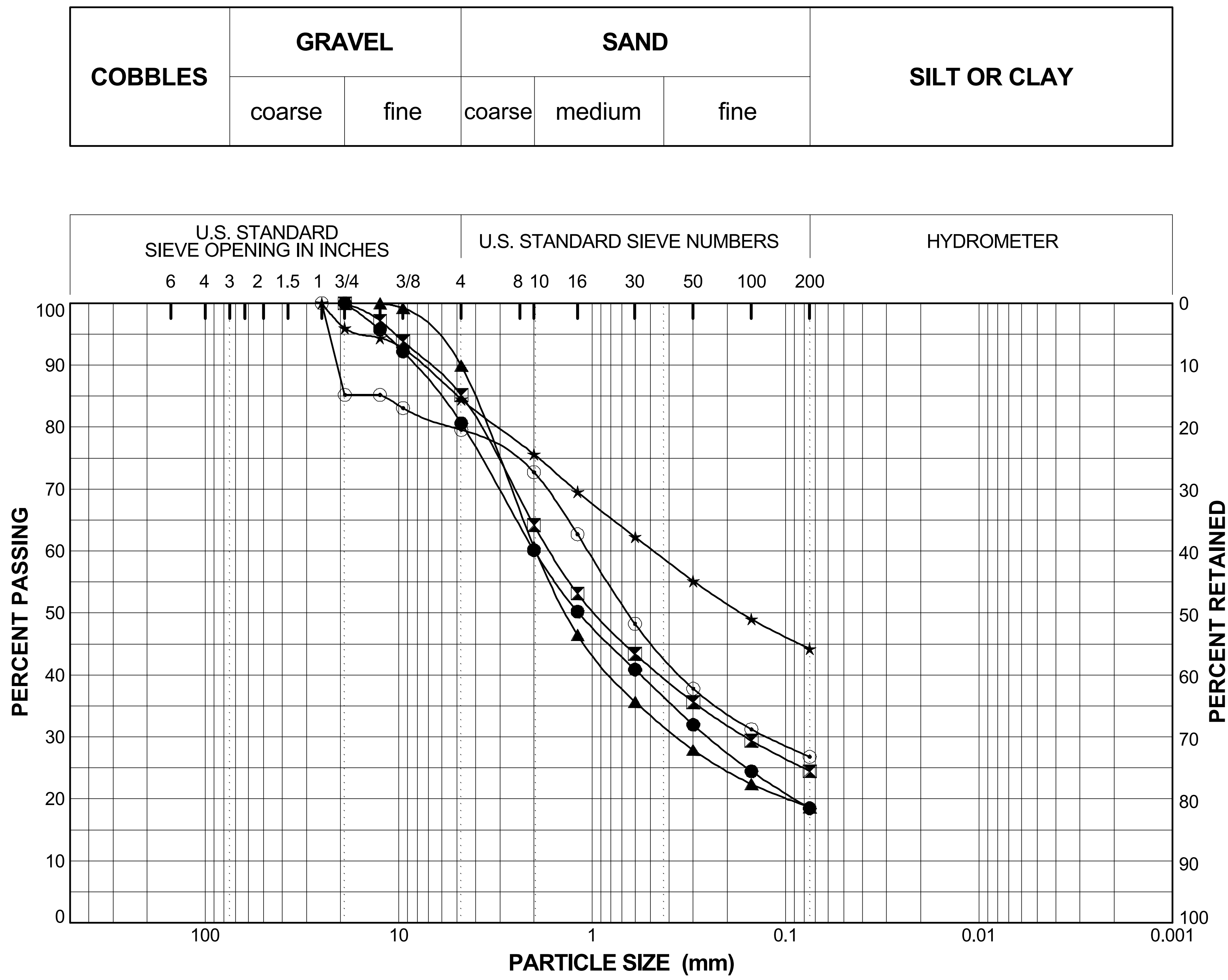
Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-64

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-19



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-64	16	75-76.5	●			Clayey Sand with Gravel (SC)
WI-64	19B	90.5-91	⧗	43	22	Clayey Sand with Gravel (SC)
WI-64	20	95-96.5	▲			Clayey Sand (SC)
WI-64	23C	111-111.5	★	41	21	Clayey Sand with Gravel (SC)
WI-64	24B	115.5-116.5	⊙			Clayey Sand with Gravel (SC)

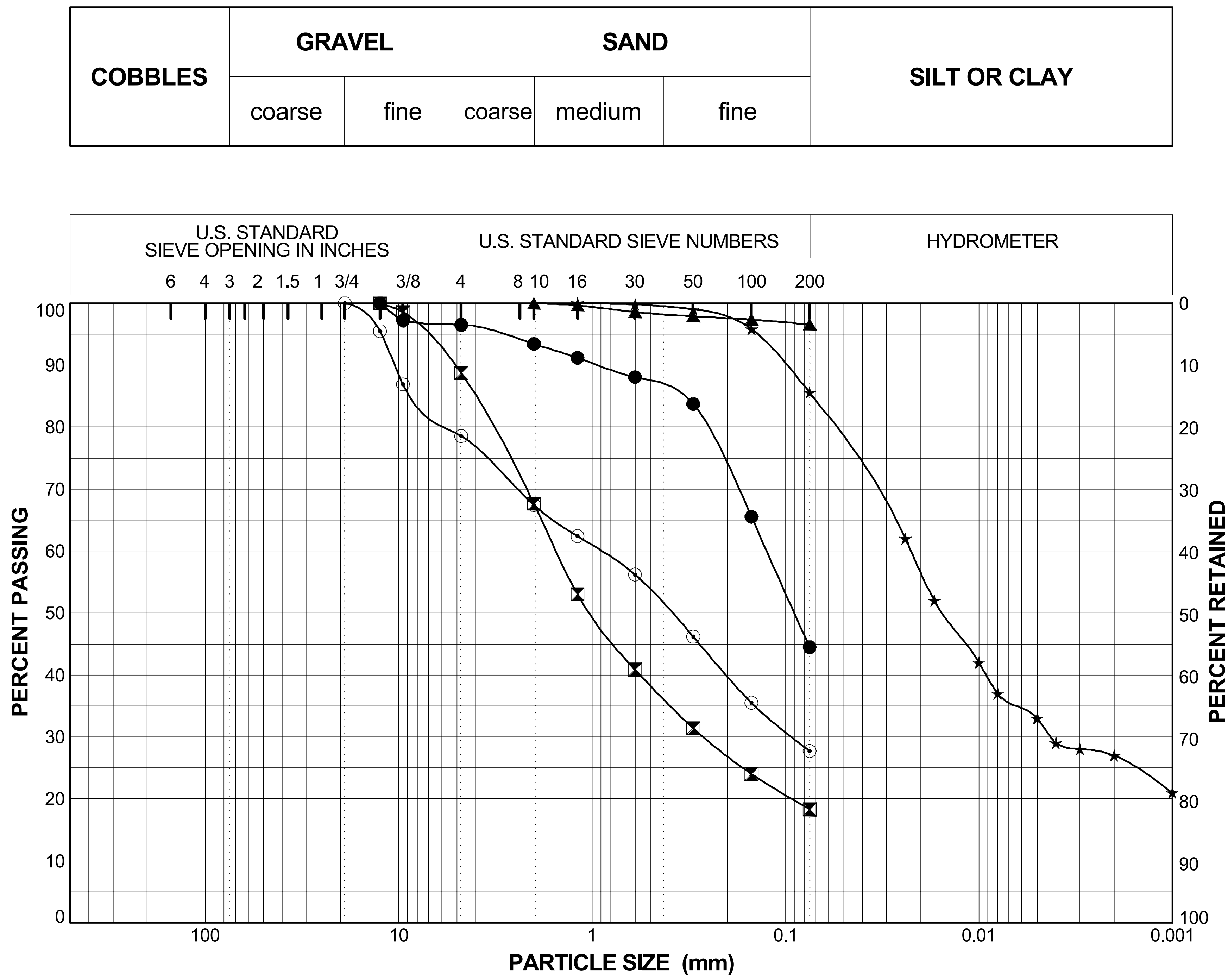
Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-64

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-20



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-64	27	125-126.5	●			Silty Clayey Sand (SC-SM)
WI-65	5	10-11.5	⧗			Clayey Sand (SC)
WI-65	8	17.5-19	▲	60	38	Clay (CH)
WI-65	10	22.5-24.5	★			Clay (CL)
WI-65	12B	28-29	⊙			Clayey Sand with Gravel (SC)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-65

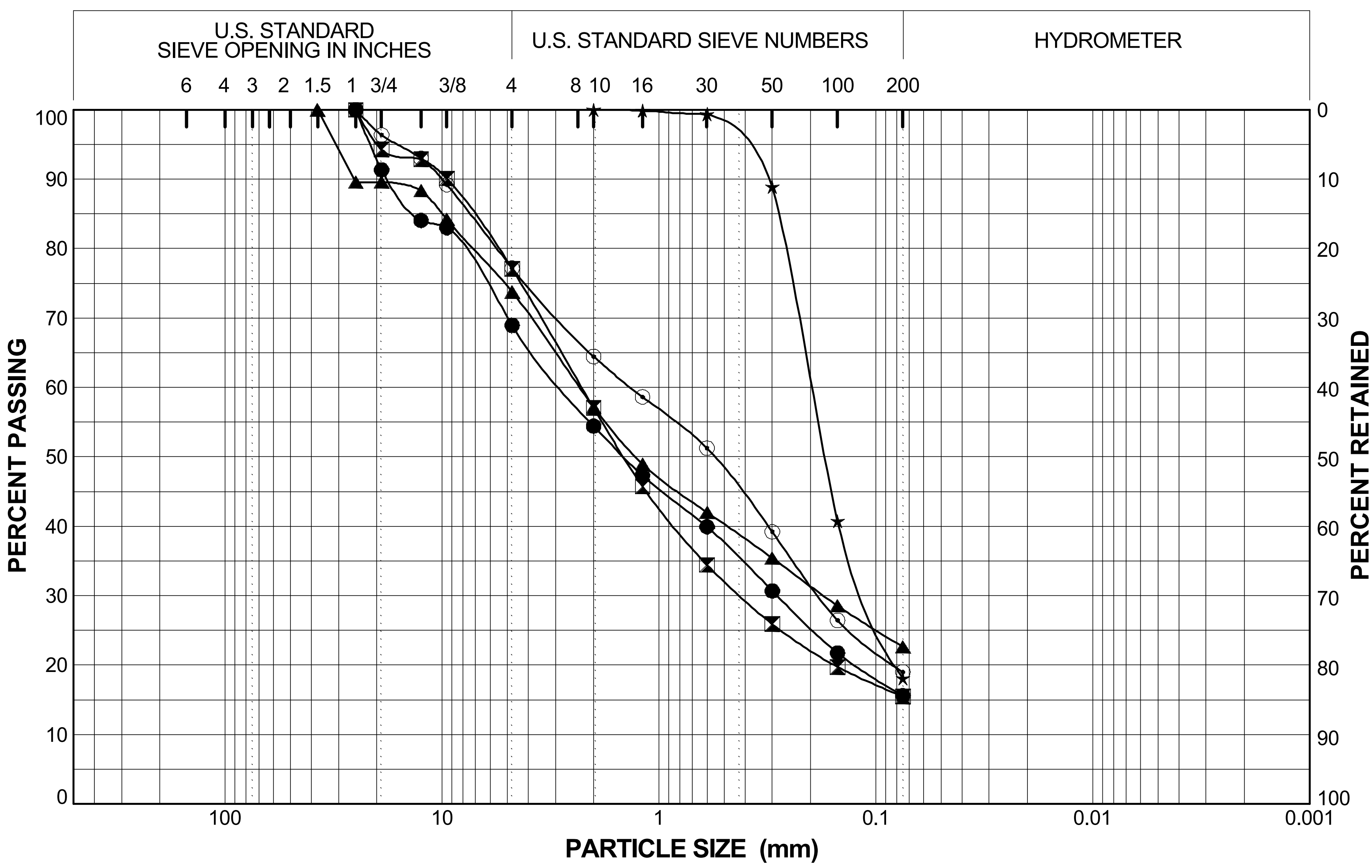
Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

Figure F-21

URS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-65	14	32.5-34	●			Clayey Sand with Gravel (SC)
WI-65	19	45-46.5	⧗			Clayey Sand with Gravel (SC)
WI-65	22	52.5-54	▲			Clayey Sand with Gravel (SC)
WI-65	23	55-56.5	★			Clayey Sand (SC)
WI-65	25	57.5-59	☉			Clayey Sand with Gravel (SC)

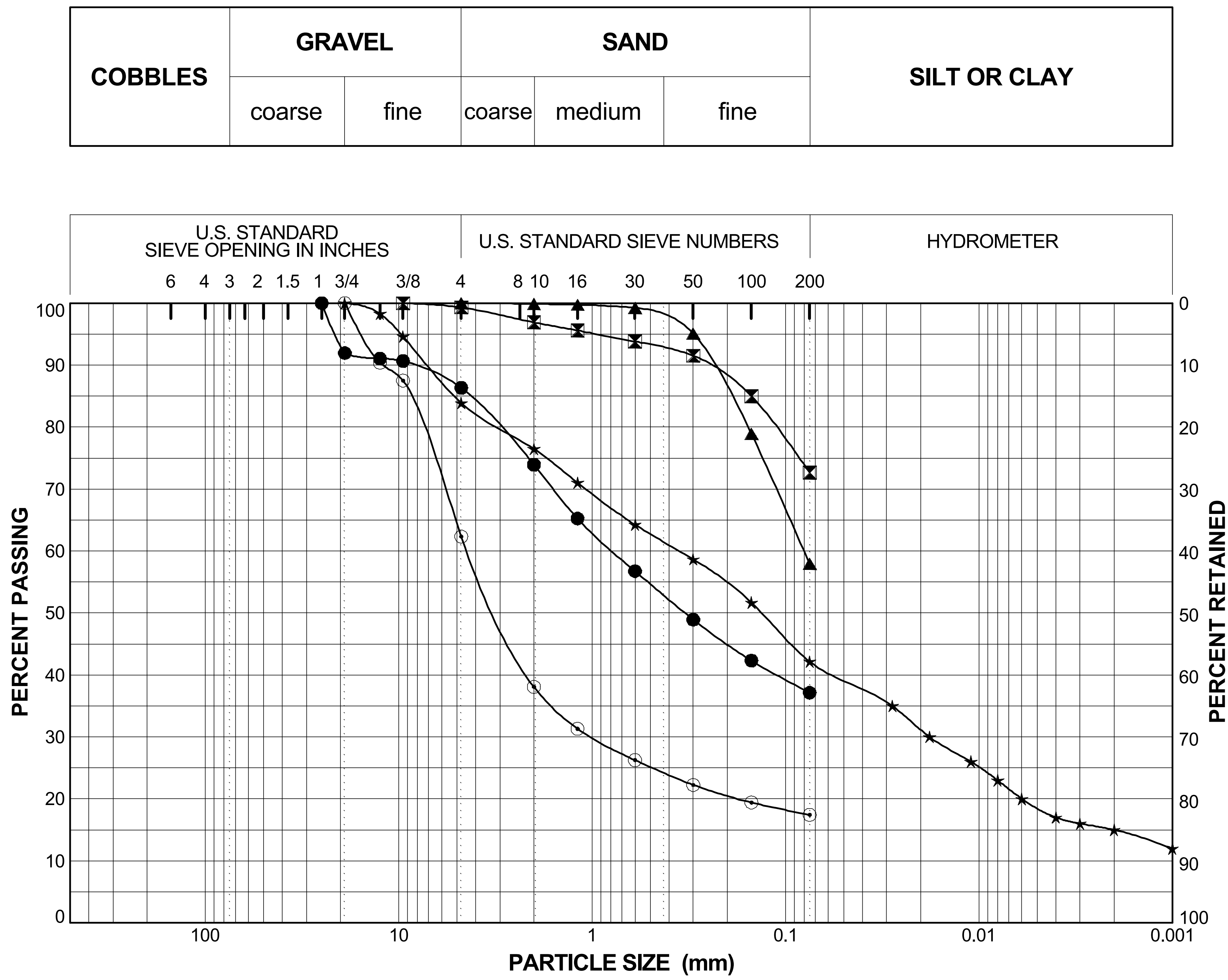
Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-65

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-22



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-66	2B	7-7.5	●	37	19	Clayey Sand (SC)
WI-66	5B	15.5-16.5	⧗			Clay with Sand (CL)
WI-66	8T	24-25	▲			Sandy Clay (CL)
WI-66	8B	25-26	★			Clayey Sand with Gravel (SC)
WI-66	13	33-34.5	⊙			Clayey Sand with Gravel (SC)

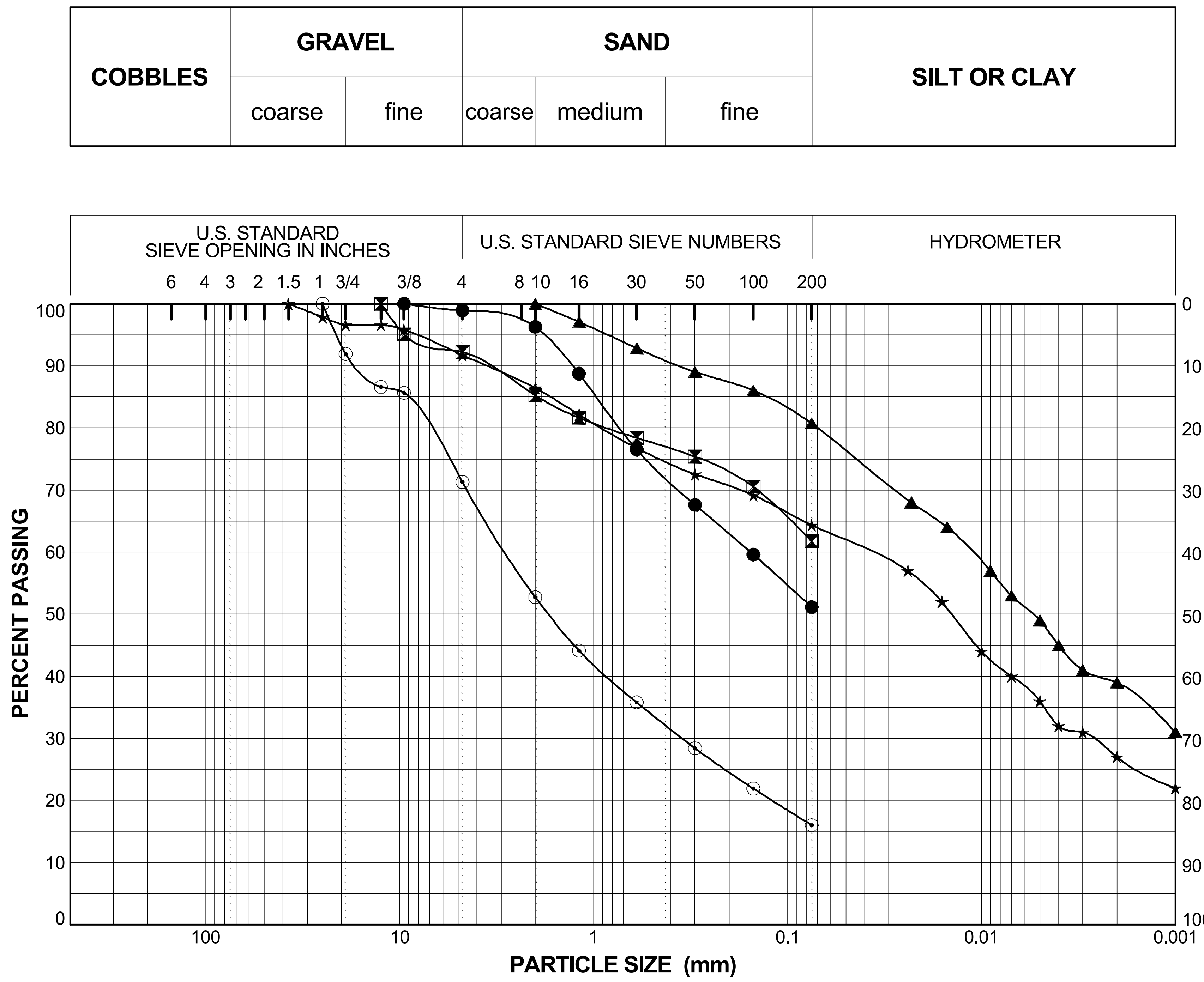
Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-66

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-23



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-66	16B	39-40	●	28	10	Sandy Clay (CL)
WI-66	18	46-47.5	⧗	36	19	Sandy Clay (CL)
WI-67	2	10-12.5	▲	44	23	Clay with Sand (CL)
WI-67	6A	19.5-21	★			Sandy Clay (CL)
WI-67	7	21.5-23	⊙			Clayey Sand with Gravel (SC)

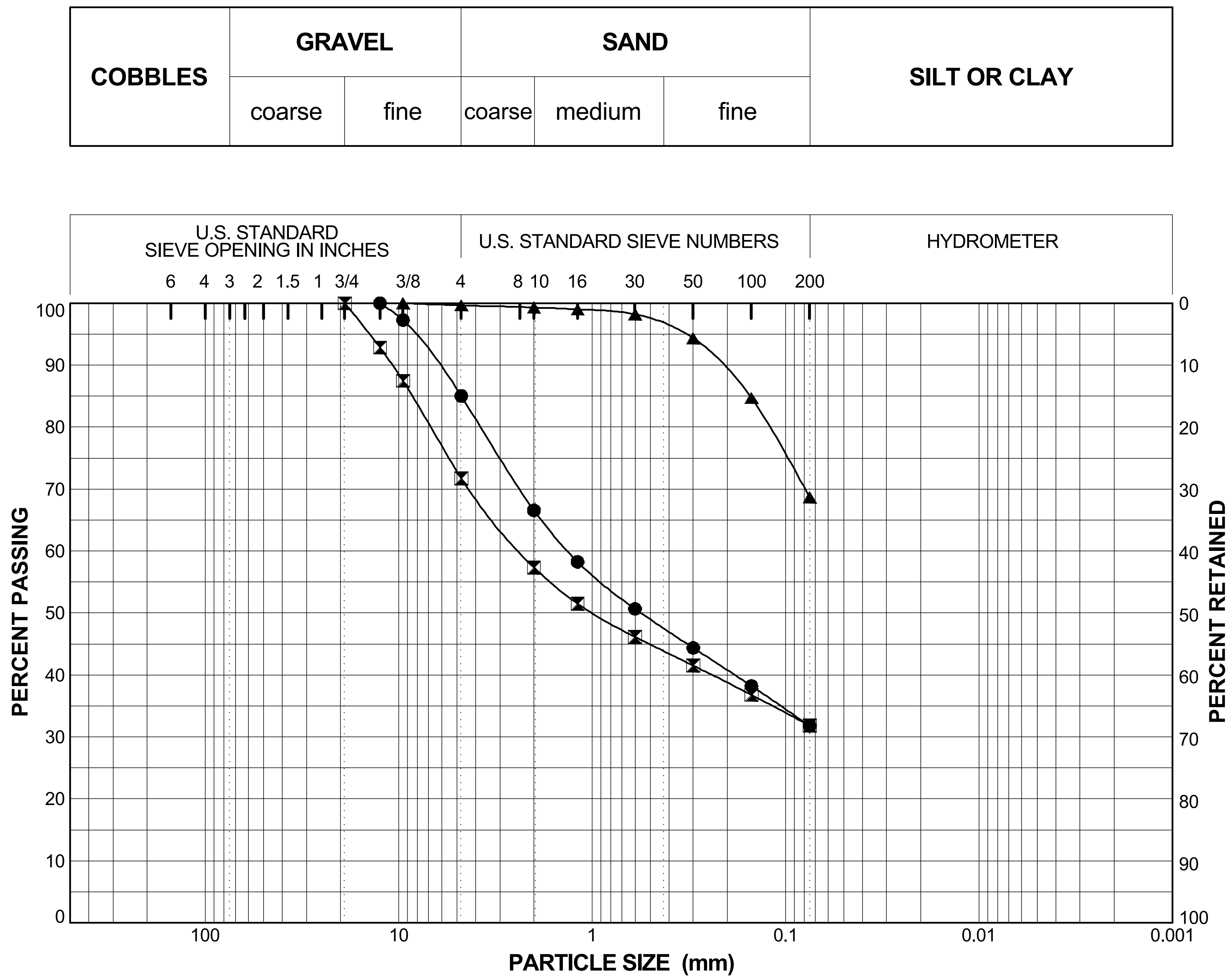
Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-67

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-24



Boring Number	Sample Number	Depth (feet)	Symbol	LL	PI	Classification
WI-67	9A	26.5-27.5	●			Clayey Sand with Gravel (SC)
WI-67	14B	41-41.5	⧗	34	14	Clayey Sand with Gravel (SC)
WI-67	18A	50.5-51	▲	32	16	Sandy Clay (CL)

Report: SIEVE_5_CURVES_OAK; File: OAK_CHABOTDAM.GPJ; 8/2/2004 WI-67

Dynamic Stability of Chabot Dam
Lake Chabot Dam, San Leandro, California
26814536.C0000

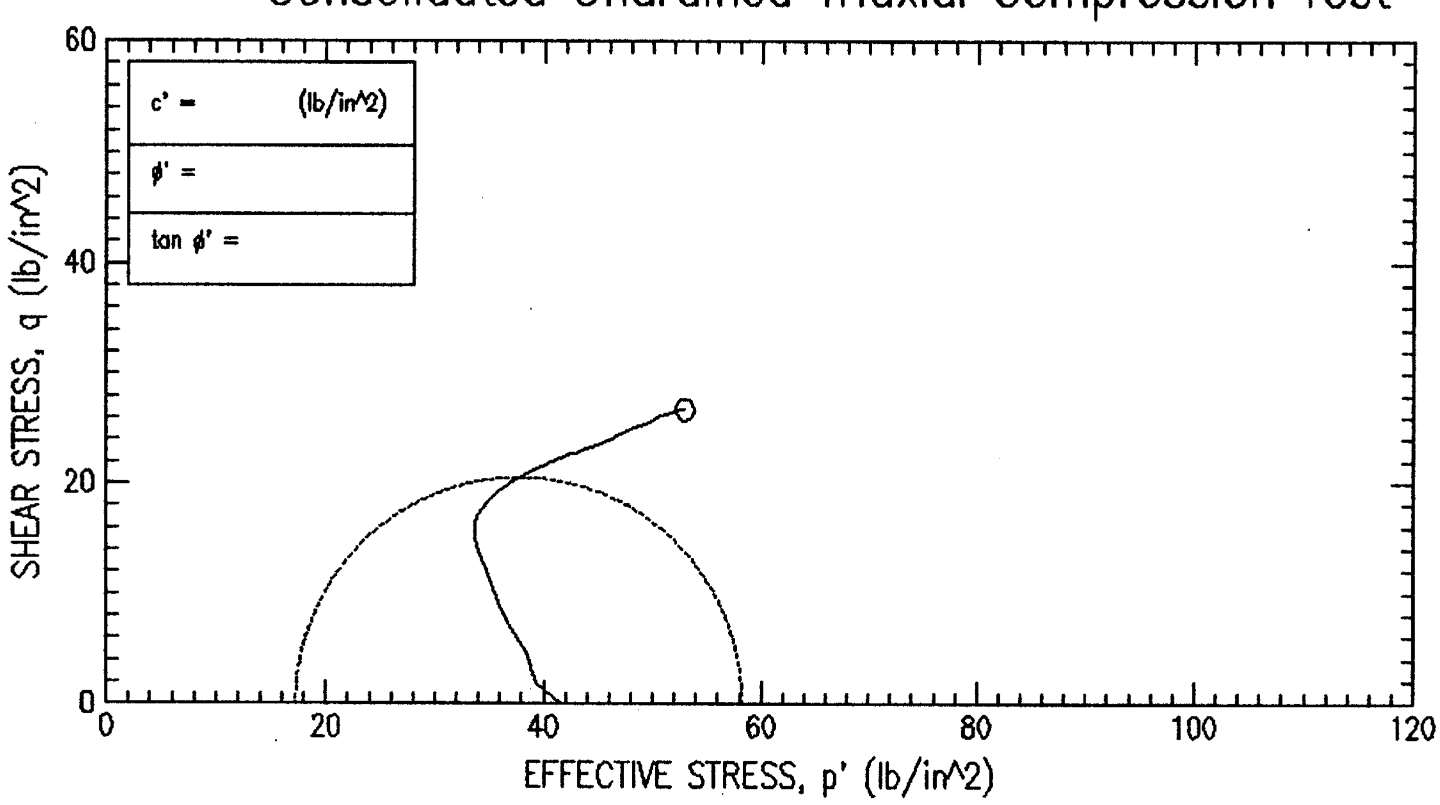
PARTICLE SIZE DISTRIBUTION CURVES

URS

Figure F-25

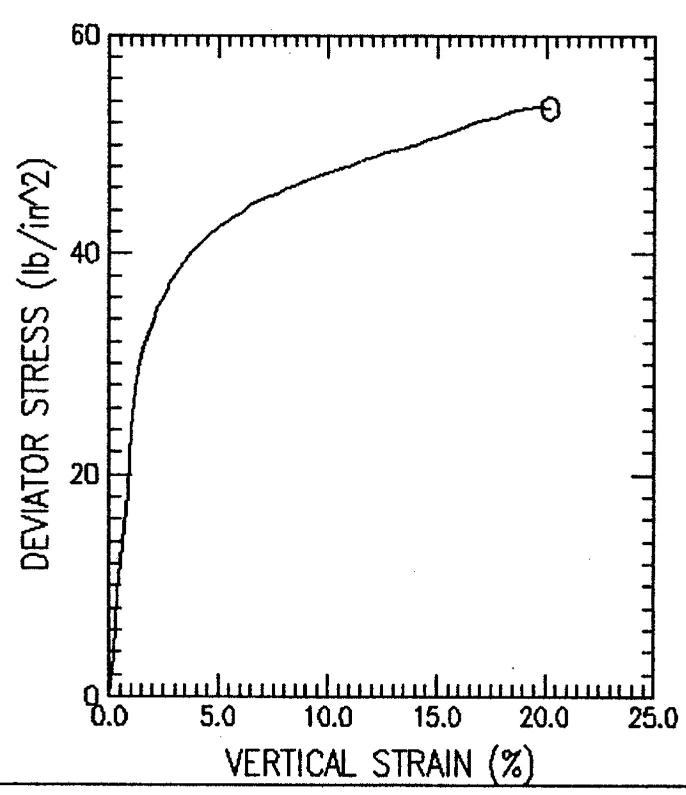
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-59-18



SYMBOL		O				
TEST NO.		WI-59-18				
INITIAL	WATER CONTENT (%)	18.95				
	DRY DENSITY (lb/ft^3)	106.87				
	SATURATION (%)	88.33				
	VOID RATIO	0.581				
BEFORE SHEAR	WATER CONTENT (%)	19.82				
	DRY DENSITY (lb/ft^3)	109.95				
	SATURATION (%)	99.96				
	VOID RATIO	0.537				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		41.67				
MAX. DEV. STRESS (lb/in^2)		55.02				
TIME TO FAILURE (min)		1326.97				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.96				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.40				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown sandy clay with gravel (CL)

LL 34.36	PL 16.62	PI 17.74	GS 2.71	TYPE OF SPECIMEN Pitcher	TYPE OF TEST	CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 41.67 psi

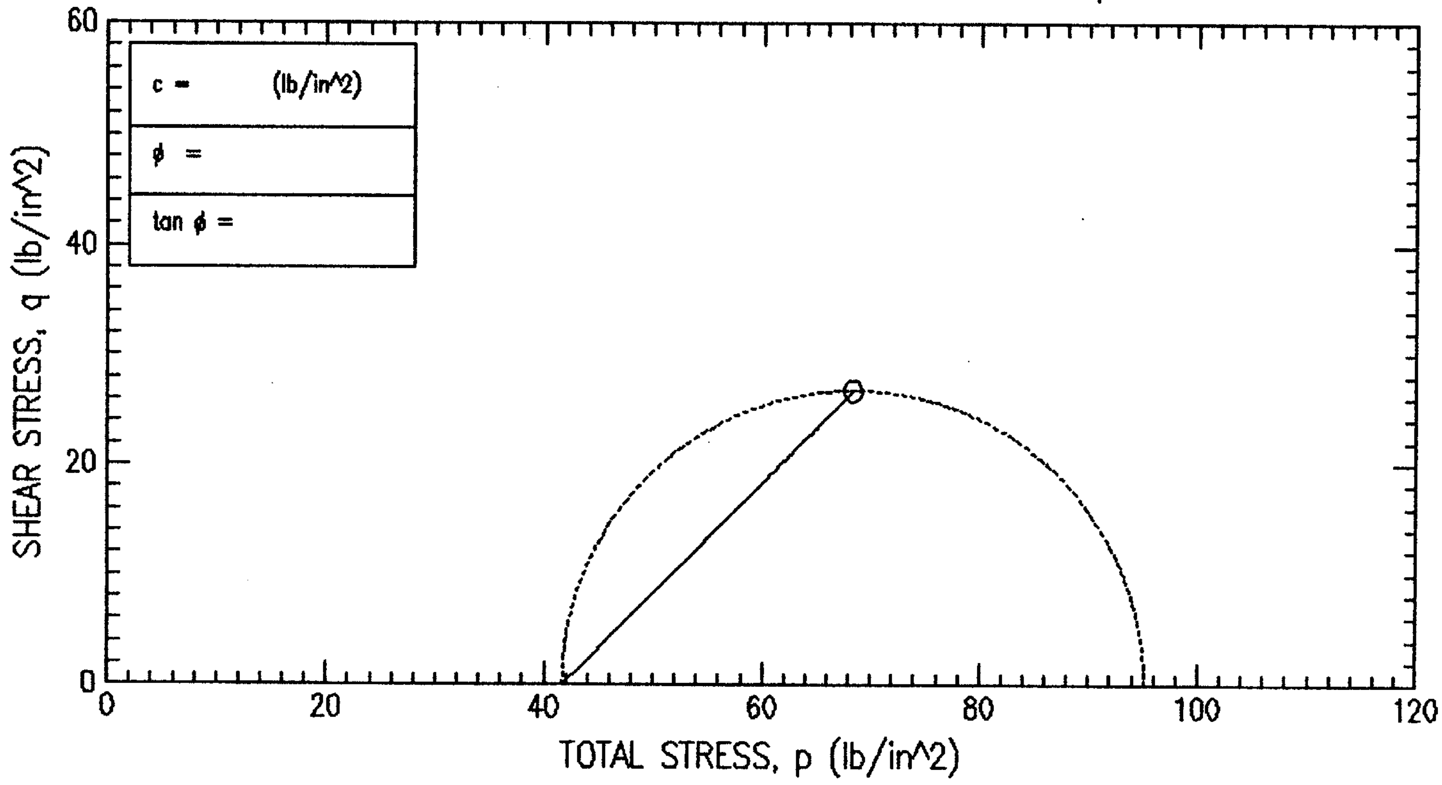
PROJECT	Chabot Dam Seismic Study				
PROJECT NO.26814536					
BORING NO. WI-59	SAMPLE NO.	18 Top			
TECH. S. Capps	DEPTH/ELEV	52.5 feet			
LABORATORY	DATE	06/14/04			

TRIAXIAL COMPRESSION TEST REPORT

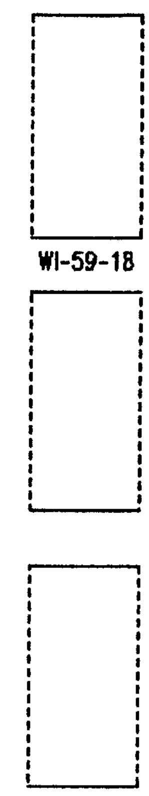
Mon 06-28-:4, 13:05:34

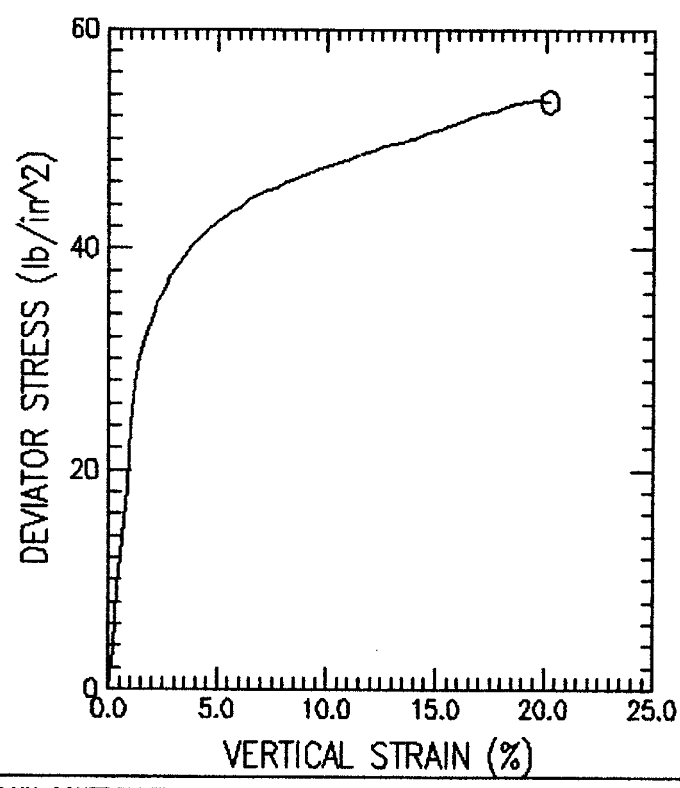
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O			
TEST NO.		WI-59-18			
INITIAL	WATER CONTENT (%)	18.95			
	DRY DENSITY (lb/ft^3)	106.87			
	SATURATION (%)	88.33			
	VOID RATIO	0.581			
BEFORE SHEAR	WATER CONTENT (%)	19.82			
	DRY DENSITY (lb/ft^3)	109.95			
	SATURATION (%)	99.96			
	VOID RATIO	0.537			
	BACK PRESS. (lb/in^2)	80.00			
MINOR PRIN. STRESS (lb/in^2)		41.67			
MAX. DEV. STRESS (lb/in^2)		55.02			
TIME TO FAILURE (min)		1326.97			
RATE OF STRAIN INCR (%/min)		0.00			
INITIAL DIAMETER (in)		2.96			
INITIAL HEIGHT (in)		5.95			
B-VALUE		97.40			

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown sandy clay with gravel (CL)

LL 34.36	PL 16.62	PI 17.74	GS 2.71	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study				
1) TXCIU Test with Effective Pressure of 41.67 psi	PROJECT NO.26814536				
	BORING NO. WI-59	SAMPLE NO.	18 Top		
	TECH. S. Capps	DEPTH/ELEV	52.5 feet		
	LABORATORY	DATE	06/14/04		
	TRIAXIAL COMPRESSION TEST REPORT				

Mon 06-28-:4, 13:04:52

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 18 Top
Sample Type : Pitcher
Soil Description : Brown sandy clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 41.67 psi

Location : San Leandro, CA
Test No. : WI-59-18
Test Date : 06/14/04
Depth : 52.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.881 (in^2)
Volume : 40.910 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	121.67	121.67	0.00	0.00	41.67	41.67	1.00	41.67	0.00
2)	0.20	125.49	121.67	4.34	1.14	41.15	37.32	1.10	39.23	1.91
3)	0.39	131.03	121.67	7.89	0.84	43.14	33.78	1.28	38.46	4.68
4)	0.59	135.41	121.67	11.44	0.83	43.97	30.23	1.45	37.10	6.87
5)	0.79	140.18	121.67	15.12	0.82	45.05	26.54	1.70	35.79	9.25
6)	1.00	145.86	121.67	19.03	0.79	46.83	22.64	2.07	34.73	12.10
7)	1.21	149.34	121.67	21.58	0.78	47.76	20.09	2.38	33.92	13.84
8)	1.40	151.78	121.67	23.07	0.77	48.70	18.60	2.62	33.65	15.05
9)	1.60	153.06	121.67	23.71	0.76	49.35	17.96	2.75	33.65	15.69
10)	1.81	154.33	121.67	24.35	0.75	49.98	17.32	2.89	33.65	16.33
11)	2.01	155.61	121.67	24.77	0.73	50.83	16.89	3.01	33.86	16.97
12)	2.21	156.77	121.67	24.99	0.71	51.78	16.68	3.10	34.23	17.55
13)	2.41	157.32	121.67	25.06	0.70	52.25	16.61	3.15	34.43	17.82
14)	2.63	158.16	121.67	25.20	0.69	52.96	16.47	3.22	34.71	18.24
15)	2.83	159.10	121.67	25.20	0.67	53.90	16.47	3.27	35.18	18.72
16)	3.02	159.74	121.67	25.13	0.66	54.61	16.54	3.30	35.58	19.04
17)	3.22	160.17	121.67	25.13	0.65	55.04	16.54	3.33	35.79	19.25
18)	3.42	160.81	121.67	24.99	0.64	55.82	16.68	3.35	36.25	19.57
19)	3.63	161.33	121.67	24.84	0.63	56.48	16.82	3.36	36.65	19.83
20)	3.83	161.85	121.67	24.70	0.61	57.15	16.96	3.37	37.06	20.09
21)	4.03	162.38	121.67	24.49	0.60	57.88	17.18	3.37	37.53	20.35
22)	4.23	162.69	121.67	24.42	0.60	58.27	17.25	3.38	37.76	20.51
23)	4.44	163.10	121.67	24.20	0.58	58.89	17.46	3.37	38.18	20.72
24)	4.63	163.52	121.67	24.06	0.57	59.45	17.60	3.38	38.53	20.93
25)	4.84	163.83	121.67	23.85	0.57	59.98	17.82	3.37	38.90	21.08
26)	5.05	164.04	121.67	23.71	0.56	60.32	17.96	3.36	39.14	21.18
27)	5.24	164.35	121.67	23.57	0.55	60.78	18.10	3.36	39.44	21.34
28)	5.45	164.65	121.67	23.35	0.54	61.30	18.31	3.35	39.80	21.49
29)	5.65	164.96	121.67	23.14	0.53	61.81	18.52	3.34	40.17	21.64
30)	5.85	165.16	121.67	23.00	0.53	62.16	18.67	3.33	40.41	21.75
31)	6.05	165.47	121.67	22.86	0.52	62.61	18.81	3.33	40.71	21.90
32)	6.46	166.16	121.67	22.43	0.50	63.73	19.23	3.31	41.48	22.25
33)	6.86	166.46	121.67	22.15	0.49	64.31	19.52	3.29	41.91	22.40
34)	7.27	166.95	121.67	21.79	0.48	65.15	19.87	3.28	42.51	22.64
35)	7.68	167.14	121.67	21.51	0.47	65.62	20.16	3.26	42.89	22.73
36)	8.08	167.71	121.67	21.15	0.46	66.55	20.51	3.24	43.53	23.02
37)	8.48	167.90	121.67	20.87	0.45	67.02	20.79	3.22	43.91	23.11
38)	8.88	168.37	121.67	20.59	0.44	67.77	21.08	3.22	44.43	23.35
39)	9.29	168.63	121.67	20.37	0.43	68.25	21.29	3.21	44.77	23.48
40)	9.69	168.90	121.67	20.09	0.43	68.80	21.58	3.19	45.19	23.61
41)	10.09	169.16	121.67	19.88	0.42	69.28	21.79	3.18	45.53	23.75
42)	10.60	169.46	121.67	19.66	0.41	69.79	22.00	3.17	45.89	23.89
43)	11.10	169.84	121.67	19.45	0.40	70.39	22.21	3.17	46.30	24.09
44)	11.61	170.22	121.67	19.31	0.40	70.91	22.36	3.17	46.63	24.27
45)	12.11	170.59	121.67	19.10	0.39	71.49	22.57	3.17	47.03	24.46
46)	12.62	170.95	121.67	18.88	0.38	72.06	22.78	3.16	47.42	24.64
47)	13.12	171.22	121.67	18.67	0.38	72.54	22.99	3.15	47.77	24.77
48)	13.64	171.46	121.67	18.60	0.37	72.86	23.06	3.16	47.96	24.90
49)	14.13	171.72	121.67	18.32	0.37	73.40	23.35	3.14	48.37	25.02
50)	14.65	172.14	121.67	18.10	0.36	74.03	23.56	3.14	48.80	25.23
51)	15.14	172.56	121.67	17.82	0.35	74.73	23.85	3.13	49.29	25.44
52)	16.15	173.19	121.67	17.47	0.34	75.72	24.20	3.13	49.96	25.76
53)	16.66	173.67	121.67	17.32	0.33	76.34	24.34	3.14	50.34	26.00
54)	17.16	173.96	121.67	17.04	0.33	76.92	24.63	3.12	50.77	26.15
55)	17.66	174.16	121.67	16.76	0.32	77.40	24.91	3.11	51.16	26.25
56)	18.18	174.53	121.67	16.47	0.31	78.05	25.19	3.10	51.62	26.43
57)	18.68	174.88	121.67	16.19	0.30	78.69	25.48	3.09	52.08	26.61
58)	19.69	175.15	121.67	15.62	0.29	79.53	26.04	3.05	52.79	26.74
59)	20.19	175.07	121.67	15.41	0.29	79.66	26.26	3.03	52.96	26.70

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 18 Top
Sample Type : Pitcher
Soil Description : Brown sandy clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 41.67 psi

Location : San Leandro, CA
Test No. : WI-59-18
Test Date : 06/14/04
Depth : 52.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.881 (in^2)
Volume : 40.910 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.76	80.00	0.00	0.00	0.00	121.67	41.67
2)	0.012	0.20	6.77	84.35	26.62	26.62	3.93	125.49	41.15
3)	0.023	0.39	6.78	87.89	65.36	65.36	9.63	131.03	43.14
4)	0.035	0.59	6.80	91.44	96.05	96.05	14.13	135.41	43.97
5)	0.047	0.79	6.81	95.13	129.67	129.67	19.04	140.18	45.05
6)	0.059	1.00	6.83	99.03	169.86	169.86	24.89	145.86	46.83
7)	0.071	1.21	6.84	101.58	194.71	194.71	28.47	149.34	47.76
8)	0.082	1.40	6.85	103.07	212.25	212.25	30.97	151.78	48.70
9)	0.094	1.60	6.87	103.71	221.75	221.75	32.29	153.06	49.35
10)	0.106	1.81	6.88	104.35	231.25	231.25	33.60	154.33	49.98
11)	0.118	2.01	6.90	104.78	240.75	240.75	34.91	155.61	50.83
12)	0.130	2.21	6.91	104.99	249.52	249.52	36.11	156.77	51.78
13)	0.142	2.41	6.92	105.06	253.91	253.91	36.67	157.32	52.25
14)	0.154	2.63	6.94	105.20	260.49	260.49	37.54	158.16	52.96
15)	0.166	2.83	6.95	105.20	267.80	267.80	38.51	159.10	53.90
16)	0.178	3.02	6.97	105.13	272.91	272.91	39.17	159.74	54.61
17)	0.189	3.22	6.98	105.13	276.57	276.57	39.61	160.17	55.04
18)	0.201	3.42	7.00	104.99	281.68	281.68	40.26	160.81	55.82
19)	0.213	3.63	7.01	104.85	286.07	286.07	40.80	161.33	56.48
20)	0.225	3.83	7.03	104.71	290.45	290.45	41.34	161.85	57.15
21)	0.237	4.03	7.04	104.49	294.84	294.84	41.88	162.38	57.88
22)	0.249	4.23	7.06	104.42	297.76	297.76	42.20	162.69	58.27
23)	0.261	4.44	7.07	104.21	301.41	301.41	42.63	163.10	58.89
24)	0.273	4.63	7.09	104.07	305.07	305.07	43.06	163.52	59.45
25)	0.285	4.84	7.10	103.85	307.99	307.99	43.38	163.83	59.98
26)	0.297	5.05	7.12	103.71	310.18	310.18	43.59	164.04	60.32
27)	0.309	5.24	7.13	103.57	313.11	313.11	43.91	164.35	60.78
28)	0.321	5.45	7.15	103.36	316.03	316.03	44.22	164.65	61.30
29)	0.333	5.65	7.16	103.15	318.95	318.95	44.54	164.96	61.81
30)	0.344	5.85	7.18	103.00	321.15	321.15	44.75	165.16	62.16
31)	0.356	6.05	7.19	102.86	324.07	324.07	45.06	165.47	62.61
32)	0.380	6.46	7.22	102.44	330.65	330.65	45.77	166.16	63.73
33)	0.404	6.86	7.25	102.15	334.30	334.30	46.08	166.46	64.31
34)	0.428	7.27	7.29	101.80	339.42	339.42	46.58	166.95	65.15
35)	0.452	7.68	7.32	101.51	342.34	342.34	46.78	167.14	65.62
36)	0.475	8.08	7.35	101.16	348.19	348.19	47.37	167.71	66.55
37)	0.499	8.48	7.38	100.88	351.11	351.11	47.56	167.90	67.02
38)	0.522	8.88	7.42	100.59	356.23	356.23	48.04	168.37	67.77
39)	0.547	9.29	7.45	100.38	359.88	359.88	48.31	168.63	68.25
40)	0.570	9.69	7.48	100.09	363.53	363.53	48.59	168.90	68.80
41)	0.594	10.09	7.52	99.88	367.19	367.19	48.86	169.16	69.28
42)	0.624	10.60	7.56	99.67	371.57	371.57	49.16	169.46	69.79
43)	0.653	11.10	7.60	99.46	376.69	376.69	49.56	169.84	70.39
44)	0.683	11.61	7.64	99.31	381.80	381.80	49.95	170.22	70.91
45)	0.713	12.11	7.69	99.10	386.92	386.92	50.33	170.59	71.49
46)	0.743	12.62	7.73	98.89	392.04	392.04	50.70	170.95	72.06
47)	0.772	13.12	7.78	98.68	396.42	396.42	50.97	171.22	72.54
48)	0.803	13.64	7.82	98.61	400.81	400.81	51.23	171.46	72.86
49)	0.832	14.13	7.87	98.32	405.19	405.19	51.49	171.72	73.40
50)	0.862	14.65	7.92	98.11	411.04	411.04	51.92	172.14	74.03
51)	0.891	15.14	7.96	97.82	416.88	416.88	52.35	172.56	74.73
52)	0.951	16.15	8.06	97.47	427.12	427.12	53.00	173.19	75.72
53)	0.980	16.66	8.11	97.33	433.69	433.69	53.49	173.67	76.34
54)	1.010	17.16	8.16	97.04	438.81	438.81	53.80	173.96	76.92
55)	1.040	17.66	8.21	96.76	443.19	443.19	54.00	174.16	77.40
56)	1.070	18.18	8.26	96.48	449.04	449.04	54.38	174.53	78.05
57)	1.099	18.68	8.31	96.19	454.89	454.89	54.75	174.88	78.69
58)	1.159	19.69	8.41	95.63	462.93	462.93	55.02	175.15	79.53
59)	1.188	20.19	8.47	95.41	465.12	465.12	54.94	175.07	79.66

URS

Mon Jun 28 13:06:06 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 18 Top
Sample Type : Pitcher
Soil Description : Brown sandy clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 41.67 psi

Location : San leandro, CA
Test No. : WI-59-18
Test Date : 06/14/04
Depth : 52.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.881 (in^2)
Volume : 40.910 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 34.36
Plastic Limit : 16.62
Specific Gravity : 2.708

INITIAL

Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.58
Saturation: 88.33 %
Dry Density : 106.87 (lb/ft^3)
Moisture : 18.95 %
Time : 0.00 (min)

INITIALIZATION

dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.58
Saturation: 88.33 %
Dry Density : 106.87 (lb/ft^3)
Moisture : 18.95 %
Total Vert. Stress : 121.67 (lb/in^
Total Hori. Stress : 121.67 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 121.67 (lb/in^
Effect.Hori. Stress: 121.67 (lb/in^

END OF CONSOLIDATION - A

dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.58
Saturation: 88.33 %
Dry Density : 106.87 (lb/ft^3)
Moisture : 18.95 %
Total Vert. Stress : 121.67 (lb/in^
Total Hori. Stress : 121.67 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 121.67 (lb/in^
Effect.Hori. Stress: 121.67 (lb/in^

END OF SATURATION

dH : 0.000 (in)
dV : 0.000 (in^3)
dVCorr : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.58
Saturation: 92.35 %
Dry Density : 106.87 (lb/ft^3)
Moisture : 19.82 %
Total Vert. Stress : 121.67 (lb/in^
Total Hori. Stress : 121.67 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 121.67 (lb/in^
Effect.Hori. Stress: 121.67 (lb/in^

END OF CONSOLIDATION - B

dH : 0.060 (in)
dV : 1.145 (in^3)
Time : 0.00 (min)
Height : 5.885 (in)
Area : 6.757 (in^2)
Void Ratio: 0.54
Saturation: 99.96 %
Dry Density : 109.95 (lb/ft^3)
Moisture : 19.82 %
Total Vert. Stress : 121.67 (lb/in^
Total Hori. Stress : 121.67 (lb/in^
Pore Pressure : 80.00 (lb/in^2
Effect.Vert. Stress: 41.67 (lb/in^2
Effect.Hori. Stress: 41.67 (lb/in^2

FAILURE DURING SHEAR

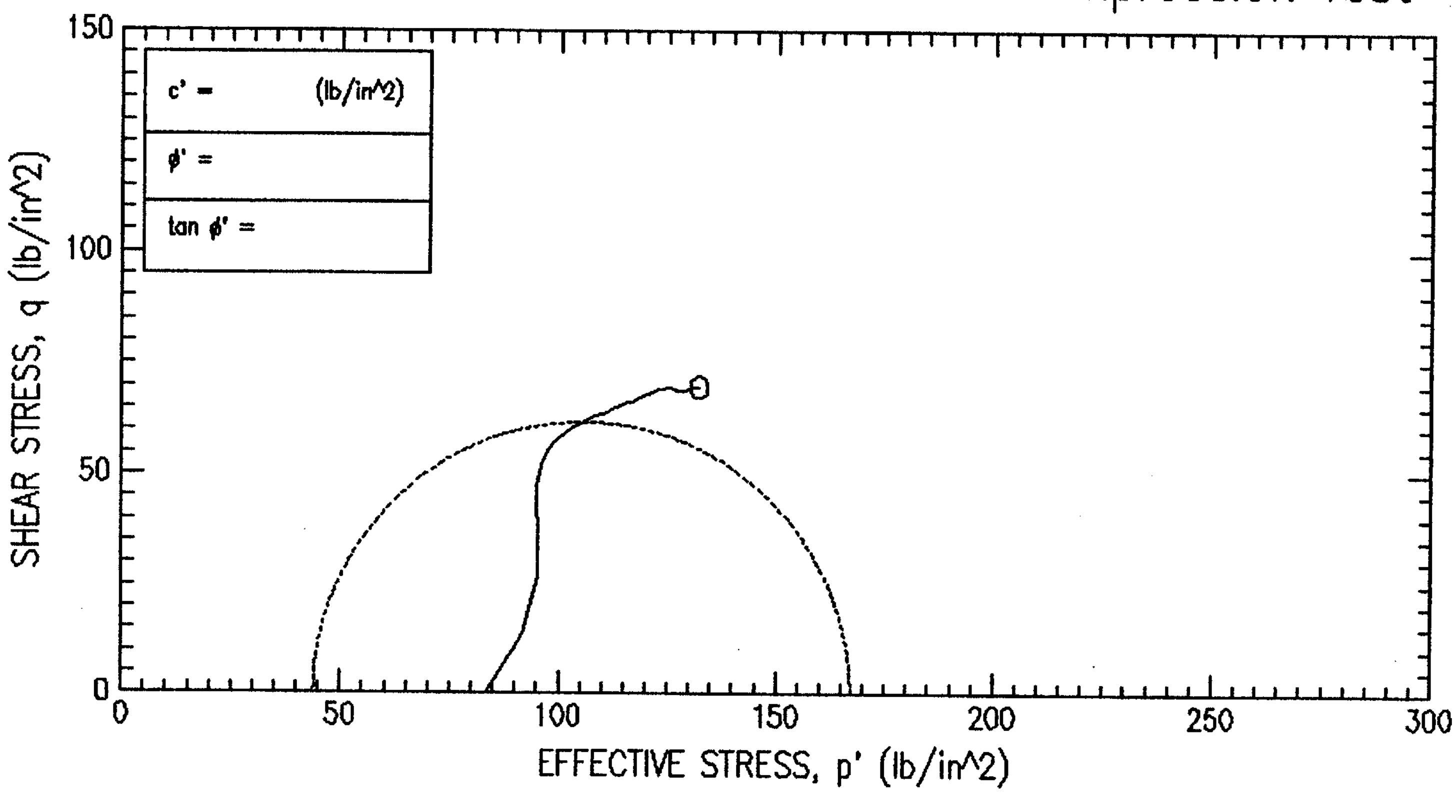
dH : 1.159 (in)
dV : 1.145 (in^3)
Strain : 19.69 %
Strength: 27.51 (lb/in^2)
Time : 1326.97 (min)
Height : 4.786 (in)
Area : 8.414 (in^2)
Void Ratio: 0.54
Saturation: 99.96 %
Dry Density : 109.95 (lb/ft^3)
Moisture : 19.82 %
Total Vert. Stress : 176.69 (lb/in^
Total Hori. Stress : 121.67 (lb/in^
Pore Pressure : 95.63 (lb/in^2
Effect.Vert. Stress: 81.07 (lb/in^2
Effect.Hori. Stress: 26.04 (lb/in^2

END OF TEST

dH : 1.188 (in)
dV : 1.145 (in^3)
Strain : 20.19 %
Time : 1361.77 (min)
Height : 4.757 (in)
Area : 8.467 (in^2)
Void Ratio: 0.54
Saturation: 99.96 %
Dry Density : 109.95 (lb/ft^3)
Moisture : 19.82 %
Total Vert. Stress : 176.61 (lb/in^
Total Hori. Stress : 121.67 (lb/in^
Pore Pressure : 95.41 (lb/in^2
Effect.Vert. Stress: 81.19 (lb/in^2
Effect.Hori. Stress: 26.26 (lb/in^2

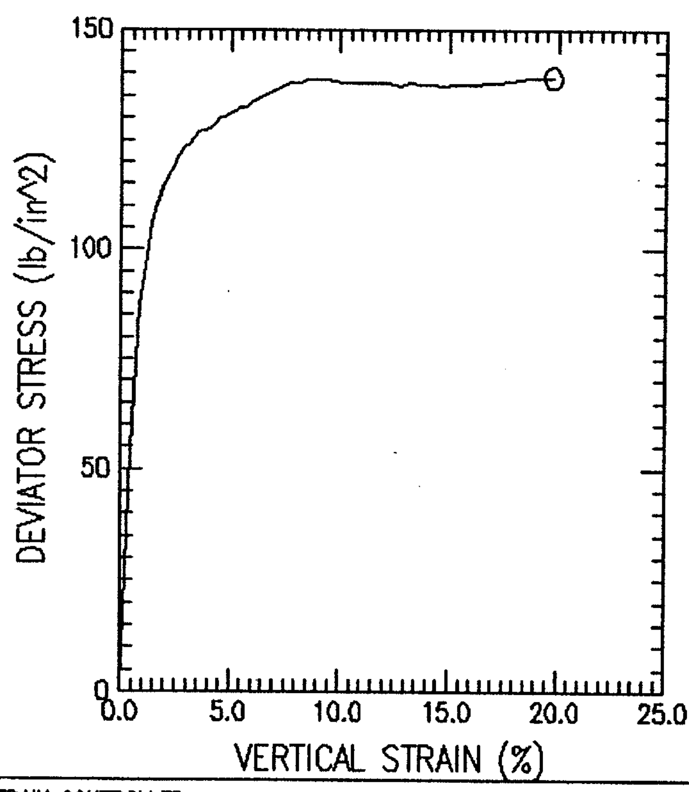
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-59-18



SYMBOL		O				
TEST NO.		WI-59-18				
INITIAL	WATER CONTENT (%)	15.67				
	DRY DENSITY (lb/ft^3)	114.93				
	SATURATION (%)	90.21				
	VOID RATIO	0.470				
BEFORE SHEAR	WATER CONTENT (%)	15.52				
	DRY DENSITY (lb/ft^3)	118.97				
	SATURATION (%)	99.98				
	VOID RATIO	0.420				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		83.33				
MAX. DEV. STRESS (lb/in^2)		144.03				
TIME TO FAILURE (min)		1293.70				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.96				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.90				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Grayish brown clayey sand (SC)

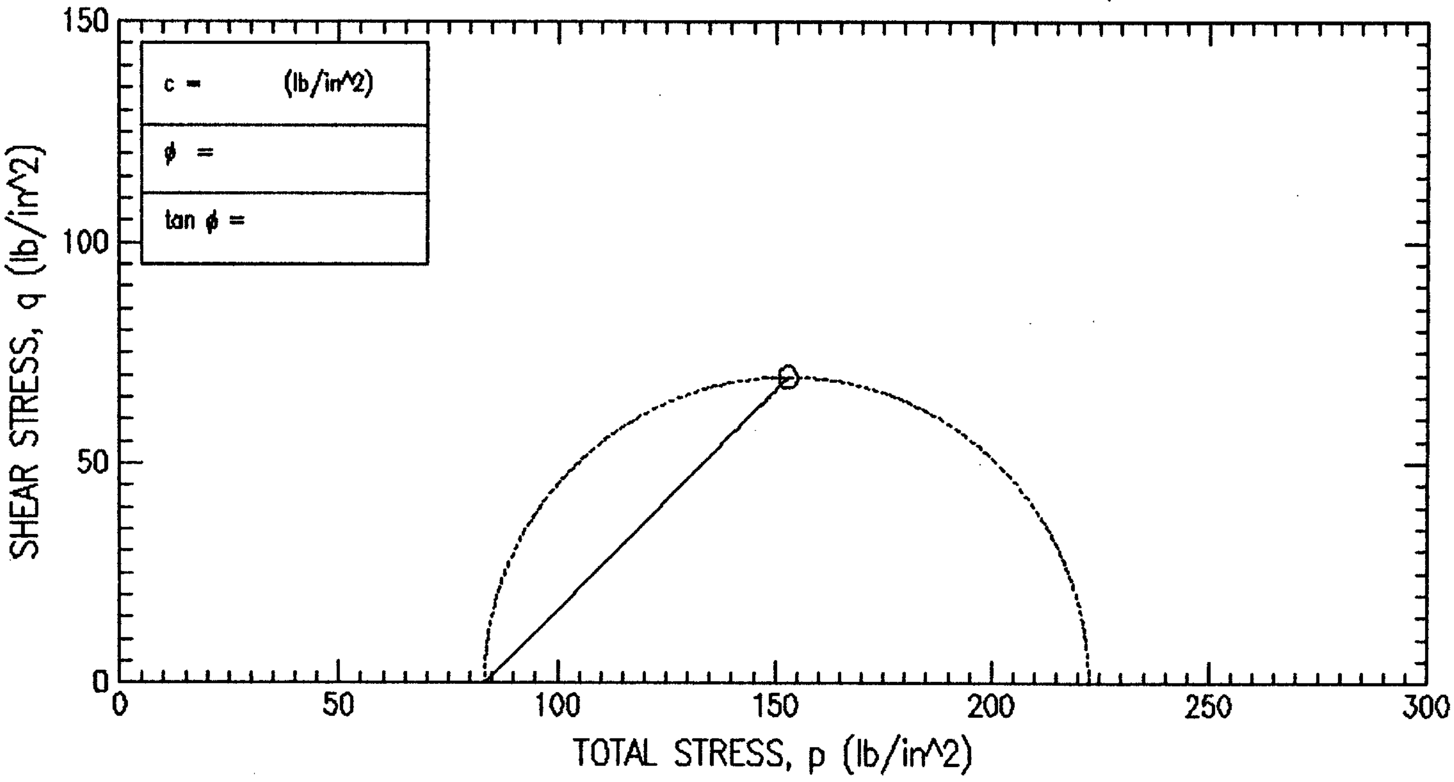
LL 33.65	PL 18.03	PI 15.62	GS 2.71	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)	
REMARKS:				PROJECT Chabot Dam Seismic Study			
1) TXCIU Test with Effective Pressure of 83.33 psi				PROJECT NO.26814536			
				BORING NO. WI-59	SAMPLE NO.	18 Bottom	
				TECH. S. Capps	DEPTH/ELEV	52.5 feet	
				LABORATORY	DATE	06/17/04	

TRIAXIAL COMPRESSION TEST REPORT

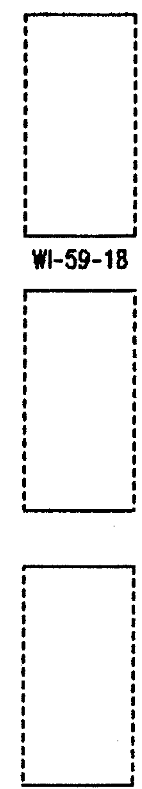
Mon 06-28-:4, 13:09:42

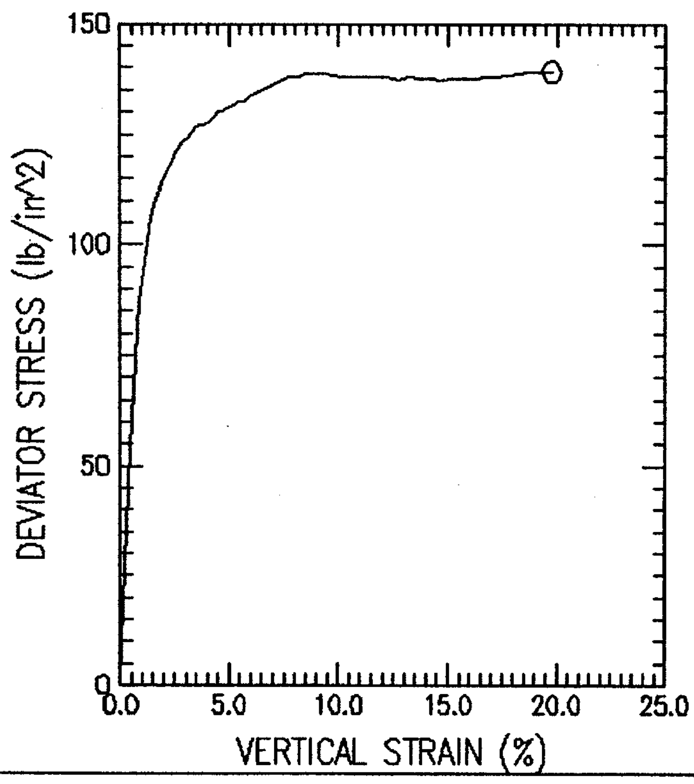
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-59-18				
INITIAL	WATER CONTENT (%)	15.67				
	DRY DENSITY (lb/ft^3)	114.93				
	SATURATION (%)	90.21				
	VOID RATIO	0.470				
BEFORE SHEAR	WATER CONTENT (%)	15.52				
	DRY DENSITY (lb/ft^3)	118.97				
	SATURATION (%)	99.98				
	VOID RATIO	0.420				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		83.33				
MAX. DEV. STRESS (lb/in^2)		144.03				
TIME TO FAILURE (min)		1293.70				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.96				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.90				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Grayish brown clayey sand (SC)

LL 33.65	PL 18.03	PI 15.62	GS 2.71	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study					
1) TXCIU Test with Effective Pressure of 83.33 psi	PROJECT NO.26814536					
	BORING NO. WI-59	SAMPLE NO.	18 Bottom			
	TECH. S. Capps	DEPTH/ELEV	52.5 feet			
	LABORATORY	DATE	06/17/04			
	TRIAXIAL COMPRESSION TEST REPORT					

Mon 06-28-:4, 13:10:20

URS

Mon Jun 28 13:10:49 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 18 Bottom
Sample Type : Pitcher
Soil Description : Grayish brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Location : San Leandro, CA
Test No. : WI-59-18
Test Date : 06/17/04
Depth : 52.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.881 (in^2)
Volume : 40.910 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	163.33	163.33	0.00	0.00	83.33	83.33	1.00	83.33	0.00
2)	0.25	190.69	163.33	5.33	0.20	105.35	77.99	1.35	91.67	13.68
3)	0.45	217.26	163.33	15.20	0.28	122.06	68.13	1.79	95.10	26.97
4)	0.64	237.38	163.33	25.27	0.34	132.10	58.06	2.28	95.08	37.02
5)	0.85	250.54	163.33	32.15	0.37	138.38	51.18	2.70	94.78	43.60
6)	1.05	257.21	163.33	35.48	0.38	141.72	47.84	2.96	94.78	46.94
7)	1.24	264.07	163.33	38.11	0.38	145.96	45.22	3.23	95.59	50.37
8)	1.46	269.33	163.33	40.02	0.38	149.30	43.30	3.45	96.30	53.00
9)	1.66	273.65	163.33	40.95	0.37	152.70	42.38	3.60	97.54	55.16
10)	1.87	277.33	163.33	41.30	0.36	156.03	42.02	3.71	99.03	57.00
11)	2.06	279.06	163.33	41.30	0.36	157.75	42.02	3.75	99.89	57.86
12)	2.27	281.17	163.33	40.95	0.35	160.22	42.38	3.78	101.30	58.92
13)	2.47	283.18	163.33	40.45	0.34	162.73	42.88	3.80	102.80	59.93
14)	2.68	284.86	163.33	39.88	0.33	164.98	43.44	3.80	104.21	60.77
15)	2.88	286.55	163.33	39.39	0.32	167.16	43.94	3.80	105.55	61.61
16)	3.08	287.31	163.33	38.96	0.31	168.35	44.37	3.79	106.36	61.99
17)	3.28	288.48	163.33	38.39	0.31	170.08	44.93	3.79	107.51	62.57
18)	3.48	289.84	163.33	37.75	0.30	172.08	45.57	3.78	108.82	63.25
19)	3.69	290.37	163.33	37.12	0.29	173.25	46.21	3.75	109.73	63.52
20)	3.88	290.52	163.33	36.76	0.29	173.75	46.56	3.73	110.16	63.60
21)	4.09	291.25	163.33	36.19	0.28	175.05	47.13	3.71	111.09	63.96
22)	4.30	292.28	163.33	35.63	0.28	176.65	47.70	3.70	112.17	64.47
23)	4.49	293.22	163.33	35.06	0.27	178.16	48.27	3.69	113.21	64.95
24)	4.70	293.54	163.33	34.77	0.27	178.76	48.55	3.68	113.65	65.10
25)	4.90	294.06	163.33	34.42	0.26	179.64	48.91	3.67	114.27	65.37
26)	5.11	294.67	163.33	33.92	0.26	180.74	49.40	3.66	115.07	65.67
27)	5.30	295.40	163.33	33.50	0.25	181.89	49.83	3.65	115.86	66.03
28)	5.51	295.60	163.33	33.14	0.25	182.45	50.18	3.64	116.32	66.14
29)	5.71	295.82	163.33	32.79	0.25	183.02	50.54	3.62	116.78	66.24
30)	5.92	296.71	163.33	32.29	0.24	184.41	51.03	3.61	117.72	66.69
31)	6.11	297.22	163.33	32.01	0.24	185.21	51.32	3.61	118.26	66.95
32)	6.52	298.21	163.33	31.44	0.23	186.76	51.88	3.60	119.32	67.44
33)	6.92	299.39	163.33	30.80	0.23	188.58	52.52	3.59	120.55	68.03
34)	7.32	300.06	163.33	30.02	0.22	190.04	53.30	3.57	121.67	68.37
35)	7.74	301.29	163.33	29.53	0.21	191.76	53.80	3.56	122.78	68.98
36)	8.14	301.36	163.33	28.96	0.21	192.40	54.37	3.54	123.38	69.02
37)	8.55	301.90	163.33	28.25	0.20	193.65	55.08	3.52	124.36	69.29
38)	8.95	301.96	163.33	27.61	0.20	194.35	55.72	3.49	125.03	69.32
39)	9.36	302.19	163.33	27.04	0.19	195.15	56.28	3.47	125.72	69.43
40)	9.76	301.77	163.33	26.55	0.19	195.22	56.78	3.44	126.00	69.22
41)	10.16	301.44	163.33	26.05	0.19	195.38	57.28	3.41	126.33	69.05
42)	10.67	301.31	163.33	25.62	0.19	195.69	57.70	3.39	126.69	68.99
43)	11.18	301.08	163.33	25.20	0.18	195.88	58.13	3.37	127.00	68.88
44)	11.68	301.14	163.33	24.84	0.18	196.30	58.48	3.36	127.39	68.91
45)	12.19	301.08	163.33	24.49	0.18	196.59	58.84	3.34	127.71	68.88
46)	12.69	300.67	163.33	24.28	0.18	196.38	59.05	3.33	127.72	68.67
47)	13.20	301.13	163.33	24.06	0.17	197.07	59.26	3.33	128.16	68.90
48)	13.71	300.86	163.33	23.78	0.17	197.08	59.55	3.31	128.31	68.77
49)	14.21	301.06	163.33	23.57	0.17	197.49	59.76	3.30	128.62	68.86
50)	14.72	300.68	163.33	23.42	0.17	197.25	59.90	3.29	128.58	68.68
51)	15.23	300.76	163.33	23.35	0.17	197.40	59.97	3.29	128.69	68.71
52)	16.24	300.70	163.33	22.93	0.17	197.77	60.40	3.27	129.08	68.69
53)	16.74	301.19	163.33	22.64	0.16	198.55	60.68	3.27	129.61	68.93
54)	17.25	301.39	163.33	22.43	0.16	198.95	60.89	3.27	129.92	69.03
55)	17.75	301.59	163.33	22.08	0.16	199.51	61.25	3.26	130.38	69.13
56)	18.27	302.09	163.33	21.93	0.16	200.15	61.39	3.26	130.77	69.38
57)	18.76	302.28	163.33	21.51	0.15	200.77	61.82	3.25	131.29	69.47
58)	19.78	302.47	163.33	20.66	0.15	201.81	62.67	3.22	132.24	69.57

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 18 Bottom
Sample Type : Pitcher
Location : San Leandro, CA
Test No. : WI-59-18
Test Date : 06/17/04
Depth : 52.5 feet
Elevation : NA
Tested by : S. Capps
Checked by : R. Taraya
Soil Description : Grayish brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Height : 5.945 (in)
Area : 6.881 (in^2)
Volume : 40.910 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.73	80.00	0.00	0.00	0.00	163.33	83.33
2)	0.014	0.25	6.75	85.34	191.06	191.06	28.32	190.69	105.35
3)	0.026	0.45	6.76	95.20	377.42	377.42	55.83	217.26	122.06
4)	0.038	0.64	6.77	105.27	519.20	519.20	76.65	237.38	132.10
5)	0.050	0.85	6.79	112.15	612.75	612.75	90.27	250.54	138.38
6)	0.062	1.05	6.80	115.49	660.98	660.98	97.18	257.21	141.72
7)	0.073	1.24	6.81	118.11	710.68	710.68	104.28	264.07	145.96
8)	0.086	1.46	6.83	120.03	749.41	749.41	109.73	269.33	149.30
9)	0.097	1.66	6.84	120.95	781.57	781.57	114.20	273.65	152.70
10)	0.110	1.87	6.86	121.31	809.34	809.34	118.01	277.33	156.03
11)	0.121	2.06	6.87	121.31	823.23	823.23	119.80	279.06	157.75
12)	0.133	2.27	6.89	120.95	840.03	840.03	121.98	281.17	160.22
13)	0.145	2.47	6.90	120.45	856.11	856.11	124.06	283.18	162.73
14)	0.157	2.68	6.92	119.89	870.00	870.00	125.81	284.86	164.98
15)	0.169	2.88	6.93	119.39	883.88	883.88	127.55	286.55	167.16
16)	0.181	3.08	6.94	118.96	891.19	891.19	128.34	287.31	168.35
17)	0.192	3.28	6.96	118.40	901.42	901.42	129.54	288.48	170.08
18)	0.204	3.48	6.97	117.76	913.12	913.12	130.95	289.84	172.08
19)	0.216	3.69	6.99	117.12	918.96	918.96	131.51	290.37	173.25
20)	0.228	3.88	7.00	116.77	921.89	921.89	131.66	290.52	173.75
21)	0.240	4.09	7.02	116.20	929.20	929.20	132.42	291.25	175.05
22)	0.252	4.30	7.03	115.63	938.70	938.70	133.48	292.28	176.65
23)	0.264	4.49	7.05	115.06	947.47	947.47	134.45	293.22	178.16
24)	0.276	4.70	7.06	114.78	951.85	951.85	134.78	293.54	178.76
25)	0.288	4.90	7.08	114.42	957.70	957.70	135.33	294.06	179.64
26)	0.300	5.11	7.09	113.93	964.28	964.28	135.96	294.67	180.74
27)	0.311	5.30	7.11	113.50	971.58	971.58	136.71	295.40	181.89
28)	0.323	5.51	7.12	113.15	975.24	975.24	136.92	295.60	182.45
29)	0.335	5.71	7.14	112.79	978.89	978.89	137.14	295.82	183.02
30)	0.347	5.92	7.15	112.30	987.66	987.66	138.06	296.71	184.41
31)	0.359	6.11	7.17	112.01	993.51	993.51	138.60	297.22	185.21
32)	0.383	6.52	7.20	111.45	1005.20	1005.20	139.62	298.21	186.76
33)	0.406	6.92	7.23	110.81	1018.36	1018.36	140.84	299.39	188.58
34)	0.430	7.32	7.26	110.03	1027.86	1027.86	141.54	300.06	190.04
35)	0.454	7.74	7.29	109.53	1041.74	1041.74	142.81	301.29	191.76
36)	0.478	8.14	7.33	108.96	1046.86	1046.86	142.88	301.36	192.40
37)	0.502	8.55	7.36	108.25	1055.63	1055.63	143.44	301.90	193.65
38)	0.525	8.95	7.39	107.61	1060.74	1060.74	143.50	301.96	194.35
39)	0.549	9.36	7.43	107.05	1067.32	1067.32	143.74	302.19	195.15
40)	0.573	9.76	7.46	106.55	1068.78	1068.78	143.30	301.77	195.22
41)	0.597	10.16	7.49	106.05	1070.98	1070.98	142.96	301.44	195.38
42)	0.626	10.67	7.53	105.63	1076.09	1076.09	142.83	301.31	195.69
43)	0.656	11.18	7.58	105.20	1080.48	1080.48	142.59	301.08	195.88
44)	0.686	11.68	7.62	104.85	1087.05	1087.05	142.66	301.14	196.30
45)	0.716	12.19	7.66	104.49	1092.90	1092.90	142.59	301.08	196.59
46)	0.745	12.69	7.71	104.28	1095.82	1095.82	142.16	300.67	196.38
47)	0.775	13.20	7.75	104.07	1106.06	1106.06	142.65	301.13	197.07
48)	0.805	13.71	7.80	103.78	1110.44	1110.44	142.37	300.86	197.08
49)	0.834	14.21	7.85	103.57	1118.48	1118.48	142.57	301.06	197.49
50)	0.865	14.72	7.89	103.43	1122.13	1122.13	142.18	300.68	197.25
51)	0.894	15.23	7.94	103.36	1129.44	1129.44	142.26	300.76	197.40
52)	0.954	16.24	8.04	102.93	1142.60	1142.60	142.20	300.70	197.77
53)	0.983	16.74	8.08	102.65	1153.56	1153.56	142.71	301.19	198.55
54)	1.013	17.25	8.13	102.44	1162.33	1162.33	142.91	301.39	198.95
55)	1.042	17.75	8.18	102.08	1171.10	1171.10	143.12	301.59	199.51
56)	1.073	18.27	8.23	101.94	1182.79	1182.79	143.63	302.09	200.15
57)	1.102	18.76	8.28	101.51	1191.56	1191.56	143.83	302.28	200.77
58)	1.161	19.78	8.39	100.66	1208.37	1208.37	144.03	302.47	201.81

URS

Mon Jun 28 13:10:49 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 18 Bottom
Sample Type : Pitcher
Soil Description : Grayish brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Location : San Leandro, CA
Test No. : WI-59-18
Test Date : 06/17/04
Depth : 52.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.881 (in^2)
Volume : 40.910 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 33.65
Plastic Limit : 18.03
Specific Gravity : 2.708

INITIAL

Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.47
Saturation: 90.21 %

Dry Density : 114.93 (lb/ft^3)
Moisture : 15.67 %

Time : 0.00 (min)

INITIALIZATION

dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)

Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.47
Saturation: 90.21 %

Dry Density : 114.93 (lb/ft^3)
Moisture : 15.67 %

Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 163.33 (lb/in^
Effect.Hori. Stress: 163.33 (lb/in^

END OF CONSOLIDATION - A

dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)

Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.47
Saturation: 90.21 %

Dry Density : 114.93 (lb/ft^3)
Moisture : 15.67 %

Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 163.33 (lb/in^
Effect.Hori. Stress: 163.33 (lb/in^

END OF SATURATION

dH : 0.000 (in)
dV : 0.000 (in^3)
dVCorr : 0.000 (in^3)
Time : 0.00 (min)

Height : 5.945 (in)
Area : 6.881 (in^2)
Void Ratio: 0.47
Saturation: 89.37 %

Dry Density : 114.93 (lb/ft^3)
Moisture : 15.52 %

Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 163.33 (lb/in^
Effect.Hori. Stress: 163.33 (lb/in^

END OF CONSOLIDATION - B

dH : 0.073 (in)
dV : 1.389 (in^3)
Time : 0.00 (min)

Height : 5.872 (in)
Area : 6.730 (in^2)
Void Ratio: 0.42
Saturation: 99.98 %

Dry Density : 118.97 (lb/ft^3)
Moisture : 15.52 %

Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 80.00 (lb/in^2
Effect.Vert. Stress: 83.33 (lb/in^2
Effect.Hori. Stress: 83.33 (lb/in^2

FAILURE DURING SHEAR

dH : 1.161 (in)
dV : 1.389 (in^3)
Strain : 19.78 %
Strength: 72.02 (lb/in^2)
Time : 1293.70 (min)

Height : 4.784 (in)
Area : 8.390 (in^2)
Void Ratio: 0.42
Saturation: 99.98 %

Dry Density : 118.97 (lb/ft^3)
Moisture : 15.52 %

Total Vert. Stress : 307.36 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 100.66 (lb/in^
Effect.Vert. Stress: 206.70 (lb/in^
Effect.Hori. Stress: 62.67 (lb/in^2

END OF TEST

dH : 1.161 (in)
dV : 1.389 (in^3)
Strain : 19.78 %
Time : 1293.70 (min)

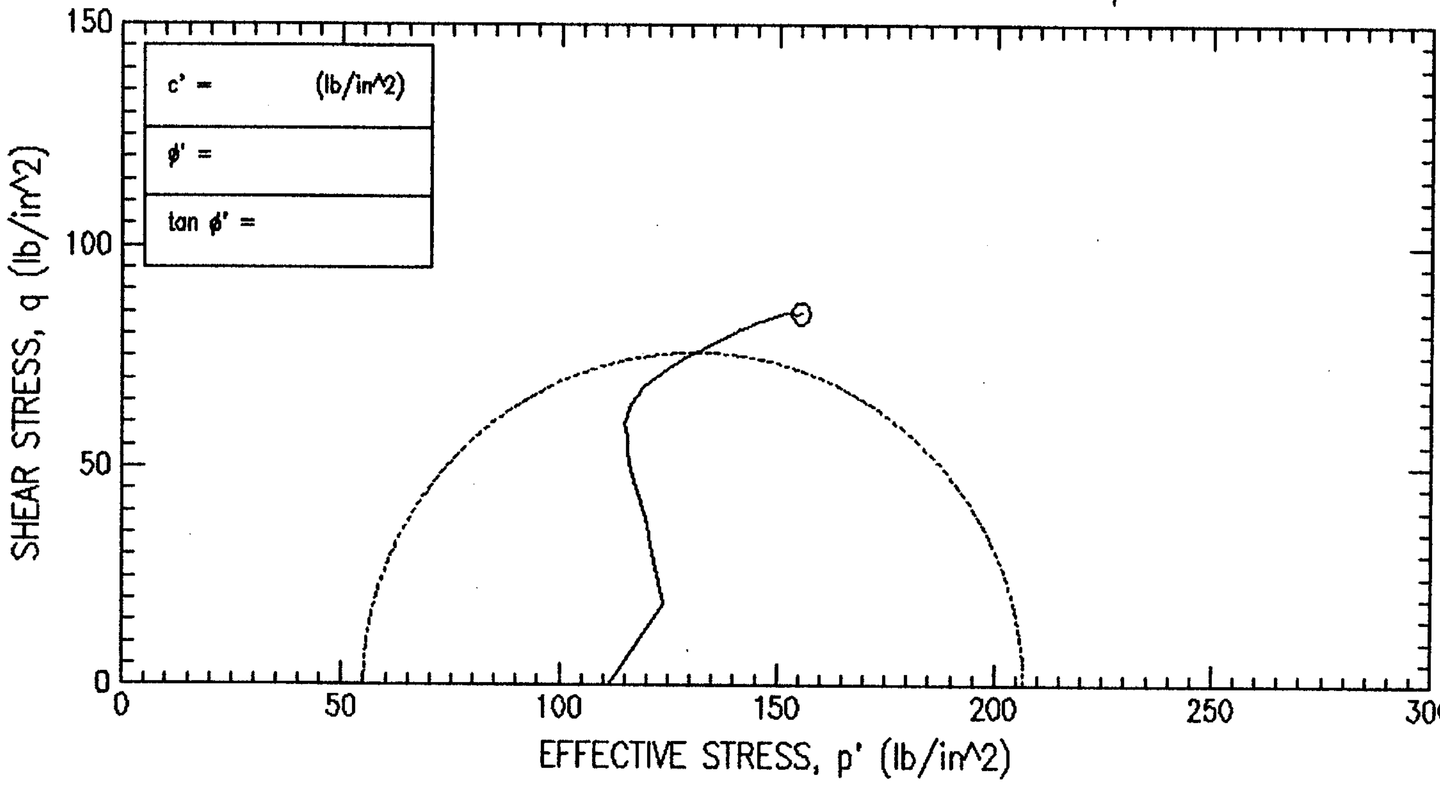
Height : 4.784 (in)
Area : 8.390 (in^2)
Void Ratio: 0.42
Saturation: 99.98 %

Dry Density : 118.97 (lb/ft^3)
Moisture : 15.52 %

Total Vert. Stress : 307.36 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 100.66 (lb/in^
Effect.Vert. Stress: 206.70 (lb/in^
Effect.Hori. Stress: 62.67 (lb/in^2

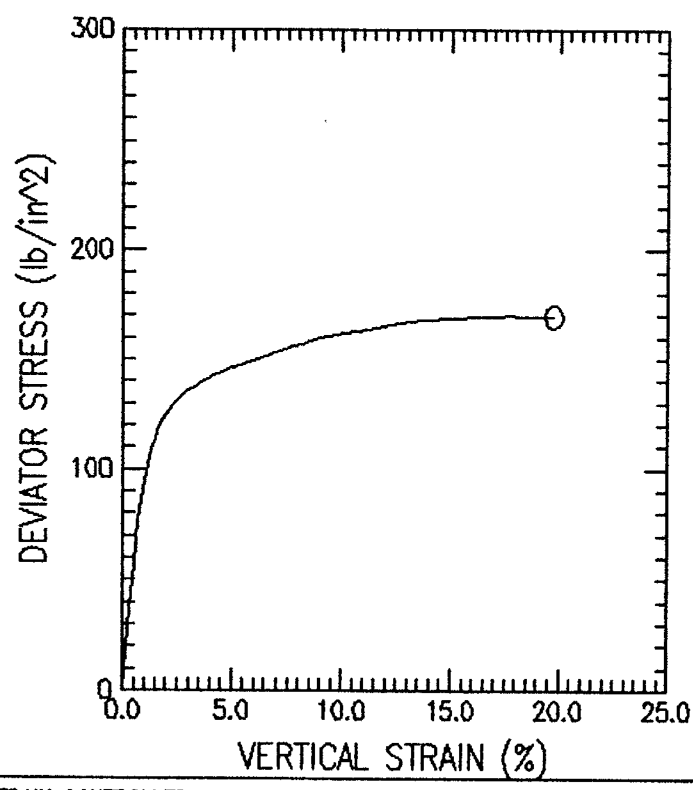
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-59-26



SYMBOL		O				
TEST NO.		WI-59-26				
INITIAL	WATER CONTENT (%)	17.01				
	DRY DENSITY (lb/ft^3)	110.72				
	SATURATION (%)	90.73				
	VOID RATIO	0.499				
BEFORE SHEAR	WATER CONTENT (%)	17.26				
	DRY DENSITY (lb/ft^3)	113.73				
	SATURATION (%)	99.99				
	VOID RATIO	0.459				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		111.11				
MAX. DEV. STRESS (lb/in^2)		174.43				
TIME TO FAILURE (min)		1160.40				
RATE OF STRAIN INCR (%/min)		0.01				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.40				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Mottled bluish gray brown clayey sand (SC)

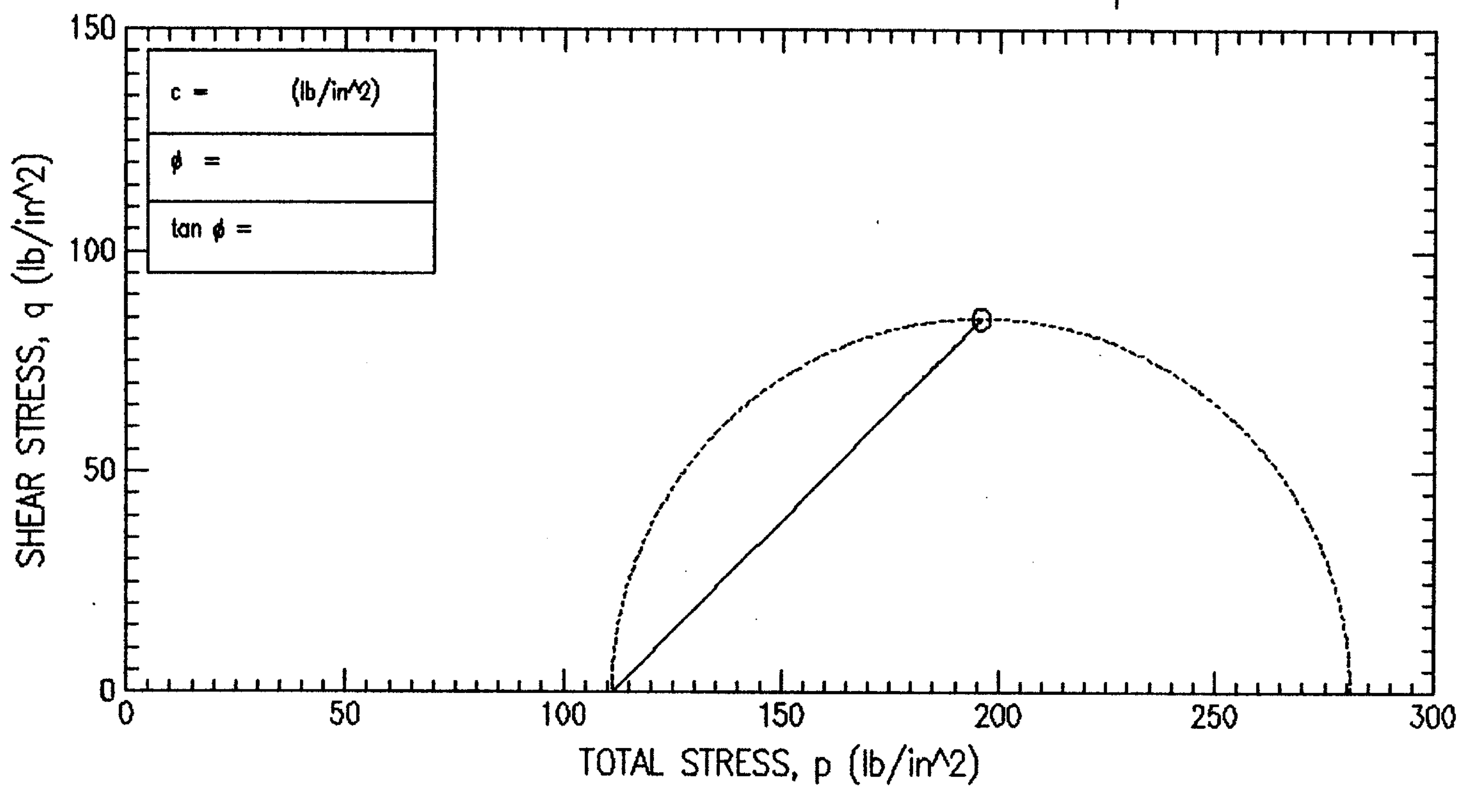
LL 50.02	PL 25.88	PI 24.14	GS 2.66	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study				
1) TXCIU Test with Effective Pressure of 111.11 psi	PROJECT NO.26814536				
	BORING NO. WI-59	SAMPLE NO.	26 Bottom		
	TECH. S. Capps	DEPTH/ELEV	77.0 feet		
	LABORATORY	DATE	06/17/04		
	TRIAXIAL COMPRESSION TEST REPORT				

Mon 06-28-:4, 11:39:38

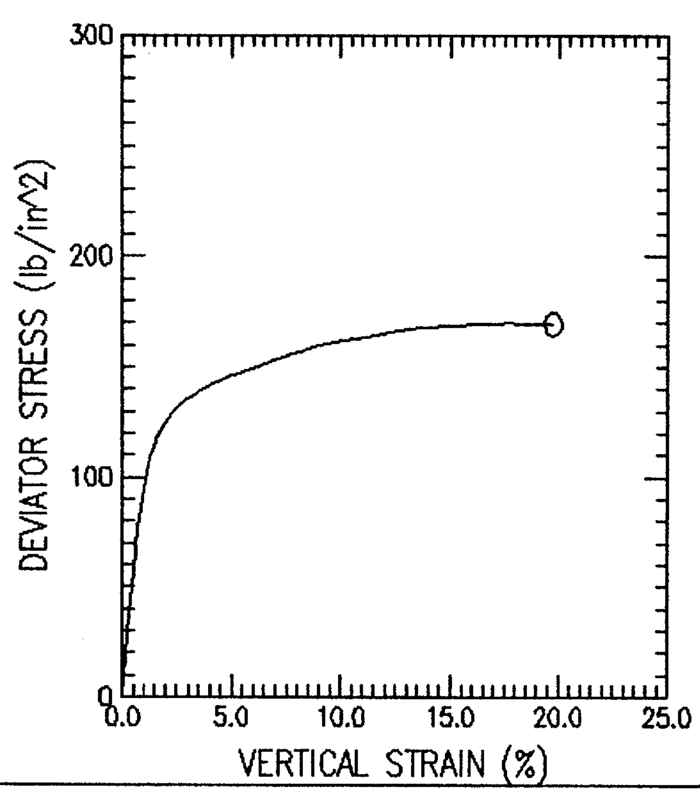
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-59-26



SYMBOL		O				
TEST NO.		WI-59-26				
INITIAL	WATER CONTENT (%)	17.01				
	DRY DENSITY (lb/ft^3)	110.72				
	SATURATION (%)	90.73				
	VOID RATIO	0.499				
BEFORE SHEAR	WATER CONTENT (%)	17.26				
	DRY DENSITY (lb/ft^3)	113.73				
	SATURATION (%)	99.99				
	VOID RATIO	0.459				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		111.11				
MAX. DEV. STRESS (lb/in^2)		174.43				
TIME TO FAILURE (min)		1160.40				
RATE OF STRAIN INCR (%/min)		0.01				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.40				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Mottled bluish gray brown clayey sand (SC)

LL 50.02	PL 25.88	PI 24.14	GS 2.66	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)	

REMARKS:

1) TXCIU Test with Effective Pressure of 111.11 psi

PROJECT Chabot Dam Seismic Study

PROJECT NO.26814536

BORING NO. WI-59	SAMPLE NO.	26 Bottom		
TECH. S. Capps	DEPTH/ELEV	77.0 feet		
LABORATORY	DATE	06/17/04		

TRIAXIAL COMPRESSION TEST REPORT

Mon 06-28-:4, 11:39:05

URS

Mon Jun 28 11:40:48 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 26 Bottom
Sample Type : Pitcher
Location : San Leandro, CA
Test No. : WI-59-26
Test Date : 06/17/04
Depth : 77.0 feet
Elevation : NA
Tested by : S. Capps
Checked by : R. Taraya
Soil Description : Mottled bluish gray brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 111.11 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	191.11	191.11	0.00	0.00	111.11	111.11	1.00	111.11	0.00
2)	0.31	228.58	191.11	5.87	0.16	142.70	105.24	1.36	123.97	18.73
3)	0.49	248.11	191.11	18.12	0.32	149.99	92.99	1.61	121.49	28.50
4)	0.69	268.02	191.11	29.98	0.39	158.04	81.13	1.95	119.58	38.45
5)	0.89	281.81	191.11	39.01	0.43	162.80	72.10	2.26	117.45	45.35
6)	1.09	292.76	191.11	45.97	0.45	166.78	65.13	2.56	115.96	50.83
7)	1.29	299.50	191.11	49.88	0.46	169.62	61.23	2.77	115.42	54.20
8)	1.49	305.29	191.11	52.86	0.46	172.42	58.24	2.96	115.33	57.09
9)	1.69	310.59	191.11	56.00	0.47	174.58	55.10	3.17	114.84	59.74
10)	1.90	314.48	191.11	57.45	0.47	177.02	53.65	3.30	115.34	61.69
11)	2.10	317.90	191.11	58.60	0.46	179.30	52.50	3.41	115.90	63.40
12)	2.30	320.39	191.11	59.14	0.46	181.25	51.97	3.49	116.61	64.64
13)	2.51	322.40	191.11	59.60	0.45	182.80	51.51	3.55	117.15	65.65
14)	2.71	324.41	191.11	59.83	0.45	184.58	51.28	3.60	117.93	66.65
15)	2.90	325.97	191.11	59.90	0.44	186.06	51.20	3.63	118.63	67.43
16)	3.11	327.50	191.11	59.98	0.44	187.51	51.13	3.67	119.32	68.19
17)	3.31	328.57	191.11	59.90	0.44	188.67	51.20	3.68	119.93	68.73
18)	3.52	330.09	191.11	59.83	0.43	190.26	51.28	3.71	120.77	69.49
19)	3.71	331.16	191.11	59.60	0.43	191.56	51.51	3.72	121.53	70.03
20)	3.92	331.76	191.11	59.44	0.42	192.31	51.66	3.72	121.99	70.33
21)	4.12	333.28	191.11	59.29	0.42	193.98	51.81	3.74	122.90	71.08
22)	4.32	334.32	191.11	59.06	0.41	195.26	52.04	3.75	123.65	71.61
23)	4.53	334.91	191.11	58.83	0.41	196.07	52.27	3.75	124.17	71.90
24)	4.73	335.94	191.11	58.60	0.40	197.34	52.50	3.76	124.92	72.42
25)	4.92	336.99	191.11	58.22	0.40	198.76	52.89	3.76	125.82	72.94
26)	5.14	337.55	191.11	57.99	0.40	199.55	53.12	3.76	126.33	73.22
27)	5.32	338.15	191.11	57.68	0.39	200.46	53.42	3.75	126.94	73.52
28)	5.53	339.15	191.11	57.45	0.39	201.69	53.65	3.76	127.67	74.02
29)	5.73	339.73	191.11	57.23	0.39	202.50	53.88	3.76	128.19	74.31
30)	5.94	340.27	191.11	57.07	0.38	203.20	54.03	3.76	128.61	74.58
31)	6.14	341.29	191.11	56.69	0.38	204.59	54.42	3.76	129.50	75.09
32)	6.54	342.83	191.11	56.15	0.37	206.68	54.95	3.76	130.81	75.86
33)	6.95	343.91	191.11	55.46	0.36	208.44	55.64	3.75	132.04	76.40
34)	7.35	345.86	191.11	54.78	0.35	211.08	56.33	3.75	133.70	77.38
35)	7.75	346.92	191.11	54.16	0.35	212.75	56.94	3.74	134.85	77.90
36)	8.16	347.96	191.11	53.47	0.34	214.48	57.63	3.72	136.06	78.43
37)	8.55	349.00	191.11	52.94	0.34	216.06	58.17	3.71	137.11	78.95
38)	8.96	350.43	191.11	52.25	0.33	218.17	58.86	3.71	138.51	79.66
39)	9.36	351.42	191.11	51.79	0.32	219.63	59.31	3.70	139.47	80.16
40)	9.77	352.39	191.11	51.18	0.32	221.21	59.93	3.69	140.57	80.64
41)	10.17	352.95	191.11	50.72	0.31	222.23	60.39	3.68	141.31	80.92
42)	10.68	354.13	191.11	50.11	0.31	224.01	61.00	3.67	142.51	81.51
43)	11.18	354.87	191.11	49.50	0.30	225.37	61.61	3.66	143.49	81.88
44)	11.69	355.60	191.11	48.88	0.30	226.71	62.22	3.64	144.47	82.25
45)	12.19	356.72	191.11	48.35	0.29	228.37	62.76	3.64	145.57	82.81
46)	12.70	357.40	191.11	47.73	0.29	229.66	63.37	3.62	146.52	83.14
47)	13.20	358.08	191.11	47.12	0.28	230.96	63.98	3.61	147.47	83.49
48)	13.71	358.72	191.11	46.59	0.28	232.13	64.52	3.60	148.32	83.80
49)	14.21	359.35	191.11	45.97	0.27	233.37	65.13	3.58	149.25	84.12
50)	14.71	359.56	191.11	45.44	0.27	234.12	65.67	3.57	149.89	84.23
51)	15.22	359.76	191.11	44.83	0.27	234.93	66.28	3.54	150.61	84.33
52)	16.22	360.51	191.11	43.83	0.26	236.68	67.27	3.52	151.98	84.70
53)	16.73	360.67	191.11	43.37	0.26	237.29	67.73	3.50	152.51	84.78
54)	17.24	360.79	191.11	42.76	0.25	238.03	68.35	3.48	153.19	84.84
55)	17.74	360.92	191.11	42.38	0.25	238.54	68.73	3.47	153.63	84.90
56)	18.24	360.26	191.11	41.84	0.25	238.42	69.26	3.44	153.84	84.58
57)	18.75	360.35	191.11	41.46	0.24	238.89	69.65	3.43	154.27	84.62
58)	19.75	360.53	191.11	40.46	0.24	240.06	70.64	3.40	155.35	84.71

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 26 Bottom
Sample Type : Pitcher
Soil Description : Mottled bluish gray brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 111.11 psi

Location : San Leandro, CA
Test No. : WI-59-26
Test Date : 06/17/04
Depth : 77.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.31	80.00	0.00	0.00	0.00	191.11	111.11
2)	0.018	0.31	6.33	85.87	243.60	243.60	38.48	228.58	142.70
3)	0.029	0.49	6.34	98.12	371.29	371.29	58.55	248.11	149.99
4)	0.041	0.69	6.35	109.98	502.02	502.02	79.00	268.02	158.04
5)	0.052	0.89	6.37	119.01	593.22	593.22	93.17	281.81	162.80
6)	0.064	1.09	6.38	125.98	666.19	666.19	104.42	292.76	166.78
7)	0.076	1.29	6.39	129.88	711.79	711.79	111.34	299.50	169.62
8)	0.088	1.49	6.41	132.87	751.31	751.31	117.28	305.29	172.42
9)	0.100	1.69	6.42	136.01	787.79	787.79	122.73	310.59	174.58
10)	0.112	1.90	6.43	137.46	815.16	815.16	126.73	314.48	177.02
11)	0.124	2.10	6.45	138.61	839.48	839.48	130.24	317.90	179.30
12)	0.135	2.30	6.46	139.14	857.72	857.72	132.80	320.39	181.25
13)	0.148	2.51	6.47	139.60	872.92	872.92	134.87	322.40	182.80
14)	0.160	2.71	6.49	139.83	888.12	888.12	136.93	324.41	184.58
15)	0.171	2.90	6.50	139.91	900.28	900.28	138.53	325.97	186.06
16)	0.183	3.11	6.51	139.98	912.44	912.44	140.10	327.50	187.51
17)	0.195	3.31	6.53	139.91	921.56	921.56	141.20	328.57	188.67
18)	0.207	3.52	6.54	139.83	933.72	933.72	142.76	330.09	190.26
19)	0.219	3.71	6.55	139.60	942.84	942.84	143.86	331.16	191.56
20)	0.231	3.92	6.57	139.45	948.93	948.93	144.48	331.76	192.31
21)	0.243	4.12	6.58	139.30	961.09	961.09	146.03	333.28	193.98
22)	0.254	4.32	6.60	139.07	970.21	970.21	147.11	334.32	195.26
23)	0.267	4.53	6.61	138.84	976.29	976.29	147.71	334.91	196.07
24)	0.279	4.73	6.62	138.61	985.41	985.41	148.78	335.94	197.34
25)	0.290	4.92	6.64	138.22	994.53	994.53	149.85	336.99	198.76
26)	0.303	5.14	6.65	137.99	1000.61	1000.61	150.42	337.55	199.55
27)	0.314	5.32	6.67	137.69	1006.69	1006.69	151.04	338.15	200.46
28)	0.326	5.53	6.68	137.46	1015.81	1015.81	152.07	339.15	201.69
29)	0.337	5.73	6.69	137.23	1021.89	1021.89	152.67	339.73	202.50
30)	0.350	5.94	6.71	137.08	1027.97	1027.97	153.22	340.27	203.20
31)	0.362	6.14	6.72	136.69	1037.09	1037.09	154.26	341.29	204.59
32)	0.385	6.54	6.75	136.16	1052.29	1052.29	155.85	342.83	206.68
33)	0.409	6.95	6.78	135.47	1064.45	1064.45	156.96	343.91	208.44
34)	0.433	7.35	6.81	134.78	1082.69	1082.69	158.96	345.86	211.08
35)	0.457	7.75	6.84	134.17	1094.85	1094.85	160.05	346.92	212.75
36)	0.481	8.16	6.87	133.48	1107.02	1107.02	161.12	347.96	214.48
37)	0.504	8.55	6.90	132.94	1119.18	1119.18	162.19	349.00	216.06
38)	0.528	8.96	6.93	132.25	1134.38	1134.38	163.66	350.43	218.17
39)	0.552	9.36	6.96	131.80	1146.54	1146.54	164.68	351.42	219.63
40)	0.576	9.77	6.99	131.18	1158.70	1158.70	165.67	352.39	221.21
41)	0.599	10.17	7.02	130.72	1167.82	1167.82	166.24	352.95	222.23
42)	0.629	10.68	7.06	130.11	1183.02	1183.02	167.45	354.13	224.01
43)	0.659	11.18	7.10	129.50	1195.18	1195.18	168.22	354.87	225.37
44)	0.689	11.69	7.15	128.89	1207.34	1207.34	168.97	355.60	226.71
45)	0.718	12.19	7.19	128.35	1222.54	1222.54	170.12	356.72	228.37
46)	0.748	12.70	7.23	127.74	1234.70	1234.70	170.81	357.40	229.66
47)	0.778	13.20	7.27	127.13	1246.86	1246.86	171.52	358.08	230.96
48)	0.808	13.71	7.31	126.59	1259.03	1259.03	172.17	358.72	232.13
49)	0.837	14.21	7.36	125.98	1271.19	1271.19	172.82	359.35	233.37
50)	0.867	14.71	7.40	125.44	1280.31	1280.31	173.04	359.56	234.12
51)	0.897	15.22	7.44	124.83	1289.43	1289.43	173.24	359.76	234.93
52)	0.956	16.22	7.53	123.84	1310.71	1310.71	174.01	360.51	236.68
53)	0.986	16.73	7.58	123.38	1319.83	1319.83	174.17	360.67	237.29
54)	1.016	17.24	7.62	122.76	1328.95	1328.95	174.30	360.79	238.03
55)	1.045	17.74	7.67	122.38	1338.07	1338.07	174.43	360.92	238.54
56)	1.075	18.24	7.72	121.85	1341.11	1341.11	173.76	360.26	238.42
57)	1.105	18.75	7.77	121.46	1350.23	1350.23	173.85	360.35	238.89
58)	1.164	19.75	7.86	120.47	1368.47	1368.47	174.03	360.53	240.06

URS

Mon Jun 28 11:40:48 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-59
Sample No. : 26 Bottom
Sample Type : Pitcher
Location : San Leandro, CA
Test No. : WI-59-26
Test Date : 06/17/04
Depth : 77.0 feet
Elevation : NA
Tested by : S. Capps
Checked by : R. Taraya
Soil Description : Mottled bluish gray brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 111.11 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 50.02
Plastic Limit : 25.88
Specific Gravity : 2.659

INITIAL
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.50
Saturation: 90.73 %
Dry Density : 110.72 (lb/ft^3)
Moisture : 17.01 %
Time : 0.00 (min)

INITIALIZATION
dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.50
Saturation: 90.73 %
Dry Density : 110.72 (lb/ft^3)
Moisture : 17.01 %
Total Vert. Stress : 191.11 (lb/in^
Total Hori. Stress : 191.11 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 191.11 (lb/in^
Effect.Hori. Stress: 191.11 (lb/in^

END OF CONSOLIDATION - A
dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.50
Saturation: 90.73 %
Dry Density : 110.72 (lb/ft^3)
Moisture : 17.01 %
Total Vert. Stress : 191.11 (lb/in^
Total Hori. Stress : 191.11 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 191.11 (lb/in^
Effect.Hori. Stress: 191.11 (lb/in^

END OF SATURATION
dH : 0.000 (in)
dV : 0.000 (in^3)
dVCorr : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.50
Saturation: 92.02 %
Dry Density : 110.72 (lb/ft^3)
Moisture : 17.26 %
Total Vert. Stress : 191.11 (lb/in^
Total Hori. Stress : 191.11 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 191.11 (lb/in^
Effect.Hori. Stress: 191.11 (lb/in^

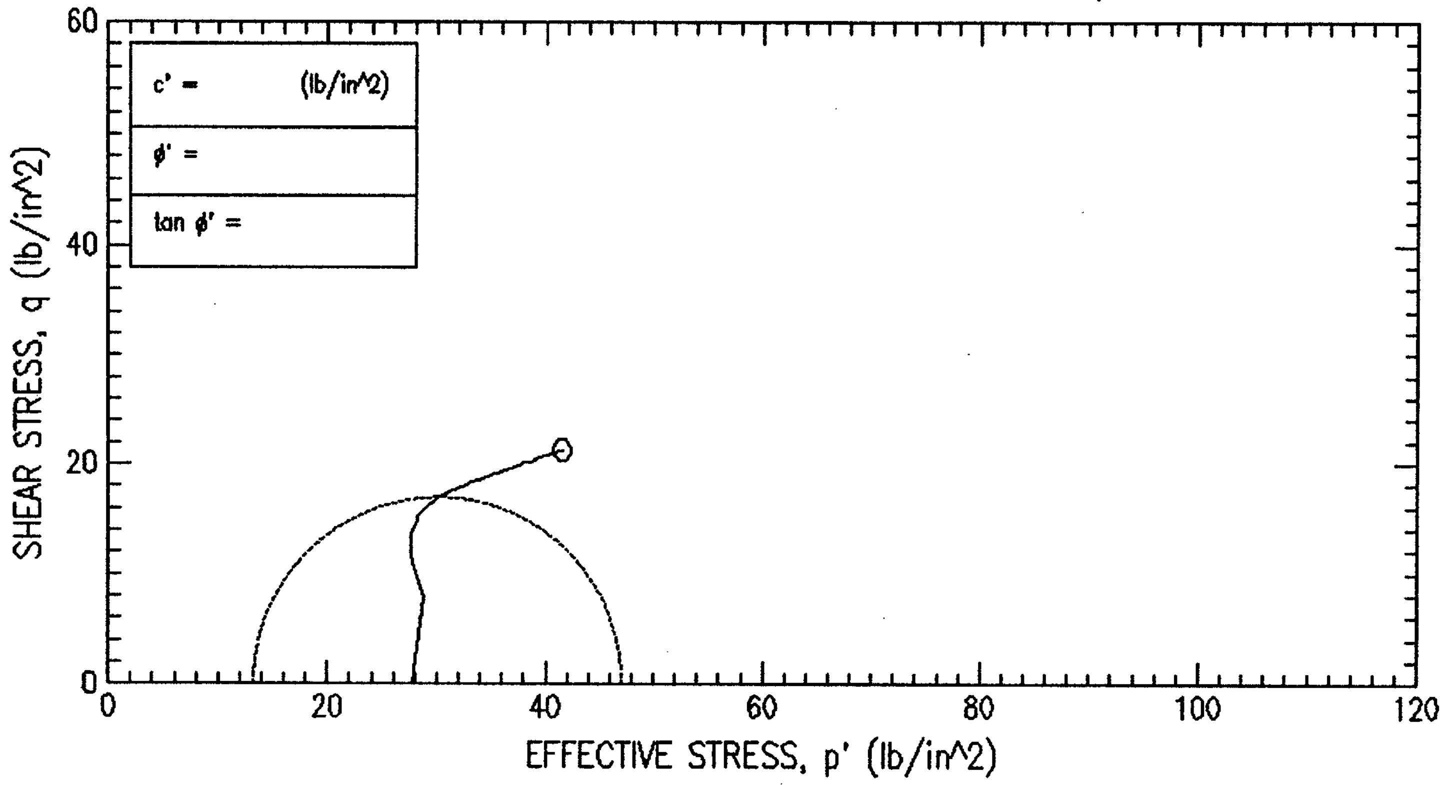
END OF CONSOLIDATION - B
dH : 0.053 (in)
dV : 1.012 (in^3)
Time : 0.00 (min)
Height : 5.892 (in)
Area : 6.310 (in^2)
Void Ratio: 0.46
Saturation: 99.99 %
Dry Density : 113.73 (lb/ft^3)
Moisture : 17.26 %
Total Vert. Stress : 191.11 (lb/in^
Total Hori. Stress : 191.11 (lb/in^
Pore Pressure : 80.00 (lb/in^2
Effect.Vert. Stress: 111.11 (lb/in^
Effect.Hori. Stress: 111.11 (lb/in^

FAILURE DURING SHEAR
dH : 1.045 (in)
dV : 1.012 (in^3)
Strain : 17.74 %
Strength: 87.21 (lb/in^2)
Time : 1160.40 (min)
Height : 4.900 (in)
Area : 7.671 (in^2)
Void Ratio: 0.46
Saturation: 99.99 %
Dry Density : 113.73 (lb/ft^3)
Moisture : 17.26 %
Total Vert. Stress : 365.54 (lb/in^
Total Hori. Stress : 191.11 (lb/in^
Pore Pressure : 122.38 (lb/in^
Effect.Vert. Stress: 243.16 (lb/in^
Effect.Hori. Stress: 68.73 (lb/in^2

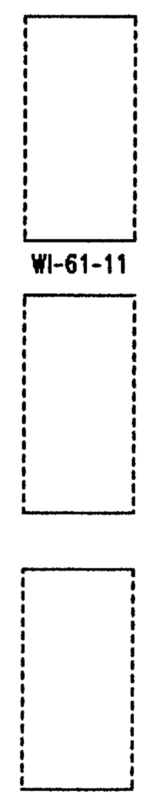
END OF TEST
dH : 1.164 (in)
dV : 1.012 (in^3)
Strain : 19.75 %
Time : 1293.23 (min)
Height : 4.781 (in)
Area : 7.864 (in^2)
Void Ratio: 0.46
Saturation: 99.99 %
Dry Density : 113.73 (lb/ft^3)
Moisture : 17.26 %
Total Vert. Stress : 365.14 (lb/in^
Total Hori. Stress : 191.11 (lb/in^
Pore Pressure : 120.47 (lb/in^
Effect.Vert. Stress: 244.67 (lb/in^
Effect.Hori. Stress: 70.64 (lb/in^2

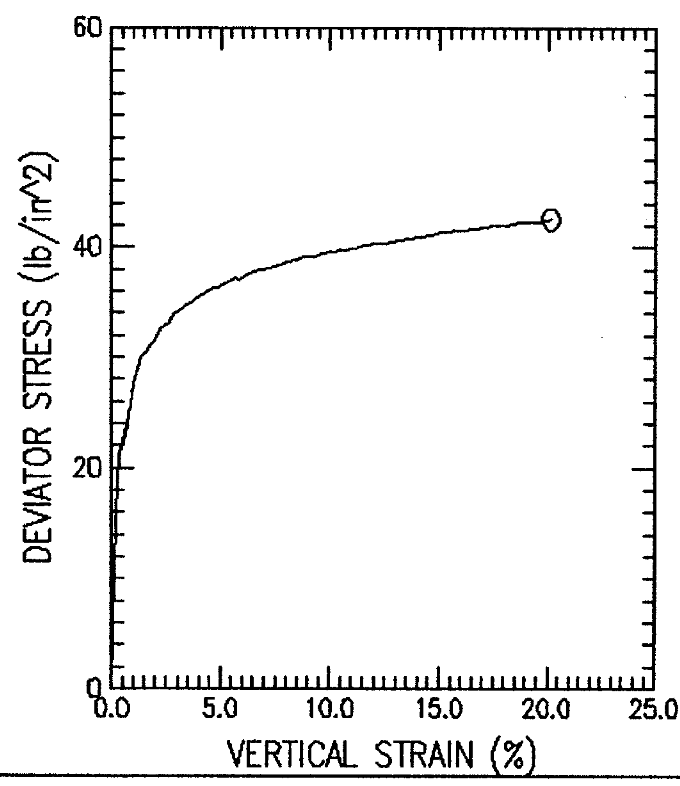
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-61-11				
INITIAL	WATER CONTENT (%)	14.52				
	DRY DENSITY (lb/ft^3)	119.76				
	SATURATION (%)	96.00				
	VOID RATIO	0.409				
BEFORE SHEAR	WATER CONTENT (%)	15.06				
	DRY DENSITY (lb/ft^3)	119.89				
	SATURATION (%)	99.98				
	VOID RATIO	0.407				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		27.78				
MAX. DEV. STRESS (lb/in^2)		43.62				
TIME TO FAILURE (min)		1362.35				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.90				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown clayey sand with gravel (SC)

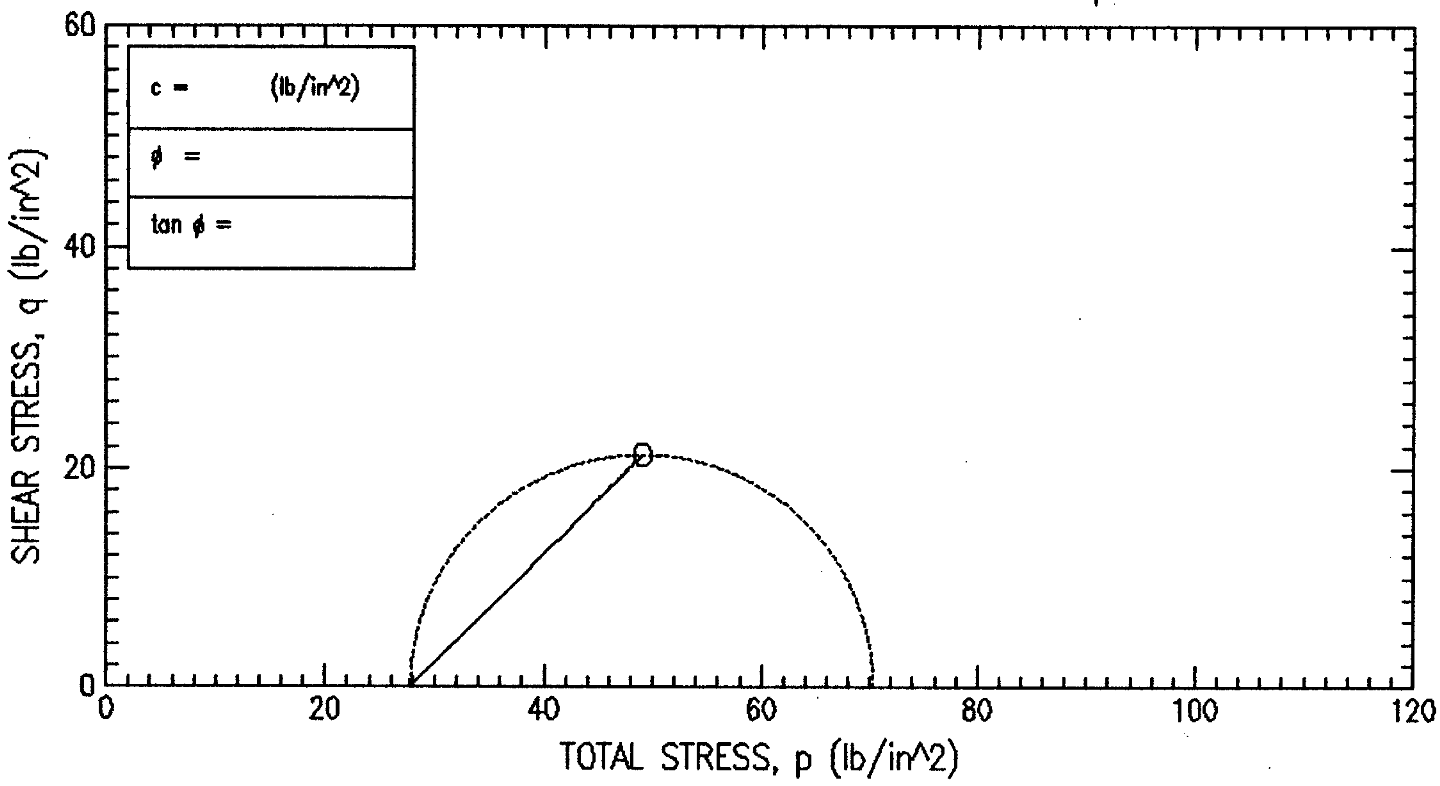
LL 37.83	PL 18.43	PI 19.40	GS 2.70	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study				
1) TXCIU Test with Effective Perssure at 27.78 psi	PROJECT NO.26814536				
	BORING NO. WI-61	SAMPLE NO.	11 Bottom		
	TECH. S. Capps	DEPTH/ELEV	40.0 feet		
	LABORATORY	DATE	06/14/04		
	TRIAXIAL COMPRESSION TEST REPORT				

Mon 06-28-:4, 12:52:09

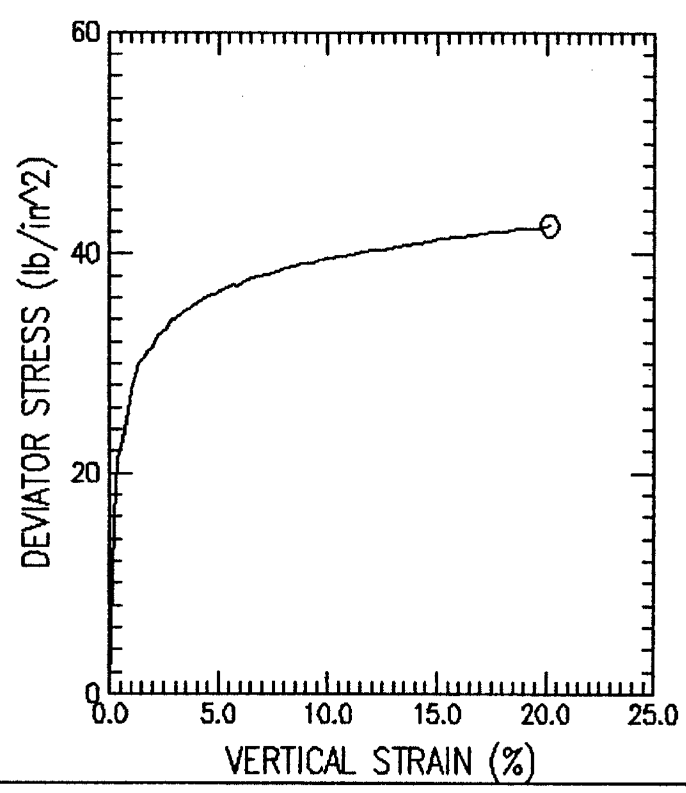
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-61-11



SYMBOL		O				
TEST NO.		WI-61-11				
INITIAL	WATER CONTENT (%)	14.52				
	DRY DENSITY (lb/ft^3)	119.76				
	SATURATION (%)	96.00				
	VOID RATIO	0.409				
BEFORE SHEAR	WATER CONTENT (%)	15.06				
	DRY DENSITY (lb/ft^3)	119.89				
	SATURATION (%)	99.98				
	VOID RATIO	0.407				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		27.78				
MAX. DEV. STRESS (lb/in^2)		43.62				
TIME TO FAILURE (min)		1362.35				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.90				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown clayey sand with gravel (SC)

LL 37.83	PL 18.43	PI 19.40	GS 2.70	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)	
REMARKS:				PROJECT Chabot Dam Seismic Study			
1) TXCIU Test with Effective Perssure at 27.78 psi				PROJECT NO.26814536			
				BORING NO. WI-61	SAMPLE NO.	11 Bottom	
				TECH. S. Capps	DEPTH/ELEV	40.0 feet	
				LABORATORY	DATE	06/14/04	
				TRIAXIAL COMPRESSION TEST REPORT			

Mon 06-28-:4, 12:51:33

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Location : San Leandro, CA
Project No. : 26814536
Test No. : WI-61-11
Boring No. : WI-61
Test Date : 06/14/04
Tested by : S. Capps
Sample No. : 11 Bottom
Depth : 40.0 feet
Checked by : R. Taraya
Sample Type : Pitcher
Elevation : NA
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Perssure at 27.78 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	107.78	107.78	0.00	0.00	27.78	27.78	1.00	27.78	0.00
2)	0.20	123.59	107.78	6.96	0.44	36.63	20.82	1.76	28.72	7.91
3)	0.39	129.03	107.78	10.48	0.49	38.55	17.30	2.23	27.93	10.62
4)	0.60	130.93	107.78	11.72	0.51	39.21	16.06	2.44	27.64	11.57
5)	0.79	133.61	107.78	13.16	0.51	40.44	14.62	2.77	27.53	12.91
6)	1.01	135.30	107.78	13.92	0.51	41.38	13.86	2.99	27.62	13.76
7)	1.21	136.79	107.78	14.33	0.49	42.46	13.45	3.16	27.95	14.50
8)	1.39	137.70	107.78	14.61	0.49	43.09	13.17	3.27	28.13	14.96
9)	1.61	138.21	107.78	14.75	0.48	43.47	13.03	3.33	28.25	15.22
10)	1.81	138.92	107.78	14.82	0.48	44.10	12.97	3.40	28.53	15.57
11)	2.01	139.63	107.78	14.75	0.46	44.88	13.03	3.44	28.96	15.92
12)	2.21	140.33	107.78	14.75	0.45	45.58	13.03	3.50	29.31	16.27
13)	2.41	140.64	107.78	14.68	0.45	45.97	13.10	3.51	29.53	16.43
14)	2.61	140.96	107.78	14.61	0.44	46.35	13.17	3.52	29.76	16.59
15)	2.82	141.65	107.78	14.54	0.43	47.11	13.24	3.56	30.17	16.93
16)	3.01	141.96	107.78	14.20	0.42	47.76	13.59	3.52	30.67	17.09
17)	3.21	142.08	107.78	14.27	0.42	47.82	13.52	3.54	30.67	17.15
18)	3.43	142.57	107.78	14.06	0.40	48.51	13.72	3.54	31.12	17.40
19)	3.62	142.69	107.78	13.99	0.40	48.70	13.79	3.53	31.25	17.46
20)	3.82	142.99	107.78	13.78	0.39	49.21	14.00	3.52	31.61	17.61
21)	4.02	143.30	107.78	13.58	0.38	49.72	14.20	3.50	31.96	17.76
22)	4.23	143.59	107.78	13.58	0.38	50.02	14.20	3.52	32.11	17.91
23)	4.43	143.71	107.78	13.44	0.37	50.27	14.34	3.51	32.31	17.96
24)	4.63	144.01	107.78	13.16	0.36	50.85	14.62	3.48	32.73	18.11
25)	4.83	144.12	107.78	13.03	0.36	51.09	14.76	3.46	32.92	18.17
26)	5.04	144.41	107.78	12.89	0.35	51.52	14.89	3.46	33.21	18.31
27)	5.24	144.52	107.78	12.75	0.35	51.77	15.03	3.44	33.40	18.37
28)	5.43	144.63	107.78	12.61	0.34	52.02	15.17	3.43	33.59	18.43
29)	5.64	144.92	107.78	12.47	0.34	52.44	15.31	3.43	33.88	18.57
30)	5.83	144.84	107.78	12.27	0.33	52.57	15.51	3.39	34.04	18.53
31)	6.05	145.12	107.78	12.27	0.33	52.86	15.51	3.41	34.19	18.67
32)	6.44	145.52	107.78	11.99	0.32	53.53	15.79	3.39	34.66	18.87
33)	6.85	145.72	107.78	11.72	0.31	54.00	16.06	3.36	35.03	18.97
34)	7.25	145.92	107.78	11.51	0.30	54.41	16.27	3.34	35.34	19.07
35)	7.65	146.11	107.78	11.30	0.29	54.81	16.48	3.33	35.65	19.17
36)	8.05	146.49	107.78	11.10	0.29	55.39	16.68	3.32	36.04	19.35
37)	8.46	146.68	107.78	10.89	0.28	55.79	16.89	3.30	36.34	19.45
38)	8.86	146.86	107.78	10.68	0.27	56.18	17.10	3.29	36.64	19.54
39)	9.27	146.87	107.78	10.55	0.27	56.32	17.24	3.27	36.78	19.54
40)	9.67	147.23	107.78	10.34	0.26	56.89	17.44	3.26	37.17	19.72
41)	10.08	147.40	107.78	10.20	0.26	57.20	17.58	3.25	37.39	19.81
42)	10.59	147.53	107.78	10.06	0.25	57.46	17.72	3.24	37.59	19.87
43)	11.08	147.65	107.78	9.93	0.25	57.73	17.86	3.23	37.79	19.94
44)	11.59	147.95	107.78	9.72	0.24	58.23	18.06	3.22	38.15	20.08
45)	12.09	148.06	107.78	9.58	0.24	58.48	18.20	3.21	38.34	20.14
46)	12.59	148.17	107.78	9.37	0.23	58.80	18.41	3.19	38.60	20.20
47)	13.10	148.45	107.78	9.17	0.23	59.29	18.61	3.19	38.95	20.34
48)	13.61	148.55	107.78	9.17	0.22	59.38	18.61	3.19	39.00	20.38
49)	14.11	148.65	107.78	9.03	0.22	59.62	18.75	3.18	39.19	20.44
50)	14.62	148.91	107.78	8.82	0.21	60.09	18.96	3.17	39.52	20.57
51)	15.12	149.17	107.78	8.62	0.21	60.55	19.16	3.16	39.86	20.70
52)	16.12	149.34	107.78	8.41	0.20	60.93	19.37	3.15	40.15	20.78
53)	16.63	149.41	107.78	8.34	0.20	61.07	19.44	3.14	40.26	20.82
54)	17.14	149.65	107.78	8.20	0.20	61.44	19.58	3.14	40.51	20.93
55)	17.63	149.72	107.78	8.13	0.19	61.58	19.65	3.13	40.62	20.97
56)	18.15	149.78	107.78	8.00	0.19	61.78	19.78	3.12	40.78	21.00
57)	18.65	150.00	107.78	7.86	0.19	62.14	19.92	3.12	41.03	21.11
58)	19.66	150.11	107.78	7.58	0.18	62.52	20.20	3.10	41.36	21.16
59)	20.16	150.31	107.78	7.51	0.18	62.80	20.27	3.10	41.53	21.27

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study Location : San Leandro, CA
Project No. : 26814536 Test No. : WI-61-11
Boring No. : WI-61 Test Date : 06/14/04 Tested by : S. Capps
Sample No. : 11 Bottom Depth : 40.0 feet Checked by : R. Taraya
Sample Type : Pitcher Elevation : NA
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Perssure at 27.78 psi

Height : 5.945 (in) Piston Diameter : 0.000 (in) Filter Correction : 0.00 (lb/in^2)
Area : 6.424 (in^2) Piston Friction : 0.00 (lb) Membrane Correction : 0.00 (lb/in)
Volume : 38.192 (in^3) Piston Weight : 0.00 (gm) Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.32	80.00	0.00	0.00	0.00	107.78	27.78
2)	0.012	0.20	6.33	86.96	102.65	102.65	16.22	123.59	36.63
3)	0.023	0.39	6.34	90.48	138.19	138.19	21.79	129.03	38.55
4)	0.035	0.60	6.36	91.72	150.89	150.89	23.74	130.93	39.21
5)	0.047	0.79	6.37	93.16	168.66	168.66	26.49	133.61	40.44
6)	0.059	1.01	6.38	93.92	180.08	180.08	28.22	135.30	41.38
7)	0.071	1.21	6.39	94.33	190.24	190.24	29.75	136.79	42.46
8)	0.082	1.39	6.41	94.61	196.59	196.59	30.69	137.70	43.09
9)	0.095	1.61	6.42	94.75	200.39	200.39	31.21	138.21	43.47
10)	0.107	1.81	6.43	94.81	205.47	205.47	31.94	138.92	44.10
11)	0.118	2.01	6.45	94.75	210.55	210.55	32.66	139.63	44.88
12)	0.130	2.21	6.46	94.75	215.63	215.63	33.38	140.33	45.58
13)	0.142	2.41	6.47	94.68	218.17	218.17	33.71	140.64	45.97
14)	0.154	2.61	6.49	94.61	220.71	220.71	34.03	140.96	46.35
15)	0.166	2.82	6.50	94.54	225.78	225.78	34.73	141.65	47.11
16)	0.178	3.01	6.51	94.19	228.32	228.32	35.06	141.96	47.76
17)	0.189	3.21	6.53	94.26	229.59	229.59	35.18	142.08	47.82
18)	0.202	3.43	6.54	94.06	233.40	233.40	35.68	142.57	48.51
19)	0.213	3.62	6.55	93.99	234.67	234.67	35.80	142.69	48.70
20)	0.225	3.82	6.57	93.78	237.21	237.21	36.12	142.99	49.21
21)	0.237	4.02	6.58	93.58	239.75	239.75	36.43	143.30	49.72
22)	0.250	4.23	6.60	93.58	242.29	242.29	36.73	143.59	50.02
23)	0.261	4.43	6.61	93.44	243.56	243.56	36.85	143.71	50.27
24)	0.273	4.63	6.62	93.16	246.09	246.09	37.16	144.01	50.85
25)	0.285	4.83	6.64	93.02	247.36	247.36	37.27	144.12	51.09
26)	0.297	5.04	6.65	92.89	249.90	249.90	37.57	144.41	51.52
27)	0.309	5.24	6.67	92.75	251.17	251.17	37.68	144.52	51.77
28)	0.320	5.43	6.68	92.61	252.44	252.44	37.79	144.63	52.02
29)	0.333	5.64	6.69	92.47	254.98	254.98	38.09	144.92	52.44
30)	0.344	5.83	6.71	92.27	254.98	254.98	38.01	144.84	52.57
31)	0.357	6.05	6.72	92.27	257.52	257.52	38.30	145.12	52.86
32)	0.380	6.44	6.75	91.99	261.33	261.33	38.70	145.52	53.53
33)	0.404	6.85	6.78	91.72	263.87	263.87	38.91	145.72	54.00
34)	0.427	7.25	6.81	91.51	266.41	266.41	39.12	145.92	54.41
35)	0.451	7.65	6.84	91.30	268.94	268.94	39.32	146.11	54.81
36)	0.475	8.05	6.87	91.10	272.75	272.75	39.70	146.49	55.39
37)	0.499	8.46	6.90	90.89	275.29	275.29	39.89	146.68	55.79
38)	0.522	8.86	6.93	90.68	277.83	277.83	40.08	146.86	56.18
39)	0.546	9.27	6.96	90.54	279.10	279.10	40.09	146.87	56.32
40)	0.570	9.67	6.99	90.34	282.91	282.91	40.46	147.23	56.89
41)	0.594	10.08	7.02	90.20	285.45	285.45	40.63	147.40	57.20
42)	0.624	10.59	7.06	90.06	287.99	287.99	40.76	147.53	57.46
43)	0.653	11.08	7.10	89.92	290.53	290.53	40.89	147.65	57.73
44)	0.683	11.59	7.14	89.72	294.33	294.33	41.20	147.95	58.23
45)	0.713	12.09	7.19	89.58	296.87	296.87	41.31	148.06	58.48
46)	0.742	12.59	7.23	89.37	299.41	299.41	41.43	148.17	58.80
47)	0.772	13.10	7.27	89.17	303.22	303.22	41.71	148.45	59.29
48)	0.803	13.61	7.31	89.17	305.76	305.76	41.81	148.55	59.38
49)	0.832	14.11	7.35	89.03	308.30	308.30	41.92	148.65	59.62
50)	0.862	14.62	7.40	88.82	312.11	312.11	42.18	148.91	60.09
51)	0.891	15.12	7.44	88.62	315.91	315.91	42.45	149.17	60.55
52)	0.951	16.12	7.53	88.41	320.99	320.99	42.62	149.34	60.93
53)	0.980	16.63	7.58	88.34	323.53	323.53	42.70	149.41	61.07
54)	1.010	17.14	7.62	88.20	327.34	327.34	42.94	149.65	61.44
55)	1.040	17.63	7.67	88.13	329.88	329.88	43.01	149.72	61.58
56)	1.070	18.15	7.72	88.00	332.42	332.42	43.07	149.78	61.78
57)	1.099	18.65	7.76	87.86	336.23	336.23	43.30	150.00	62.14
58)	1.159	19.66	7.86	87.58	341.30	341.30	43.41	150.11	62.52
59)	1.188	20.16	7.91	87.51	345.11	345.11	43.62	150.31	62.80

URS

Mon Jun 28 12:52:38 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study Location : San Leandro, CA
Project No. : 26814536 Test No. : WI-61-11
Boring No. : WI-61 Test Date : 06/14/04 Tested by : S. Capps
Sample No. : 11 Bottom Depth : 40.0 feet Checked by : R. Taraya
Sample Type : Pitcher Elevation : NA
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Perssure at 27.78 psi

Height : 5.945 (in) Piston Diameter : 0.000 (in) Filter Correction : 0.00 (lb/in^2)
Area : 6.424 (in^2) Piston Friction : 0.00 (lb) Membrane Correction : 0.00 (lb/in)
Volume : 38.192 (in^3) Piston Weight : 0.00 (gm) Area Correction : Uniform

Liquid Limit : 37.83 Plastic Limit : 18.43 Specific Gravity : 2.704

INITIAL
Height : 5.945 (in) Dry Density : 119.76 (lb/ft^3)
Area : 6.424 (in^2) Moisture : 14.52 %
Void Ratio: 0.41
Saturation: 96.00 %
Time : 0.00 (min)

INITIALIZATION
dH : 0.000 (in) Height : 5.945 (in) Dry Density : 119.76 (lb/ft^3) Total Vert. Stress : 107.78 (lb/in^
dV : 0.000 (in^3) Area : 6.424 (in^2) Moisture : 14.52 % Total Hori. Stress : 107.78 (lb/in^
Void Ratio: 0.41 Pore Pressure : 0.00 (lb/in^2)
Saturation: 96.00 % Effect.Vert. Stress: 107.78 (lb/in^
Time : 0.00 (min) Effect.Hori. Stress: 107.78 (lb/in^

END OF CONSOLIDATION - A
dH : 0.000 (in) Height : 5.945 (in) Dry Density : 119.76 (lb/ft^3) Total Vert. Stress : 107.78 (lb/in^
dV : 0.000 (in^3) Area : 6.424 (in^2) Moisture : 14.52 % Total Hori. Stress : 107.78 (lb/in^
Void Ratio: 0.41 Pore Pressure : 0.00 (lb/in^2)
Saturation: 96.00 % Effect.Vert. Stress: 107.78 (lb/in^
Time : 0.00 (min) Effect.Hori. Stress: 107.78 (lb/in^

END OF SATURATION
dH : 0.000 (in) Height : 5.945 (in) Dry Density : 116.89 (lb/ft^3) Total Vert. Stress : 107.78 (lb/in^
dV : 0.000 (in^3) Area : 6.424 (in^2) Moisture : 15.06 % Total Hori. Stress : 107.78 (lb/in^
dVCorr : 0.000 (in^3) Void Ratio: 0.44 Pore Pressure : 0.00 (lb/in^2)
Saturation: 91.85 % Effect.Vert. Stress: 107.78 (lb/in^
Time : 0.00 (min) Effect.Hori. Stress: 107.78 (lb/in^

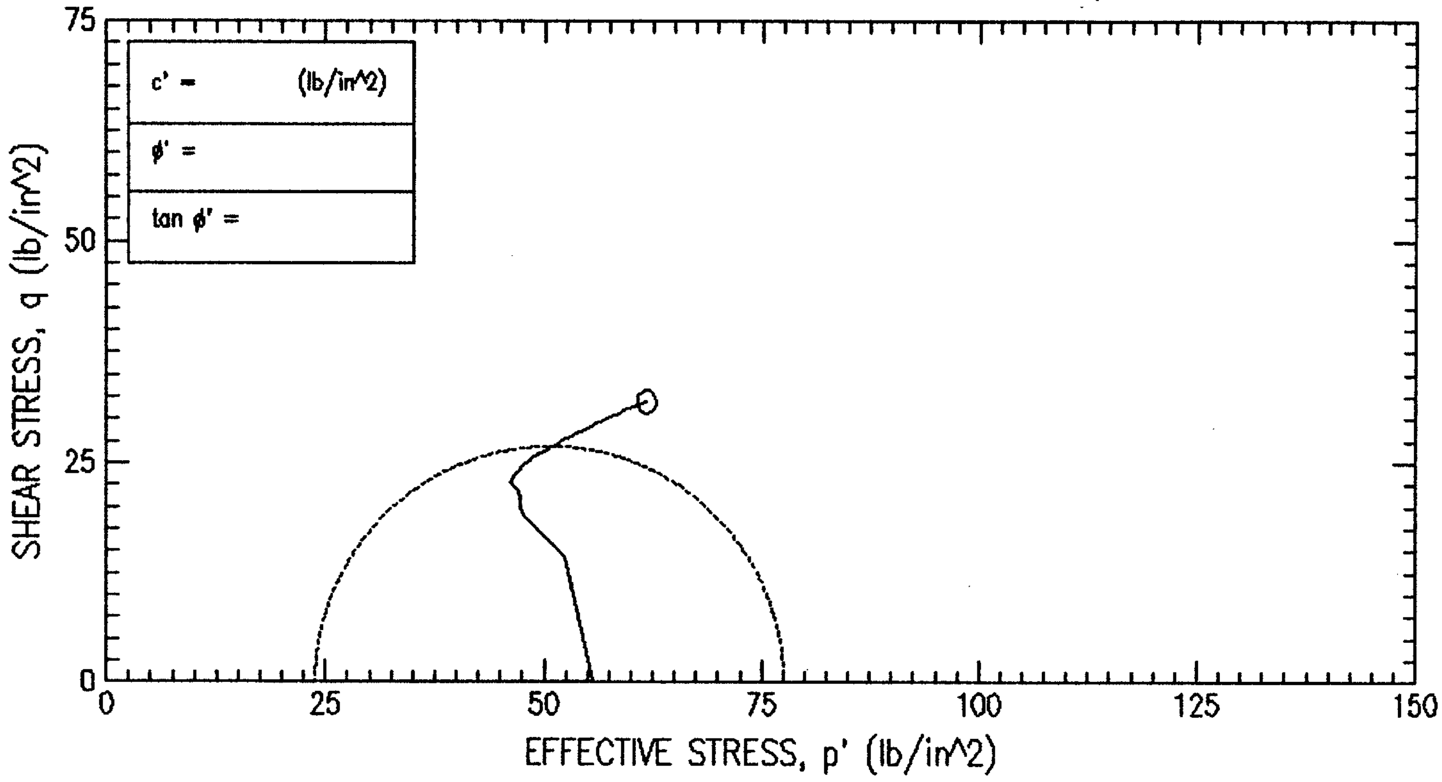
END OF CONSOLIDATION - B
dH : 0.050 (in) Height : 5.895 (in) Dry Density : 119.89 (lb/ft^3) Total Vert. Stress : 107.78 (lb/in^
dV : 0.954 (in^3) Area : 6.317 (in^2) Moisture : 15.06 % Total Hori. Stress : 107.78 (lb/in^
Void Ratio: 0.41 Pore Pressure : 80.00 (lb/in^2
Saturation: 99.98 % Effect.Vert. Stress: 27.78 (lb/in^2
Time : 0.00 (min) Effect.Hori. Stress: 27.78 (lb/in^2

FAILURE DURING SHEAR
dH : 1.188 (in) Height : 4.757 (in) Dry Density : 119.89 (lb/ft^3) Total Vert. Stress : 151.40 (lb/in^
dV : 0.954 (in^3) Area : 7.912 (in^2) Moisture : 15.06 % Total Hori. Stress : 107.78 (lb/in^
Strain : 20.16 % Void Ratio: 0.41 Pore Pressure : 87.51 (lb/in^2
Strength: 21.81 (lb/in^2) Saturation: 99.98 % Effect.Vert. Stress: 63.89 (lb/in^2
Time : 1362.35 (min) Effect.Hori. Stress: 20.27 (lb/in^2

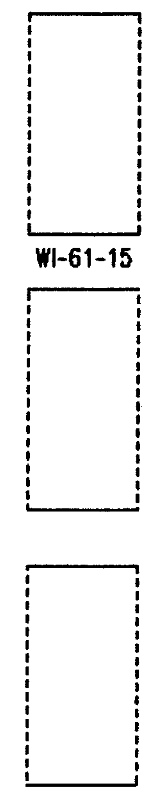
END OF TEST
dH : 1.188 (in) Height : 4.757 (in) Dry Density : 119.89 (lb/ft^3) Total Vert. Stress : 151.40 (lb/in^
dV : 0.954 (in^3) Area : 7.912 (in^2) Moisture : 15.06 % Total Hori. Stress : 107.78 (lb/in^
Strain : 20.16 % Void Ratio: 0.41 Pore Pressure : 87.51 (lb/in^2
Saturation: 99.98 % Effect.Vert. Stress: 63.89 (lb/in^2
Time : 1362.35 (min) Effect.Hori. Stress: 20.27 (lb/in^2

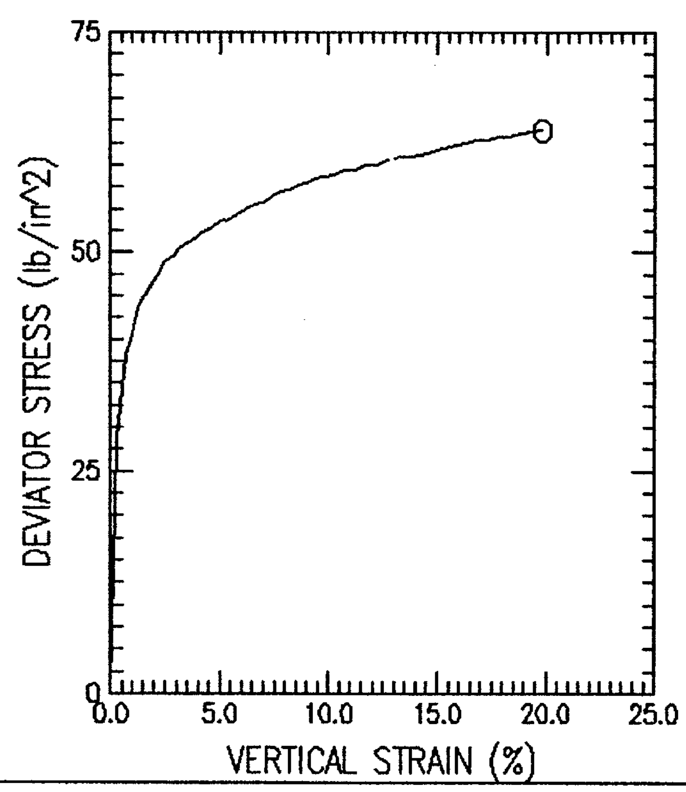
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-61-15				
INITIAL	WATER CONTENT (%)	11.75				
	DRY DENSITY (lb/ft^3)	129.61				
	SATURATION (%)	96.11				
	VOID RATIO	0.340				
BEFORE SHEAR	WATER CONTENT (%)	12.16				
	DRY DENSITY (lb/ft^3)	129.79				
	SATURATION (%)	99.97				
	VOID RATIO	0.339				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		55.56				
MAX. DEV. STRESS (lb/in^2)		66.09				
TIME TO FAILURE (min)		1336.88				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.10				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Reddish brown clayey sand with gravel (SC)

LL 34.54	PL 16.73	PI 17.81	GS 2.78	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 55.56 psi

PROJECT Chabot Dam Seismic Study

PROJECT NO.26814536

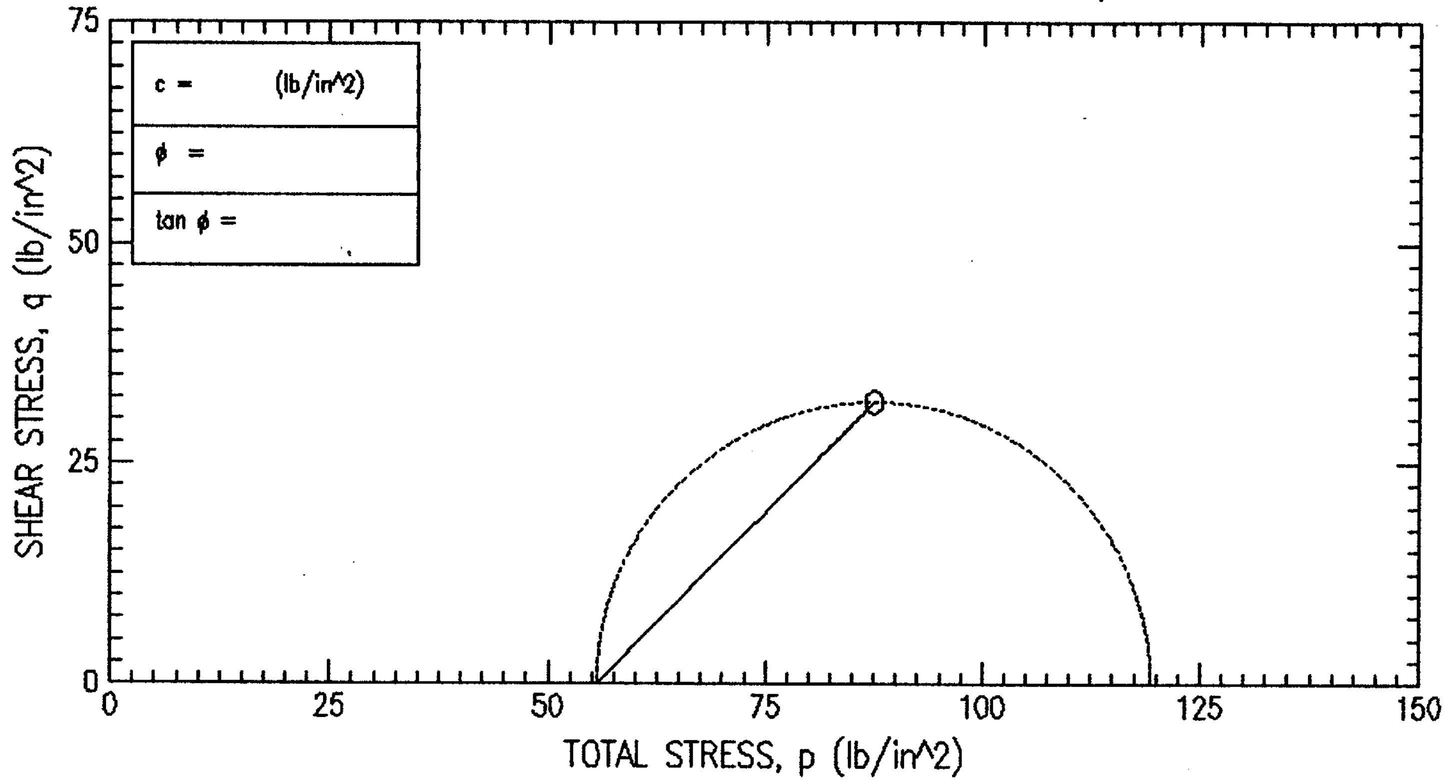
BORING NO. WI-61	SAMPLE NO.	15 Bottom		
TECH. S. Capps	DEPTH/ELEV	60.0		
LABORATORY	DATE	06/14/04		

TRIAXIAL COMPRESSION TEST REPORT

Mon 06-28-:4, 12:47:17

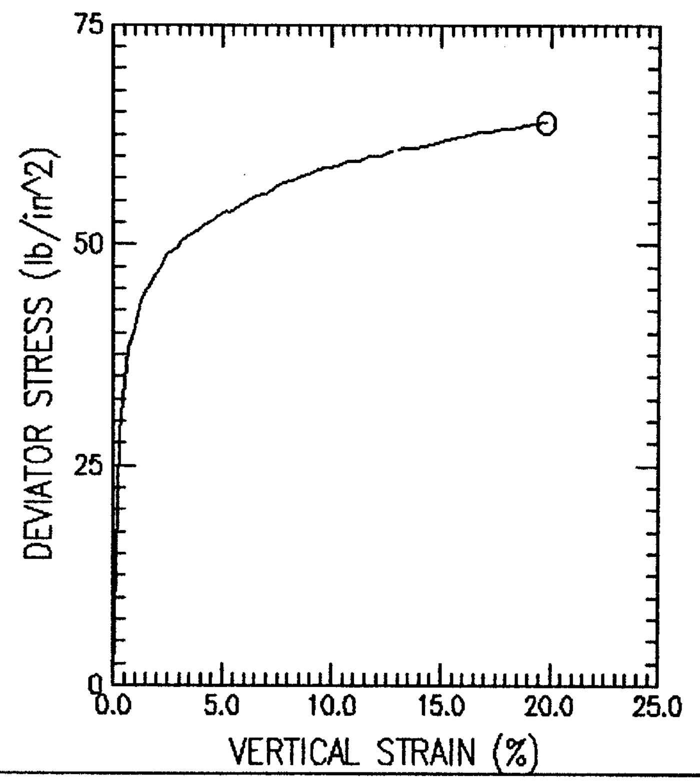
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-61-15



SYMBOL		O				
TEST NO.		WI-61-15				
INITIAL	WATER CONTENT (%)	11.75				
	DRY DENSITY (lb/ft^3)	129.61				
	SATURATION (%)	96.11				
	VOID RATIO	0.340				
BEFORE SHEAR	WATER CONTENT (%)	12.16				
	DRY DENSITY (lb/ft^3)	129.79				
	SATURATION (%)	99.97				
	VOID RATIO	0.339				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		55.56				
MAX. DEV. STRESS (lb/in^2)		66.09				
TIME TO FAILURE (min)		1336.88				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.10				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Reddish brown clayey sand with gravel (SC)

LL 34.54	PL 16.73	PI 17.81	GS 2.78	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study				
1) TXCIU Test with Effective Pressure of 55.56 psi	PROJECT NO.26814536				
	BORING NO. WI-61	SAMPLE NO.	15 Bottom		
	TECH. S. Capps	DEPTH/ELEV	60.0		
	LABORATORY	DATE	06/14/04		
	TRIAXIAL COMPRESSION TEST REPORT				

Mon 06-28-:4, 12:46:42

URS

Mon Jun 28 12:47:48 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-61
Sample No. : 15 Bottom
Sample Type : Pitcher
Soil Description : Reddish brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Location : San Leandro, CA
Test No. : WI-61-15
Test Date : 06/14/04
Depth : 60.0
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	135.56	135.56	0.00	0.00	55.56	55.56	1.00	55.56	0.00
2)	0.29	164.07	135.56	17.50	0.61	66.56	38.05	1.75	52.31	14.25
3)	0.49	170.06	135.56	23.47	0.68	66.59	32.08	2.08	49.33	17.25
4)	0.69	173.71	135.56	27.07	0.71	66.63	28.49	2.34	47.56	19.07
5)	0.90	175.48	135.56	28.22	0.71	67.26	27.34	2.46	47.30	19.96
6)	1.10	177.71	135.56	29.37	0.70	68.34	26.19	2.61	47.27	21.08
7)	1.30	179.01	135.56	30.21	0.70	68.80	25.35	2.71	47.07	21.73
8)	1.50	180.31	135.56	31.51	0.70	68.80	24.05	2.86	46.42	22.38
9)	1.70	181.14	135.56	32.20	0.71	68.94	23.36	2.95	46.15	22.79
10)	1.90	181.96	135.56	32.43	0.70	69.53	23.13	3.01	46.33	23.20
11)	2.10	182.78	135.56	32.50	0.69	70.27	23.05	3.05	46.66	23.61
12)	2.30	183.60	135.56	32.58	0.68	71.01	22.97	3.09	46.99	24.02
13)	2.51	184.41	135.56	32.66	0.67	71.75	22.90	3.13	47.32	24.42
14)	2.71	184.77	135.56	32.81	0.67	71.95	22.74	3.16	47.35	24.60
15)	2.91	185.12	135.56	32.73	0.66	72.38	22.82	3.17	47.60	24.78
16)	3.12	185.92	135.56	32.35	0.64	73.56	23.20	3.17	48.38	25.18
17)	3.32	186.26	135.56	32.58	0.64	73.68	22.97	3.21	48.33	25.35
18)	3.52	186.61	135.56	32.50	0.64	74.10	23.05	3.21	48.58	25.53
19)	3.72	186.95	135.56	32.50	0.63	74.44	23.05	3.23	48.75	25.70
20)	3.93	187.29	135.56	32.12	0.62	75.17	23.43	3.21	49.30	25.87
21)	4.13	187.64	135.56	32.20	0.62	75.43	23.36	3.23	49.39	26.04
22)	4.33	187.97	135.56	32.12	0.61	75.85	23.43	3.24	49.64	26.21
23)	4.54	188.30	135.56	32.05	0.61	76.26	23.51	3.24	49.88	26.37
24)	4.73	188.64	135.56	31.66	0.60	76.98	23.89	3.22	50.43	26.54
25)	4.94	188.97	135.56	31.74	0.59	77.23	23.82	3.24	50.52	26.71
26)	5.14	189.31	135.56	31.74	0.59	77.56	23.82	3.26	50.69	26.87
27)	5.34	189.19	135.56	31.66	0.59	77.52	23.89	3.24	50.71	26.82
28)	5.54	189.52	135.56	30.97	0.57	78.54	24.58	3.20	51.56	26.98
29)	5.75	189.84	135.56	31.13	0.57	78.71	24.43	3.22	51.57	27.14
30)	5.96	190.16	135.56	31.20	0.57	78.95	24.35	3.24	51.65	27.30
31)	6.15	190.49	135.56	31.20	0.57	79.28	24.35	3.26	51.81	27.46
32)	6.56	191.12	135.56	30.90	0.56	80.22	24.66	3.25	52.44	27.78
33)	6.97	191.31	135.56	30.67	0.55	80.64	24.89	3.24	52.77	27.88
34)	7.37	191.94	135.56	30.44	0.54	81.50	25.12	3.24	53.31	28.19
35)	7.77	192.56	135.56	29.98	0.53	82.58	25.58	3.23	54.08	28.50
36)	8.18	192.74	135.56	29.90	0.52	82.83	25.65	3.23	54.24	28.59
37)	8.58	193.34	135.56	29.44	0.51	83.90	26.11	3.21	55.00	28.89
38)	8.99	193.51	135.56	29.52	0.51	83.99	26.04	3.23	55.01	28.98
39)	9.39	194.10	135.56	29.21	0.50	84.88	26.34	3.22	55.61	29.27
40)	9.79	194.26	135.56	29.21	0.50	85.04	26.34	3.23	55.69	29.35
41)	10.20	194.41	135.56	29.06	0.49	85.35	26.50	3.22	55.92	29.43
42)	10.70	194.92	135.56	28.83	0.49	86.09	26.72	3.22	56.41	29.68
43)	11.21	195.00	135.56	28.68	0.48	86.32	26.88	3.21	56.60	29.72
44)	11.72	195.49	135.56	28.45	0.47	87.03	27.11	3.21	57.07	29.96
45)	12.23	195.55	135.56	28.29	0.47	87.25	27.26	3.20	57.26	30.00
46)	12.73	196.03	135.56	28.14	0.47	87.88	27.41	3.21	57.65	30.23
47)	13.24	196.48	135.56	27.99	0.46	88.49	27.57	3.21	58.03	30.46
48)	13.74	196.54	135.56	27.84	0.46	88.70	27.72	3.20	58.21	30.49
49)	14.24	196.58	135.56	27.68	0.45	88.90	27.87	3.19	58.38	30.51
50)	14.75	197.02	135.56	27.45	0.45	89.56	28.10	3.19	58.83	30.73
51)	15.26	197.44	135.56	27.38	0.44	90.06	28.18	3.20	59.12	30.94
52)	16.27	197.88	135.56	26.99	0.43	90.88	28.56	3.18	59.72	31.16
53)	16.78	198.28	135.56	26.84	0.43	91.43	28.71	3.18	60.07	31.36
54)	17.28	198.29	135.56	26.46	0.42	91.82	29.10	3.16	60.46	31.36
55)	17.79	198.67	135.56	26.38	0.42	92.29	29.17	3.16	60.73	31.56
56)	18.29	198.67	135.56	26.15	0.41	92.51	29.40	3.15	60.96	31.55
57)	18.80	199.04	135.56	26.00	0.41	93.03	29.56	3.15	61.30	31.74
58)	19.81	199.37	135.56	25.69	0.40	93.68	29.86	3.14	61.77	31.91

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-61
Sample No. : 15 Bottom
Sample Type : Pitcher
Soil Description : Reddish brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Location : San Leandro, CA
Test No. : WI-61-15
Test Date : 06/14/04
Depth : 60.0
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.28	80.00	0.00	0.00	0.00	135.56	55.56
2)	0.017	0.29	6.29	97.51	185.83	185.83	29.53	164.07	66.56
3)	0.029	0.49	6.31	103.48	225.36	225.36	35.73	170.06	66.59
4)	0.041	0.69	6.32	107.07	249.68	249.68	39.51	173.71	66.63
5)	0.053	0.90	6.33	108.22	261.84	261.84	41.35	175.48	67.26
6)	0.065	1.10	6.35	109.37	277.04	277.04	43.66	177.71	68.34
7)	0.077	1.30	6.36	110.21	286.16	286.16	45.00	179.01	68.80
8)	0.088	1.50	6.37	111.51	295.28	295.28	46.34	180.31	68.80
9)	0.100	1.70	6.38	112.20	301.36	301.36	47.20	181.14	68.94
10)	0.112	1.90	6.40	112.43	307.44	307.44	48.06	181.96	69.53
11)	0.124	2.10	6.41	112.51	313.52	313.52	48.90	182.78	70.27
12)	0.135	2.30	6.42	112.59	319.60	319.60	49.75	183.60	71.01
13)	0.148	2.51	6.44	112.66	325.68	325.68	50.59	184.41	71.75
14)	0.159	2.71	6.45	112.82	328.72	328.72	50.96	184.77	71.95
15)	0.171	2.91	6.46	112.74	331.76	331.76	51.32	185.12	72.38
16)	0.183	3.12	6.48	112.36	337.84	337.84	52.15	185.92	73.56
17)	0.195	3.32	6.49	112.59	340.89	340.89	52.51	186.26	73.68
18)	0.207	3.52	6.51	112.51	343.93	343.93	52.87	186.61	74.10
19)	0.219	3.72	6.52	112.51	346.97	346.97	53.22	186.95	74.44
20)	0.231	3.93	6.53	112.13	350.01	350.01	53.57	187.29	75.17
21)	0.243	4.13	6.55	112.20	353.05	353.05	53.93	187.64	75.43
22)	0.254	4.33	6.56	112.13	356.09	356.09	54.28	187.97	75.85
23)	0.267	4.54	6.57	112.05	359.13	359.13	54.62	188.30	76.26
24)	0.278	4.73	6.59	111.67	362.17	362.17	54.97	188.64	76.98
25)	0.290	4.94	6.60	111.74	365.21	365.21	55.31	188.97	77.23
26)	0.302	5.14	6.62	111.74	368.25	368.25	55.66	189.31	77.56
27)	0.314	5.34	6.63	111.67	368.25	368.25	55.54	189.19	77.52
28)	0.326	5.54	6.64	110.98	371.29	371.29	55.88	189.52	78.54
29)	0.338	5.75	6.66	111.13	374.33	374.33	56.21	189.84	78.71
30)	0.350	5.96	6.67	111.21	377.37	377.37	56.54	190.16	78.95
31)	0.362	6.15	6.69	111.21	380.41	380.41	56.88	190.49	79.28
32)	0.385	6.56	6.72	110.90	386.49	386.49	57.54	191.12	80.22
33)	0.409	6.97	6.75	110.67	389.53	389.53	57.74	191.31	80.64
34)	0.433	7.37	6.78	110.44	395.61	395.61	58.39	191.94	81.50
35)	0.456	7.77	6.80	109.98	401.69	401.69	59.03	192.56	82.58
36)	0.481	8.18	6.84	109.91	404.73	404.73	59.21	192.74	82.83
37)	0.504	8.58	6.86	109.45	410.81	410.81	59.84	193.34	83.90
38)	0.528	8.99	6.90	109.52	413.85	413.85	60.01	193.51	83.99
39)	0.552	9.39	6.93	109.22	419.93	419.93	60.63	194.10	84.88
40)	0.575	9.79	6.96	109.22	422.97	422.97	60.79	194.26	85.04
41)	0.600	10.20	6.99	109.06	426.01	426.01	60.95	194.41	85.35
42)	0.629	10.70	7.03	108.84	432.09	432.09	61.48	194.92	86.09
43)	0.659	11.21	7.07	108.68	435.13	435.13	61.56	195.00	86.32
44)	0.689	11.72	7.11	108.45	441.21	441.21	62.06	195.49	87.03
45)	0.719	12.23	7.15	108.30	444.25	444.25	62.13	195.55	87.25
46)	0.748	12.73	7.19	108.15	450.33	450.33	62.62	196.03	87.88
47)	0.778	13.24	7.23	107.99	456.41	456.41	63.09	196.48	88.49
48)	0.807	13.74	7.28	107.84	459.45	459.45	63.15	196.54	88.70
49)	0.837	14.24	7.32	107.69	462.49	462.49	63.20	196.58	88.90
50)	0.867	14.75	7.36	107.46	468.57	468.57	63.64	197.02	89.56
51)	0.897	15.26	7.41	107.38	474.65	474.65	64.09	197.44	90.06
52)	0.956	16.27	7.50	107.00	483.77	483.77	64.54	197.88	90.88
53)	0.986	16.78	7.54	106.85	489.85	489.85	64.95	198.28	91.43
54)	1.016	17.28	7.59	106.46	492.90	492.90	64.96	198.29	91.82
55)	1.045	17.79	7.63	106.39	498.98	498.98	65.36	198.67	92.29
56)	1.075	18.29	7.68	106.16	502.02	502.02	65.36	198.67	92.51
57)	1.105	18.80	7.73	106.00	508.10	508.10	65.74	199.04	93.03
58)	1.164	19.81	7.83	105.70	517.22	517.22	66.09	199.37	93.68

URS

Mon Jun 28 12:47:48 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-61
Sample No. : 15 Bottom
Sample Type : Pitcher
Soil Description : Reddish brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Location : San Leandro, CA
Test No. : WI-61-15
Test Date : 06/14/04
Depth : 60.0
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 34.54
Plastic Limit : 16.73
Specific Gravity : 2.784

INITIAL

Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.34 Saturation: 96.11 %	Dry Density : 129.61 (lb/ft^3) Moisture : 11.75 %	

INITIALIZATION

dH : 0.000 (in) dV : 0.000 (in^3) Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.34 Saturation: 96.11 %	Dry Density : 129.61 (lb/ft^3) Moisture : 11.75 %	Total Vert. Stress : 135.56 (lb/in^ Total Hori. Stress : 135.56 (lb/in^ Pore Pressure : 0.00 (lb/in^2) Effect.Vert. Stress: 135.56 (lb/in^ Effect.Hori. Stress: 135.56 (lb/in^

END OF CONSOLIDATION - A

dH : 0.000 (in) dV : 0.000 (in^3) Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.34 Saturation: 96.11 %	Dry Density : 129.61 (lb/ft^3) Moisture : 11.75 %	Total Vert. Stress : 135.56 (lb/in^ Total Hori. Stress : 135.56 (lb/in^ Pore Pressure : 0.00 (lb/in^2) Effect.Vert. Stress: 135.56 (lb/in^ Effect.Hori. Stress: 135.56 (lb/in^

END OF SATURATION

dH : 0.000 (in) dV : 0.000 (in^3) dVCorr : 0.000 (in^3) Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.39 Saturation: 87.63 %	Dry Density : 125.32 (lb/ft^3) Moisture : 12.16 %	Total Vert. Stress : 135.56 (lb/in^ Total Hori. Stress : 135.56 (lb/in^ Pore Pressure : 0.00 (lb/in^2) Effect.Vert. Stress: 135.56 (lb/in^ Effect.Hori. Stress: 135.56 (lb/in^

END OF CONSOLIDATION - B

dH : 0.069 (in) dV : 1.314 (in^3) Time : 0.00 (min)	Height : 5.876 (in) Area : 6.276 (in^2) Void Ratio: 0.34 Saturation: 99.97 %	Dry Density : 129.79 (lb/ft^3) Moisture : 12.16 %	Total Vert. Stress : 135.56 (lb/in^ Total Hori. Stress : 135.56 (lb/in^ Pore Pressure : 80.00 (lb/in^2 Effect.Vert. Stress: 55.56 (lb/in^2 Effect.Hori. Stress: 55.56 (lb/in^2

FAILURE DURING SHEAR

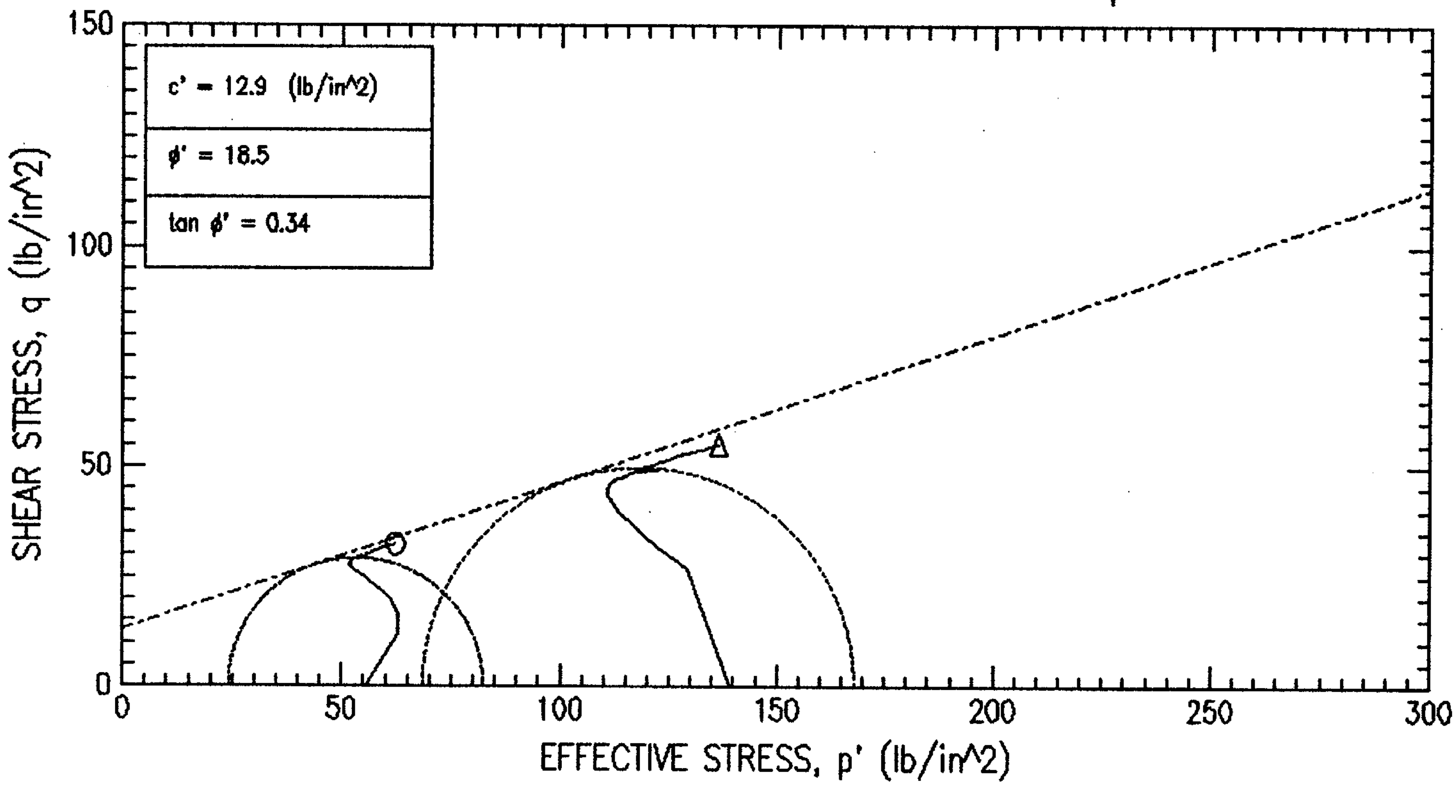
dH : 1.164 (in) dV : 1.314 (in^3) Strain : 19.81 % Strength: 33.04 (lb/in^2) Time : 1336.88 (min)	Height : 4.781 (in) Area : 7.826 (in^2) Void Ratio: 0.34 Saturation: 99.97 %	Dry Density : 129.79 (lb/ft^3) Moisture : 12.16 %	Total Vert. Stress : 201.65 (lb/in^ Total Hori. Stress : 135.56 (lb/in^ Pore Pressure : 105.70 (lb/in^ Effect.Vert. Stress: 95.95 (lb/in^2 Effect.Hori. Stress: 29.86 (lb/in^2

END OF TEST

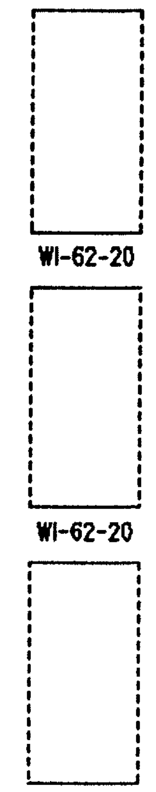
dH : 1.164 (in) dV : 1.314 (in^3) Strain : 19.81 % Time : 1336.88 (min)	Height : 4.781 (in) Area : 7.826 (in^2) Void Ratio: 0.34 Saturation: 99.97 %	Dry Density : 129.79 (lb/ft^3) Moisture : 12.16 %	Total Vert. Stress : 201.65 (lb/in^ Total Hori. Stress : 135.56 (lb/in^ Pore Pressure : 105.70 (lb/in^ Effect.Vert. Stress: 95.95 (lb/in^2 Effect.Hori. Stress: 29.86 (lb/in^2

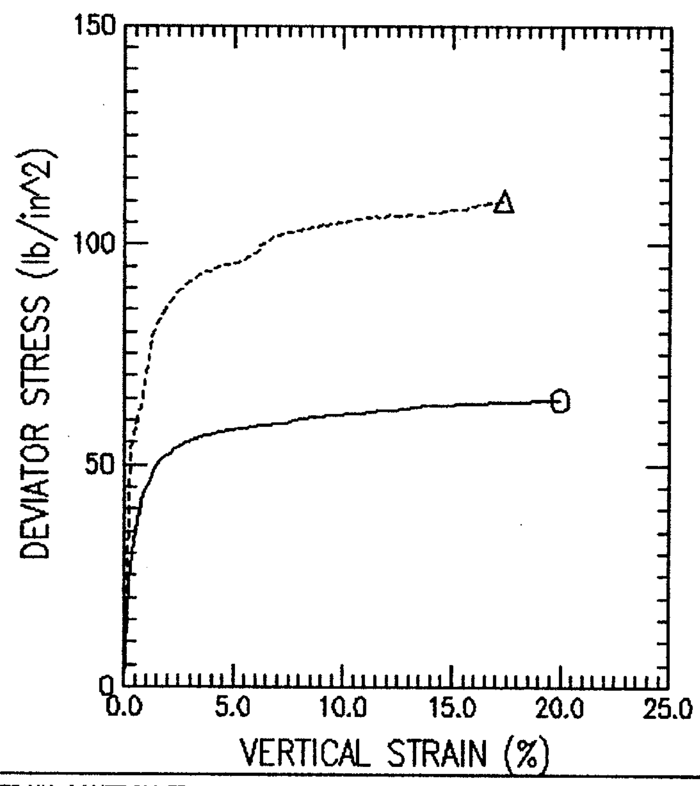
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O	Δ		
TEST NO.		WI-62-20	WI-62-20		
INITIAL	WATER CONTENT (%)	23.83	14.24		
	DRY DENSITY (lb/ft^3)	101.52	120.19		
	SATURATION (%)	97.23	95.17		
	VOID RATIO	0.663	0.405		
BEFORE SHEAR	WATER CONTENT (%)	17.93	12.31		
	DRY DENSITY (lb/ft^3)	113.67	126.66		
	SATURATION (%)	99.94	99.97		
	VOID RATIO	0.485	0.333		
	BACK PRESS. (lb/in^2)	80.00	80.00		
MINOR PRIN. STRESS (lb/in^2)		55.56	138.88		
MAX. DEV. STRESS (lb/in^2)		68.76	115.89		
TIME TO FAILURE (min)		1293.88	1967.48		
RATE OF STRAIN INCR (%/min)		0.00	0.00		
INITIAL DIAMETER (in)		2.86	2.86		
INITIAL HEIGHT (in)		5.95	5.95		
B-VALUE		98.20	97.20		

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown sandy clay (CL) 2) Brown clayey sand with gravel (SC)

LL 44.46	PL 22.10	PI 22.36	GS 2.71	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)		
REMARKS:				PROJECT Chabot Dam Seismic Study				
1) TXCIU Test with Effective Pressure of 55.56 psi				PROJECT NO.26814536				
2) TXCIU Test with Effective Pressure of 138.89 psi				BORING NO. WI-62	SAMPLE NO.	20 Top	20 Bottom	
				TECH. S. Capps	DEPTH/ELEV	65.0 feet	65.0 feet	
				LABORATORY	DATE	06/17/04	06/22/04	
				TRIAXIAL COMPRESSION TEST REPORT				

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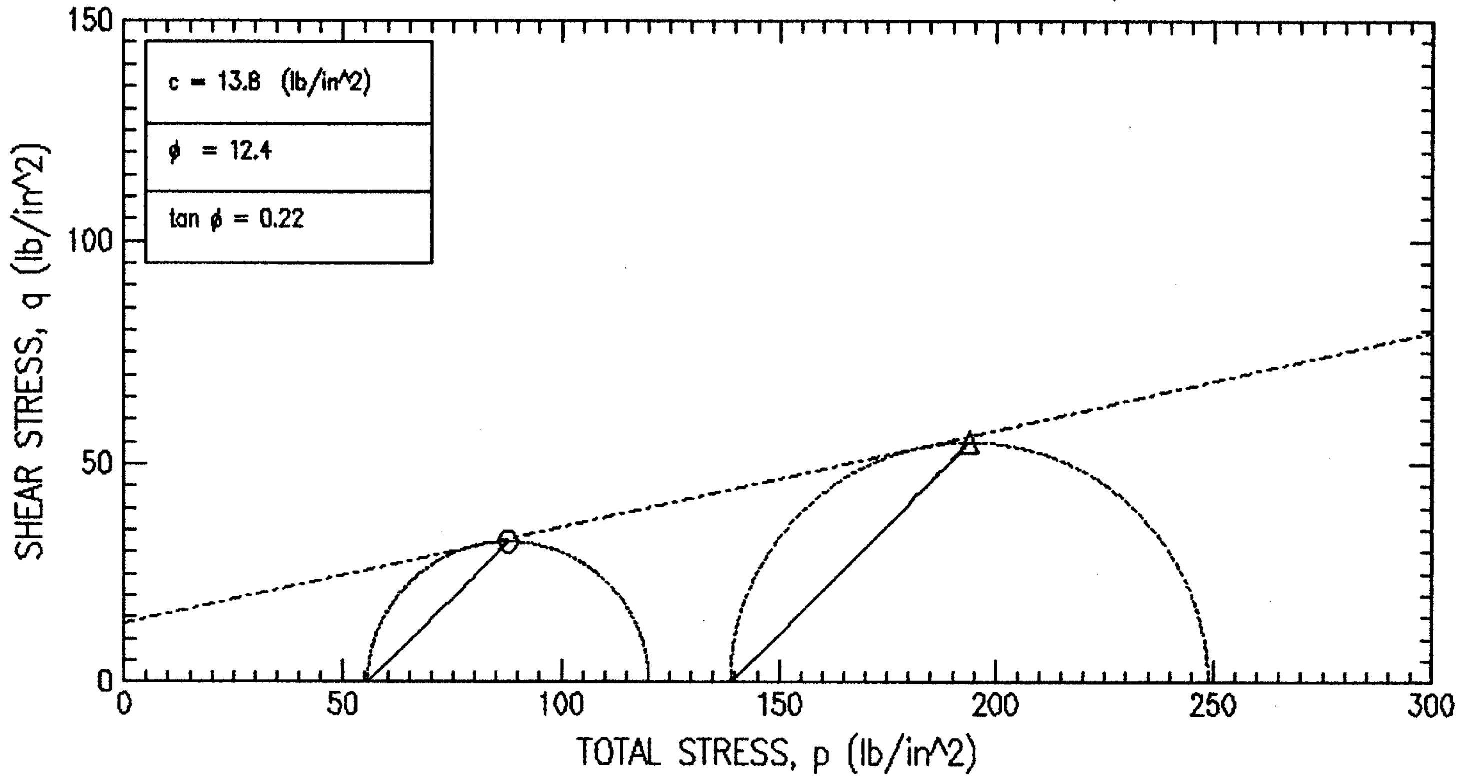
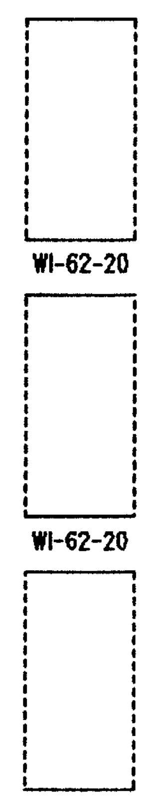
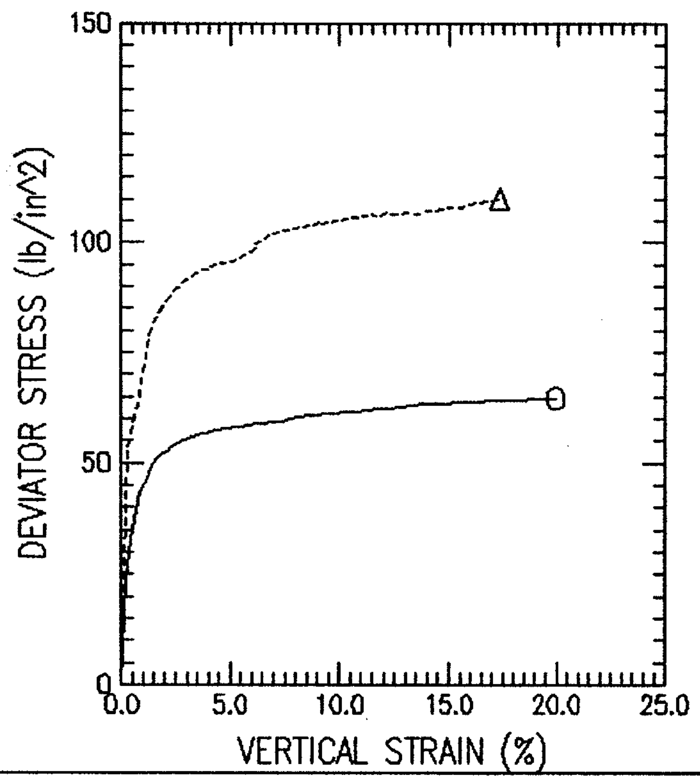
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O	Δ		
TEST NO.		WI-62-20	WI-62-20		
INITIAL	WATER CONTENT (%)	23.83	14.24		
	DRY DENSITY (lb/ft^3)	101.52	120.19		
	SATURATION (%)	97.23	95.17		
	VOID RATIO	0.663	0.405		
BEFORE SHEAR	WATER CONTENT (%)	17.93	12.31		
	DRY DENSITY (lb/ft^3)	113.67	126.66		
	SATURATION (%)	99.94	99.97		
	VOID RATIO	0.485	0.333		
	BACK PRESS. (lb/in^2)	80.00	80.00		
MINOR PRIN. STRESS (lb/in^2)		55.56	138.88		
MAX. DEV. STRESS (lb/in^2)		68.76	115.89		
TIME TO FAILURE (min)		1293.88	1967.48		
RATE OF STRAIN INCR (%/min)		0.00	0.00		
INITIAL DIAMETER (in)		2.86	2.86		
INITIAL HEIGHT (in)		5.95	5.95		
B-VALUE		98.20	97.20		

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

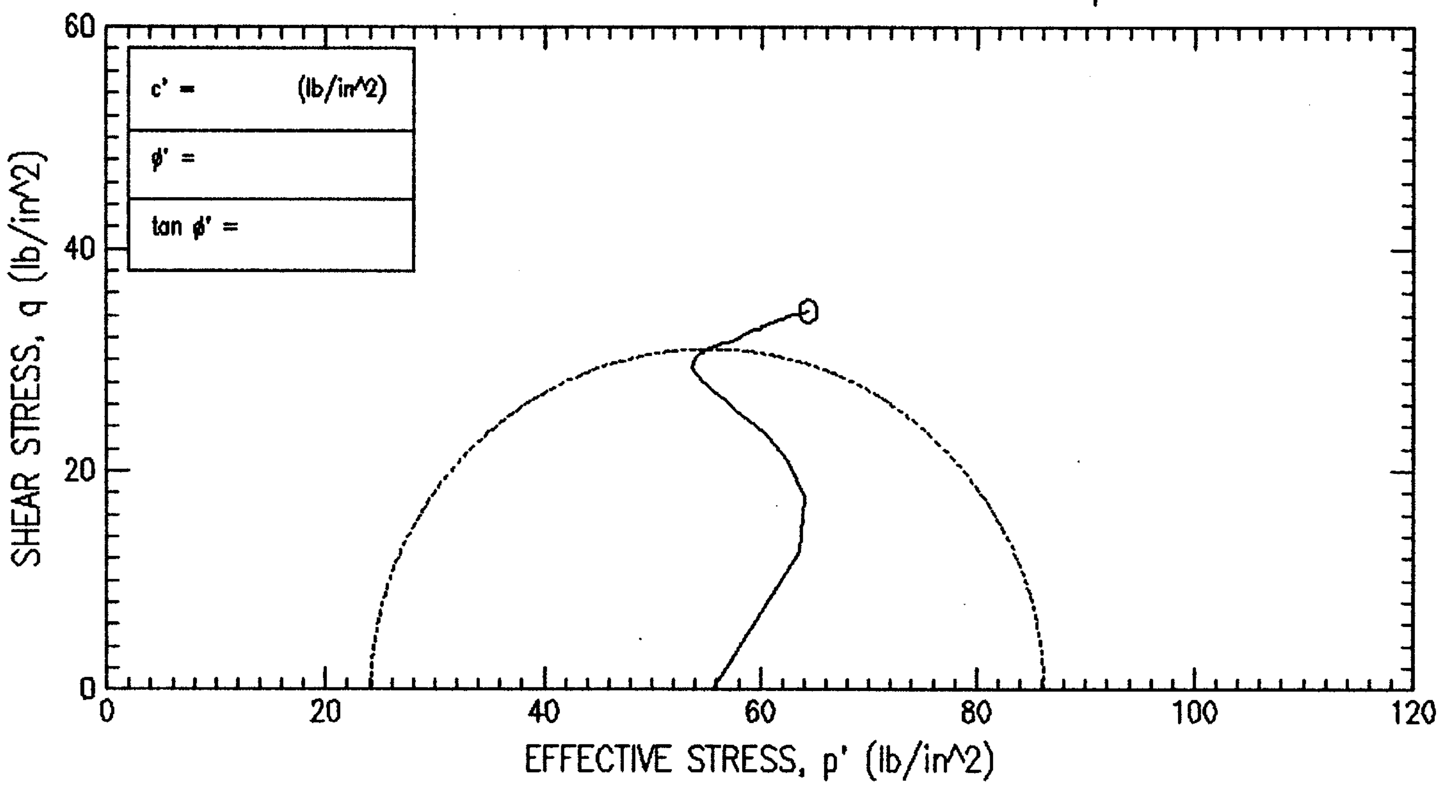
1) Brown sandy clay (CL) 2) Brown clayey sand with gravel (SC)

LL 44.46	PL 22.10	PI 22.36	GS 2.71	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)	
REMARKS:				PROJECT Chabot Dam Seismic Study			
1) TXCIU Test with Effective Pressure of 55.56 psi				PROJECT NO.26814536			
2) TXCIU Test with Effective Pressure of 138.89 psi				BORING NO. WI-62	SAMPLE NO.	20 Top	20 Bottom
				TECH. S. Capps	DEPTH/ELEV	65.0 feet	65.0 feet
				LABORATORY	DATE	06/17/04	06/22/04
				TRIAXIAL COMPRESSION TEST REPORT			

Wed 07-07-:4, 07:07:53

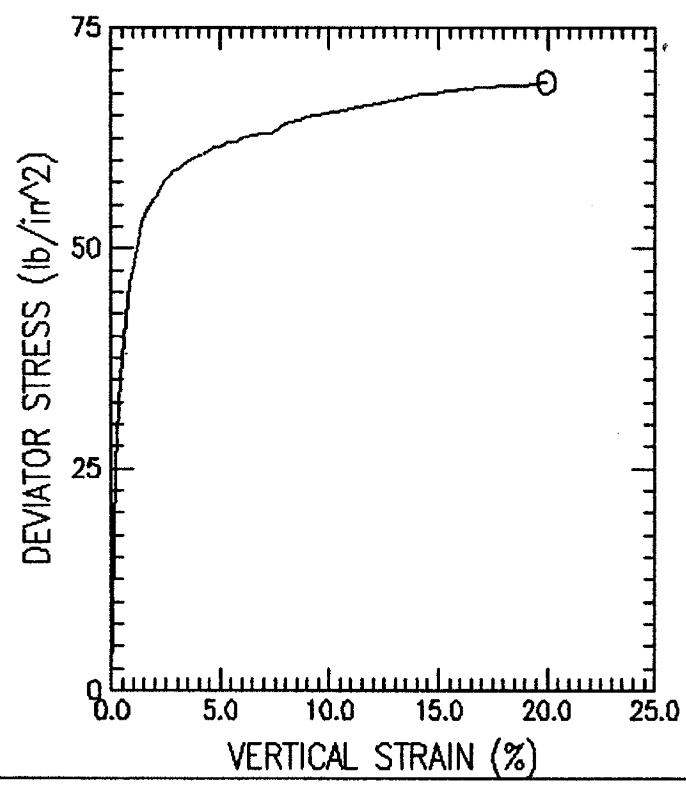
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-62-20



SYMBOL		O			
TEST NO.		WI-62-20			
INITIAL	WATER CONTENT (%)	23.83			
	DRY DENSITY (lb/ft^3)	101.52			
	SATURATION (%)	97.23			
	VOID RATIO	0.663			
BEFORE SHEAR	WATER CONTENT (%)	17.93			
	DRY DENSITY (lb/ft^3)	113.67			
	SATURATION (%)	99.94			
	VOID RATIO	0.485			
	BACK PRESS. (lb/in^2)	80.00			
MINOR PRIN. STRESS (lb/in^2)		55.56			
MAX. DEV. STRESS (lb/in^2)		68.76			
TIME TO FAILURE (min)		1293.88			
RATE OF STRAIN INCR (%/min)		0.00			
INITIAL DIAMETER (in)		2.86			
INITIAL HEIGHT (in)		5.95			
B-VALUE		98.20			

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown sandy clay (CL)

LL 44.46	PL 22.10	PI 22.36	GS 2.71	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 55.56 psi

PROJECT Chabot Dam Seismic Study

PROJECT NO.26814536

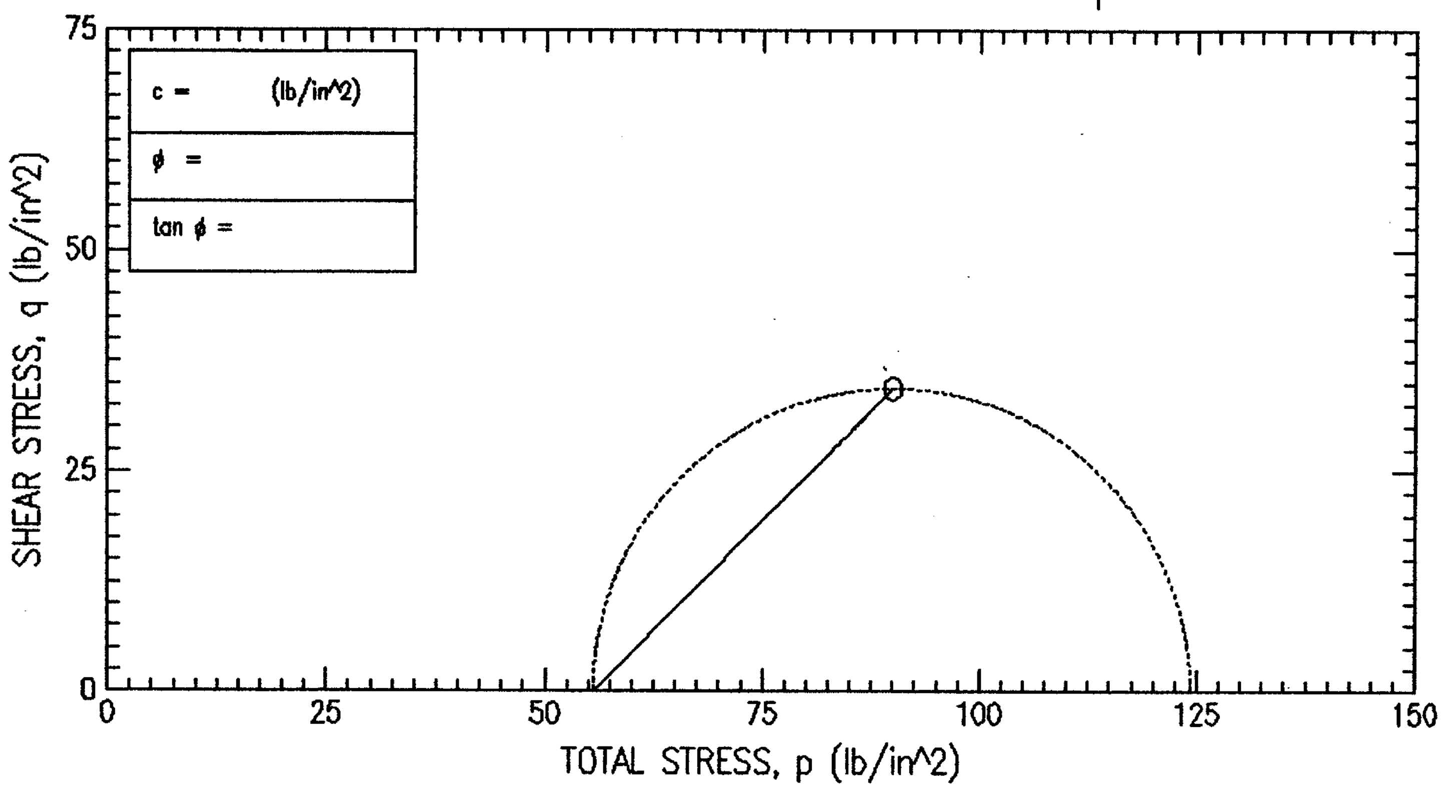
BORING NO. WI-62	SAMPLE NO.	20 Top			
TECH. S. Capps	DEPTH/ELEV	65.0 feet			
LABORATORY	DATE	06/17/04			

TRIAXIAL COMPRESSION TEST REPORT

Mon 06-28-:4, 11:50:25

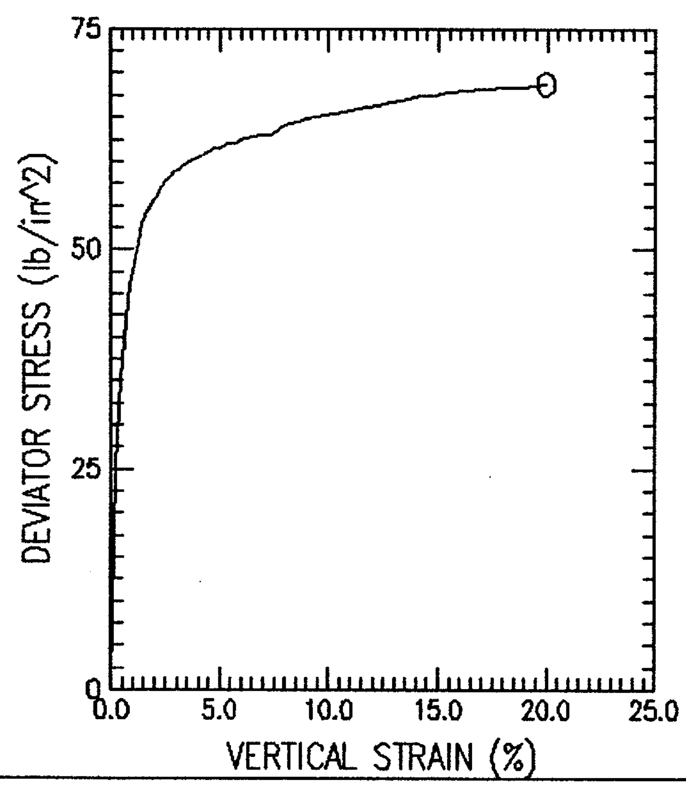
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-62-20



SYMBOL		O				
TEST NO.		WI-62-20				
INITIAL	WATER CONTENT (%)	23.83				
	DRY DENSITY (lb/ft^3)	101.52				
	SATURATION (%)	97.23				
	VOID RATIO	0.663				
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	DRY DENSITY (lb/ft^3)	113.67				
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B-VALUE		98.20				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown sandy clay (CL)

LL 44.46	PL 22.10	PI 22.36	GS 2.71	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study					
1) TXCIU Test with Effective Pressure of 55.56 psi	PROJECT NO.26814536					
	BORING NO. WI-62	SAMPLE NO.	20 Top			
	TECH. S. Capps	DEPTH/ELEV	65.0 feet			
	LABORATORY	DATE	06/17/04			
	TRIAXIAL COMPRESSION TEST REPORT					

Mon 06-28-:4, 11:51:15

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study Location : San Leandro, CA
Project No. : 26814536 Test No. : WI-62-20
Boring No. : WI-62 Test Date : 06/17/04 Tested by : S. Capps
Sample No. : 20 Top Depth : 65.0 feet Checked by : R. Taraya
Sample Type : Pitcher Elevation : NA
Soil Description : Brown sandy clay (CL)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Height : 5.945 (in) Piston Diameter : 0.000 (in) Filter Correction : 0.00 (lb/in^2)
Area : 6.424 (in^2) Piston Friction : 0.00 (lb) Membrane Correction : 0.00 (lb/in)
Volume : 38.192 (in^3) Piston Weight : 0.00 (gm) Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	135.56	135.56	0.00	0.00	55.56	55.56	1.00	55.56	0.00
2)	0.24	160.81	135.56	4.69	0.19	76.12	50.87	1.50	63.50	12.63
3)	0.44	170.81	135.56	9.24	0.26	81.58	46.32	1.76	63.95	17.63
4)	0.64	177.50	135.56	13.99	0.33	83.51	41.57	2.01	62.54	20.97
5)	0.85	181.70	135.56	17.98	0.39	83.72	37.58	2.23	60.65	23.07
6)	1.06	183.85	135.56	20.33	0.42	83.52	35.23	2.37	59.38	24.14
7)	1.26	186.39	135.56	23.15	0.46	83.24	32.41	2.57	57.83	25.42
8)	1.46	188.32	135.56	25.29	0.48	83.03	30.28	2.74	56.65	26.38
9)	1.67	189.83	135.56	27.01	0.50	82.82	28.55	2.90	55.69	27.13
10)	1.88	191.12	135.56	28.39	0.51	82.74	27.18	3.04	54.96	27.78
11)	2.08	191.62	135.56	29.07	0.52	82.54	26.49	3.12	54.51	28.03
12)	2.29	192.51	135.56	29.76	0.52	82.74	25.80	3.21	54.27	28.47
13)	2.48	193.20	135.56	30.45	0.53	82.75	25.11	3.30	53.93	28.82
14)	2.70	193.87	135.56	30.93	0.53	82.94	24.63	3.37	53.78	29.15
15)	2.89	194.35	135.56	31.28	0.53	83.08	24.28	3.42	53.68	29.40
16)	3.10	194.63	135.56	31.35	0.53	83.28	24.21	3.44	53.75	29.53
17)	3.30	194.90	135.56	31.49	0.53	83.42	24.08	3.46	53.75	29.67
18)	3.51	195.37	135.56	31.62	0.53	83.75	23.94	3.50	53.84	29.91
19)	3.72	195.64	135.56	31.69	0.53	83.95	23.87	3.52	53.91	30.04
20)	3.91	195.91	135.56	31.76	0.53	84.15	23.80	3.54	53.98	30.18
21)	4.12	196.18	135.56	31.83	0.53	84.35	23.73	3.55	54.04	30.31
22)	4.32	196.45	135.56	31.76	0.52	84.69	23.80	3.56	54.24	30.44
23)	4.53	196.71	135.56	31.69	0.52	85.02	23.87	3.56	54.44	30.57
24)	4.73	196.97	135.56	31.62	0.51	85.35	23.94	3.57	54.64	30.71
25)	4.93	197.04	135.56	31.55	0.51	85.48	24.01	3.56	54.74	30.74
26)	5.14	197.29	135.56	31.49	0.51	85.81	24.08	3.56	54.94	30.87
27)	5.34	197.55	135.56	31.42	0.51	86.13	24.14	3.57	55.14	30.99
28)	5.55	197.61	135.56	31.35	0.51	86.27	24.21	3.56	55.24	31.03
29)	5.76	197.67	135.56	31.21	0.50	86.46	24.35	3.55	55.41	31.05
30)	5.97	197.92	135.56	31.07	0.50	86.85	24.49	3.55	55.67	31.18
31)	6.16	198.17	135.56	31.00	0.50	87.17	24.56	3.55	55.87	31.31
32)	6.57	198.29	135.56	30.87	0.49	87.43	24.70	3.54	56.06	31.36
33)	6.99	198.58	135.56	30.59	0.49	87.99	24.97	3.52	56.48	31.51
34)	7.38	198.50	135.56	30.11	0.48	88.40	25.45	3.47	56.93	31.47
35)	7.80	199.36	135.56	29.76	0.47	89.60	25.80	3.47	57.70	31.90
36)	8.20	199.84	135.56	29.49	0.46	90.35	26.07	3.47	58.21	32.14
37)	8.61	200.12	135.56	29.28	0.45	90.84	26.28	3.46	58.56	32.28
38)	9.02	200.39	135.56	29.14	0.45	91.25	26.42	3.45	58.83	32.42
39)	9.43	200.66	135.56	29.01	0.45	91.65	26.56	3.45	59.10	32.55
40)	9.84	200.73	135.56	28.94	0.44	91.80	26.62	3.45	59.21	32.59
41)	10.25	201.00	135.56	28.80	0.44	92.20	26.76	3.45	59.48	32.72
42)	10.76	201.17	135.56	28.52	0.43	92.65	27.04	3.43	59.84	32.81
43)	11.27	201.53	135.56	28.45	0.43	93.07	27.11	3.43	60.09	32.98
44)	11.78	201.70	135.56	28.25	0.43	93.45	27.31	3.42	60.38	33.07
45)	12.29	201.86	135.56	28.04	0.42	93.82	27.52	3.41	60.67	33.15
46)	12.80	202.19	135.56	27.90	0.42	94.29	27.66	3.41	60.97	33.32
47)	13.31	202.52	135.56	27.63	0.41	94.89	27.93	3.40	61.41	33.48
48)	13.82	202.83	135.56	27.49	0.41	95.34	28.07	3.40	61.70	33.63
49)	14.34	202.95	135.56	27.28	0.40	95.67	28.28	3.38	61.97	33.70
50)	14.84	203.09	135.56	27.08	0.40	96.01	28.48	3.37	62.25	33.76
51)	15.35	203.38	135.56	26.94	0.40	96.44	28.62	3.37	62.53	33.91
52)	16.38	203.59	135.56	26.66	0.39	96.93	28.90	3.35	62.91	34.01
53)	16.88	203.69	135.56	26.53	0.39	97.17	29.04	3.35	63.10	34.07
54)	17.39	203.79	135.56	26.39	0.39	97.40	29.17	3.34	63.29	34.11
55)	17.90	203.87	135.56	26.18	0.38	97.69	29.38	3.33	63.54	34.16
56)	18.42	203.95	135.56	26.11	0.38	97.84	29.45	3.32	63.64	34.19
57)	18.93	204.02	135.56	25.91	0.38	98.12	29.66	3.31	63.89	34.23
58)	19.95	204.32	135.56	25.63	0.37	98.69	29.93	3.30	64.31	34.38

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-62
Sample No. : 20 Top
Sample Type : Pitcher
Soil Description : Brown sandy clay (CL)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Location : San Leandro, CA
Test No. : WI-62-20
Test Date : 06/17/04
Depth : 65.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.16	80.00	0.00	0.00	0.00	135.56	55.56
2)	0.014	0.24	6.18	84.69	155.96	155.96	25.25	160.81	76.12
3)	0.026	0.44	6.19	89.24	218.17	218.17	35.25	170.81	81.58
4)	0.038	0.64	6.20	93.99	260.06	260.06	41.94	177.50	83.51
5)	0.049	0.85	6.21	97.98	286.72	286.72	46.14	181.70	83.72
6)	0.062	1.06	6.23	100.33	300.68	300.68	48.29	183.85	83.52
7)	0.073	1.26	6.24	103.15	317.18	317.18	50.83	186.39	83.24
8)	0.085	1.46	6.25	105.28	329.88	329.88	52.76	188.32	83.03
9)	0.097	1.67	6.27	107.01	340.03	340.03	54.27	189.83	82.82
10)	0.110	1.88	6.28	108.38	348.92	348.92	55.56	191.12	82.74
11)	0.121	2.08	6.29	109.07	352.73	352.73	56.06	191.62	82.54
12)	0.133	2.29	6.31	109.76	359.08	359.08	56.95	192.51	82.74
13)	0.144	2.48	6.32	110.45	364.15	364.15	57.64	193.20	82.75
14)	0.157	2.70	6.33	110.93	369.23	369.23	58.31	193.87	82.94
15)	0.168	2.89	6.34	111.28	373.04	373.04	58.79	194.35	83.08
16)	0.180	3.10	6.36	111.35	375.58	375.58	59.07	194.63	83.28
17)	0.192	3.30	6.37	111.48	378.12	378.12	59.34	194.90	83.42
18)	0.204	3.51	6.39	111.62	381.93	381.93	59.81	195.37	83.75
19)	0.216	3.72	6.40	111.69	384.46	384.46	60.08	195.64	83.95
20)	0.228	3.91	6.41	111.76	387.00	387.00	60.35	195.91	84.15
21)	0.240	4.12	6.43	111.83	389.54	389.54	60.62	196.18	84.35
22)	0.251	4.32	6.44	111.76	392.08	392.08	60.89	196.45	84.69
23)	0.264	4.53	6.45	111.69	394.62	394.62	61.15	196.71	85.02
24)	0.275	4.73	6.47	111.62	397.16	397.16	61.41	196.97	85.35
25)	0.287	4.93	6.48	111.55	398.43	398.43	61.48	197.04	85.48
26)	0.299	5.14	6.50	111.48	400.97	400.97	61.73	197.29	85.81
27)	0.311	5.34	6.51	111.42	403.51	403.51	61.99	197.55	86.13
28)	0.323	5.55	6.52	111.35	404.78	404.78	62.05	197.61	86.27
29)	0.335	5.76	6.54	111.21	406.05	406.05	62.11	197.67	86.46
30)	0.347	5.97	6.55	111.07	408.58	408.58	62.36	197.92	86.85
31)	0.359	6.16	6.57	111.00	411.12	411.12	62.61	198.17	87.17
32)	0.382	6.57	6.59	110.86	413.66	413.66	62.73	198.29	87.43
33)	0.407	6.99	6.62	110.59	417.47	417.47	63.02	198.58	87.99
34)	0.430	7.38	6.65	110.11	418.74	418.74	62.94	198.50	88.40
35)	0.454	7.80	6.68	109.76	426.36	426.36	63.80	199.36	89.60
36)	0.477	8.20	6.71	109.49	431.43	431.43	64.28	199.84	90.35
37)	0.501	8.61	6.74	109.28	435.24	435.24	64.56	200.12	90.84
38)	0.525	9.02	6.77	109.14	439.05	439.05	64.83	200.39	91.25
39)	0.549	9.43	6.80	109.00	442.86	442.86	65.10	200.66	91.65
40)	0.573	9.84	6.83	108.94	445.40	445.40	65.17	200.73	91.80
41)	0.597	10.25	6.86	108.80	449.21	449.21	65.44	201.00	92.20
42)	0.627	10.76	6.90	108.52	453.02	453.02	65.61	201.17	92.65
43)	0.656	11.27	6.94	108.45	458.09	458.09	65.97	201.53	93.07
44)	0.686	11.78	6.98	108.25	461.90	461.90	66.14	201.70	93.45
45)	0.715	12.29	7.02	108.04	465.71	465.71	66.30	201.86	93.82
46)	0.745	12.80	7.07	107.90	470.79	470.79	66.63	202.19	94.29
47)	0.775	13.31	7.11	107.63	475.87	475.87	66.96	202.52	94.89
48)	0.805	13.82	7.15	107.49	480.94	480.94	67.27	202.83	95.34
49)	0.835	14.34	7.19	107.28	484.75	484.75	67.39	202.95	95.67
50)	0.864	14.84	7.24	107.08	488.56	488.56	67.53	203.09	96.01
51)	0.894	15.35	7.28	106.94	493.64	493.64	67.82	203.38	96.44
52)	0.954	16.38	7.37	106.66	501.25	501.25	68.03	203.59	96.93
53)	0.983	16.88	7.41	106.52	505.06	505.06	68.13	203.69	97.17
54)	1.012	17.39	7.46	106.39	508.87	508.87	68.23	203.79	97.40
55)	1.042	17.90	7.50	106.18	512.68	512.68	68.31	203.87	97.69
56)	1.072	18.42	7.55	106.11	516.49	516.49	68.39	203.95	97.84
57)	1.102	18.93	7.60	105.90	520.30	520.30	68.46	204.02	98.12
58)	1.161	19.95	7.70	105.63	529.18	529.18	68.76	204.32	98.69

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study   Location : San Leandro, CA
Project No. : 26814536   Test No. : WI-62-20
Boring No. : WI-62   Test Date : 06/17/04   Tested by : S. Capps
Sample No. : 20 Top   Depth : 65.0 feet   Checked by : R. Taraya
Sample Type : Pitcher   Elevation : NA
Soil Description : Brown sandy clay (CL)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Height : 5.945 (in)   Piston Diameter : 0.000 (in)   Filter Correction : 0.00 (lb/in^2)
Area : 6.424 (in^2)   Piston Friction : 0.00 (lb)   Membrane Correction : 0.00 (lb/in)
Volume : 38.192 (in^3)   Piston Weight : 0.00 (gm)   Area Correction : Uniform

Liquid Limit : 44.46   Plastic Limit : 22.1   Specific Gravity : 2.706

INITIAL
Height : 5.945 (in)   Dry Density : 101.52 (lb/ft^3)
Area : 6.424 (in^2)   Moisture : 23.83 %
Void Ratio: 0.66
Saturation: 97.23 %
Time : 0.00 (min)

INITIALIZATION
dH : 0.000 (in)   Height : 5.945 (in)   Dry Density : 101.52 (lb/ft^3)   Total Vert. Stress : 135.56 (lb/in^
dV : 0.000 (in^3)   Area : 6.424 (in^2)   Moisture : 23.83 %   Total Hori. Stress : 135.56 (lb/in^
Void Ratio: 0.66   Pore Pressure : 0.00 (lb/in^2)
Saturation: 97.23 %   Effect.Vert. Stress: 135.56 (lb/in^
Time : 0.00 (min)   Effect.Hori. Stress: 135.56 (lb/in^

END OF CONSOLIDATION - A
dH : 0.000 (in)   Height : 5.945 (in)   Dry Density : 101.52 (lb/ft^3)   Total Vert. Stress : 135.56 (lb/in^
dV : 0.000 (in^3)   Area : 6.424 (in^2)   Moisture : 23.83 %   Total Hori. Stress : 135.56 (lb/in^
Void Ratio: 0.66   Pore Pressure : 0.00 (lb/in^2)
Saturation: 97.23 %   Effect.Vert. Stress: 135.56 (lb/in^
Time : 0.00 (min)   Effect.Hori. Stress: 135.56 (lb/in^

END OF SATURATION
dH : 0.000 (in)   Height : 5.945 (in)   Dry Density : 106.76 (lb/ft^3)   Total Vert. Stress : 135.56 (lb/in^
dV : 0.000 (in^3)   Area : 6.424 (in^2)   Moisture : 17.93 %   Total Hori. Stress : 135.56 (lb/in^
dVCorr : 0.000 (in^3)   Void Ratio: 0.58   Pore Pressure : 0.00 (lb/in^2)
Saturation: 83.42 %   Effect.Vert. Stress: 135.56 (lb/in^
Time : 0.00 (min)   Effect.Hori. Stress: 135.56 (lb/in^

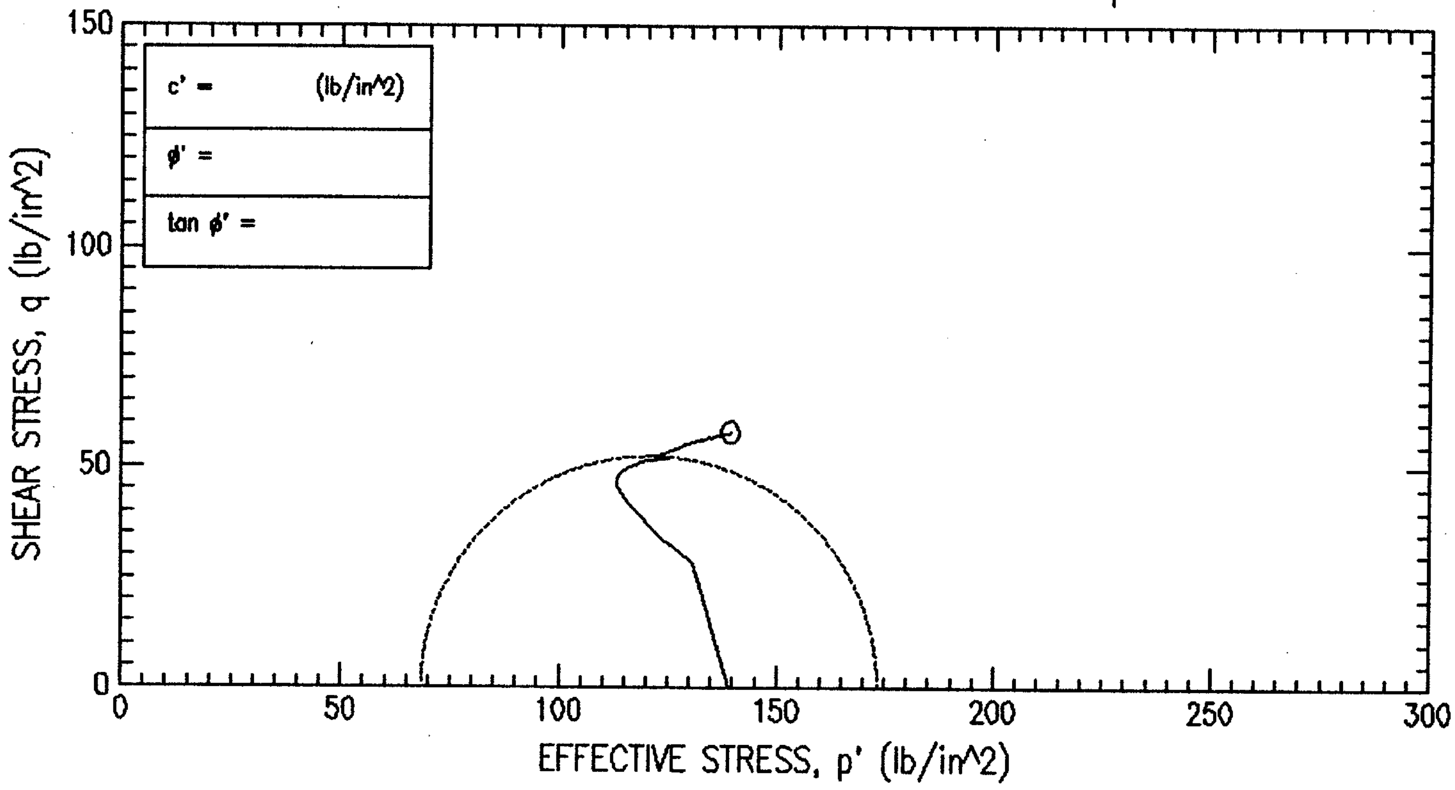
END OF CONSOLIDATION - B
dH : 0.123 (in)   Height : 5.822 (in)   Dry Density : 113.67 (lb/ft^3)   Total Vert. Stress : 135.56 (lb/in^
dV : 2.322 (in^3)   Area : 6.161 (in^2)   Moisture : 17.93 %   Total Hori. Stress : 135.56 (lb/in^
Void Ratio: 0.49   Pore Pressure : 80.00 (lb/in^2
Saturation: 99.94 %   Effect.Vert. Stress: 55.56 (lb/in^2
Time : 0.00 (min)   Effect.Hori. Stress: 55.56 (lb/in^2

FAILURE DURING SHEAR
dH : 1.161 (in)   Height : 4.784 (in)   Dry Density : 113.67 (lb/ft^3)   Total Vert. Stress : 204.32 (lb/in^
dV : 2.322 (in^3)   Area : 7.697 (in^2)   Moisture : 17.93 %   Total Hori. Stress : 135.56 (lb/in^
Strain : 19.95 %   Void Ratio: 0.49   Pore Pressure : 105.63 (lb/in^
Strength: 34.38 (lb/in^2)Saturation: 99.94 %   Effect.Vert. Stress: 98.69 (lb/in^2
Time : 1293.88 (min)   Effect.Hori. Stress: 29.93 (lb/in^2

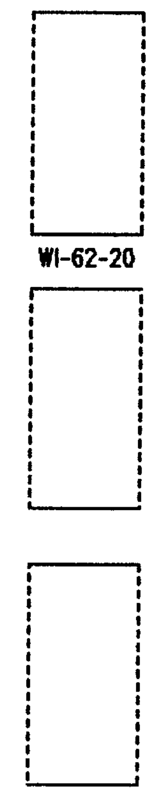
END OF TEST
dH : 1.161 (in)   Height : 4.784 (in)   Dry Density : 113.67 (lb/ft^3)   Total Vert. Stress : 204.32 (lb/in^
dV : 2.322 (in^3)   Area : 7.697 (in^2)   Moisture : 17.93 %   Total Hori. Stress : 135.56 (lb/in^
Strain : 19.95 %   Void Ratio: 0.49   Pore Pressure : 105.63 (lb/in^
Saturation: 99.94 %   Effect.Vert. Stress: 98.69 (lb/in^2
Time : 1293.88 (min)   Effect.Hori. Stress: 29.93 (lb/in^2

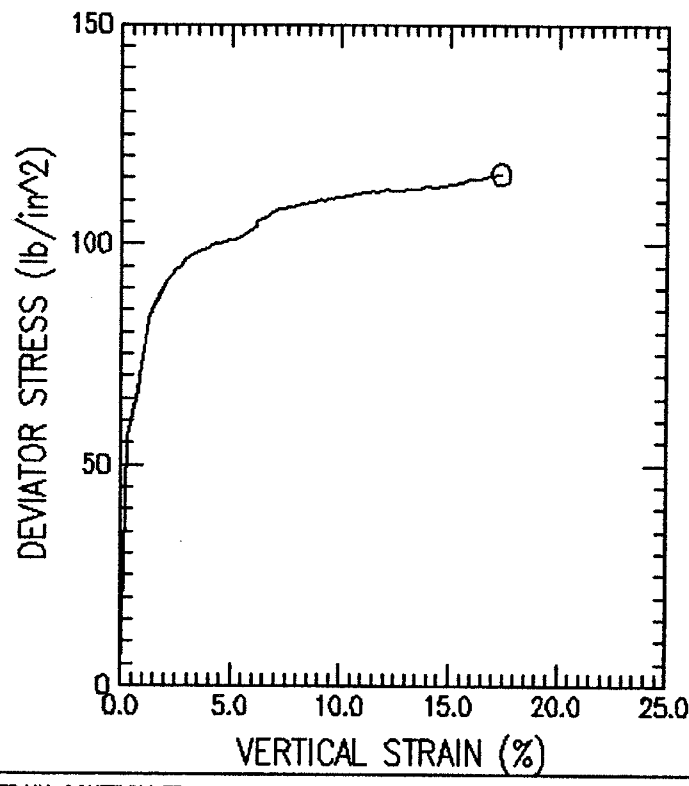
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-62-20				
INITIAL	WATER CONTENT (%)	14.24				
	DRY DENSITY (lb/ft^3)	120.19				
	SATURATION (%)	95.17				
	VOID RATIO	0.405				
BEFORE SHEAR	WATER CONTENT (%)	12.31				
	DRY DENSITY (lb/ft^3)	126.66				
	SATURATION (%)	99.97				
	VOID RATIO	0.333				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		138.88				
MAX. DEV. STRESS (lb/in^2)		115.89				
TIME TO FAILURE (min)		1967.48				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.20				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

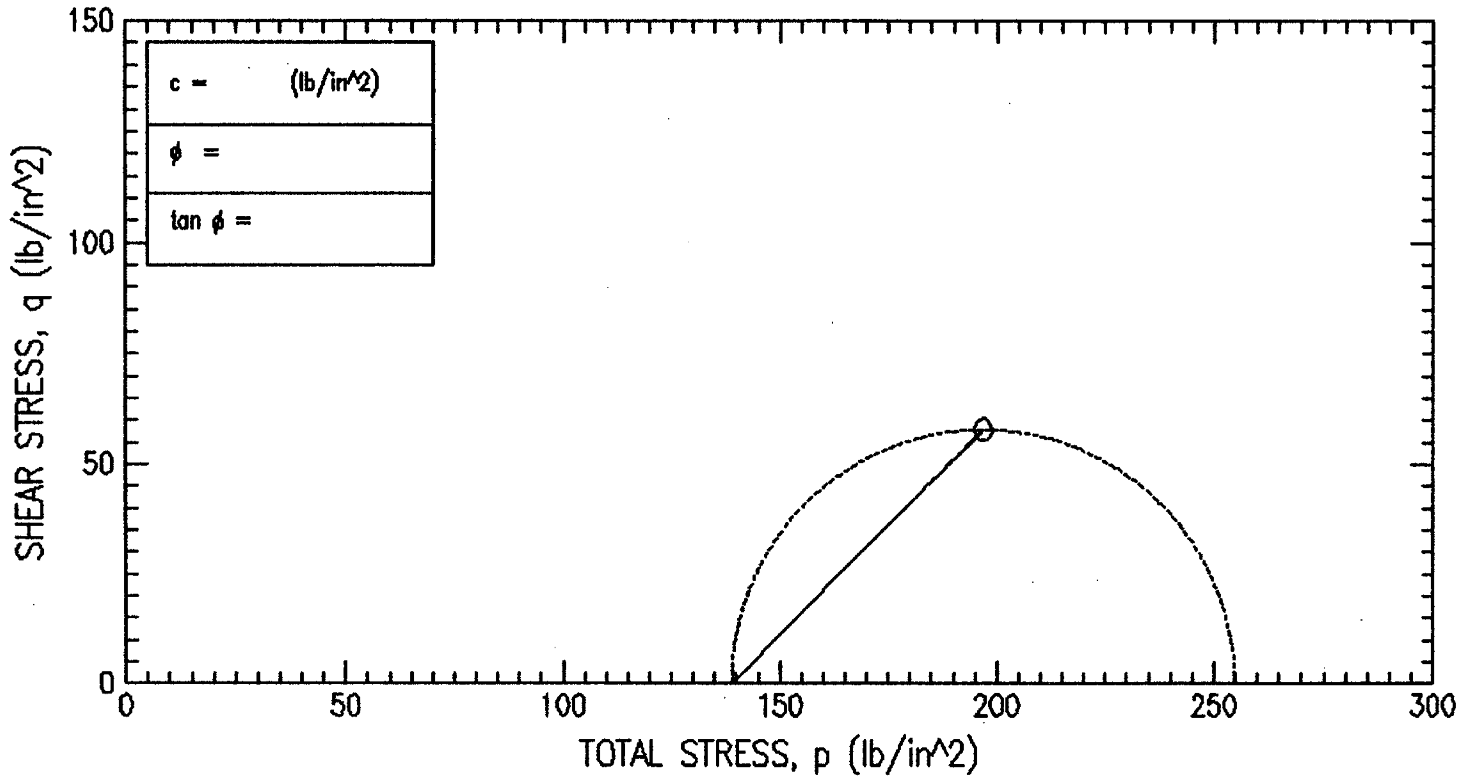
1) Brown clayey sand with gravel (SC)

LL 42.44	PL 16.17	PI 26.27	GS 2.71	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)		
REMARKS:				PROJECT Chabot Dam Seismic Study				
1) TXCIU Test with Effective Pressure of 138.89 psi				PROJECT NO.26814536				
				BORING NO. WI-62	SAMPLE NO.	20 Bottom		
				TECH. S. Capps	DEPTH/ELEV	65.0 feet		
				LABORATORY	DATE	06/22/04		
				TRIAXIAL COMPRESSION TEST REPORT				

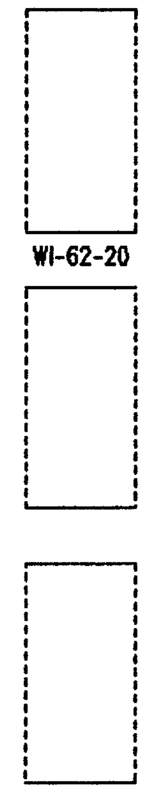
Wed 06-30-:4, 16:41:39

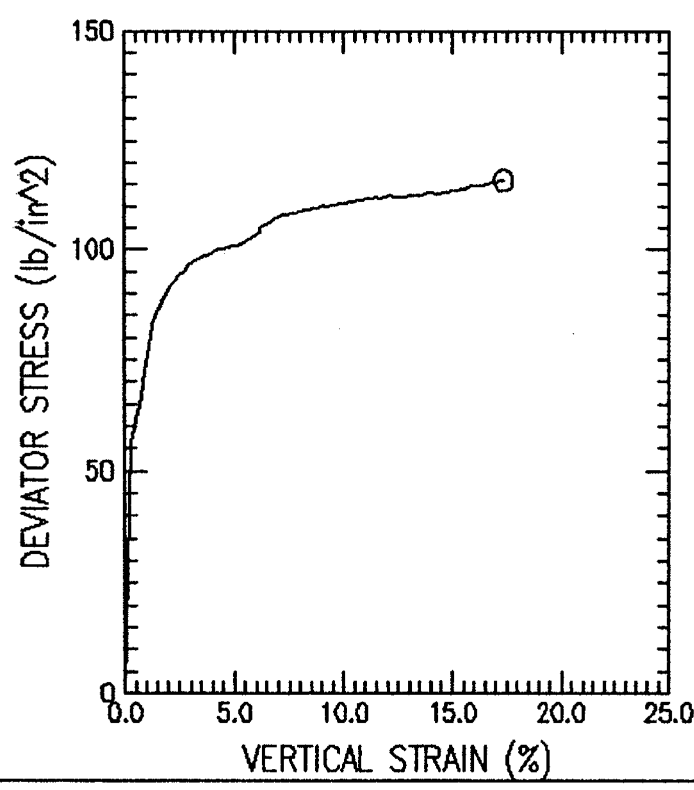
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-62-20				
INITIAL	WATER CONTENT (%)	14.24				
	DRY DENSITY (lb/ft^3)	120.19				
	SATURATION (%)	95.17				
	VOID RATIO	0.405				
BEFORE SHEAR	WATER CONTENT (%)	12.31				
	DRY DENSITY (lb/ft^3)	126.66				
	SATURATION (%)	99.97				
	VOID RATIO	0.333				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		138.88				
MAX. DEV. STRESS (lb/in^2)		115.89				
TIME TO FAILURE (min)		1967.48				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.20				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown clayey sand with gravel (SC)

LL 42.44	PL 16.17	PI 26.27	GS 2.71	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study					
1) TXCIU Test with Effective Pressure of 138.89 psi	PROJECT NO.26814536					
	BORING NO. WI-62	SAMPLE NO.	20 Bottom			
	TECH. S. Capps	DEPTH/ELEV	65.0 feet			
	LABORATORY	DATE	06/22/04			
	TRIAXIAL COMPRESSION TEST REPORT					

Wed 06-30-:4, 16:42:48

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Location : San Leandro, CA
Project No. : 26814536
Test No. : WI-62-20
Boring No. : WI-62
Test Date : 06/22/04
Tested by : S. Capps
Sample No. : 20 Bottom
Depth : 65.0 feet
Checked by : R. Taraya
Sample Type : Pitcher
Elevation : NA
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 138.89 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	218.89	218.89	0.00	0.00	138.88	138.88	1.00	138.88	0.00
2)	0.29	275.14	218.89	36.25	0.64	158.88	102.63	1.55	130.76	28.13
3)	0.50	280.39	218.89	41.84	0.68	158.55	97.04	1.63	127.79	30.75
4)	0.74	285.59	218.89	48.27	0.72	157.32	90.61	1.74	123.97	33.35
5)	0.88	291.33	218.89	53.86	0.74	157.46	85.03	1.85	121.25	36.22
6)	1.09	296.99	218.89	59.44	0.76	157.54	79.44	1.98	118.49	39.05
7)	1.29	301.67	218.89	64.11	0.77	157.55	74.77	2.11	116.16	41.39
8)	1.50	304.87	218.89	66.94	0.78	157.92	71.94	2.20	114.93	42.99
9)	1.70	307.11	218.89	68.86	0.78	158.24	70.03	2.26	114.13	44.11
10)	1.90	308.85	218.89	70.24	0.78	158.61	68.65	2.31	113.63	44.98
11)	2.11	310.58	218.89	71.46	0.78	159.11	67.42	2.36	113.27	45.85
12)	2.31	311.83	218.89	72.23	0.78	159.59	66.66	2.39	113.13	46.47
13)	2.51	313.07	218.89	72.84	0.77	160.23	66.05	2.43	113.14	47.09
14)	2.72	313.82	218.89	73.07	0.77	160.75	65.82	2.44	113.28	47.47
15)	2.91	315.06	218.89	73.37	0.76	161.68	65.51	2.47	113.60	48.09
16)	3.12	315.80	218.89	73.45	0.76	162.35	65.43	2.48	113.89	48.46
17)	3.33	316.54	218.89	73.45	0.75	163.08	65.43	2.49	114.26	48.82
18)	3.54	317.28	218.89	73.30	0.74	163.98	65.59	2.50	114.78	49.19
19)	3.73	317.55	218.89	73.30	0.74	164.25	65.59	2.50	114.92	49.33
20)	3.94	317.81	218.89	73.07	0.74	164.73	65.82	2.50	115.27	49.46
21)	4.14	318.54	218.89	72.84	0.73	165.70	66.05	2.51	115.87	49.83
22)	4.34	318.80	218.89	72.61	0.73	166.19	66.28	2.51	116.23	49.96
23)	4.54	319.06	218.89	72.30	0.72	166.75	66.58	2.50	116.67	50.08
24)	4.74	319.32	218.89	72.15	0.72	167.16	66.74	2.50	116.95	50.21
25)	4.95	319.56	218.89	71.84	0.71	167.71	67.04	2.50	117.38	50.34
26)	5.16	319.80	218.89	71.61	0.71	168.19	67.27	2.50	117.73	50.46
27)	5.36	320.06	218.89	71.46	0.71	168.59	67.42	2.50	118.01	50.59
28)	5.56	320.77	218.89	71.08	0.70	169.69	67.81	2.50	118.75	50.94
29)	5.77	321.47	218.89	70.85	0.69	170.61	68.04	2.51	119.32	51.29
30)	5.98	322.16	218.89	70.47	0.68	171.69	68.42	2.51	120.05	51.63
31)	6.18	322.86	218.89	65.87	0.63	176.98	73.01	2.42	125.00	51.99
32)	6.19	323.77	218.89	70.39	0.67	173.37	68.50	2.53	120.93	52.44
33)	6.40	324.45	218.89	69.09	0.65	175.36	69.80	2.51	122.58	52.78
34)	6.60	325.14	218.89	67.94	0.64	177.20	70.94	2.50	124.07	53.13
35)	6.80	325.83	218.89	67.25	0.63	178.57	71.63	2.49	125.10	53.47
36)	7.00	326.50	218.89	66.94	0.62	179.55	71.94	2.50	125.75	53.81
37)	7.20	326.72	218.89	66.56	0.62	180.16	72.32	2.49	126.24	53.92
38)	7.41	326.94	218.89	66.33	0.61	180.60	72.55	2.49	126.58	54.03
39)	7.62	327.15	218.89	66.10	0.61	181.04	72.78	2.49	126.91	54.13
40)	7.81	327.37	218.89	66.03	0.61	181.34	72.86	2.49	127.10	54.24
41)	8.02	327.58	218.89	65.72	0.60	181.86	73.16	2.49	127.51	54.35
42)	8.22	327.79	218.89	65.72	0.60	182.07	73.16	2.49	127.62	54.45
43)	8.42	328.00	218.89	65.49	0.60	182.51	73.39	2.49	127.95	54.56
44)	8.63	328.21	218.89	65.34	0.60	182.86	73.55	2.49	128.21	54.66
45)	8.83	328.41	218.89	65.18	0.60	183.22	73.70	2.49	128.46	54.76
46)	9.03	329.06	218.89	65.11	0.59	183.95	73.78	2.49	128.86	55.08
47)	9.24	328.80	218.89	64.88	0.59	183.92	74.01	2.49	128.96	54.96
48)	9.45	328.99	218.89	64.73	0.59	184.26	74.16	2.48	129.21	55.05
49)	9.66	329.19	218.89	64.57	0.59	184.61	74.31	2.48	129.46	55.15
50)	9.85	329.39	218.89	64.34	0.58	185.04	74.54	2.48	129.79	55.25
51)	10.05	329.58	218.89	64.19	0.58	185.39	74.69	2.48	130.04	55.35
52)	10.26	329.76	218.89	63.96	0.58	185.80	74.92	2.48	130.36	55.44
53)	10.46	329.96	218.89	63.88	0.58	186.07	75.00	2.48	130.54	55.54
54)	10.67	330.14	218.89	63.65	0.57	186.48	75.23	2.48	130.86	55.62
55)	10.87	330.33	218.89	63.58	0.57	186.75	75.31	2.48	131.03	55.72
56)	11.07	330.51	218.89	63.27	0.57	187.24	75.61	2.48	131.43	55.81
57)	11.27	330.69	218.89	63.12	0.56	187.57	75.77	2.48	131.67	55.90
58)	11.48	330.87	218.89	63.04	0.56	187.83	75.84	2.48	131.83	55.99
59)	11.69	330.61	218.89	62.81	0.56	187.79	76.07	2.47	131.93	55.86
60)	11.88	330.79	218.89	62.58	0.56	188.20	76.30	2.47	132.25	55.95
61)	12.09	331.38	218.89	62.43	0.55	188.95	76.45	2.47	132.70	56.25
62)	12.30	331.12	218.89	62.28	0.55	188.83	76.61	2.46	132.72	56.11
63)	12.70	331.03	218.89	61.89	0.55	189.13	76.99	2.46	133.06	56.07

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Location : San Leandro, CA
Project No. : 26814536
Test No. : WI-62-20
Boring No. : WI-62
Test Date : 06/22/04
Tested by : S. Capps
Sample No. : 20 Bottom
Depth : 65.0 feet
Checked by : R. Taraya
Sample Type : Pitcher
Elevation : NA
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 138.89 psi

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
64)	13.11	331.35	218.89	61.51	0.55	189.84	77.37	2.45	133.61	56.23
65)	13.52	331.25	218.89	61.20	0.54	190.04	77.68	2.45	133.86	56.18
66)	13.93	331.99	218.89	60.82	0.54	191.16	78.06	2.45	134.61	56.55
67)	14.32	331.89	218.89	60.36	0.53	191.52	78.52	2.44	135.02	56.50
68)	14.73	332.19	218.89	59.98	0.53	192.20	78.90	2.44	135.55	56.65
69)	15.14	332.47	218.89	59.98	0.53	192.48	78.90	2.44	135.69	56.79
70)	15.55	332.75	218.89	59.52	0.52	193.23	79.36	2.43	136.30	56.93
71)	15.96	333.44	218.89	58.91	0.51	194.53	79.98	2.43	137.25	57.28
72)	16.37	333.70	218.89	58.14	0.51	195.55	80.74	2.42	138.15	57.40
73)	16.87	334.23	218.89	57.61	0.50	196.62	81.28	2.42	138.95	57.67
74)	17.35	334.78	218.89	57.53	0.50	197.25	81.35	2.42	139.30	57.95

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-62
Sample No. : 20 Bottom
Sample Type : Pitcher
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 138.89 psi

Location : San Leandro, CA
Test No. : WI-62-20
Test Date : 06/22/04
Depth : 65.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.20	80.00	0.00	0.00	0.00	218.89	138.88
2)	0.017	0.29	6.22	116.26	350.01	350.01	56.25	275.14	158.88
3)	0.029	0.50	6.23	121.85	383.45	383.45	61.50	280.39	158.55
4)	0.043	0.74	6.25	128.28	416.89	416.89	66.71	285.59	157.32
5)	0.052	0.88	6.26	133.86	453.37	453.37	72.44	291.33	157.46
6)	0.064	1.09	6.27	139.45	489.85	489.85	78.10	296.99	157.54
7)	0.075	1.29	6.28	144.12	520.26	520.26	82.78	301.67	157.55
8)	0.088	1.50	6.30	146.95	541.54	541.54	85.99	304.87	157.92
9)	0.099	1.70	6.31	148.86	556.74	556.74	88.22	307.11	158.24
10)	0.111	1.90	6.32	150.24	568.90	568.90	89.96	308.85	158.61
11)	0.123	2.11	6.34	151.47	581.06	581.06	91.69	310.58	159.11
12)	0.135	2.31	6.35	152.23	590.18	590.18	92.94	311.83	159.59
13)	0.146	2.51	6.36	152.84	599.30	599.30	94.18	313.07	160.23
14)	0.159	2.72	6.38	153.07	605.38	605.38	94.93	313.82	160.75
15)	0.170	2.91	6.39	153.38	614.50	614.50	96.17	315.06	161.68
16)	0.182	3.12	6.40	153.46	620.58	620.58	96.91	315.80	162.35
17)	0.195	3.33	6.42	153.46	626.66	626.66	97.65	316.54	163.08
18)	0.207	3.54	6.43	153.30	632.74	632.74	98.39	317.28	163.98
19)	0.218	3.73	6.44	153.30	635.78	635.78	98.66	317.55	164.25
20)	0.230	3.94	6.46	153.07	638.82	638.82	98.92	317.81	164.73
21)	0.242	4.14	6.47	152.84	644.91	644.91	99.65	318.54	165.70
22)	0.254	4.34	6.49	152.61	647.95	647.95	99.91	318.80	166.19
23)	0.265	4.54	6.50	152.31	650.99	650.99	100.17	319.06	166.75
24)	0.277	4.74	6.51	152.15	654.03	654.03	100.43	319.32	167.16
25)	0.289	4.95	6.53	151.85	657.07	657.07	100.67	319.56	167.71
26)	0.301	5.16	6.54	151.62	660.11	660.11	100.92	319.80	168.19
27)	0.313	5.36	6.55	151.47	663.15	663.15	101.17	320.06	168.59
28)	0.325	5.56	6.57	151.08	669.23	669.23	101.88	320.77	169.69
29)	0.337	5.77	6.58	150.85	675.31	675.31	102.58	321.47	170.61
30)	0.349	5.98	6.60	150.47	681.39	681.39	103.27	322.16	171.69
31)	0.361	6.18	6.61	145.88	687.47	687.47	103.97	322.86	176.98
32)	0.362	6.19	6.61	150.39	693.55	693.55	104.88	323.77	173.37
33)	0.374	6.40	6.63	149.09	699.63	699.63	105.56	324.45	175.36
34)	0.385	6.60	6.64	147.94	705.71	705.71	106.25	325.14	177.20
35)	0.397	6.80	6.66	147.26	711.79	711.79	106.94	325.83	178.57
36)	0.409	7.00	6.67	146.95	717.87	717.87	107.62	326.50	179.55
37)	0.421	7.20	6.69	146.57	720.91	720.91	107.84	326.72	180.16
38)	0.433	7.41	6.70	146.34	723.95	723.95	108.05	326.94	180.60
39)	0.445	7.62	6.72	146.11	726.99	726.99	108.26	327.15	181.04
40)	0.456	7.81	6.73	146.03	730.03	730.03	108.48	327.37	181.34
41)	0.468	8.02	6.74	145.73	733.07	733.07	108.69	327.58	181.86
42)	0.480	8.22	6.76	145.73	736.11	736.11	108.90	327.79	182.07
43)	0.492	8.42	6.77	145.50	739.15	739.15	109.11	328.00	182.51
44)	0.504	8.63	6.79	145.34	742.19	742.19	109.32	328.21	182.86
45)	0.516	8.83	6.80	145.19	745.23	745.23	109.52	328.41	183.22
46)	0.528	9.03	6.82	145.11	751.31	751.31	110.17	329.06	183.95
47)	0.540	9.24	6.84	144.88	751.31	751.31	109.92	328.80	183.92
48)	0.552	9.45	6.85	144.73	754.35	754.35	110.10	328.99	184.26
49)	0.564	9.66	6.87	144.58	757.39	757.39	110.30	329.19	184.61
50)	0.575	9.85	6.88	144.35	760.43	760.43	110.50	329.39	185.04
51)	0.587	10.05	6.90	144.19	763.47	763.47	110.69	329.58	185.39
52)	0.600	10.26	6.91	143.96	766.51	766.51	110.88	329.76	185.80
53)	0.611	10.46	6.93	143.89	769.55	769.55	111.07	329.96	186.07
54)	0.623	10.67	6.94	143.66	772.59	772.59	111.25	330.14	186.48
55)	0.635	10.87	6.96	143.58	775.63	775.63	111.44	330.33	186.75
56)	0.647	11.07	6.98	143.28	778.67	778.67	111.62	330.51	187.24
57)	0.659	11.27	6.99	143.12	781.71	781.71	111.80	330.69	187.57
58)	0.670	11.48	7.01	143.05	784.75	784.75	111.98	330.87	187.83
59)	0.683	11.69	7.02	142.82	784.75	784.75	111.72	330.61	187.79
60)	0.694	11.88	7.04	142.59	787.79	787.79	111.90	330.79	188.20
61)	0.706	12.09	7.06	142.43	793.87	793.87	112.50	331.38	188.95
62)	0.719	12.30	7.07	142.28	793.87	793.87	112.23	331.12	188.83
63)	0.742	12.70	7.11	141.90	796.92	796.92	112.14	331.03	189.13

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study Location : San Leandro, CA
Project No. : 26814536 Test No. : WI-62-20
Boring No. : WI-62 Test Date : 06/22/04 Tested by : S. Capps
Sample No. : 20 Bottom Depth : 65.0 feet Checked by : R. Taraya
Sample Type : Pitcher Elevation : NA
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 138.89 psi

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
64)	0.766	13.11	7.14	141.52	803.00	803.00	112.46	331.35	189.84
65)	0.790	13.52	7.17	141.21	806.04	806.04	112.36	331.25	190.04
66)	0.814	13.93	7.21	140.83	815.16	815.16	113.10	331.99	191.16
67)	0.837	14.32	7.24	140.37	818.20	818.20	113.00	331.89	191.52
68)	0.861	14.73	7.28	139.98	824.28	824.28	113.30	332.19	192.20
69)	0.885	15.14	7.31	139.98	830.36	830.36	113.58	332.47	192.48
70)	0.908	15.55	7.35	139.53	836.44	836.44	113.86	332.75	193.23
71)	0.932	15.96	7.38	138.91	845.56	845.56	114.55	333.44	194.53
72)	0.956	16.37	7.42	138.15	851.64	851.64	114.81	333.70	195.55
73)	0.986	16.87	7.46	137.61	860.76	860.76	115.34	334.23	196.62
74)	1.013	17.35	7.51	137.54	869.88	869.88	115.89	334.78	197.25

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

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Project : Chabot Dam Seismic Study  Location : San Leandro, CA
Project No. : 26814536              Test No. : WI-62-20
Boring No. : WI-62                  Test Date : 06/22/04          Tested by : S. Capps
Sample No. : 20 Bottom              Depth : 65.0 feet             Checked by : R. Taraya
Sample Type : Pitcher               Elevation : NA
Soil Description : Brown clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 138.89 psi

Height     : 5.945 (in)       Piston Diameter : 0.000 (in)    Filter Correction   : 0.00 (lb/in^2)
Area       : 6.424 (in^2)     Piston Friction : 0.00 (lb)     Membrane Correction : 0.00 (lb/in)
Volume     : 38.192 (in^3)    Piston Weight   : 0.00 (gm)     Area Correction     : Uniform

Liquid Limit : 42.44          Plastic Limit : 16.17           Specific Gravity : 2.706

INITIAL
                       Height     : 5.945 (in)     Dry Density : 120.19 (lb/ft^3)
                       Area       : 6.424 (in^2)   Moisture    : 14.24 %
                       Void Ratio: 0.40
                       Saturation: 95.17 %
Time     : 0.00 (min)

INITIALIZATION
dH       : 0.000 (in)    Height     : 5.945 (in)     Dry Density : 120.19 (lb/ft^3)  Total Vert. Stress : 218.89 (lb/in^
dV       : 0.000 (in^3)  Area       : 6.424 (in^2)   Moisture    : 14.24 %           Total Hori. Stress : 218.89 (lb/in^
                         Void Ratio: 0.40                                            Pore Pressure      : 0.00 (lb/in^2)
                         Saturation: 95.17 %                                         Effect.Vert. Stress: 218.89 (lb/in^
Time     : 0.00 (min)                                                                Effect.Hori. Stress: 218.89 (lb/in^

END OF CONSOLIDATION - A
dH       : 0.000 (in)    Height     : 5.945 (in)     Dry Density : 120.19 (lb/ft^3)  Total Vert. Stress : 218.89 (lb/in^
dV       : 0.000 (in^3)  Area       : 6.424 (in^2)   Moisture    : 14.24 %           Total Hori. Stress : 218.89 (lb/in^
                         Void Ratio: 0.40                                            Pore Pressure      : 0.00 (lb/in^2)
                         Saturation: 95.17 %                                         Effect.Vert. Stress: 218.89 (lb/in^
Time     : 0.00 (min)                                                                Effect.Hori. Stress: 218.89 (lb/in^

END OF SATURATION
dH       : 0.000 (in)    Height     : 5.945 (in)     Dry Density : 120.19 (lb/ft^3)  Total Vert. Stress : 218.89 (lb/in^
dV       : 0.000 (in^3)  Area       : 6.424 (in^2)   Moisture    : 12.31 %           Total Hori. Stress : 218.89 (lb/in^
dVCorr   : 0.000 (in^3)  Void Ratio: 0.40                                            Pore Pressure      : 0.00 (lb/in^2)
                         Saturation: 82.25 %                                         Effect.Vert. Stress: 218.89 (lb/in^
Time     : 0.00 (min)                                                                Effect.Hori. Stress: 218.89 (lb/in^

END OF CONSOLIDATION - B
dH       : 0.103 (in)    Height     : 5.842 (in)     Dry Density : 126.66 (lb/ft^3)  Total Vert. Stress : 218.89 (lb/in^
dV       : 1.951 (in^3)  Area       : 6.204 (in^2)   Moisture    : 12.31 %           Total Hori. Stress : 218.89 (lb/in^
                         Void Ratio: 0.33                                            Pore Pressure      : 80.00 (lb/in^2
                         Saturation: 99.97 %                                         Effect.Vert. Stress: 138.88 (lb/in^
Time     : 0.00 (min)                                                                Effect.Hori. Stress: 138.88 (lb/in^

FAILURE DURING SHEAR
dH       : 1.013 (in)    Height     : 4.932 (in)     Dry Density : 126.66 (lb/ft^3)  Total Vert. Stress : 334.78 (lb/in^
dV       : 1.951 (in^3)  Area       : 7.506 (in^2)   Moisture    : 12.31 %           Total Hori. Stress : 218.89 (lb/in^
Strain   : 17.35 %       Void Ratio: 0.33                                            Pore Pressure      : 137.54 (lb/in^
Strength: 57.95 (lb/in^2)Saturation: 99.97 %                                         Effect.Vert. Stress: 197.25 (lb/in^
Time     : 1967.48 (min)                                                             Effect.Hori. Stress: 81.35 (lb/in^2

END OF TEST
dH       : 1.013 (in)    Height     : 4.932 (in)     Dry Density : 126.66 (lb/ft^3)  Total Vert. Stress : 334.78 (lb/in^
dV       : 1.951 (in^3)  Area       : 7.506 (in^2)   Moisture    : 12.31 %           Total Hori. Stress : 218.89 (lb/in^
Strain   : 17.35 %       Void Ratio: 0.33                                            Pore Pressure      : 137.54 (lb/in^
                         Saturation: 99.97 %                                         Effect.Vert. Stress: 197.25 (lb/in^
Time     : 1967.48 (min)                                                             Effect.Hori. Stress: 81.35 (lb/in^2
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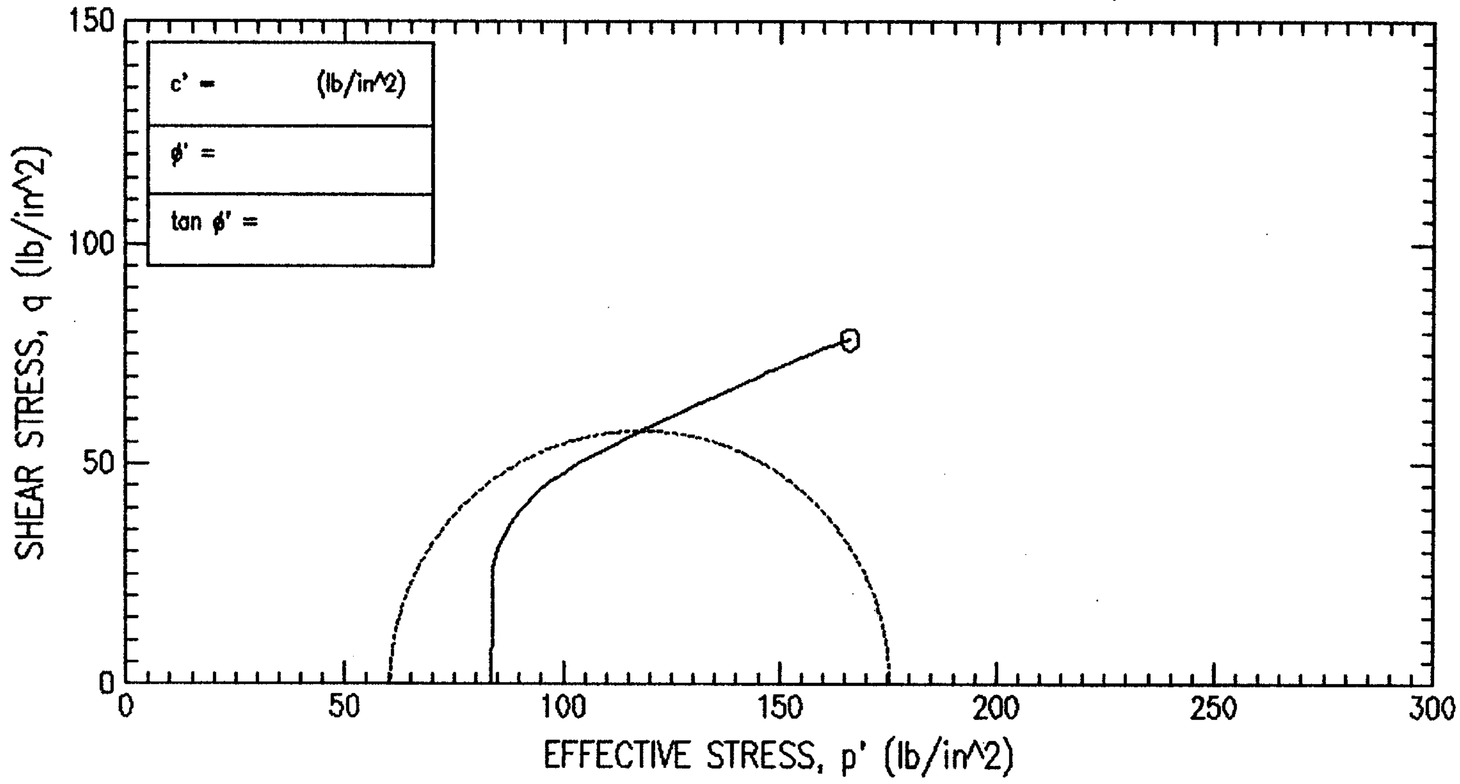
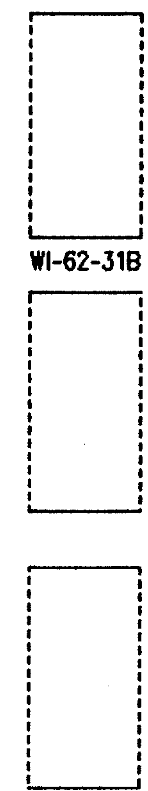
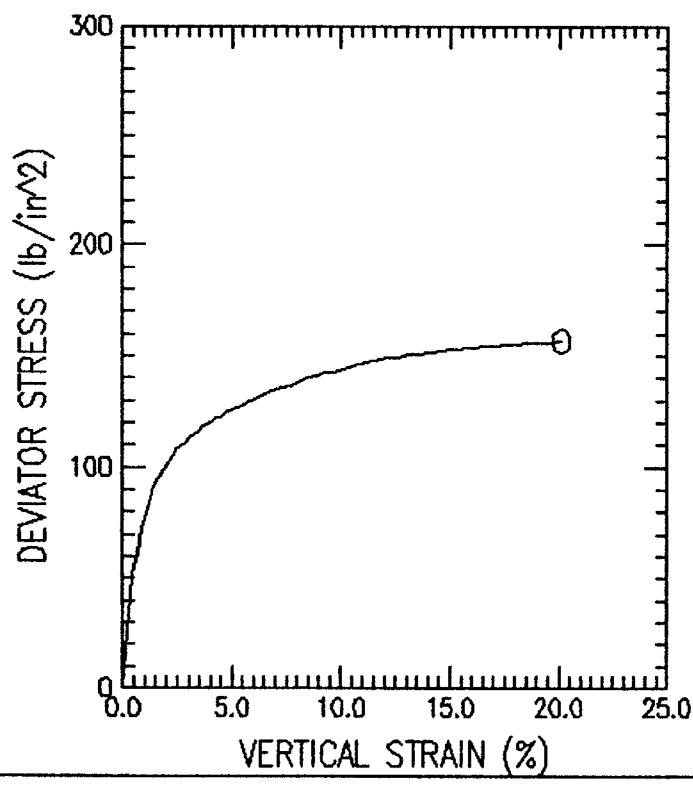
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O			
TEST NO.		WI-62-31B			
INITIAL	WATER CONTENT (%)	15.80			
	DRY DENSITY (lb/ft^3)	112.84			
	SATURATION (%)	95.19			
	VOID RATIO	0.429			
BEFORE SHEAR	WATER CONTENT (%)	15.99			
	DRY DENSITY (lb/ft^3)	114.10			
	SATURATION (%)	99.98			
	VOID RATIO	0.413			
	BACK PRESS. (lb/in^2)	80.00			
MINOR PRIN. STRESS (lb/in^2)		83.33			
MAX. DEV. STRESS (lb/in^2)		158.46			
TIME TO FAILURE (min)		1384.70			
RATE OF STRAIN INCR (%/min)		0.00			
INITIAL DIAMETER (in)		2.86			
INITIAL HEIGHT (in)		5.95			
B-VALUE		98.30			

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Mottled gray brown silty sand (SM)

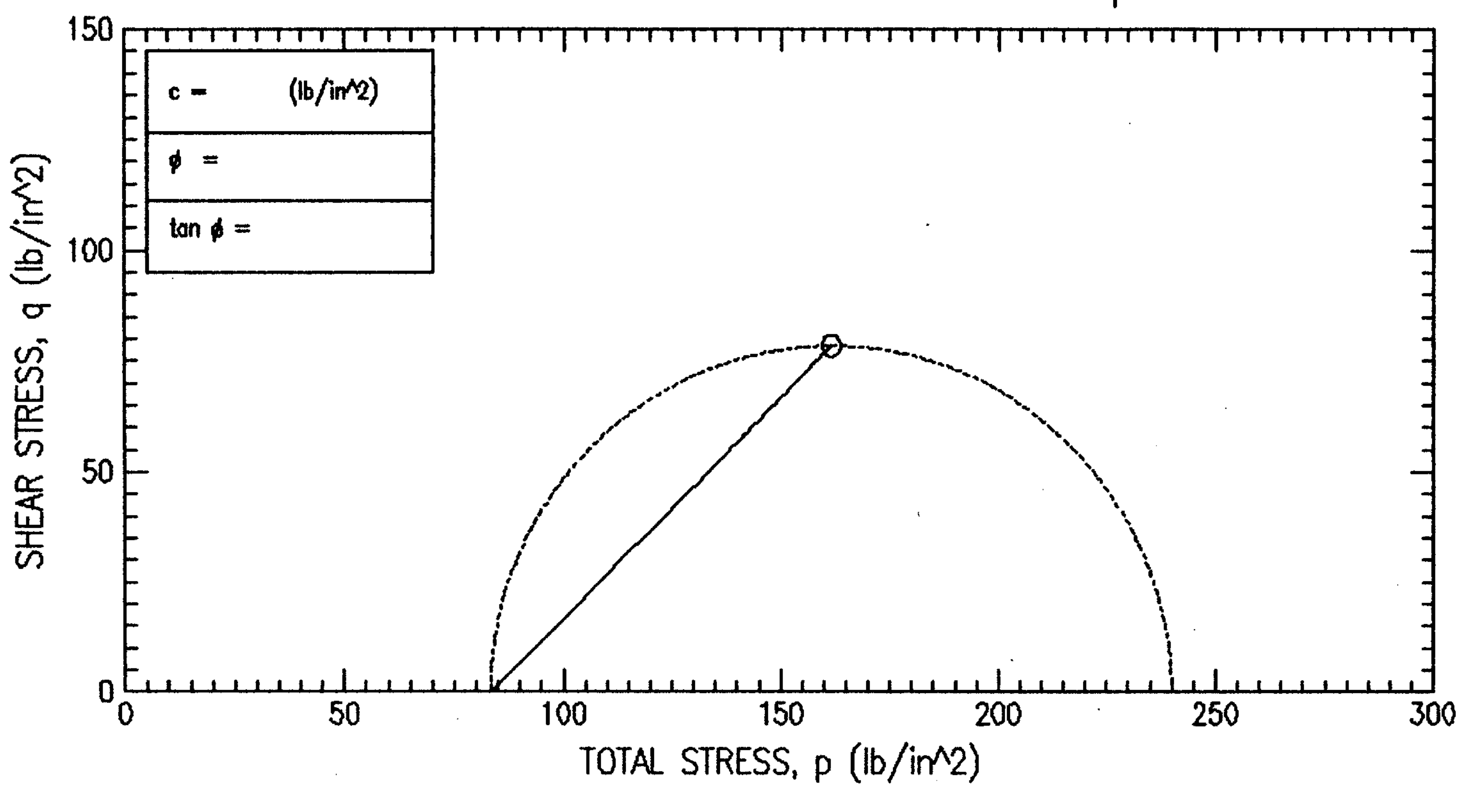
LL 46.10	PL 33.30	PI 12.80	GS 2.58	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study					
1) TXCIU Test with Effective Pressure of 83.33 psi	PROJECT NO.26814536					
	BORING NO. WI-62	SAMPLE NO.	31 Bottom			
	TECH. S. Capps	DEPTH/ELEV	97.5 feet			
	LABORATORY	DATE	07/07/04			
	TRIAXIAL COMPRESSION TEST REPORT					

Tue 07-13-:4, 14:37:05

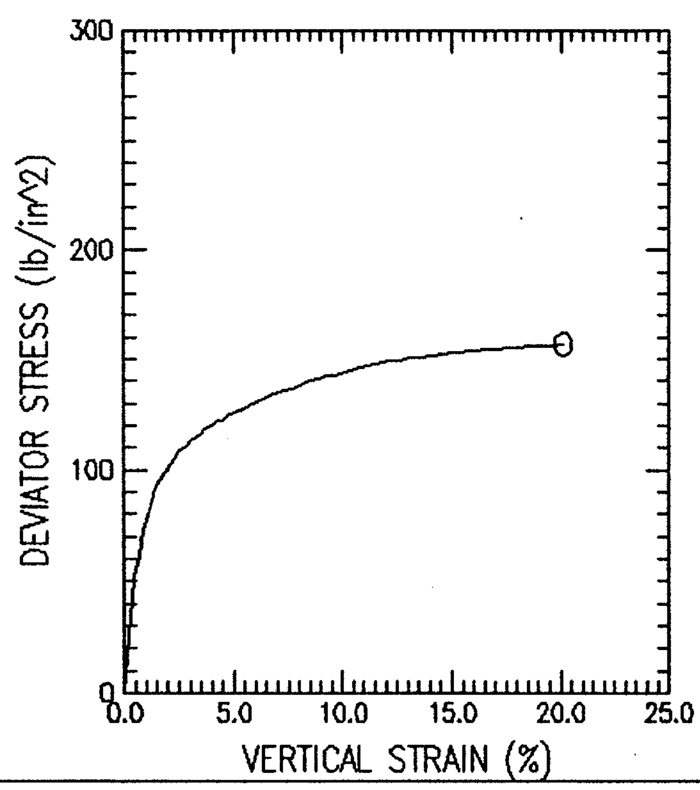
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-62-31B



SYMBOL		O			
TEST NO.		WI-62-31B			
INITIAL	WATER CONTENT (%)	15.80			
	DRY DENSITY (lb/ft^3)	112.84			
	SATURATION (%)	95.19			
	VOID RATIO	0.429			
BEFORE SHEAR	WATER CONTENT (%)	15.99			
	DRY DENSITY (lb/ft^3)	114.10			
	SATURATION (%)	99.98			
	VOID RATIO	0.413			
	BACK PRESS. (lb/in^2)	80.00			
MINOR PRIN. STRESS (lb/in^2)		83.33			
MAX. DEV. STRESS (lb/in^2)		158.46			
TIME TO FAILURE (min)		1384.70			
RATE OF STRAIN INCR (%/min)		0.00			
INITIAL DIAMETER (in)		2.86			
INITIAL HEIGHT (in)		5.95			
B-VALUE		98.30			

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Mottled gray brown silty sand (SM)

LL 46.10	PL 33.30	PI 12.80	GS 2.58	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study				
1) TXCIU Test with Effective Pressure of 83.33 psi	PROJECT NO.26814536				
	BORING NO. WI-62	SAMPLE NO.	31 Bottom		
	TECH. S. Capps	DEPTH/ELEV	97.5 feet		
	LABORATORY	DATE	07/07/04		
	TRIAXIAL COMPRESSION TEST REPORT				

Tue 07-13-:4, 14:36:32

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-62
Sample No. : 31 Bottom
Sample Type : Pitcher
Soil Description : Mottled gray brown silty sand (SM)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Location : San Leandro, CA
Test No. : WI-62-31B
Test Date : 07/07/04
Depth : 97.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	163.33	163.33	0.00	0.00	83.33	83.33	1.00	83.33	0.00
2)	0.26	196.78	163.33	16.29	0.49	100.50	67.05	1.50	83.77	16.72
3)	0.46	215.02	163.33	25.24	0.49	109.78	58.09	1.89	83.94	25.84
4)	0.66	224.74	163.33	29.22	0.48	115.53	54.11	2.13	84.82	30.71
5)	0.86	235.84	163.33	32.05	0.44	123.79	51.28	2.41	87.54	36.26
6)	1.06	242.70	163.33	32.82	0.41	129.88	50.51	2.57	90.20	39.68
7)	1.26	249.52	163.33	32.74	0.38	136.78	50.59	2.70	93.69	43.09
8)	1.46	254.92	163.33	32.21	0.35	142.72	51.13	2.79	96.92	45.79
9)	1.66	258.44	163.33	31.36	0.33	147.07	51.97	2.83	99.52	47.55
10)	1.86	261.95	163.33	30.37	0.31	151.58	52.96	2.86	102.27	49.31
11)	2.06	265.44	163.33	29.14	0.29	156.30	54.19	2.88	105.25	51.06
12)	2.26	268.00	163.33	27.92	0.27	160.08	55.41	2.89	107.75	52.33
13)	2.46	271.00	163.33	26.77	0.25	164.24	56.56	2.90	110.40	53.84
14)	2.67	272.61	163.33	25.78	0.24	166.84	57.56	2.90	112.20	54.64
15)	2.86	274.23	163.33	25.01	0.23	169.22	58.32	2.90	113.77	55.45
16)	3.07	276.27	163.33	23.86	0.21	172.41	59.47	2.90	115.94	56.47
17)	3.27	278.31	163.33	22.95	0.20	175.37	60.39	2.90	117.88	57.49
18)	3.47	279.45	163.33	22.18	0.19	177.27	61.15	2.90	119.21	58.06
19)	3.67	281.47	163.33	21.26	0.18	180.21	62.07	2.90	121.14	59.07
20)	3.87	282.59	163.33	20.50	0.17	182.10	62.84	2.90	122.47	59.63
21)	4.07	284.15	163.33	19.65	0.16	184.49	63.68	2.90	124.09	60.41
22)	4.27	285.26	163.33	18.97	0.16	186.29	64.37	2.89	125.33	60.96
23)	4.47	285.90	163.33	18.43	0.15	187.48	64.90	2.89	126.19	61.29
24)	4.67	287.43	163.33	17.89	0.14	189.54	65.44	2.90	127.49	62.05
25)	4.87	288.53	163.33	17.21	0.14	191.33	66.13	2.89	128.73	62.60
26)	5.08	289.60	163.33	16.59	0.13	193.01	66.74	2.89	129.87	63.13
27)	5.27	290.23	163.33	16.13	0.13	194.10	67.20	2.89	130.65	63.45
28)	5.47	290.86	163.33	15.60	0.12	195.26	67.74	2.88	131.50	63.76
29)	5.67	291.92	163.33	14.91	0.12	197.02	68.42	2.88	132.72	64.30
30)	5.88	292.97	163.33	14.37	0.11	198.60	68.96	2.88	133.78	64.82
31)	6.08	293.58	163.33	13.99	0.11	199.59	69.34	2.88	134.47	65.13
32)	6.48	295.66	163.33	12.84	0.10	202.82	70.49	2.88	136.66	66.17
33)	6.88	297.30	163.33	11.92	0.09	205.38	71.41	2.88	138.39	66.98
34)	7.28	298.90	163.33	10.93	0.08	207.97	72.40	2.87	140.19	67.78
35)	7.69	300.05	163.33	10.09	0.07	209.97	73.25	2.87	141.61	68.36
36)	8.09	301.63	163.33	9.09	0.07	212.54	74.24	2.86	143.39	69.15
37)	8.49	303.18	163.33	8.17	0.06	215.01	75.16	2.86	145.09	69.93
38)	8.89	304.29	163.33	7.41	0.05	216.88	75.92	2.86	146.40	70.48
39)	9.29	305.81	163.33	6.64	0.05	219.17	76.69	2.86	147.93	71.24
40)	9.69	306.03	163.33	5.95	0.04	220.08	77.38	2.84	148.73	71.35
41)	10.09	307.52	163.33	5.27	0.04	222.25	78.07	2.85	150.16	72.09
42)	10.59	308.82	163.33	4.50	0.03	224.32	78.83	2.85	151.58	72.75
43)	11.09	310.10	163.33	3.81	0.03	226.30	79.52	2.85	152.91	73.39
44)	11.60	310.92	163.33	3.20	0.02	227.72	80.13	2.84	153.93	73.80
45)	12.10	312.16	163.33	2.51	0.02	229.65	80.82	2.84	155.24	74.41
46)	12.61	312.55	163.33	1.90	0.01	230.65	81.44	2.83	156.04	74.61
47)	13.10	313.75	163.33	1.36	0.01	232.39	81.97	2.84	157.18	75.21
48)	13.60	314.11	163.33	0.75	0.00	233.36	82.58	2.83	157.97	75.39
49)	14.10	314.85	163.33	0.29	0.00	234.57	83.04	2.82	158.80	75.76
50)	14.61	315.57	163.33	-0.32	-0.00	235.89	83.65	2.82	159.77	76.12
51)	15.11	316.28	163.33	-0.78	-0.01	237.06	84.11	2.82	160.59	76.47
52)	16.11	317.24	163.33	-1.55	-0.01	238.79	84.88	2.81	161.84	76.96
53)	16.62	317.49	163.33	-2.01	-0.01	239.50	85.34	2.81	162.42	77.08
54)	17.12	318.13	163.33	-2.39	-0.02	240.52	85.72	2.81	163.12	77.40
55)	17.61	318.76	163.33	-2.62	-0.02	241.38	85.95	2.81	163.67	77.71
56)	18.12	318.57	163.33	-3.00	-0.02	241.58	86.33	2.80	163.96	77.62
57)	18.62	319.16	163.33	-3.31	-0.02	242.47	86.64	2.80	164.55	77.91
58)	19.63	319.50	163.33	-4.07	-0.03	243.58	87.40	2.79	165.49	78.09
59)	20.13	320.04	163.33	-4.45	-0.03	244.49	87.79	2.79	166.14	78.35

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-62
Sample No. : 31 Bottom
Sample Type : Pitcher
Soil Description : Mottled gray brown silty sand (SM)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Location : San Leandro, CA
Test No. : WI-62-31B
Test Date : 07/07/04
Depth : 97.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.38	80.00	0.00	0.00	0.00	163.33	83.33
2)	0.015	0.26	6.39	96.28	216.24	216.24	33.82	196.78	100.50
3)	0.027	0.46	6.41	105.24	334.80	334.80	52.26	215.02	109.78
4)	0.039	0.66	6.42	109.22	398.65	398.65	62.10	224.74	115.53
5)	0.051	0.86	6.43	112.05	471.61	471.61	73.32	235.84	123.79
6)	0.063	1.06	6.44	112.82	517.22	517.22	80.25	242.70	129.88
7)	0.074	1.26	6.46	112.74	562.82	562.82	87.15	249.52	136.78
8)	0.086	1.46	6.47	112.20	599.30	599.30	92.61	254.92	142.72
9)	0.099	1.66	6.48	111.36	623.62	623.62	96.17	258.44	147.07
10)	0.110	1.86	6.50	110.37	647.95	647.95	99.72	261.95	151.58
11)	0.122	2.06	6.51	109.14	672.27	672.27	103.25	265.44	156.30
12)	0.134	2.26	6.52	107.92	690.51	690.51	105.84	268.00	160.08
13)	0.146	2.46	6.54	106.77	711.79	711.79	108.88	271.00	164.24
14)	0.158	2.67	6.55	105.77	723.95	723.95	110.50	272.61	166.84
15)	0.169	2.86	6.56	105.01	736.11	736.11	112.14	274.23	169.22
16)	0.182	3.07	6.58	103.86	751.31	751.31	114.21	276.27	172.41
17)	0.194	3.27	6.59	102.94	766.51	766.51	116.27	278.31	175.37
18)	0.205	3.47	6.61	102.18	775.63	775.63	117.42	279.45	177.27
19)	0.218	3.67	6.62	101.26	790.83	790.83	119.46	281.47	180.21
20)	0.229	3.87	6.63	100.49	799.96	799.96	120.60	282.59	182.10
21)	0.241	4.07	6.65	99.65	812.12	812.12	122.17	284.15	184.49
22)	0.253	4.27	6.66	98.96	821.24	821.24	123.29	285.26	186.29
23)	0.265	4.47	6.68	98.43	827.32	827.32	123.94	285.90	187.48
24)	0.277	4.67	6.69	97.89	839.48	839.48	125.49	287.43	189.54
25)	0.288	4.87	6.70	97.20	848.60	848.60	126.60	288.53	191.33
26)	0.301	5.08	6.72	96.59	857.72	857.72	127.68	289.60	193.01
27)	0.312	5.27	6.73	96.13	863.80	863.80	128.32	290.23	194.10
28)	0.324	5.47	6.75	95.59	869.88	869.88	128.95	290.86	195.26
29)	0.336	5.67	6.76	94.91	879.00	879.00	130.03	291.92	197.02
30)	0.348	5.88	6.77	94.37	888.12	888.12	131.09	292.97	198.60
31)	0.360	6.08	6.79	93.99	894.20	894.20	131.71	293.58	199.59
32)	0.384	6.48	6.82	92.84	912.44	912.44	133.81	295.66	202.82
33)	0.407	6.88	6.85	91.92	927.64	927.64	135.47	297.30	205.38
34)	0.431	7.28	6.88	90.93	942.84	942.84	137.08	298.90	207.97
35)	0.455	7.69	6.91	90.08	955.01	955.01	138.25	300.05	209.97
36)	0.479	8.09	6.94	89.09	970.21	970.21	139.84	301.63	212.54
37)	0.503	8.49	6.97	88.17	985.41	985.41	141.41	303.18	215.01
38)	0.526	8.89	7.00	87.41	997.57	997.57	142.53	304.29	216.88
39)	0.550	9.29	7.03	86.64	1012.77	1012.77	144.07	305.81	219.17
40)	0.574	9.69	7.06	85.95	1018.85	1018.85	144.29	306.03	220.08
41)	0.598	10.09	7.09	85.26	1034.05	1034.05	145.80	307.52	222.25
42)	0.627	10.59	7.13	84.50	1049.25	1049.25	147.12	308.82	224.32
43)	0.657	11.09	7.17	83.81	1064.45	1064.45	148.41	310.10	226.30
44)	0.687	11.60	7.21	83.20	1076.61	1076.61	149.24	310.92	227.72
45)	0.717	12.10	7.26	82.51	1091.81	1091.81	150.49	312.16	229.65
46)	0.747	12.61	7.30	81.89	1100.94	1100.94	150.88	312.55	230.65
47)	0.776	13.10	7.34	81.36	1116.14	1116.14	152.10	313.75	232.39
48)	0.805	13.60	7.38	80.75	1125.26	1125.26	152.46	314.11	233.36
49)	0.835	14.10	7.42	80.29	1137.42	1137.42	153.22	314.85	234.57
50)	0.865	14.61	7.47	79.68	1149.58	1149.58	153.94	315.57	235.89
51)	0.895	15.11	7.51	79.22	1161.74	1161.74	154.66	316.28	237.06
52)	0.954	16.11	7.60	78.45	1183.02	1183.02	155.63	317.24	238.79
53)	0.984	16.62	7.65	77.99	1192.14	1192.14	155.88	317.49	239.50
54)	1.014	17.12	7.69	77.61	1204.30	1204.30	156.53	318.13	240.52
55)	1.043	17.61	7.74	77.38	1216.46	1216.46	157.17	318.76	241.38
56)	1.073	18.12	7.79	77.00	1222.54	1222.54	156.98	318.57	241.58
57)	1.103	18.62	7.84	76.69	1234.70	1234.70	157.57	319.16	242.47
58)	1.163	19.63	7.93	75.93	1252.95	1252.95	157.92	319.50	243.58
59)	1.192	20.13	7.98	75.54	1265.11	1265.11	158.46	320.04	244.49

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-62
Sample No. : 31 Bottom
Sample Type : Pitcher
Soil Description : Mottled gray brown silty sand (SM)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Location : San Leandro, CA
Test No. : WI-62-31B
Test Date : 07/07/04
Depth : 97.5 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 46.1
Plastic Limit : 33.3
Specific Gravity : 2.584

INITIAL
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.43
Saturation: 95.19 %
Dry Density : 112.84 (lb/ft^3)
Moisture : 15.80 %
Time : 0.00 (min)

INITIALIZATION
dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.43
Saturation: 95.19 %
Dry Density : 112.84 (lb/ft^3)
Moisture : 15.80 %
Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 163.33 (lb/in^
Effect.Hori. Stress: 163.33 (lb/in^

END OF CONSOLIDATION - A
dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.43
Saturation: 95.19 %
Dry Density : 112.84 (lb/ft^3)
Moisture : 15.80 %
Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 163.33 (lb/in^
Effect.Hori. Stress: 163.33 (lb/in^

END OF SATURATION
dH : 0.000 (in)
dV : 0.000 (in^3)
dVCorr : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.43
Saturation: 96.30 %
Dry Density : 112.84 (lb/ft^3)
Moisture : 15.99 %
Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 163.33 (lb/in^
Effect.Hori. Stress: 163.33 (lb/in^

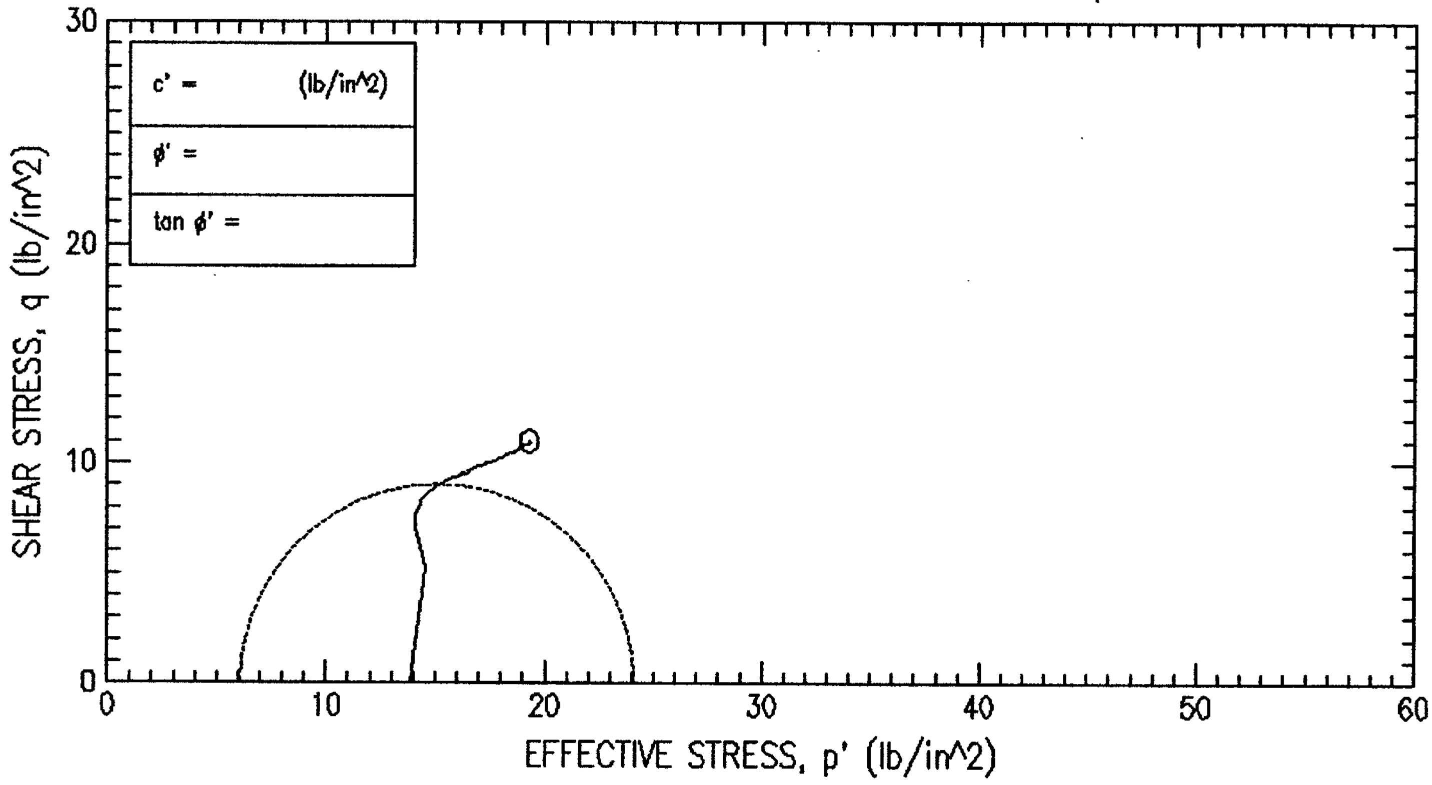
END OF CONSOLIDATION - B
dH : 0.022 (in)
dV : 0.422 (in^3)
Time : 0.00 (min)
Height : 5.923 (in)
Area : 6.377 (in^2)
Void Ratio: 0.41
Saturation: 99.98 %
Dry Density : 114.10 (lb/ft^3)
Moisture : 15.99 %
Total Vert. Stress : 163.33 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 80.00 (lb/in^2
Effect.Vert. Stress: 83.33 (lb/in^2
Effect.Hori. Stress: 83.33 (lb/in^2

FAILURE DURING SHEAR
dH : 1.192 (in)
dV : 0.422 (in^3)
Strain : 20.13 %
Strength: 79.23 (lb/in^2)
Time : 1384.70 (min)
Height : 4.753 (in)
Area : 7.984 (in^2)
Void Ratio: 0.41
Saturation: 99.98 %
Dry Density : 114.10 (lb/ft^3)
Moisture : 15.99 %
Total Vert. Stress : 321.79 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 75.54 (lb/in^2
Effect.Vert. Stress: 246.24 (lb/in^
Effect.Hori. Stress: 87.79 (lb/in^2

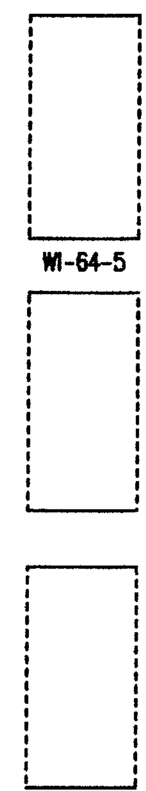
END OF TEST
dH : 1.192 (in)
dV : 0.422 (in^3)
Strain : 20.13 %
Time : 1384.70 (min)
Height : 4.753 (in)
Area : 7.984 (in^2)
Void Ratio: 0.41
Saturation: 99.98 %
Dry Density : 114.10 (lb/ft^3)
Moisture : 15.99 %
Total Vert. Stress : 321.79 (lb/in^
Total Hori. Stress : 163.33 (lb/in^
Pore Pressure : 75.54 (lb/in^2
Effect.Vert. Stress: 246.24 (lb/in^
Effect.Hori. Stress: 87.79 (lb/in^2

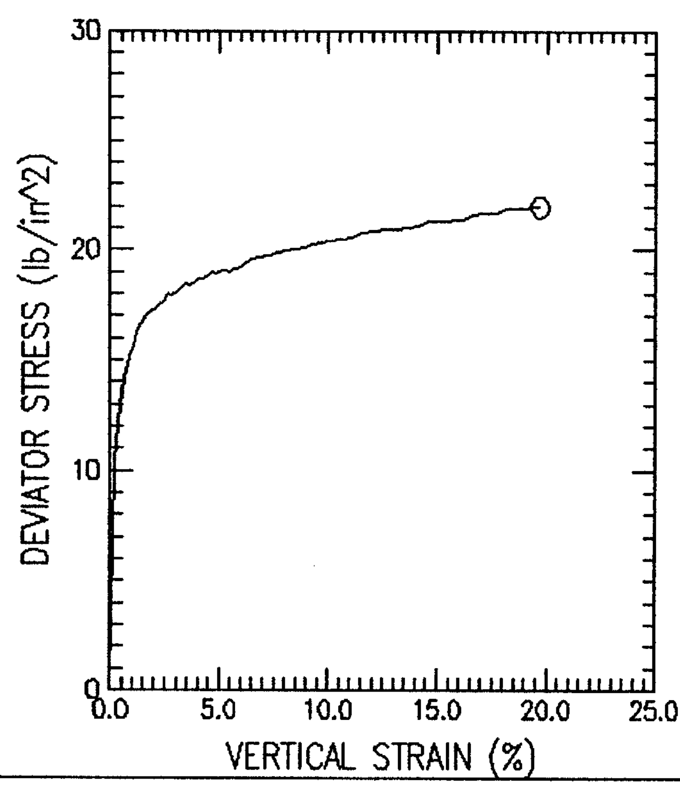
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-64-5				
INITIAL	WATER CONTENT (%)	19.91				
	DRY DENSITY (lb/ft^3)	107.31				
	SATURATION (%)	94.87				
	VOID RATIO	0.565				
BEFORE SHEAR	WATER CONTENT (%)	19.50				
	DRY DENSITY (lb/ft^3)	110.12				
	SATURATION (%)	99.99				
	VOID RATIO	0.525				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		13.89				
MAX. DEV. STRESS (lb/in^2)		21.93				
TIME TO FAILURE (min)		1311.77				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		98.70				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Grayish brown sandy clay with gravel (CL)

LL 44.43	PL 20.91	PI 23.52	GS 2.69	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 13.89 psi

PROJECT Chabot Dam Seismic Study

PROJECT NO.26814536

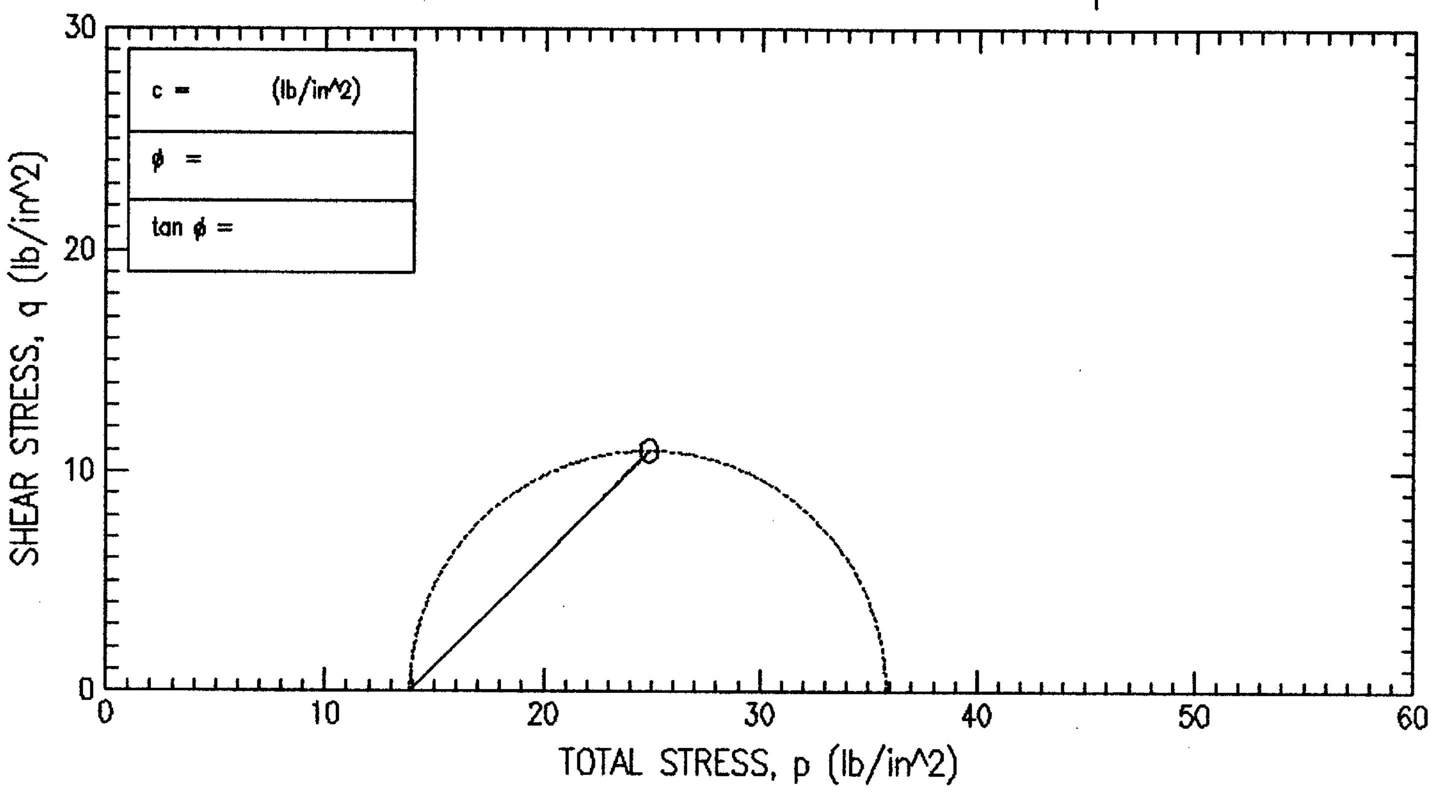
BORING NO. WI-64	SAMPLE NO.	5 Bottom			
TECH. S. Capps	DEPTH/ELEV	20.2			
LABORATORY	DATE	06/22/04			

TRIAXIAL COMPRESSION TEST REPORT

Thu 07-01-:4, 08:25:12

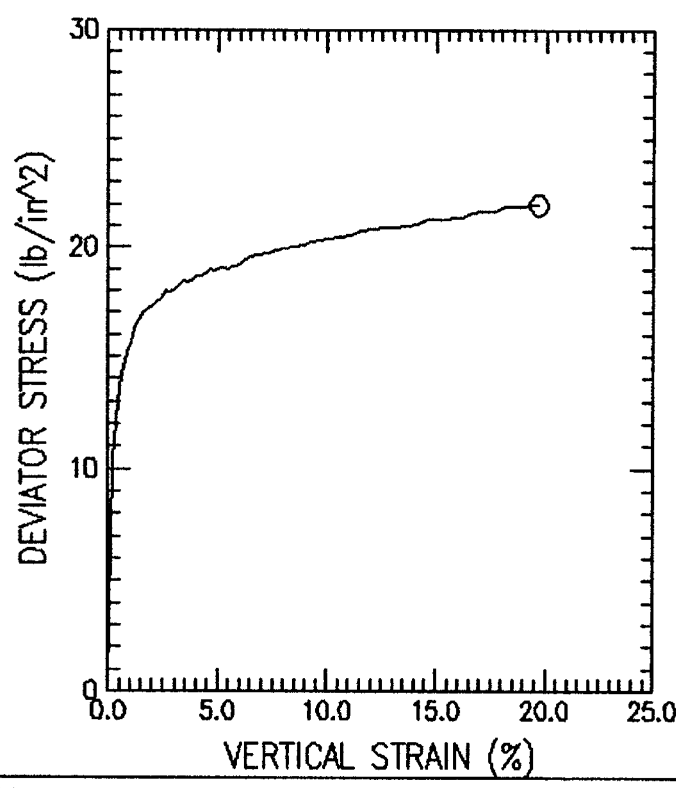
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-64-5



SYMBOL		O				
TEST NO.		WI-64-5				
INITIAL	WATER CONTENT (%)	19.91				
	DRY DENSITY (lb/ft^3)	107.31				
	SATURATION (%)	94.87				
	VOID RATIO	0.565				
BEFORE SHEAR	WATER CONTENT (%)	19.50				
	DRY DENSITY (lb/ft^3)	110.12				
	SATURATION (%)	99.99				
	VOID RATIO	0.525				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		13.89				
MAX. DEV. STRESS (lb/in^2)		21.93				
TIME TO FAILURE (min)		1311.77				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		98.70				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Grayish brown sandy clay with gravel (CL)

LL 44.43	PL 20.91	PI 23.52	GS 2.69	TYPE OF SPECIMEN Pitcher	TYPE OF TEST	CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 13.89 psi

PROJECT Chabot Dam Seismic Study

PROJECT NO.26814536

BORING NO. WI-64	SAMPLE NO.	5 Bottom			
TECH. S. Capps	DEPTH/ELEV	20.2			
LABORATORY	DATE	06/22/04			

TRIAXIAL COMPRESSION TEST REPORT

Thu 07-01-:4, 08:25:58

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-64
Sample No. : 5 Bottom
Sample Type : Pitcher
Location : San Leandro, CA
Test No. : WI-64-5
Test Date : 06/22/04
Depth : 20.2
Elevation : NA
Tested by : S. Capps
Checked by : R. Taraya
Soil Description : Grayish brown sandy clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 13.89 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	93.89	93.89	0.00	0.00	13.89	13.89	1.00	13.89	0.00
2)	0.21	104.29	93.89	4.55	0.44	19.74	9.34	2.11	14.54	5.20
3)	0.41	106.87	93.89	6.14	0.47	20.74	7.75	2.67	14.25	6.49
4)	0.62	108.05	93.89	6.90	0.49	21.15	7.00	3.02	14.07	7.08
5)	0.82	109.01	93.89	7.38	0.49	21.64	6.51	3.32	14.08	7.56
6)	1.01	109.58	93.89	7.58	0.48	22.00	6.31	3.49	14.15	7.85
7)	1.22	110.15	93.89	7.72	0.48	22.43	6.17	3.63	14.30	8.13
8)	1.41	110.51	93.89	7.86	0.47	22.65	6.03	3.76	14.34	8.31
9)	1.62	110.87	93.89	7.86	0.46	23.01	6.03	3.82	14.52	8.49
10)	1.83	111.03	93.89	7.86	0.46	23.17	6.03	3.84	14.60	8.57
11)	2.03	111.19	93.89	7.86	0.45	23.34	6.03	3.87	14.68	8.65
12)	2.23	111.36	93.89	7.79	0.45	23.57	6.10	3.86	14.83	8.73
13)	2.43	111.52	93.89	7.79	0.44	23.73	6.10	3.89	14.91	8.81
14)	2.64	111.87	93.89	7.79	0.43	24.08	6.10	3.95	15.09	8.99
15)	2.84	111.83	93.89	7.72	0.43	24.11	6.17	3.91	15.14	8.97
16)	3.04	111.99	93.89	7.65	0.42	24.34	6.24	3.90	15.29	9.05
17)	3.24	112.15	93.89	7.65	0.42	24.50	6.24	3.93	15.37	9.13
18)	3.45	112.30	93.89	7.58	0.41	24.72	6.31	3.92	15.51	9.21
19)	3.65	112.26	93.89	7.51	0.41	24.75	6.38	3.88	15.56	9.19
20)	3.85	112.42	93.89	7.45	0.40	24.97	6.45	3.87	15.71	9.26
21)	4.04	112.57	93.89	7.38	0.39	25.20	6.51	3.87	15.86	9.34
22)	4.25	112.53	93.89	7.31	0.39	25.23	6.58	3.83	15.91	9.32
23)	4.46	112.69	93.89	7.17	0.38	25.52	6.72	3.80	16.12	9.40
24)	4.66	112.84	93.89	7.10	0.37	25.74	6.79	3.79	16.26	9.47
25)	4.85	112.80	93.89	7.17	0.38	25.63	6.72	3.81	16.18	9.46
26)	5.06	112.95	93.89	7.10	0.37	25.85	6.79	3.81	16.32	9.53
27)	5.26	112.91	93.89	7.03	0.37	25.88	6.86	3.77	16.37	9.51
28)	5.46	112.87	93.89	6.96	0.37	25.91	6.93	3.74	16.42	9.49
29)	5.66	113.02	93.89	6.96	0.36	26.06	6.93	3.76	16.49	9.56
30)	5.86	112.98	93.89	6.90	0.36	26.08	7.00	3.73	16.54	9.54
31)	6.06	113.13	93.89	7.03	0.37	26.09	6.86	3.80	16.48	9.62
32)	6.46	113.42	93.89	6.83	0.35	26.59	7.07	3.76	16.83	9.76
33)	6.87	113.52	93.89	6.76	0.34	26.77	7.13	3.75	16.95	9.82
34)	7.27	113.62	93.89	6.69	0.34	26.94	7.20	3.74	17.07	9.87
35)	7.68	113.72	93.89	6.55	0.33	27.17	7.34	3.70	17.26	9.92
36)	8.09	113.82	93.89	6.55	0.33	27.27	7.34	3.71	17.31	9.97
37)	8.49	113.92	93.89	6.41	0.32	27.51	7.48	3.68	17.49	10.01
38)	8.89	114.01	93.89	6.34	0.32	27.67	7.55	3.67	17.61	10.06
39)	9.29	114.11	93.89	6.28	0.31	27.83	7.62	3.65	17.72	10.11
40)	9.69	114.20	93.89	6.21	0.31	27.99	7.69	3.64	17.84	10.15
41)	10.10	114.29	93.89	6.14	0.30	28.15	7.75	3.63	17.95	10.20
42)	10.60	114.35	93.89	6.07	0.30	28.29	7.82	3.62	18.05	10.23
43)	11.11	114.41	93.89	6.00	0.29	28.42	7.89	3.60	18.15	10.26
44)	11.61	114.66	93.89	6.00	0.29	28.66	7.89	3.63	18.27	10.38
45)	12.11	114.71	93.89	5.93	0.28	28.78	7.96	3.62	18.37	10.41
46)	12.62	114.77	93.89	5.93	0.28	28.84	7.96	3.62	18.40	10.44
47)	13.12	114.82	93.89	5.79	0.28	29.03	8.10	3.58	18.57	10.47
48)	13.64	114.87	93.89	5.79	0.28	29.08	8.10	3.59	18.59	10.49
49)	14.14	114.92	93.89	5.79	0.28	29.13	8.10	3.60	18.62	10.52
50)	14.64	115.14	93.89	5.72	0.27	29.42	8.17	3.60	18.79	10.63
51)	15.15	115.19	93.89	5.72	0.27	29.47	8.17	3.61	18.82	10.65
52)	16.15	115.27	93.89	5.66	0.26	29.62	8.24	3.60	18.93	10.69
53)	16.66	115.48	93.89	5.72	0.27	29.76	8.17	3.64	18.96	10.79
54)	17.16	115.52	93.89	5.72	0.26	29.79	8.17	3.65	18.98	10.81
55)	17.66	115.55	93.89	5.45	0.25	30.10	8.44	3.57	19.27	10.83
56)	18.17	115.75	93.89	5.45	0.25	30.30	8.44	3.59	19.37	10.93
57)	18.67	115.78	93.89	5.59	0.26	30.19	8.31	3.64	19.25	10.94
58)	19.69	115.82	93.89	5.59	0.25	30.24	8.31	3.64	19.27	10.97

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-64
Sample No. : 5 Bottom
Sample Type : Pitcher
Location : San Leandro, CA
Test No. : WI-64-5
Test Date : 06/22/04
Depth : 20.2
Elevation : NA
Tested by : S. Capps
Checked by : R. Taraya
Soil Description : Grayish brown sandy clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 13.89 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.31	80.00	0.00	0.00	0.00	93.89	13.89
2)	0.013	0.21	6.33	84.55	65.83	65.83	10.40	104.29	19.74
3)	0.024	0.41	6.34	86.14	82.34	82.34	12.98	106.87	20.74
4)	0.037	0.62	6.35	86.89	89.95	89.95	14.16	108.05	21.15
5)	0.048	0.82	6.37	87.38	96.30	96.30	15.12	109.01	21.64
6)	0.060	1.01	6.38	87.58	100.11	100.11	15.69	109.58	22.00
7)	0.072	1.22	6.39	87.72	103.92	103.92	16.26	110.15	22.43
8)	0.083	1.41	6.41	87.86	106.46	106.46	16.62	110.51	22.65
9)	0.096	1.62	6.42	87.86	108.99	108.99	16.98	110.87	23.01
10)	0.108	1.83	6.43	87.86	110.26	110.26	17.14	111.03	23.17
11)	0.120	2.03	6.45	87.86	111.53	111.53	17.30	111.19	23.34
12)	0.131	2.23	6.46	87.79	112.80	112.80	17.47	111.36	23.57
13)	0.143	2.43	6.47	87.79	114.07	114.07	17.63	111.52	23.73
14)	0.155	2.64	6.49	87.79	116.61	116.61	17.98	111.87	24.08
15)	0.167	2.84	6.50	87.72	116.61	116.61	17.94	111.83	24.11
16)	0.179	3.04	6.51	87.65	117.88	117.88	18.10	111.99	24.34
17)	0.191	3.24	6.53	87.65	119.15	119.15	18.26	112.15	24.50
18)	0.203	3.45	6.54	87.58	120.42	120.42	18.41	112.30	24.72
19)	0.215	3.65	6.55	87.51	120.42	120.42	18.37	112.26	24.75
20)	0.227	3.85	6.57	87.44	121.69	121.69	18.53	112.42	24.97
21)	0.238	4.04	6.58	87.38	122.96	122.96	18.68	112.57	25.20
22)	0.251	4.25	6.59	87.31	122.96	122.96	18.64	112.53	25.23
23)	0.263	4.46	6.61	87.17	124.23	124.23	18.80	112.69	25.52
24)	0.275	4.66	6.62	87.10	125.50	125.50	18.95	112.84	25.74
25)	0.286	4.85	6.64	87.17	125.50	125.50	18.91	112.80	25.63
26)	0.298	5.06	6.65	87.10	126.77	126.77	19.06	112.95	25.85
27)	0.310	5.26	6.66	87.03	126.77	126.77	19.02	112.91	25.88
28)	0.322	5.46	6.68	86.96	126.77	126.77	18.98	112.87	25.91
29)	0.333	5.66	6.69	86.96	128.04	128.04	19.13	113.02	26.06
30)	0.346	5.86	6.71	86.89	128.04	128.04	19.09	112.98	26.08
31)	0.357	6.06	6.72	87.03	129.31	129.31	19.24	113.13	26.09
32)	0.381	6.46	6.75	86.82	131.84	131.84	19.53	113.42	26.59
33)	0.405	6.87	6.78	86.76	133.11	133.11	19.63	113.52	26.77
34)	0.429	7.27	6.81	86.69	134.38	134.38	19.73	113.62	26.94
35)	0.453	7.68	6.84	86.55	135.65	135.65	19.83	113.72	27.17
36)	0.477	8.09	6.87	86.55	136.92	136.92	19.93	113.82	27.27
37)	0.500	8.49	6.90	86.41	138.19	138.19	20.03	113.92	27.51
38)	0.524	8.89	6.93	86.34	139.46	139.46	20.12	114.01	27.67
39)	0.548	9.29	6.96	86.27	140.73	140.73	20.22	114.11	27.83
40)	0.571	9.69	6.99	86.20	142.00	142.00	20.31	114.20	27.99
41)	0.595	10.10	7.02	86.14	143.27	143.27	20.40	114.29	28.15
42)	0.625	10.60	7.06	86.07	144.54	144.54	20.46	114.35	28.29
43)	0.655	11.11	7.10	86.00	145.81	145.81	20.52	114.41	28.42
44)	0.684	11.61	7.14	86.00	148.35	148.35	20.77	114.66	28.66
45)	0.714	12.11	7.18	85.93	149.62	149.62	20.82	114.71	28.78
46)	0.744	12.62	7.23	85.93	150.89	150.89	20.88	114.77	28.84
47)	0.773	13.12	7.27	85.79	152.16	152.16	20.93	114.82	29.03
48)	0.804	13.64	7.31	85.79	153.42	153.42	20.98	114.87	29.08
49)	0.834	14.14	7.35	85.79	154.69	154.69	21.03	114.92	29.13
50)	0.863	14.64	7.40	85.72	157.23	157.23	21.25	115.14	29.42
51)	0.893	15.15	7.44	85.72	158.50	158.50	21.30	115.19	29.47
52)	0.952	16.15	7.53	85.65	161.04	161.04	21.38	115.27	29.62
53)	0.982	16.66	7.58	85.72	163.58	163.58	21.59	115.48	29.76
54)	1.011	17.16	7.62	85.72	164.85	164.85	21.63	115.52	29.79
55)	1.041	17.66	7.67	85.45	166.12	166.12	21.66	115.55	30.10
56)	1.071	18.17	7.72	85.45	168.66	168.66	21.86	115.75	30.30
57)	1.101	18.67	7.76	85.58	169.93	169.93	21.89	115.78	30.19
58)	1.160	19.69	7.86	85.58	172.47	172.47	21.93	115.82	30.24

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-64
Sample No. : 5 Bottom
Sample Type : Pitcher
Soil Description : Grayish brown sandy clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 13.89 psi

Location : San Leandro, CA
Test No. : WI-64-5
Test Date : 06/22/04
Depth : 20.2
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)	Piston Diameter : 0.000 (in)	Filter Correction : 0.00 (lb/in^2)
Area : 6.424 (in^2)	Piston Friction : 0.00 (lb)	Membrane Correction : 0.00 (lb/in)
Volume : 38.192 (in^3)	Piston Weight : 0.00 (gm)	Area Correction : Uniform
Liquid Limit : 44.43	Plastic Limit : 20.91	Specific Gravity : 2.691

INITIAL

Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.56 Saturation: 94.87 %	Dry Density : 107.31 (lb/ft^3) Moisture : 19.91 %	

INITIALIZATION

dH : 0.000 (in) dV : 0.000 (in^3) Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.56 Saturation: 94.87 %	Dry Density : 107.31 (lb/ft^3) Moisture : 19.91 %	Total Vert. Stress : 93.89 (lb/in^2 Total Hori. Stress : 93.89 (lb/in^2 Pore Pressure : 0.00 (lb/in^2) Effect.Vert. Stress: 93.89 (lb/in^2 Effect.Hori. Stress: 93.89 (lb/in^2

END OF CONSOLIDATION - A

dH : 0.000 (in) dV : 0.000 (in^3) Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.56 Saturation: 94.87 %	Dry Density : 107.31 (lb/ft^3) Moisture : 19.91 %	Total Vert. Stress : 93.89 (lb/in^2 Total Hori. Stress : 93.89 (lb/in^2 Pore Pressure : 0.00 (lb/in^2) Effect.Vert. Stress: 93.89 (lb/in^2 Effect.Hori. Stress: 93.89 (lb/in^2

END OF SATURATION

dH : 0.000 (in) dV : 0.000 (in^3) dVCorr : 0.000 (in^3) Time : 0.00 (min)	Height : 5.945 (in) Area : 6.424 (in^2) Void Ratio: 0.56 Saturation: 92.92 %	Dry Density : 107.31 (lb/ft^3) Moisture : 19.50 %	Total Vert. Stress : 93.89 (lb/in^2 Total Hori. Stress : 93.89 (lb/in^2 Pore Pressure : 0.00 (lb/in^2) Effect.Vert. Stress: 93.89 (lb/in^2 Effect.Hori. Stress: 93.89 (lb/in^2

END OF CONSOLIDATION - B

dH : 0.051 (in) dV : 0.974 (in^3) Time : 0.00 (min)	Height : 5.894 (in) Area : 6.315 (in^2) Void Ratio: 0.52 Saturation: 99.99 %	Dry Density : 110.12 (lb/ft^3) Moisture : 19.50 %	Total Vert. Stress : 93.89 (lb/in^2 Total Hori. Stress : 93.89 (lb/in^2 Pore Pressure : 80.00 (lb/in^2 Effect.Vert. Stress: 13.89 (lb/in^2 Effect.Hori. Stress: 13.89 (lb/in^2

FAILURE DURING SHEAR

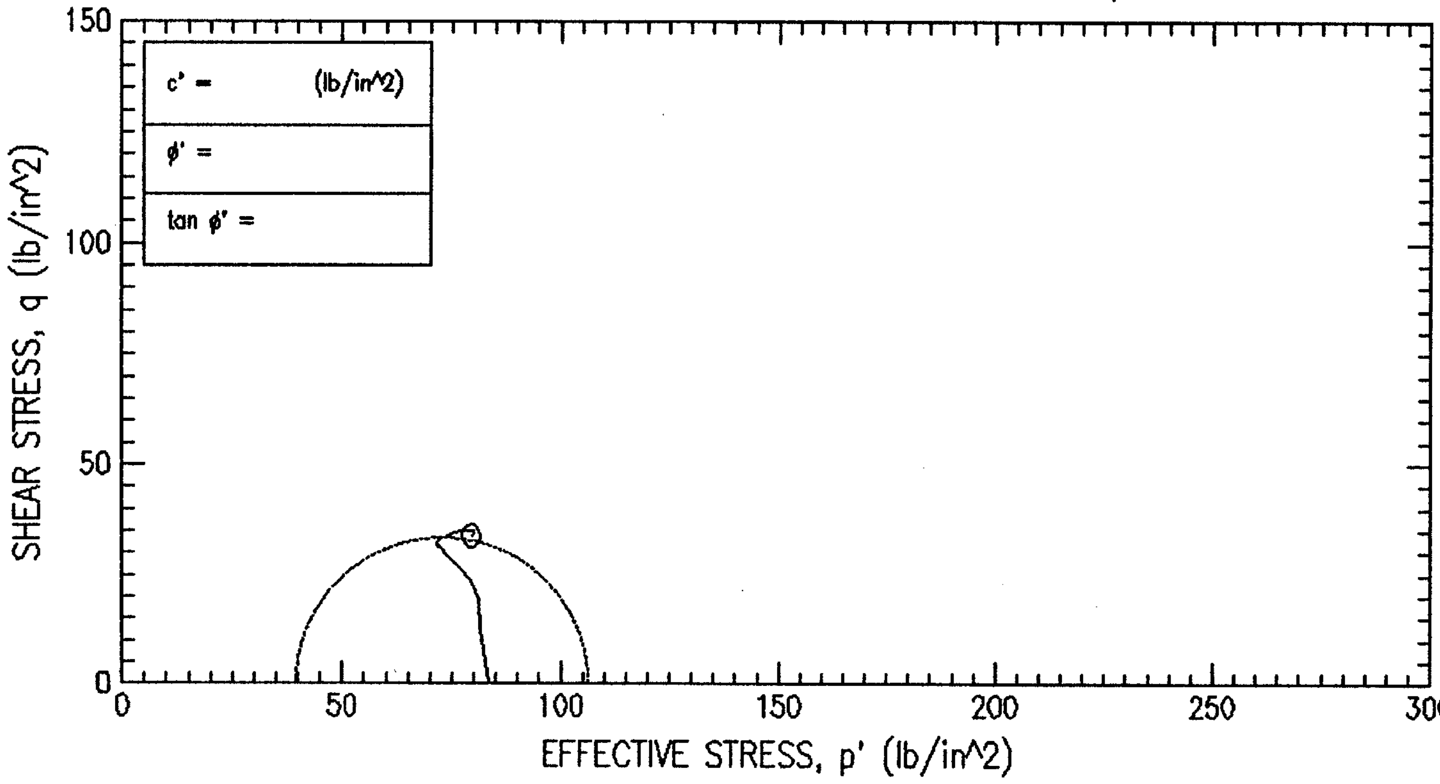
dH : 1.160 (in) dV : 0.974 (in^3) Strain : 19.69 % Strength: 10.97 (lb/in^2) Time : 1311.77 (min)	Height : 4.785 (in) Area : 7.863 (in^2) Void Ratio: 0.52 Saturation: 99.99 %	Dry Density : 110.12 (lb/ft^3) Moisture : 19.50 %	Total Vert. Stress : 115.82 (lb/in^ Total Hori. Stress : 93.89 (lb/in^2 Pore Pressure : 85.58 (lb/in^2 Effect.Vert. Stress: 30.24 (lb/in^2 Effect.Hori. Stress: 8.31 (lb/in^2)

END OF TEST

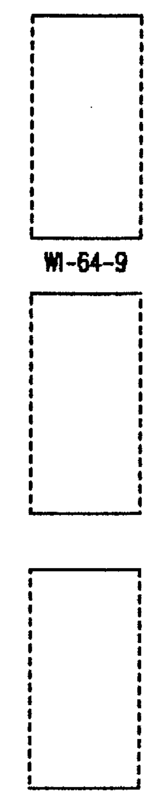
dH : 1.160 (in) dV : 0.974 (in^3) Strain : 19.69 % Time : 1311.77 (min)	Height : 4.785 (in) Area : 7.863 (in^2) Void Ratio: 0.52 Saturation: 99.99 %	Dry Density : 110.12 (lb/ft^3) Moisture : 19.50 %	Total Vert. Stress : 115.82 (lb/in^ Total Hori. Stress : 93.89 (lb/in^2 Pore Pressure : 85.58 (lb/in^2 Effect.Vert. Stress: 30.24 (lb/in^2 Effect.Hori. Stress: 8.31 (lb/in^2)

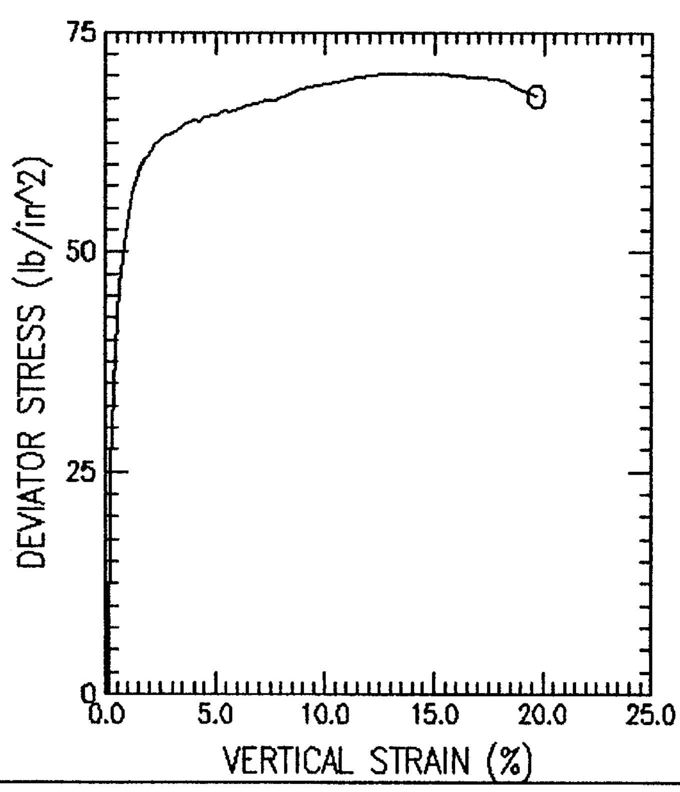
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-64-9				
INITIAL	WATER CONTENT (%)	18.64				
	DRY DENSITY (lb/ft^3)	109.86				
	SATURATION (%)	96.75				
	VOID RATIO	0.513				
BEFORE SHEAR	WATER CONTENT (%)	17.90				
	DRY DENSITY (lb/ft^3)	112.56				
	SATURATION (%)	99.99				
	VOID RATIO	0.477				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		83.33				
MAX. DEV. STRESS (lb/in^2)		72.07				
TIME TO FAILURE (min)		880.27				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.90				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown clayey sand (SC)

LL 41.87	PL 20.04	PI 21.83	GS 2.66	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 83.33 psi

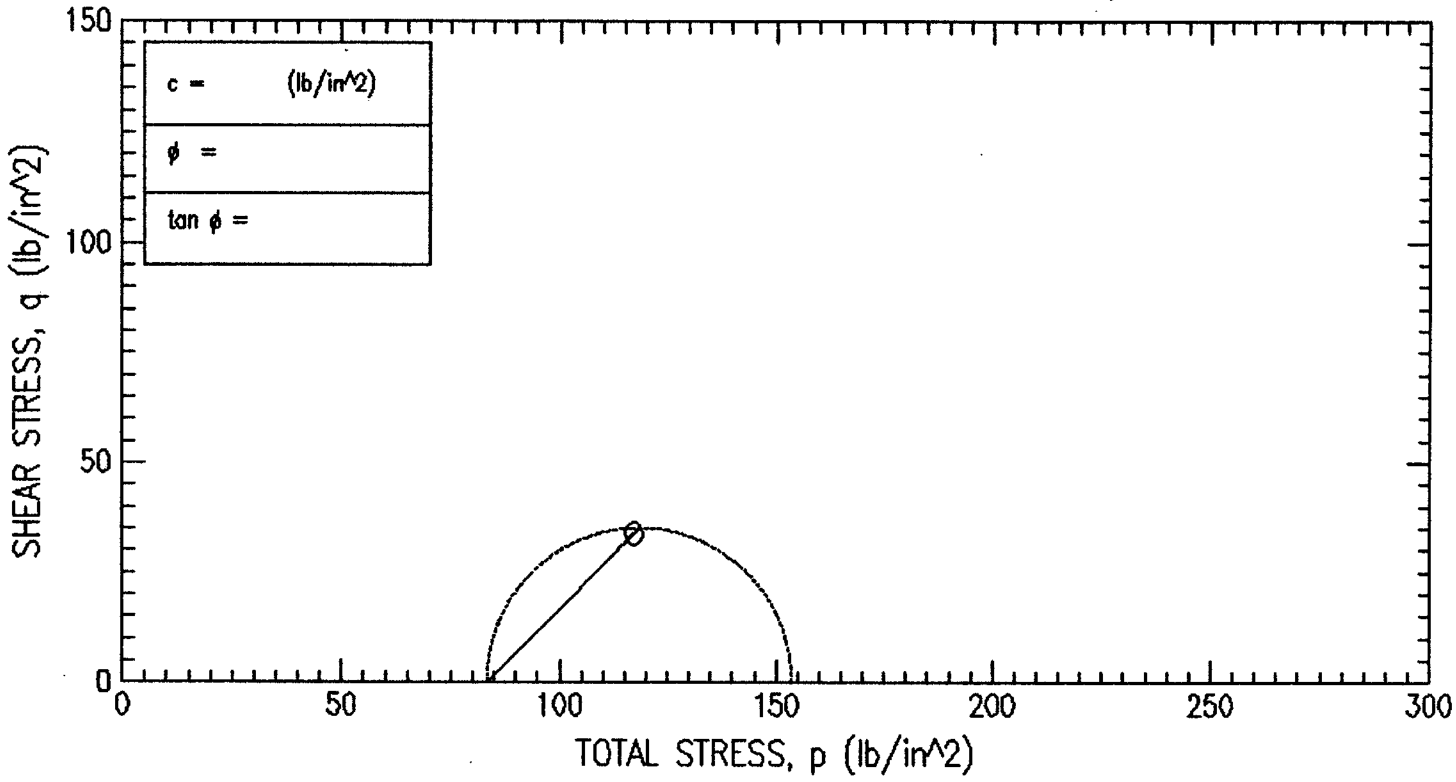
PROJECT	Chabot Dam Seismic Study				
PROJECT NO.26814536					
BORING NO. WI-64	SAMPLE NO.	9 Bottom			
TECH. S. Capps	DEPTH/ELEV	40.0 feet			
LABORATORY	DATE	06/22/04			

TRIAXIAL COMPRESSION TEST REPORT

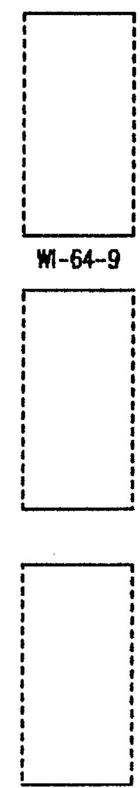
Thu 07-01-:4, 08:29:09

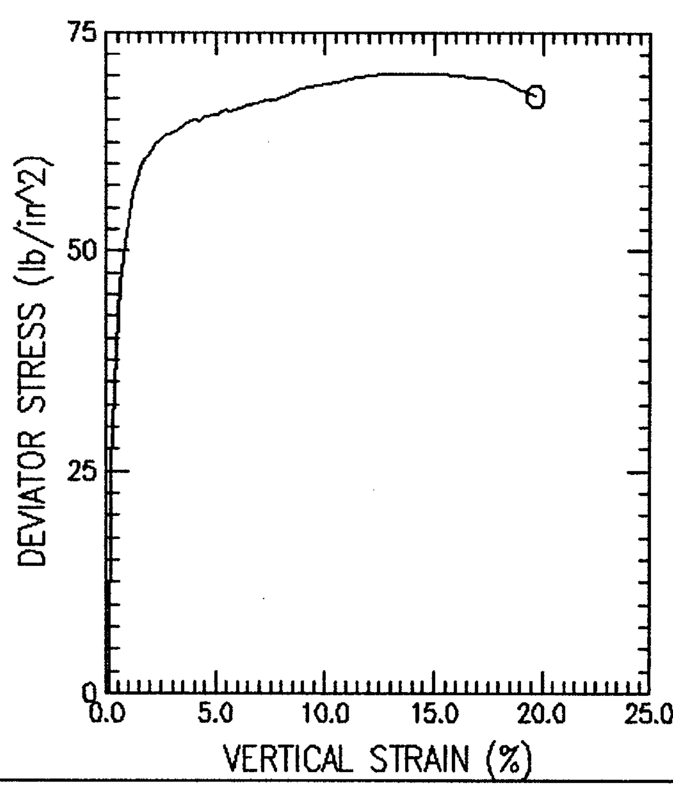
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-64-9				
INITIAL	WATER CONTENT (%)	18.64				
	DRY DENSITY (lb/ft^3)	109.86				
	SATURATION (%)	96.75				
	VOID RATIO	0.513				
BEFORE SHEAR	WATER CONTENT (%)	17.90				
	DRY DENSITY (lb/ft^3)	112.56				
	SATURATION (%)	99.99				
	VOID RATIO	0.477				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		83.33				
MAX. DEV. STRESS (lb/in^2)		72.07				
TIME TO FAILURE (min)		880.27				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.90				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Brown clayey sand (SC)

LL 41.87	PL 20.04	PI 21.83	GS 2.66	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:	PROJECT Chabot Dam Seismic Study		
1) TXCIU Test with Effective Pressure of 83.33 psi	PROJECT NO.26814536		
	BORING NO. WI-64	SAMPLE NO.	9 Bottom
	TECH. S. Capps	DEPTH/ELEV	40.0 feet
	LABORATORY	DATE	06/22/04

TRIAXIAL COMPRESSION TEST REPORT

Thu 07-01-:4, 08:27:56

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Location : San leandro, CA
Project No. : 26814536
Test No. : WI-64-9
Boring No. : WI-64
Test Date : 06/22/04
Tested by : S. Capps
Sample No. : 9 Bottom
Depth : 40.0 feet
Checked by : R. Taraya
Sample Type : Pitcher
Elevation : NA
Soil Description : Brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.13	163.33	163.33	0.00	0.00	83.33	83.33	1.00	83.33	0.00
2)	0.21	188.49	163.33	14.42	0.57	94.07	68.91	1.37	81.49	12.58
3)	0.41	202.15	163.33	21.72	0.56	100.42	61.60	1.63	81.01	19.41
4)	0.61	209.47	163.33	26.69	0.58	102.78	56.64	1.81	79.71	23.07
5)	0.82	214.30	163.33	31.16	0.61	103.14	52.17	1.98	77.65	25.48
6)	1.01	217.66	163.33	34.35	0.63	103.31	48.98	2.11	76.14	27.17
7)	1.22	219.89	163.33	36.48	0.64	103.41	46.85	2.21	75.13	28.28
8)	1.42	221.56	163.33	38.25	0.66	103.30	45.07	2.29	74.19	29.11
9)	1.62	222.88	163.33	39.53	0.66	103.35	43.80	2.36	73.57	29.78
10)	1.83	223.97	163.33	40.66	0.67	103.31	42.66	2.42	72.98	30.32
11)	2.03	224.73	163.33	41.44	0.67	103.29	41.88	2.47	72.58	30.70
12)	2.23	225.49	163.33	42.08	0.68	103.41	41.24	2.51	72.32	31.08
13)	2.43	225.92	163.33	42.58	0.68	103.33	40.75	2.54	72.04	31.29
14)	2.64	226.44	163.33	42.93	0.68	103.50	40.39	2.56	71.95	31.55
15)	2.83	226.75	163.33	43.36	0.68	103.39	39.97	2.59	71.68	31.71
16)	3.04	226.94	163.33	43.50	0.68	103.44	39.82	2.60	71.63	31.81
17)	3.23	227.15	163.33	43.71	0.68	103.43	39.61	2.61	71.52	31.91
18)	3.44	227.44	163.33	43.86	0.68	103.58	39.47	2.62	71.53	32.06
19)	3.64	227.96	163.33	44.00	0.68	103.96	39.33	2.64	71.65	32.32
20)	3.84	228.26	163.33	44.07	0.68	104.19	39.26	2.65	71.72	32.47
21)	4.04	228.45	163.33	44.21	0.68	104.24	39.12	2.66	71.68	32.56
22)	4.25	228.21	163.33	44.21	0.68	103.99	39.12	2.66	71.55	32.44
23)	4.45	228.72	163.33	44.21	0.68	104.50	39.12	2.67	71.81	32.69
24)	4.65	228.80	163.33	44.21	0.68	104.58	39.12	2.67	71.85	32.73
25)	4.85	228.98	163.33	44.28	0.67	104.69	39.04	2.68	71.87	32.82
26)	5.05	228.94	163.33	44.21	0.67	104.73	39.12	2.68	71.92	32.81
27)	5.25	229.23	163.33	44.35	0.67	104.88	38.97	2.69	71.93	32.95
28)	5.45	229.42	163.33	44.28	0.67	105.13	39.04	2.69	72.09	33.04
29)	5.65	229.28	163.33	44.28	0.67	104.99	39.04	2.69	72.02	32.97
30)	5.86	229.56	163.33	44.07	0.67	105.48	39.26	2.69	72.37	33.11
31)	6.06	229.73	163.33	44.07	0.66	105.66	39.26	2.69	72.46	33.20
32)	6.46	229.98	163.33	43.93	0.66	106.05	39.40	2.69	72.72	33.32
33)	6.88	230.21	163.33	43.86	0.66	106.35	39.47	2.69	72.91	33.44
34)	7.27	230.55	163.33	43.64	0.65	106.91	39.68	2.69	73.30	33.61
35)	7.67	230.57	163.33	43.43	0.65	107.14	39.90	2.69	73.52	33.62
36)	8.07	230.90	163.33	43.15	0.64	107.75	40.18	2.68	73.97	33.79
37)	8.48	231.43	163.33	43.00	0.63	108.42	40.32	2.69	74.37	34.05
38)	8.88	231.85	163.33	42.86	0.63	108.99	40.46	2.69	74.72	34.26
39)	9.30	232.05	163.33	42.72	0.62	109.33	40.61	2.69	74.97	34.36
40)	9.69	232.37	163.33	42.51	0.62	109.86	40.82	2.69	75.34	34.52
41)	10.09	232.46	163.33	42.29	0.61	110.16	41.03	2.68	75.60	34.57
42)	10.60	232.68	163.33	42.01	0.61	110.67	41.31	2.68	75.99	34.68
43)	11.10	232.99	163.33	41.73	0.60	111.26	41.60	2.67	76.43	34.83
44)	11.60	233.20	163.33	41.51	0.59	111.68	41.81	2.67	76.74	34.93
45)	12.11	233.39	163.33	41.23	0.59	112.16	42.10	2.66	77.13	35.03
46)	12.61	233.58	163.33	40.95	0.58	112.63	42.38	2.66	77.51	35.13
47)	13.11	233.67	163.33	40.59	0.58	113.07	42.73	2.65	77.90	35.17
48)	13.62	233.55	163.33	40.24	0.57	113.31	43.09	2.63	78.20	35.11
49)	14.14	233.62	163.33	39.95	0.57	113.66	43.37	2.62	78.52	35.14
50)	14.63	233.60	163.33	39.60	0.56	113.99	43.73	2.61	78.86	35.13
51)	15.13	233.57	163.33	39.32	0.56	114.25	44.01	2.60	79.13	35.12
52)	16.14	233.49	163.33	38.89	0.55	114.60	44.44	2.58	79.52	35.08
53)	16.64	233.16	163.33	38.53	0.55	114.62	44.79	2.56	79.71	34.92
54)	17.15	233.21	163.33	38.32	0.55	114.88	45.00	2.55	79.94	34.94
55)	17.66	233.06	163.33	38.39	0.55	114.66	44.93	2.55	79.80	34.86
56)	18.17	232.81	163.33	38.18	0.55	114.63	45.15	2.54	79.89	34.74
57)	18.67	232.20	163.33	37.97	0.55	114.23	45.36	2.52	79.79	34.43
58)	19.67	231.08	163.33	37.75	0.56	113.32	45.57	2.49	79.45	33.88

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study Location : San leandro, CA
Project No. : 26814536 Test No. : WI-64-9
Boring No. : WI-64 Test Date : 06/22/04 Tested by : S. Capps
Sample No. : 9 Bottom Depth : 40.0 feet Checked by : R. Taraya
Sample Type : Pitcher Elevation : NA
Soil Description : Brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Height : 5.945 (in) Piston Diameter : 0.000 (in) Filter Correction : 0.00 (lb/in^2)
Area : 6.424 (in^2) Piston Friction : 0.00 (lb) Membrane Correction : 0.00 (lb/in)
Volume : 38.192 (in^3) Piston Weight : 0.00 (gm) Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.008	0.13	6.33	80.00	0.00	0.00	0.00	163.33	83.33
2)	0.013	0.21	6.33	94.42	163.29	163.29	25.78	188.49	94.07
3)	0.024	0.41	6.35	101.73	252.45	252.45	39.77	202.15	100.42
4)	0.036	0.61	6.36	106.69	300.68	300.68	47.28	209.47	102.78
5)	0.048	0.82	6.37	111.16	332.84	332.84	52.22	214.30	103.14
6)	0.060	1.01	6.39	114.35	355.49	355.49	55.67	217.66	103.31
7)	0.072	1.22	6.40	116.48	370.84	370.84	57.95	219.89	103.41
8)	0.084	1.42	6.41	118.26	382.54	382.54	59.66	221.56	103.30
9)	0.096	1.62	6.43	119.53	392.04	392.04	61.02	222.88	103.35
10)	0.108	1.83	6.44	120.67	400.08	400.08	62.14	223.97	103.31
11)	0.120	2.03	6.45	121.45	405.92	405.92	62.92	224.73	103.29
12)	0.131	2.23	6.47	122.09	411.77	411.77	63.69	225.49	103.41
13)	0.143	2.43	6.48	122.58	415.42	415.42	64.13	225.92	103.33
14)	0.156	2.64	6.49	122.94	419.81	419.81	64.66	226.44	103.50
15)	0.167	2.83	6.51	123.36	422.73	422.73	64.98	226.75	103.39
16)	0.179	3.04	6.52	123.51	424.92	424.92	65.18	226.94	103.44
17)	0.191	3.23	6.53	123.72	427.12	427.12	65.39	227.15	103.43
18)	0.203	3.44	6.55	123.86	430.04	430.04	65.69	227.44	103.58
19)	0.215	3.64	6.56	124.00	434.42	434.42	66.22	227.96	103.96
20)	0.227	3.84	6.57	124.07	437.35	437.35	66.53	228.26	104.19
21)	0.238	4.04	6.59	124.21	439.54	439.54	66.73	228.45	104.24
22)	0.251	4.25	6.60	124.21	438.81	438.81	66.47	228.21	103.99
23)	0.262	4.45	6.62	124.21	443.19	443.19	67.00	228.72	104.50
24)	0.274	4.65	6.63	124.21	444.66	444.66	67.08	228.80	104.58
25)	0.286	4.85	6.64	124.29	446.85	446.85	67.26	228.98	104.69
26)	0.298	5.05	6.66	124.21	447.58	447.58	67.23	228.94	104.73
27)	0.310	5.25	6.67	124.36	450.50	450.50	67.53	229.23	104.88
28)	0.322	5.45	6.69	124.29	452.70	452.70	67.71	229.42	105.13
29)	0.333	5.65	6.70	124.29	452.70	452.70	67.57	229.28	104.99
30)	0.346	5.86	6.71	124.07	455.62	455.62	67.85	229.56	105.48
31)	0.357	6.06	6.73	124.07	457.81	457.81	68.04	229.73	105.66
32)	0.381	6.46	6.76	123.93	461.47	461.47	68.29	229.98	106.05
33)	0.405	6.88	6.79	123.86	465.12	465.12	68.52	230.21	106.35
34)	0.429	7.27	6.82	123.65	469.50	469.50	68.88	230.55	106.91
35)	0.453	7.67	6.85	123.43	471.70	471.70	68.90	230.57	107.14
36)	0.476	8.07	6.88	123.15	476.08	476.08	69.24	230.90	107.75
37)	0.500	8.48	6.91	123.01	481.93	481.93	69.78	231.43	108.42
38)	0.524	8.88	6.94	122.87	487.04	487.04	70.21	231.85	108.99
39)	0.548	9.30	6.97	122.72	490.70	490.70	70.41	232.05	109.33
40)	0.571	9.69	7.00	122.51	495.08	495.08	70.74	232.37	109.86
41)	0.595	10.09	7.03	122.30	498.01	498.01	70.83	232.46	110.16
42)	0.625	10.60	7.07	122.02	502.39	502.39	71.06	232.68	110.67
43)	0.655	11.10	7.11	121.73	507.51	507.51	71.38	232.99	111.26
44)	0.684	11.60	7.15	121.52	511.89	511.89	71.58	233.20	111.68
45)	0.714	12.11	7.19	121.23	516.28	516.28	71.79	233.39	112.16
46)	0.744	12.61	7.23	120.95	520.66	520.66	71.98	233.58	112.63
47)	0.773	13.11	7.28	120.60	524.32	524.32	72.07	233.67	113.07
48)	0.803	13.62	7.32	120.24	526.51	526.51	71.95	233.55	113.31
49)	0.834	14.14	7.36	119.96	530.16	530.16	72.02	233.62	113.66
50)	0.863	14.63	7.40	119.60	533.09	533.09	72.00	233.60	113.99
51)	0.892	15.13	7.45	119.32	536.01	536.01	71.96	233.57	114.25
52)	0.952	16.14	7.54	118.89	541.86	541.86	71.89	233.49	114.60
53)	0.982	16.64	7.58	118.54	542.59	542.59	71.55	233.16	114.62
54)	1.011	17.15	7.63	118.33	546.24	546.24	71.60	233.21	114.88
55)	1.041	17.66	7.68	118.40	548.43	548.43	71.44	233.06	114.66
56)	1.071	18.17	7.72	118.18	549.90	549.90	71.19	232.81	114.63
57)	1.101	18.67	7.77	117.97	548.43	548.43	70.56	232.20	114.23
58)	1.160	19.67	7.87	117.76	546.24	546.24	69.42	231.08	113.32

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic Study
Project No. : 26814536
Boring No. : WI-64
Sample No. : 9 Bottom
Sample Type : Pitcher
Soil Description : Brown clayey sand (SC)
Remarks : TXCIU Test with Effective Pressure of 83.33 psi

Location : San leandro, CA
Test No. : WI-64-9
Test Date : 06/22/04
Depth : 40.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 41.87
Plastic Limit : 20.04
Specific Gravity : 2.664

INITIAL

Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.51
Saturation: 96.75 %

Dry Density : 109.86 (lb/ft^3)
Moisture : 18.64 %

Time : 0.00 (min)

INITIALIZATION

dH : 0.000 (in)	Height : 5.945 (in)	Dry Density : 109.86 (lb/ft^3)	Total Vert. Stress : 163.33 (lb/in^
dV : 0.000 (in^3)	Area : 6.424 (in^2)	Moisture : 18.64 %	Total Hori. Stress : 163.33 (lb/in^
	Void Ratio: 0.51		Pore Pressure : 0.00 (lb/in^2)
	Saturation: 96.75 %		Effect.Vert. Stress: 163.33 (lb/in^
Time : 0.00 (min)			Effect.Hori. Stress: 163.33 (lb/in^

END OF CONSOLIDATION - A

dH : 0.000 (in)	Height : 5.945 (in)	Dry Density : 109.86 (lb/ft^3)	Total Vert. Stress : 163.33 (lb/in^
dV : 0.000 (in^3)	Area : 6.424 (in^2)	Moisture : 18.64 %	Total Hori. Stress : 163.33 (lb/in^
	Void Ratio: 0.51		Pore Pressure : 0.00 (lb/in^2)
	Saturation: 96.75 %		Effect.Vert. Stress: 163.33 (lb/in^
Time : 0.00 (min)			Effect.Hori. Stress: 163.33 (lb/in^

END OF SATURATION

dH : 0.000 (in)	Height : 5.945 (in)	Dry Density : 109.86 (lb/ft^3)	Total Vert. Stress : 163.33 (lb/in^
dV : 0.000 (in^3)	Area : 6.424 (in^2)	Moisture : 17.90 %	Total Hori. Stress : 163.33 (lb/in^
dVCorr : 0.000 (in^3)	Void Ratio: 0.51		Pore Pressure : 0.00 (lb/in^2)
	Saturation: 92.91 %		Effect.Vert. Stress: 163.33 (lb/in^
Time : 0.00 (min)			Effect.Hori. Stress: 163.33 (lb/in^

END OF CONSOLIDATION - B

dH : 0.048 (in)	Height : 5.897 (in)	Dry Density : 112.56 (lb/ft^3)	Total Vert. Stress : 163.33 (lb/in^
dV : 0.917 (in^3)	Area : 6.321 (in^2)	Moisture : 17.90 %	Total Hori. Stress : 163.33 (lb/in^
	Void Ratio: 0.48		Pore Pressure : 80.00 (lb/in^2
	Saturation: 99.99 %		Effect.Vert. Stress: 83.33 (lb/in^2
Time : 0.00 (min)			Effect.Hori. Stress: 83.33 (lb/in^2

FAILURE DURING SHEAR

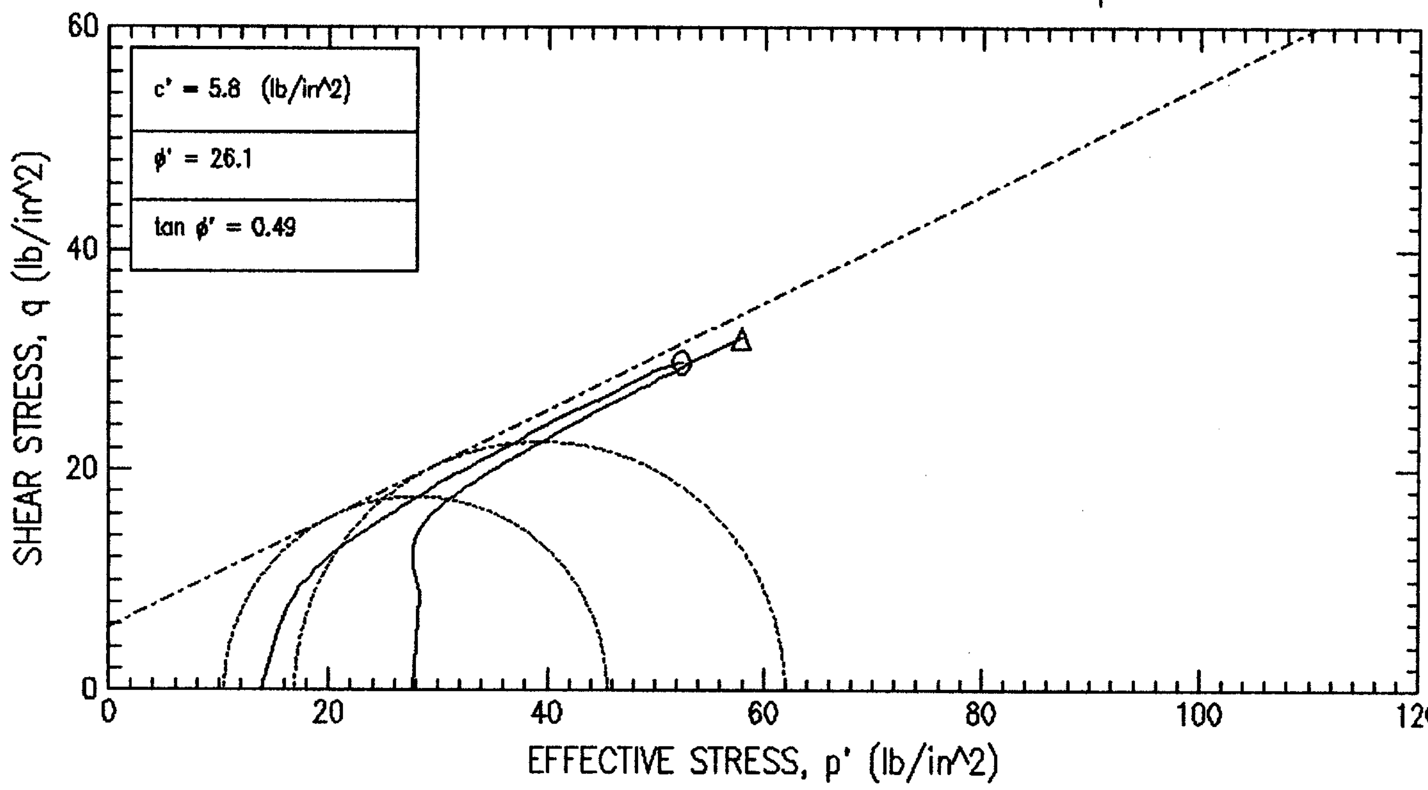
dH : 0.773 (in)	Height : 5.172 (in)	Dry Density : 112.56 (lb/ft^3)	Total Vert. Stress : 235.40 (lb/in^
dV : 0.917 (in^3)	Area : 7.275 (in^2)	Moisture : 17.90 %	Total Hori. Stress : 163.33 (lb/in^
Strain : 13.11 %	Void Ratio: 0.48		Pore Pressure : 120.60 (lb/in^
Strength: 36.03 (lb/in^2)	Saturation: 99.99 %		Effect.Vert. Stress: 114.80 (lb/in^
Time : 880.27 (min)			Effect.Hori. Stress: 42.73 (lb/in^2

END OF TEST

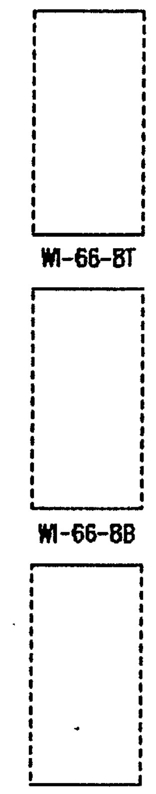
dH : 1.160 (in)	Height : 4.785 (in)	Dry Density : 112.56 (lb/ft^3)	Total Vert. Stress : 232.75 (lb/in^
dV : 0.917 (in^3)	Area : 7.869 (in^2)	Moisture : 17.90 %	Total Hori. Stress : 163.33 (lb/in^
Strain : 19.67 %	Void Ratio: 0.48		Pore Pressure : 117.76 (lb/in^
	Saturation: 99.99 %		Effect.Vert. Stress: 114.99 (lb/in^
Time : 1311.40 (min)			Effect.Hori. Stress: 45.57 (lb/in^2

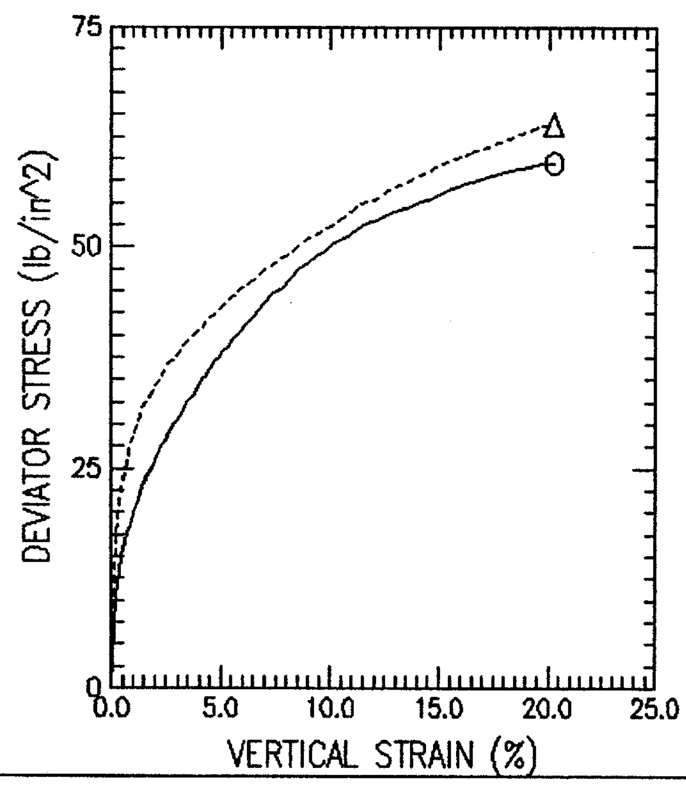
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O	Δ		
TEST NO.		WI-66-8T	WI-66-8B		
INITIAL	WATER CONTENT (%)	17.32	12.50		
	DRY DENSITY (lb/ft^3)	112.06	122.36		
	SATURATION (%)	96.64	94.45		
	VOID RATIO	0.474	0.350		
BEFORE SHEAR	WATER CONTENT (%)	16.07	11.67		
	DRY DENSITY (lb/ft^3)	115.91	126.20		
	SATURATION (%)	99.99	99.93		
	VOID RATIO	0.426	0.309		
	BACK PRESS. (lb/in^2)	80.00	80.00		
MINOR PRIN. STRESS (lb/in^2)		13.89	27.78		
MAX. DEV. STRESS (lb/in^2)		61.53	65.89		
TIME TO FAILURE (min)		1170.80	1392.17		
RATE OF STRAIN INCR (%/min)		0.00	0.00		
INITIAL DIAMETER (in)		2.86	2.86		
INITIAL HEIGHT (in)		5.00	5.95		
B-VALUE		98.10	97.80		

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

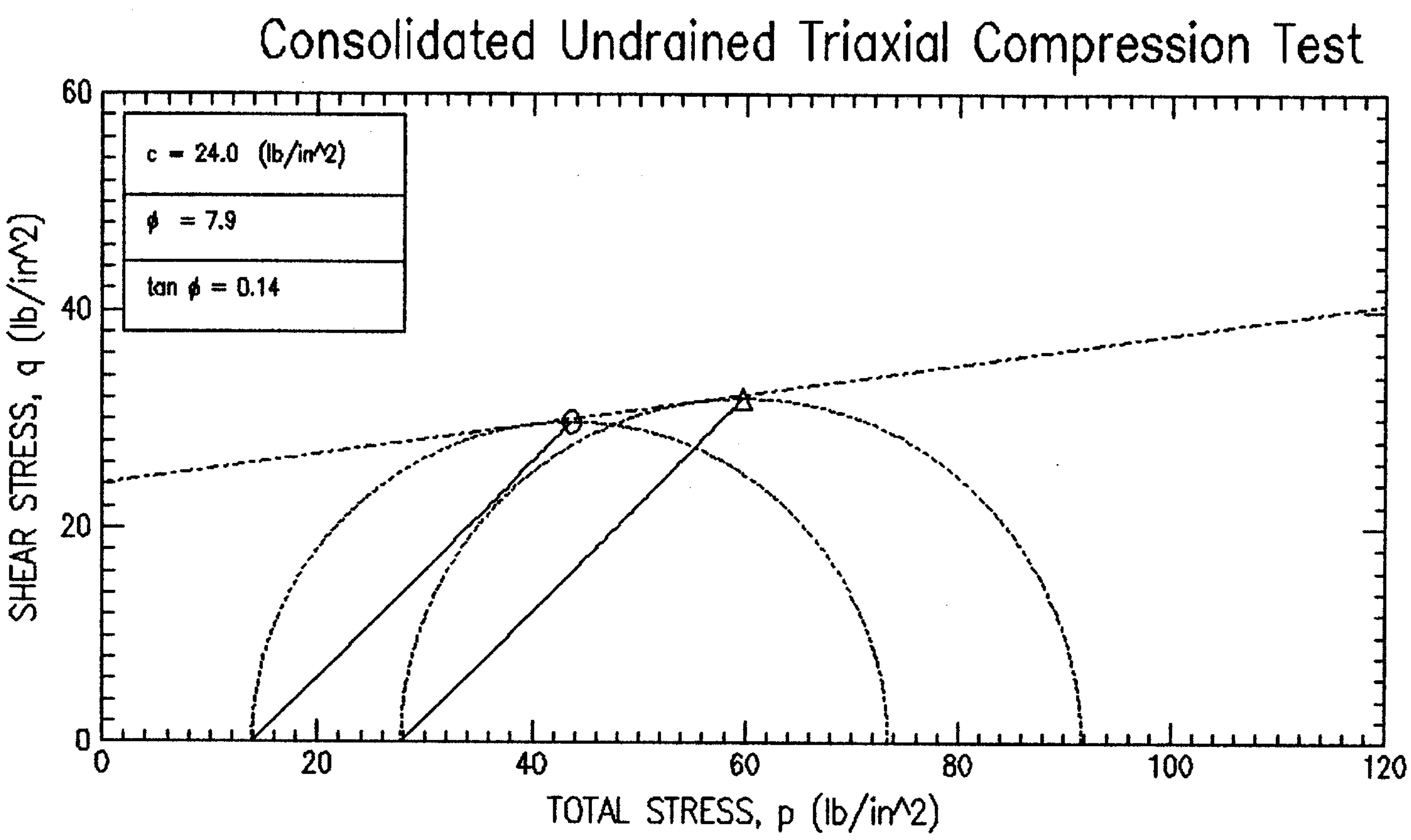
1) Gray fine sandy clay (CL)   2) Gray clayey sand with gravel (SC)

LL 26.78	PL 16.67	PI 10.11	GS 2.65	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)	
REMARKS:				PROJECT Chabot Dam Siesmic			
1) TXCIU Test with Effective Pressure of 13.89 psi				PROJECT NO.26814536			
2) TXCIU Test with Effective Pressure of 27.78 psi				BORING NO. WI-66	SAMPLE NO.	8 Top	8 Bottom
				TECH. S. Capps	DEPTH/ELEV	24.0 feet	24.0 feet
				LABORATORY	DATE	06/24/04	06/24/04
				TRIAXIAL COMPRESSION TEST REPORT			

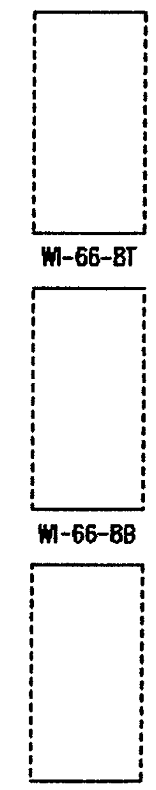
Tue 07-06-:4, 10:01:38

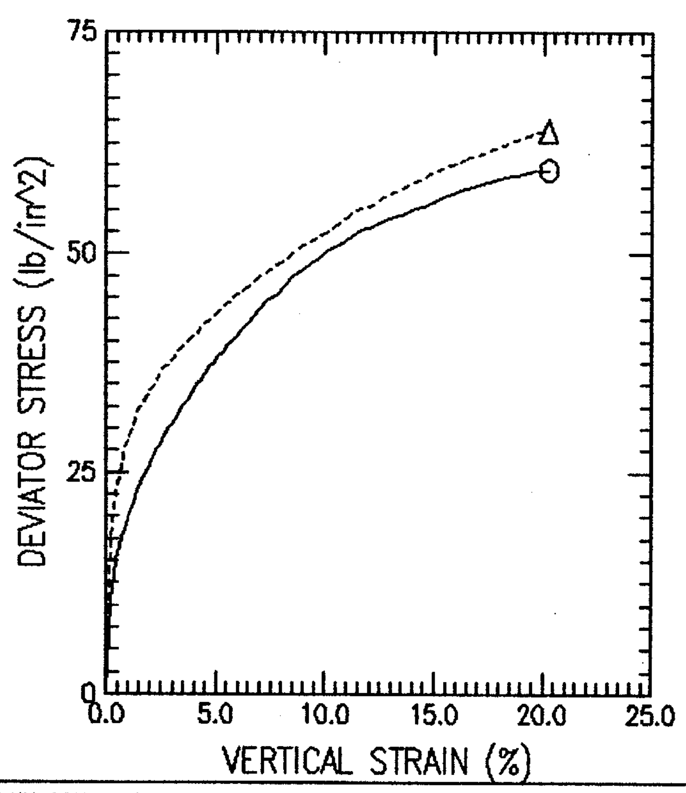
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O	Δ		
TEST NO.		WI-66-8T	WI-66-8B		
INITIAL	WATER CONTENT (%)	17.32	12.50		
	DRY DENSITY (lb/ft^3)	112.06	122.36		
	SATURATION (%)	96.64	94.45		
	VOID RATIO	0.474	0.350		
BEFORE SHEAR	WATER CONTENT (%)	16.07	11.67		
	DRY DENSITY (lb/ft^3)	115.91	126.20		
	SATURATION (%)	99.99	99.93		
	VOID RATIO	0.426	0.309		
	BACK PRESS. (lb/in^2)	80.00	80.00		
MINOR PRIN. STRESS (lb/in^2)		13.89	27.78		
MAX. DEV. STRESS (lb/in^2)		61.53	65.89		
TIME TO FAILURE (min)		1170.80	1392.17		
RATE OF STRAIN INCR (%/min)		0.00	0.00		
INITIAL DIAMETER (in)		2.86	2.86		
INITIAL HEIGHT (in)		5.00	5.95		
B-VALUE		98.10	97.80		

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray fine sandy clay (CL)

2) Gray clayey sand with gravel (SC)

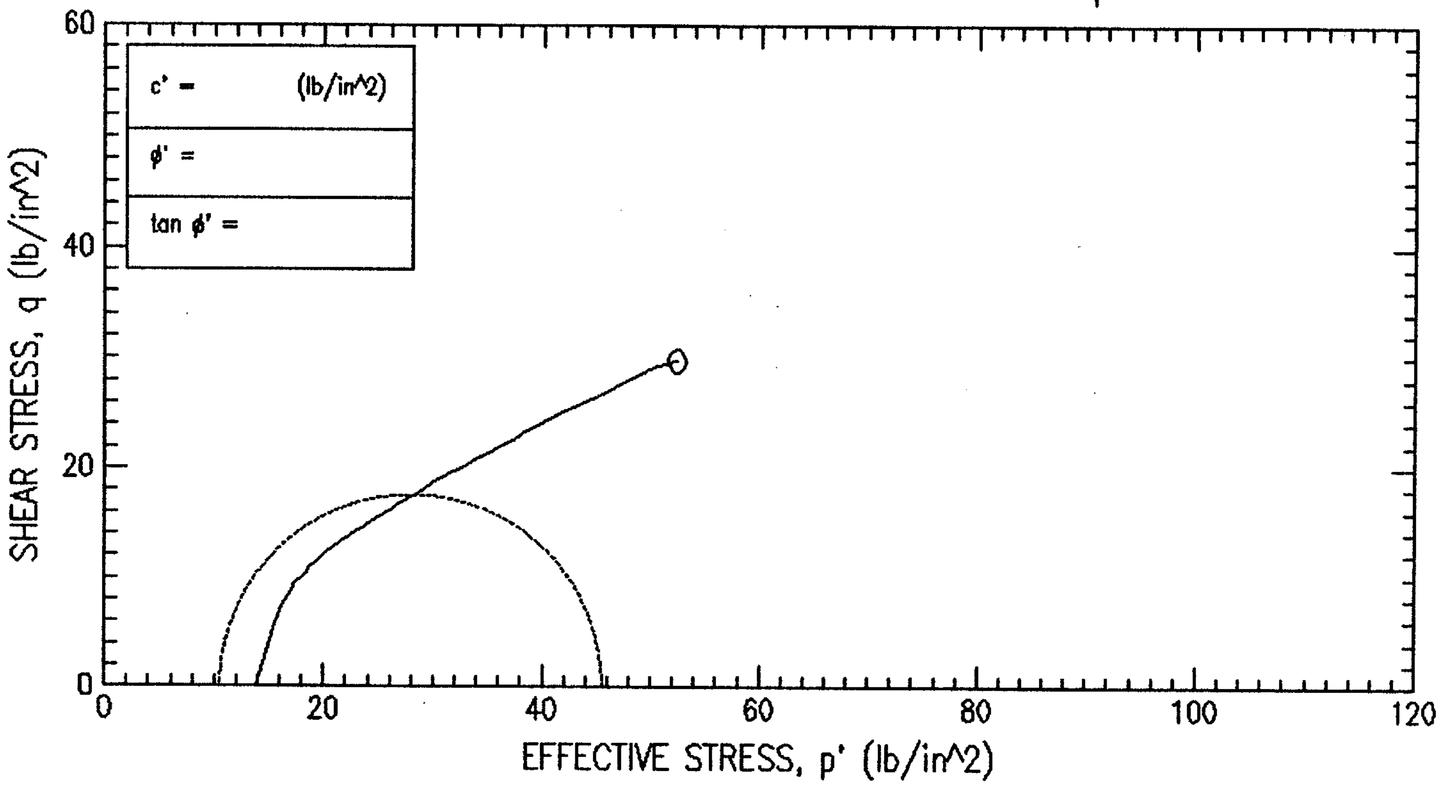
LL 26.78	PL 16.67	PI 10.11	GS 2.65	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)	
REMARKS:				PROJECT Chabot Dam Siesmic			
1) TXCIU Test with Effective Pressure of 13.89 psi				PROJECT NO.26814536			
2) TXCIU Test with Effective Pressure of 27.78 psi				BORING NO. WI-66	SAMPLE NO.	8 Top	8 Bottom
				TECH. S. Capps	DEPTH/ELEV	24.0 feet	24.0 feet
				LABORATORY	DATE	06/24/04	06/24/04

TRIAXIAL COMPRESSION TEST REPORT

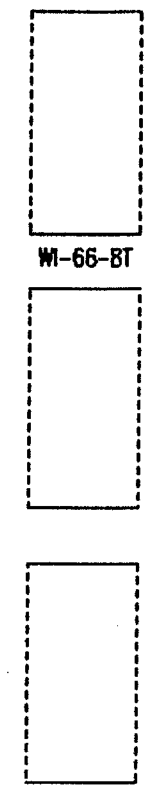
Tue 07-06-:4, 10:02:11

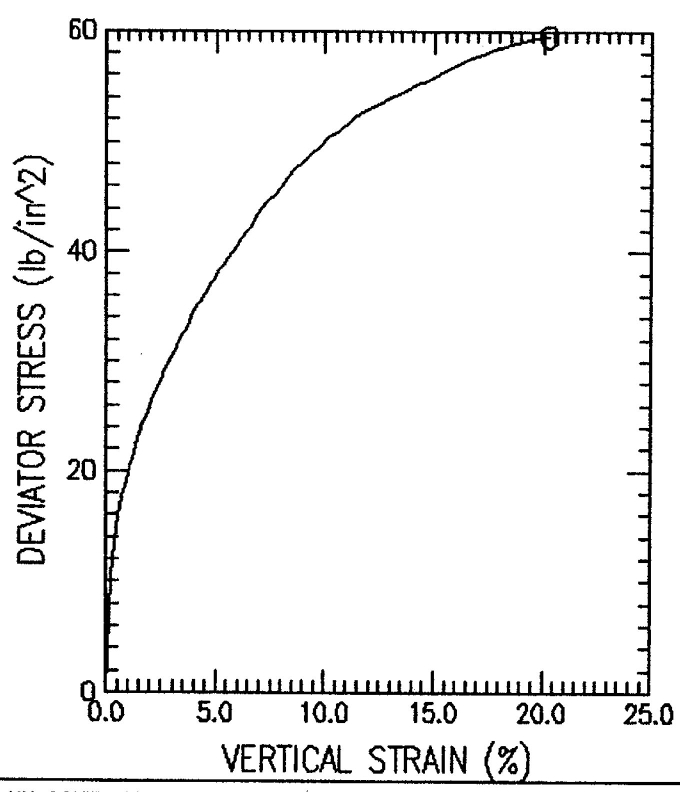
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-66-8T				
INITIAL	WATER CONTENT (%)	17.32				
	DRY DENSITY (lb/ft^3)	112.06				
	SATURATION (%)	96.64				
	VOID RATIO	0.474				
BEFORE SHEAR	WATER CONTENT (%)	16.07				
	DRY DENSITY (lb/ft^3)	115.91				
	SATURATION (%)	99.99				
	VOID RATIO	0.426				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		13.89				
MAX. DEV. STRESS (lb/in^2)		61.53				
TIME TO FAILURE (min)		1170.80				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.00				
B-VALUE		98.10				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

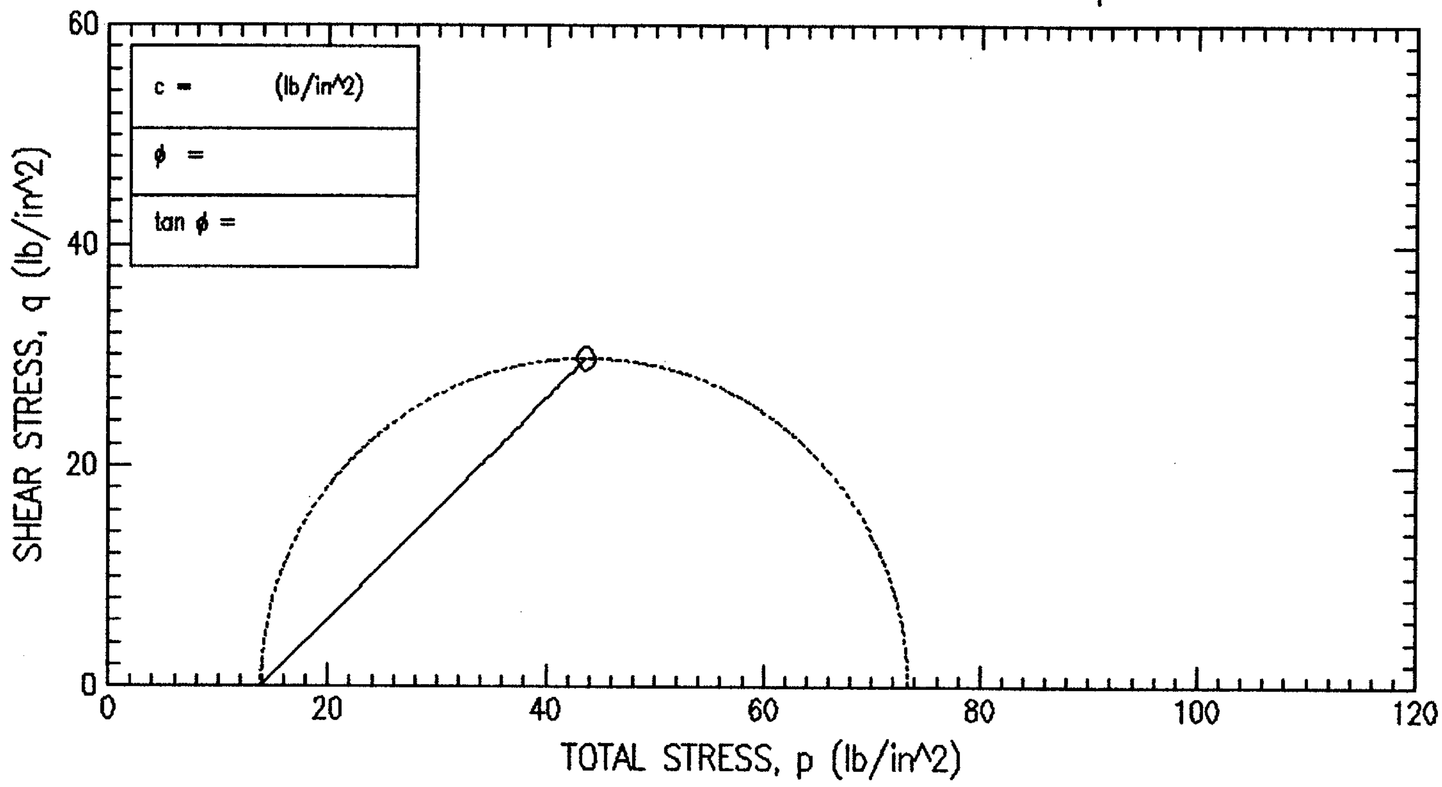
1) Gray fine sandy clay (CL)

LL 26.78	PL 16.67	PI 10.11	GS 2.65	TYPE OF SPECIMEN Pitcher		TYPE OF TEST CU (R)	
REMARKS:				PROJECT Chabot Dam Siesmic			
1) TXCIU Test with Effective Pressure of 13.89 psi				PROJECT NO.26814536			
				BORING NO. WI-66	SAMPLE NO.	8 Top	
				TECH. S. Capps	DEPTH/ELEV	24.0 feet	
				LABORATORY	DATE	06/24/04	
				TRIAXIAL COMPRESSION TEST REPORT			

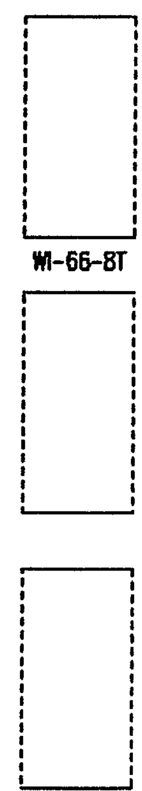
Tue 07-06-:4, 09:59:00

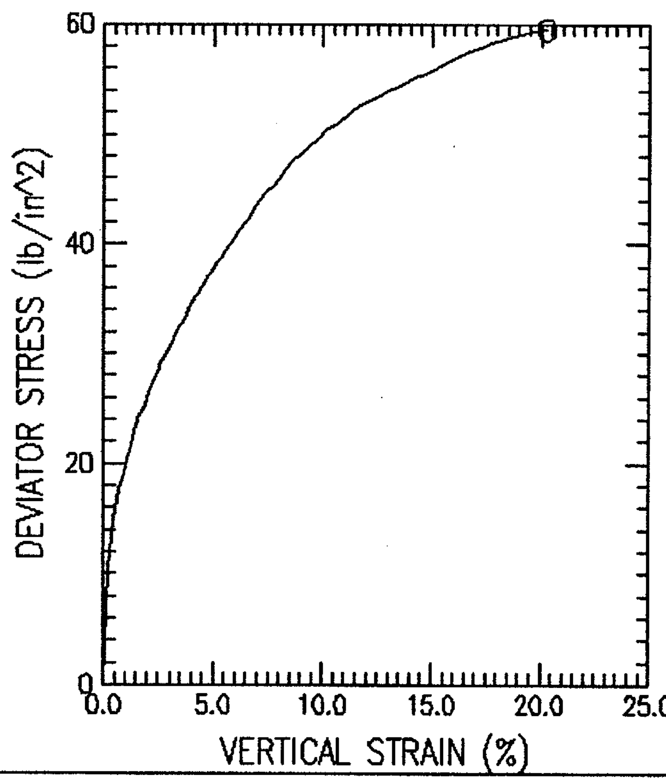
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-66-8T				
INITIAL	WATER CONTENT (%)	17.32				
	DRY DENSITY (lb/ft^3)	112.06				
	SATURATION (%)	96.64				
	VOID RATIO	0.474				
BEFORE SHEAR	WATER CONTENT (%)	16.07				
	DRY DENSITY (lb/ft^3)	115.91				
	SATURATION (%)	99.99				
	VOID RATIO	0.426				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		13.89				
MAX. DEV. STRESS (lb/in^2)		61.53				
TIME TO FAILURE (min)		1170.80				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.00				
B-VALUE		98.10				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray fine sandy clay (CL)

LL 26.78	PL 16.67	PI 10.11	GS 2.65

TYPE OF SPECIMEN Pitcher | TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 13.89 psi

PROJECT Chabot Dam Siesmic

PROJECT NO.26814536

BORING NO. WI-66	SAMPLE NO.	8 Top			
TECH. S. Capps	DEPTH/ELEV	24.0 feet			
LABORATORY	DATE	06/24/04			

TRIAXIAL COMPRESSION TEST REPORT

Tue 07-06-:4, 09:59:39

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Siesmic
Project No. : 26814536
Boring No. : WI-66
Sample No. : 8 Top
Sample Type : Pitcher
Soil Description : Gray fine sandy clay (CL)
Remarks : TXCIU Test with Effective Pressure of 13.89 psi

Location : San Leandro, CA
Test No. : WI-66-8T
Test Date : 06/24/04
Depth : 24.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.000 (in)
Area : 6.424 (in^2)
Volume : 32.121 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	93.89	93.89	0.00	0.00	13.89	13.89	1.00	13.89	0.00
2)	0.24	104.39	93.89	3.73	0.35	20.66	10.17	2.03	15.41	5.25
3)	0.44	108.84	93.89	5.17	0.35	23.67	8.72	2.71	16.19	7.48
4)	0.64	111.53	93.89	5.66	0.32	25.87	8.24	3.14	17.06	8.82
5)	0.85	112.46	93.89	5.93	0.32	26.53	7.96	3.33	17.25	9.29
6)	1.06	114.35	93.89	5.93	0.29	28.43	7.96	3.57	18.19	10.23
7)	1.26	115.47	93.89	6.07	0.28	29.40	7.82	3.76	18.61	10.79
8)	1.47	116.77	93.89	5.93	0.26	30.84	7.96	3.87	19.40	11.44
9)	1.66	118.27	93.89	5.93	0.24	32.34	7.96	4.06	20.15	12.19
10)	1.87	119.17	93.89	5.79	0.23	33.38	8.10	4.12	20.74	12.64
11)	2.07	120.27	93.89	5.59	0.21	34.68	8.31	4.18	21.49	13.19
12)	2.28	121.36	93.89	5.38	0.20	35.98	8.51	4.23	22.25	13.73
13)	2.46	122.07	93.89	5.17	0.18	36.90	8.72	4.23	22.81	14.09
14)	2.67	123.15	93.89	4.97	0.17	38.18	8.93	4.28	23.55	14.63
15)	2.86	124.04	93.89	4.76	0.16	39.28	9.13	4.30	24.21	15.08
16)	3.07	124.73	93.89	4.62	0.15	40.11	9.27	4.33	24.69	15.42
17)	3.28	125.61	93.89	4.35	0.14	41.27	9.55	4.32	25.41	15.86
18)	3.48	126.49	93.89	3.93	0.12	42.56	9.96	4.27	26.26	16.30
19)	3.68	126.99	93.89	3.93	0.12	43.05	9.96	4.32	26.51	16.55
20)	3.88	127.86	93.89	3.52	0.10	44.34	10.37	4.27	27.35	16.98
21)	4.08	128.91	93.89	3.38	0.10	45.53	10.51	4.33	28.02	17.51
22)	4.29	129.21	93.89	3.04	0.09	46.17	10.85	4.25	28.51	17.66
23)	4.50	130.06	93.89	2.83	0.08	47.23	11.06	4.27	29.15	18.09
24)	4.70	130.92	93.89	2.69	0.07	48.23	11.20	4.31	29.71	18.52
25)	4.89	131.22	93.89	2.62	0.07	48.59	11.27	4.31	29.93	18.66
26)	5.09	132.06	93.89	2.28	0.06	49.79	11.61	4.29	30.70	19.09
27)	5.30	132.54	93.89	2.00	0.05	50.53	11.89	4.25	31.21	19.32
28)	5.50	133.19	93.89	1.73	0.04	51.47	12.16	4.23	31.81	19.65
29)	5.71	133.84	93.89	1.32	0.03	52.53	12.58	4.18	32.55	19.98
30)	5.91	134.31	93.89	1.25	0.03	53.06	12.64	4.20	32.85	20.21
31)	6.11	134.96	93.89	0.97	0.02	53.99	12.92	4.18	33.45	20.53
32)	6.51	136.06	93.89	0.56	0.01	55.50	13.33	4.16	34.42	21.08
33)	6.92	137.33	93.89	0.14	0.00	57.19	13.75	4.16	35.47	21.72
34)	7.32	138.41	93.89	-0.41	-0.01	58.82	14.30	4.11	36.56	22.26
35)	7.72	139.12	93.89	-0.75	-0.02	59.87	14.64	4.09	37.26	22.61
36)	8.13	140.18	93.89	-1.03	-0.02	61.20	14.92	4.10	38.06	23.14
37)	8.54	141.22	93.89	-1.51	-0.03	62.73	15.40	4.07	39.07	23.67
38)	8.95	142.08	93.89	-1.92	-0.04	64.00	15.81	4.05	39.91	24.09
39)	9.36	142.75	93.89	-2.27	-0.05	65.01	16.16	4.02	40.59	24.43
40)	9.75	143.42	93.89	-2.61	-0.05	66.03	16.50	4.00	41.27	24.76
41)	10.15	144.25	93.89	-3.02	-0.06	67.28	16.92	3.98	42.10	25.18
42)	10.65	144.84	93.89	-3.44	-0.07	68.28	17.33	3.94	42.80	25.48
43)	11.18	145.76	93.89	-3.99	-0.08	69.75	17.88	3.90	43.81	25.93
44)	11.68	146.50	93.89	-4.33	-0.08	70.83	18.22	3.89	44.53	26.30
45)	12.17	146.89	93.89	-4.61	-0.09	71.50	18.50	3.87	45.00	26.50
46)	12.68	147.61	93.89	-5.09	-0.09	72.70	18.98	3.83	45.84	26.86
47)	13.19	147.98	93.89	-5.23	-0.10	73.21	19.12	3.83	46.16	27.04
48)	13.70	148.50	93.89	-5.50	-0.10	74.00	19.40	3.82	46.70	27.30
49)	14.19	149.03	93.89	-5.85	-0.11	74.88	19.74	3.79	47.31	27.57
50)	14.71	149.36	93.89	-5.92	-0.11	75.28	19.81	3.80	47.54	27.74
51)	15.21	150.03	93.89	-6.12	-0.11	76.15	20.02	3.80	48.08	28.07
52)	16.23	150.99	93.89	-6.61	-0.12	77.60	20.50	3.79	49.05	28.55
53)	16.73	151.46	93.89	-6.88	-0.12	78.35	20.77	3.77	49.56	28.79
54)	17.24	151.76	93.89	-7.02	-0.12	78.78	20.91	3.77	49.84	28.93
55)	17.73	152.22	93.89	-7.29	-0.13	79.51	21.19	3.75	50.35	29.16
56)	18.25	152.49	93.89	-7.43	-0.13	79.92	21.32	3.75	50.62	29.30
57)	18.75	152.77	93.89	-7.98	-0.14	80.75	21.87	3.69	51.31	29.44
58)	19.76	153.28	93.89	-8.47	-0.14	81.75	22.36	3.66	52.05	29.70
59)	20.27	153.38	93.89	-8.74	-0.15	82.12	22.63	3.63	52.38	29.74

URS

Tue Jul 06 09:58:21 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Siesmic
Project No. : 26814536
Boring No. : WI-66
Sample No. : 8 Top
Sample Type : Pitcher
Soil Description : Gray fine sandy clay (CL)
Remarks : TXCIU Test with Effective Pressure of 13.89 psi

Location : San Leandro, CA
Test No. : WI-66-8T
Test Date : 06/24/04
Depth : 24.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.000 (in)
Area : 6.424 (in^2)
Volume : 32.121 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.28	80.00	0.00	0.00	0.00	93.89	13.89
2)	0.012	0.24	6.30	83.72	68.37	68.37	10.86	104.39	20.66
3)	0.022	0.44	6.31	85.17	97.57	97.57	15.46	108.84	23.67
4)	0.032	0.64	6.32	85.65	115.34	115.34	18.24	111.53	25.87
5)	0.042	0.85	6.34	85.93	121.69	121.69	19.21	112.46	26.53
6)	0.052	1.06	6.35	85.93	134.38	134.38	21.17	114.35	28.43
7)	0.062	1.26	6.36	86.07	142.00	142.00	22.32	115.47	29.40
8)	0.072	1.47	6.37	85.93	150.89	150.89	23.67	116.77	30.84
9)	0.082	1.66	6.39	85.93	161.04	161.04	25.21	118.27	32.34
10)	0.093	1.87	6.40	85.79	167.39	167.39	26.15	119.17	33.38
11)	0.103	2.07	6.41	85.58	175.01	175.01	27.28	120.27	34.68
12)	0.113	2.28	6.43	85.38	182.62	182.62	28.41	121.36	35.98
13)	0.122	2.46	6.44	85.17	187.70	187.70	29.15	122.07	36.90
14)	0.132	2.67	6.45	84.96	195.32	195.32	30.26	123.15	38.18
15)	0.141	2.86	6.47	84.76	201.66	201.66	31.19	124.04	39.28
16)	0.152	3.07	6.48	84.62	206.74	206.74	31.90	124.73	40.11
17)	0.162	3.28	6.49	84.34	213.09	213.09	32.81	125.61	41.27
18)	0.172	3.48	6.51	83.93	219.44	219.44	33.72	126.49	42.56
19)	0.182	3.68	6.52	83.93	223.24	223.24	34.23	126.99	43.05
20)	0.192	3.88	6.54	83.52	229.59	229.59	35.13	127.86	44.34
21)	0.202	4.08	6.55	83.38	237.21	237.21	36.22	128.91	45.53
22)	0.212	4.29	6.56	83.04	239.75	239.75	36.53	129.21	46.17
23)	0.223	4.50	6.58	82.83	246.09	246.09	37.41	130.06	47.23
24)	0.232	4.70	6.59	82.69	252.44	252.44	38.30	130.92	48.23
25)	0.242	4.89	6.60	82.62	254.98	254.98	38.61	131.22	48.59
26)	0.252	5.09	6.62	82.28	261.33	261.33	39.48	132.06	49.79
27)	0.262	5.30	6.63	82.00	265.14	265.14	39.97	132.54	50.53
28)	0.272	5.50	6.65	81.73	270.21	270.21	40.65	133.19	51.47
29)	0.282	5.71	6.66	81.31	275.29	275.29	41.32	133.84	52.53
30)	0.292	5.91	6.68	81.25	279.10	279.10	41.80	134.31	53.06
31)	0.302	6.11	6.69	80.97	284.18	284.18	42.48	134.96	53.99
32)	0.322	6.51	6.72	80.56	293.06	293.06	43.62	136.06	55.50
33)	0.342	6.92	6.75	80.14	303.22	303.22	44.93	137.33	57.19
34)	0.362	7.32	6.78	79.59	312.11	312.11	46.05	138.41	58.82
35)	0.382	7.72	6.81	79.25	318.45	318.45	46.78	139.12	59.87
36)	0.402	8.13	6.84	78.97	327.34	327.34	47.88	140.18	61.20
37)	0.422	8.54	6.87	78.49	336.23	336.23	48.96	141.22	62.73
38)	0.443	8.95	6.90	78.08	343.84	343.84	49.84	142.08	64.00
39)	0.463	9.36	6.93	77.73	350.19	350.19	50.53	142.75	65.01
40)	0.482	9.75	6.96	77.39	356.54	356.54	51.23	143.42	66.03
41)	0.502	10.15	6.99	76.97	364.15	364.15	52.09	144.25	67.28
42)	0.527	10.65	7.03	76.56	370.50	370.50	52.70	144.84	68.28
43)	0.553	11.18	7.07	76.01	379.39	379.39	53.65	145.76	69.75
44)	0.577	11.68	7.11	75.67	387.00	387.00	54.42	146.50	70.83
45)	0.602	12.17	7.15	75.39	392.08	392.08	54.82	146.89	71.50
46)	0.627	12.68	7.19	74.91	399.70	399.70	55.56	147.61	72.70
47)	0.652	13.19	7.24	74.77	404.78	404.78	55.94	147.98	73.21
48)	0.677	13.70	7.28	74.49	411.12	411.12	56.48	148.50	74.00
49)	0.701	14.19	7.32	74.15	417.47	417.47	57.03	149.03	74.88
50)	0.727	14.71	7.36	74.08	422.55	422.55	57.38	149.36	75.28
51)	0.752	15.21	7.41	73.87	430.16	430.16	58.07	150.03	76.15
52)	0.803	16.23	7.50	73.39	442.86	442.86	59.06	150.99	77.60
53)	0.827	16.73	7.54	73.12	449.21	449.21	59.55	151.46	78.35
54)	0.852	17.24	7.59	72.98	454.28	454.28	59.85	151.76	78.78
55)	0.877	17.73	7.64	72.70	460.63	460.63	60.33	152.22	79.51
56)	0.903	18.25	7.68	72.57	465.71	465.71	60.61	152.49	79.92
57)	0.927	18.75	7.73	72.02	470.79	470.79	60.90	152.77	80.75
58)	0.977	19.76	7.83	71.53	480.94	480.94	61.43	153.28	81.75
59)	1.002	20.27	7.88	71.26	484.75	484.75	61.53	153.38	82.12

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CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

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Project : Chabot Dam Siesmic          Location : San Leandro, CA
Project No. : 26814536                Test No. : WI-66-8T
Boring No. : WI-66                    Test Date : 06/24/04             Tested by : S. Capps
Sample No. : 8 Top                    Depth : 24.0 feet                Checked by : R. Taraya
Sample Type : Pitcher                 Elevation : NA
Soil Description : Gray fine sandy clay (CL)
Remarks : TXCIU Test with Effective Pressure of 13.89 psi

Height       : 5.000 (in)            Piston Diameter : 0.000 (in)      Filter Correction    : 0.00 (lb/in^2)
Area         : 6.424 (in^2)          Piston Friction : 0.00 (lb)       Membrane Correction : 0.00 (lb/in)
Volume       : 32.121 (in^3)         Piston Weight   : 0.00 (gm)       Area Correction     : Uniform

Liquid Limit : 26.78                 Plastic Limit : 16.67             Specific Gravity : 2.648

INITIAL
                             Height     : 5.000 (in)      Dry Density : 112.06 (lb/ft^3)
                             Area       : 6.424 (in^2)    Moisture    : 17.32 %
                             Void Ratio: 0.47
                             Saturation: 96.64 %
Time     : 0.00 (min)

INITIALIZATION
dH       : 0.000 (in)        Height     : 5.000 (in)      Dry Density : 112.06 (lb/ft^3)  Total Vert. Stress : 93.89 (lb/in^2
dV       : 0.000 (in^3)      Area       : 6.424 (in^2)    Moisture    : 17.32 %           Total Hori. Stress : 93.89 (lb/in^2
                             Void Ratio: 0.47                                             Pore Pressure      : 0.00 (lb/in^2)
                             Saturation: 96.64 %                                          Effect.Vert. Stress: 93.89 (lb/in^2
Time     : 0.00 (min)                                                                     Effect.Hori. Stress: 93.89 (lb/in^2

END OF CONSOLIDATION - A
dH       : 0.000 (in)        Height     : 5.000 (in)      Dry Density : 112.06 (lb/ft^3)  Total Vert. Stress : 93.89 (lb/in^2
dV       : 0.000 (in^3)      Area       : 6.424 (in^2)    Moisture    : 17.32 %           Total Hori. Stress : 93.89 (lb/in^2
                             Void Ratio: 0.47                                             Pore Pressure      : 0.00 (lb/in^2)
                             Saturation: 96.64 %                                          Effect.Vert. Stress: 93.89 (lb/in^2
Time     : 0.00 (min)                                                                     Effect.Hori. Stress: 93.89 (lb/in^2

END OF SATURATION
dH       : 0.000 (in)        Height     : 5.000 (in)      Dry Density : 112.06 (lb/ft^3)  Total Vert. Stress : 93.89 (lb/in^2
dV       : 0.000 (in^3)      Area       : 6.424 (in^2)    Moisture    : 16.07 %           Total Hori. Stress : 93.89 (lb/in^2
dVCorr   : 0.000 (in^3)      Void Ratio: 0.47                                             Pore Pressure      : 0.00 (lb/in^2)
                             Saturation: 89.68 %                                          Effect.Vert. Stress: 93.89 (lb/in^2
Time     : 0.00 (min)                                                                     Effect.Hori. Stress: 93.89 (lb/in^2

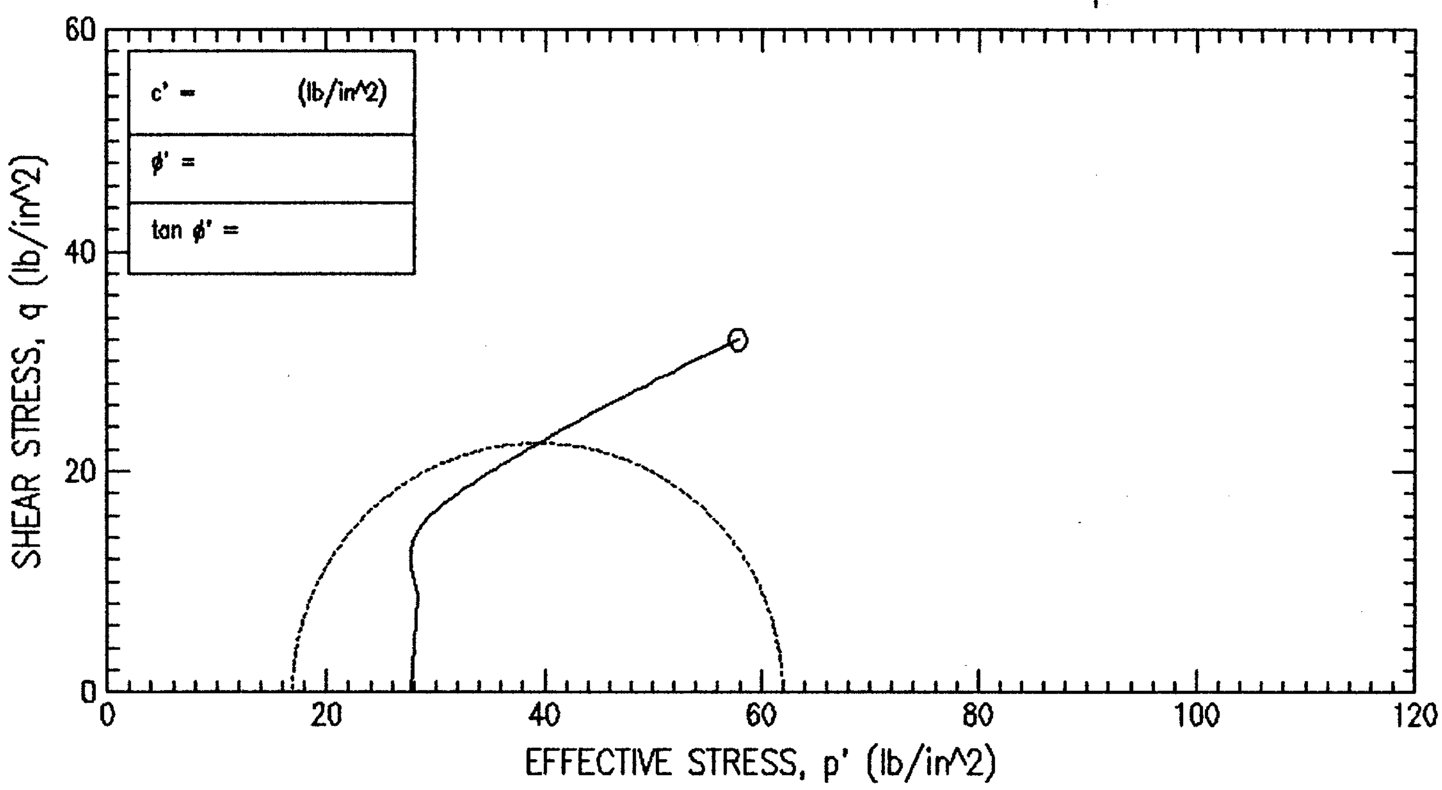
END OF CONSOLIDATION - B
dH       : 0.056 (in)        Height     : 4.944 (in)      Dry Density : 115.91 (lb/ft^3)  Total Vert. Stress : 93.89 (lb/in^2
dV       : 1.066 (in^3)      Area       : 6.281 (in^2)    Moisture    : 16.07 %           Total Hori. Stress : 93.89 (lb/in^2
                             Void Ratio: 0.43                                             Pore Pressure      : 80.00 (lb/in^2
                             Saturation: 99.99 %                                          Effect.Vert. Stress: 13.89 (lb/in^2
Time     : 0.00 (min)                                                                     Effect.Hori. Stress: 13.89 (lb/in^2

FAILURE DURING SHEAR
dH       : 1.002 (in)        Height     : 3.998 (in)      Dry Density : 115.91 (lb/ft^3)  Total Vert. Stress : 155.42 (lb/in^
dV       : 1.066 (in^3)      Area       : 7.878 (in^2)    Moisture    : 16.07 %           Total Hori. Stress : 93.89 (lb/in^2
Strain   : 20.27 %           Void Ratio: 0.43                                             Pore Pressure      : 71.26 (lb/in^2
Strength: 30.77 (lb/in^2)Saturation: 99.99 %                                              Effect.Vert. Stress: 84.16 (lb/in^2
Time     : 1170.80 (min)                                                                  Effect.Hori. Stress: 22.63 (lb/in^2

END OF TEST
dH       : 1.002 (in)        Height     : 3.998 (in)      Dry Density : 115.91 (lb/ft^3)  Total Vert. Stress : 155.42 (lb/in^
dV       : 1.066 (in^3)      Area       : 7.878 (in^2)    Moisture    : 16.07 %           Total Hori. Stress : 93.89 (lb/in^2
Strain   : 20.27 %           Void Ratio: 0.43                                             Pore Pressure      : 71.26 (lb/in^2
                             Saturation: 99.99 %                                          Effect.Vert. Stress: 84.16 (lb/in^2
Time     : 1170.80 (min)                                                                  Effect.Hori. Stress: 22.63 (lb/in^2
```

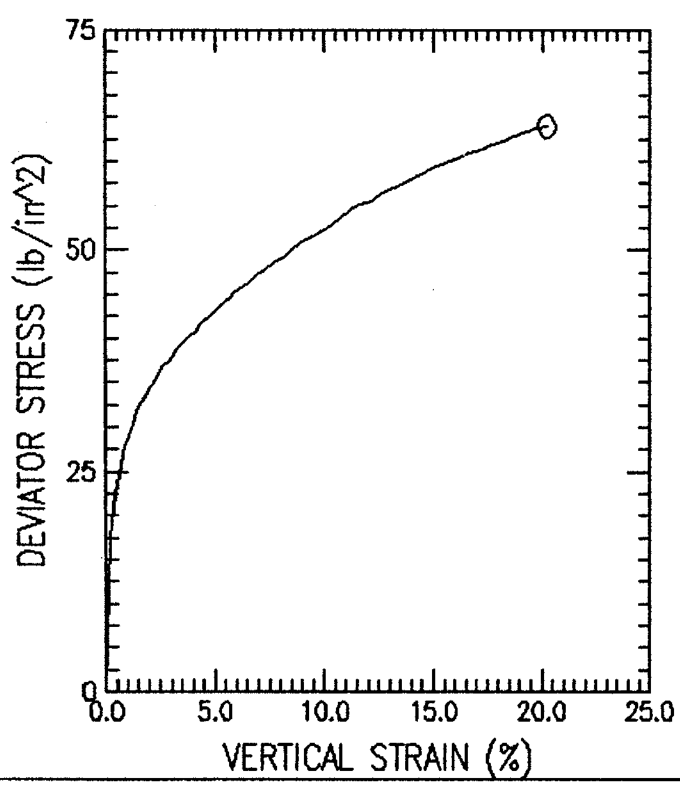
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-66-8B



	SYMBOL	O			
	TEST NO.	WI-66-8B			
INITIAL	WATER CONTENT (%)	12.50			
	DRY DENSITY (lb/ft^3)	122.36			
	SATURATION (%)	94.45			
	VOID RATIO	0.350			
BEFORE SHEAR	WATER CONTENT (%)	11.67			
	DRY DENSITY (lb/ft^3)	126.20			
	SATURATION (%)	99.93			
	VOID RATIO	0.309			
	BACK PRESS. (lb/in^2)	80.00			
	MINOR PRIN. STRESS (lb/in^2)	27.78			
	MAX. DEV. STRESS (lb/in^2)	65.89			
	TIME TO FAILURE (min)	1392.17			
	RATE OF STRAIN INCR (%/min)	0.00			
	INITIAL DIAMETER (in)	2.86			
	INITIAL HEIGHT (in)	5.95			
	B-VALUE	97.80			

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray clayey sand with gravel (SC)

LL 28.13	PL 17.19	PI 10.94	GS 2.65	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 27.78 psi

PROJECT Chabot Dam Seismic

PROJECT NO.26814536

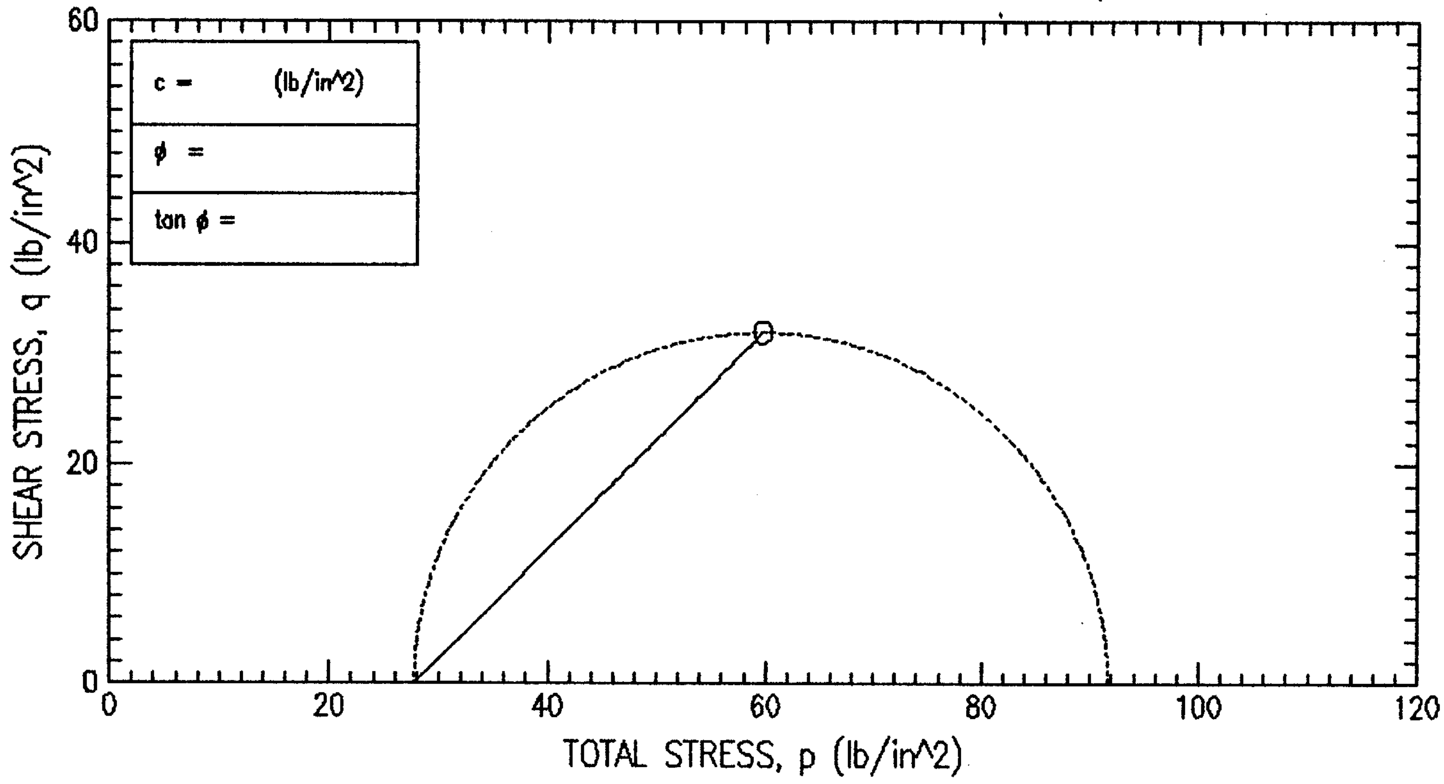
BORING NO. WI-66	SAMPLE NO.	8 Bottom			
TECH. S. Capps	DEPTH/ELEV	24.0 feet			
LABORATORY	DATE	06/24/04			

TRIAXIAL COMPRESSION TEST REPORT

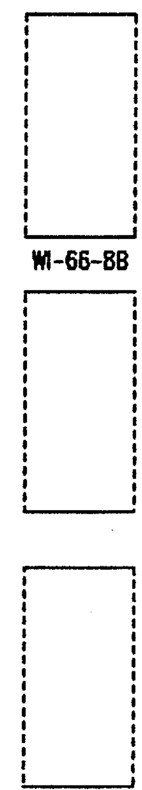
Tue 07-06-:4, 09:52:04

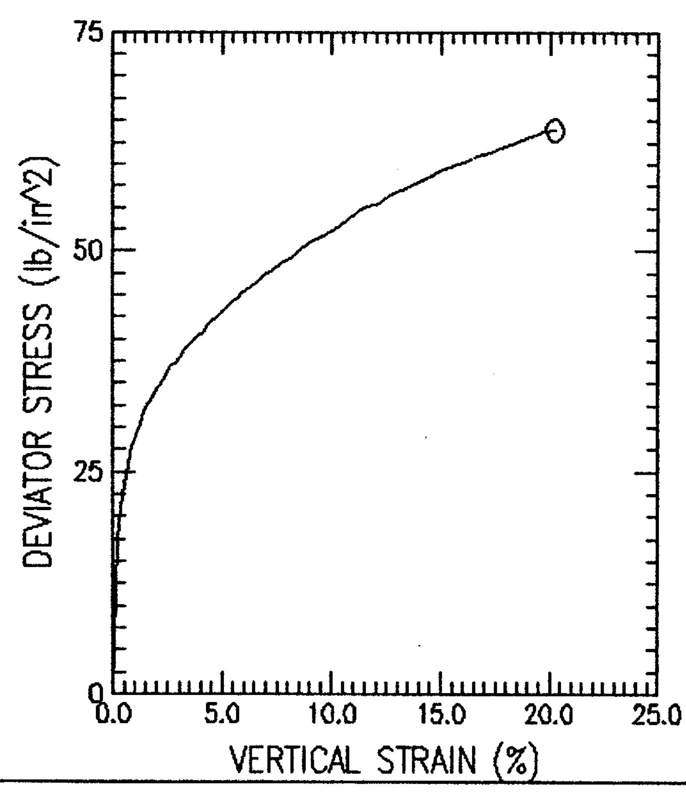
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES





SYMBOL		O				
TEST NO.		WI-66-8B				
INITIAL	WATER CONTENT (%)	12.50				
	DRY DENSITY (lb/ft^3)	122.36				
	SATURATION (%)	94.45				
	VOID RATIO	0.350				
BEFORE SHEAR	WATER CONTENT (%)	11.67				
	DRY DENSITY (lb/ft^3)	126.20				
	SATURATION (%)	99.93				
	VOID RATIO	0.309				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		27.78				
MAX. DEV. STRESS (lb/in^2)		65.89				
TIME TO FAILURE (min)		1392.17				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.80				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray clayey sand with gravel (SC)

LL 28.13	PL 17.19	PI 10.94	GS 2.65	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 27.78 psi

PROJECT Chabot Dam Seismic

PROJECT NO.26814536

BORING NO. WI-66	SAMPLE NO.	8 Bottom			
TECH. S. Capps	DEPTH/ELEV	24.0 feet			
LABORATORY	DATE	06/24/04			

TRIAXIAL COMPRESSION TEST REPORT

Tue 07-06-:4, 09:51:27

URS

Tue Jul 06 09:52:35 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic
Project No. : 26814536
Boring No. : WI-66
Sample No. : 8 Bottom
Sample Type : Pitcher
Soil Description : Gray clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 27.78 psi

Location : San leandro, CA
Test No. : WI-66-8B
Test Date : 06/24/04
Depth : 24.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	107.78	107.78	0.00	0.00	27.78	27.78	1.00	27.78	0.00
2)	0.24	125.24	107.78	8.17	0.47	37.06	19.60	1.89	28.33	8.73
3)	0.44	130.25	107.78	11.29	0.50	38.95	16.48	2.36	27.72	11.23
4)	0.65	133.67	107.78	13.00	0.50	40.67	14.78	2.75	27.72	12.94
5)	0.85	135.74	107.78	13.78	0.49	41.96	14.00	3.00	27.98	13.98
6)	1.05	136.91	107.78	13.99	0.48	42.91	13.79	3.11	28.35	14.56
7)	1.25	138.18	107.78	14.20	0.47	43.98	13.57	3.24	28.77	15.20
8)	1.45	139.56	107.78	14.27	0.45	45.28	13.50	3.35	29.39	15.89
9)	1.65	140.61	107.78	14.20	0.43	46.40	13.57	3.42	29.99	16.41
10)	1.85	141.64	107.78	14.13	0.42	47.51	13.64	3.48	30.58	16.93
11)	2.05	142.23	107.78	13.99	0.41	48.24	13.79	3.50	31.01	17.23
12)	2.26	143.04	107.78	13.92	0.39	49.12	13.86	3.54	31.49	17.63
13)	2.46	143.85	107.78	13.71	0.38	50.14	14.07	3.56	32.11	18.04
14)	2.66	144.65	107.78	13.56	0.37	51.08	14.21	3.59	32.65	18.44
15)	2.86	145.12	107.78	13.42	0.36	51.70	14.35	3.60	33.02	18.67
16)	3.06	145.70	107.78	13.28	0.35	52.42	14.50	3.62	33.46	18.96
17)	3.26	146.49	107.78	13.00	0.34	53.49	14.78	3.62	34.14	19.36
18)	3.48	147.06	107.78	12.85	0.33	54.20	14.92	3.63	34.56	19.64
19)	3.68	147.52	107.78	12.71	0.32	54.80	15.06	3.64	34.93	19.87
20)	3.88	148.09	107.78	12.50	0.31	55.58	15.28	3.64	35.43	20.15
21)	4.08	148.54	107.78	12.36	0.30	56.18	15.42	3.64	35.80	20.38
22)	4.29	149.21	107.78	12.14	0.29	57.06	15.63	3.65	36.34	20.71
23)	4.48	149.77	107.78	11.93	0.28	57.83	15.84	3.65	36.84	21.00
24)	4.69	150.11	107.78	11.86	0.28	58.24	15.91	3.66	37.08	21.16
25)	4.89	150.55	107.78	11.65	0.27	58.90	16.13	3.65	37.51	21.39
26)	5.09	151.00	107.78	11.44	0.26	59.56	16.34	3.65	37.95	21.61
27)	5.29	151.55	107.78	11.29	0.26	60.25	16.48	3.66	38.37	21.88
28)	5.49	151.99	107.78	11.15	0.25	60.83	16.62	3.66	38.73	22.10
29)	5.70	152.31	107.78	11.01	0.25	61.30	16.77	3.66	39.03	22.27
30)	5.89	152.86	107.78	10.87	0.24	61.99	16.91	3.67	39.45	22.54
31)	6.10	153.29	107.78	10.66	0.23	62.63	17.12	3.66	39.87	22.75
32)	6.50	154.04	107.78	10.37	0.22	63.66	17.40	3.66	40.53	23.13
33)	6.91	154.99	107.78	10.02	0.21	64.97	17.76	3.66	41.37	23.61
34)	7.31	155.52	107.78	9.73	0.20	65.78	18.04	3.65	41.91	23.87
35)	7.71	156.35	107.78	9.31	0.19	67.04	18.47	3.63	42.75	24.28
36)	8.12	156.96	107.78	9.09	0.18	67.86	18.68	3.63	43.27	24.59
37)	8.53	157.88	107.78	8.74	0.17	69.13	19.04	3.63	44.08	25.05
38)	8.92	158.48	107.78	8.53	0.17	69.95	19.25	3.63	44.60	25.35
39)	9.33	159.07	107.78	8.17	0.16	70.89	19.60	3.62	45.25	25.65
40)	9.73	159.66	107.78	7.89	0.15	71.77	19.89	3.61	45.83	25.94
41)	10.14	160.33	107.78	7.60	0.14	72.73	20.17	3.61	46.45	26.28
42)	10.65	161.24	107.78	7.18	0.13	74.06	20.60	3.60	47.33	26.73
43)	11.16	162.24	107.78	6.90	0.13	75.34	20.88	3.61	48.11	27.23
44)	11.66	162.83	107.78	6.54	0.12	76.28	21.23	3.59	48.76	27.52
45)	12.16	163.21	107.78	6.19	0.11	77.01	21.59	3.57	49.30	27.71
46)	12.66	164.17	107.78	5.90	0.10	78.26	21.87	3.58	50.07	28.19
47)	13.16	164.83	107.78	5.55	0.10	79.27	22.23	3.57	50.75	28.52
48)	13.68	165.26	107.78	5.19	0.09	80.07	22.58	3.55	51.32	28.74
49)	14.18	165.89	107.78	4.91	0.08	80.98	22.87	3.54	51.92	29.06
50)	14.69	166.60	107.78	4.55	0.08	82.04	23.22	3.53	52.63	29.41
51)	15.19	167.22	107.78	4.27	0.07	82.94	23.50	3.53	53.22	29.72
52)	16.20	168.11	107.78	3.77	0.06	84.33	24.00	3.51	54.17	30.17
53)	16.70	168.69	107.78	3.49	0.06	85.19	24.29	3.51	54.74	30.45
54)	17.21	169.15	107.78	3.28	0.05	85.87	24.50	3.51	55.18	30.69
55)	17.71	169.71	107.78	3.14	0.05	86.57	24.64	3.51	55.61	30.97
56)	18.22	170.06	107.78	2.85	0.05	87.21	24.92	3.50	56.06	31.14
57)	18.74	170.50	107.78	2.50	0.04	87.99	25.28	3.48	56.64	31.36
58)	19.74	171.44	107.78	2.00	0.03	89.44	25.77	3.47	57.61	31.83
59)	20.24	171.67	107.78	1.86	0.03	89.81	25.92	3.47	57.86	31.94

URS

Tue Jul 06 09:52:35 2004

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic
Project No. : 26814536
Boring No. : WI-66
Sample No. : 8 Bottom
Sample Type : Pitcher
Soil Description : Gray clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 27.78 psi

Location : San leandro, CA
Test No. : WI-66-8B
Test Date : 06/24/04
Depth : 24.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.29	80.00	0.00	0.00	0.00	107.78	27.78
2)	0.014	0.24	6.31	88.18	113.59	113.59	18.01	125.24	37.06
3)	0.026	0.44	6.32	91.30	146.48	146.48	23.17	130.25	38.95
4)	0.038	0.65	6.33	93.00	169.13	169.13	26.70	133.67	40.67
5)	0.050	0.85	6.35	93.78	183.02	183.02	28.84	135.74	41.96
6)	0.062	1.05	6.36	93.99	191.06	191.06	30.04	136.91	42.91
7)	0.073	1.25	6.37	94.21	199.83	199.83	31.36	138.18	43.98
8)	0.086	1.45	6.39	94.28	209.33	209.33	32.78	139.56	45.28
9)	0.097	1.65	6.40	94.21	216.64	216.64	33.86	140.61	46.40
10)	0.109	1.85	6.41	94.14	223.95	223.95	34.92	141.64	47.51
11)	0.121	2.05	6.43	93.99	228.33	228.33	35.54	142.23	48.24
12)	0.133	2.26	6.44	93.92	234.18	234.18	36.37	143.04	49.12
13)	0.144	2.46	6.45	93.71	240.02	240.02	37.20	143.85	50.14
14)	0.157	2.66	6.47	93.57	245.87	245.87	38.03	144.65	51.08
15)	0.168	2.86	6.48	93.43	249.52	249.52	38.51	145.12	51.70
16)	0.180	3.06	6.49	93.28	253.91	253.91	39.11	145.70	52.42
17)	0.192	3.26	6.51	93.00	259.76	259.76	39.93	146.49	53.49
18)	0.205	3.48	6.52	92.86	264.14	264.14	40.51	147.06	54.20
19)	0.216	3.68	6.53	92.72	267.80	267.80	40.99	147.52	54.80
20)	0.228	3.88	6.55	92.50	272.18	272.18	41.57	148.09	55.58
21)	0.240	4.08	6.56	92.36	275.83	275.83	42.04	148.54	56.18
22)	0.252	4.29	6.58	92.15	280.95	280.95	42.73	149.21	57.06
23)	0.264	4.48	6.59	91.94	285.34	285.34	43.31	149.77	57.83
24)	0.276	4.69	6.60	91.87	288.26	288.26	43.66	150.11	58.24
25)	0.288	4.89	6.62	91.65	291.91	291.91	44.12	150.55	58.90
26)	0.299	5.09	6.63	91.44	295.57	295.57	44.58	151.00	59.56
27)	0.311	5.29	6.64	91.30	299.95	299.95	45.14	151.55	60.25
28)	0.323	5.49	6.66	91.16	303.61	303.61	45.59	151.99	60.83
29)	0.335	5.70	6.67	91.01	306.53	306.53	45.93	152.31	61.30
30)	0.347	5.89	6.69	90.87	310.91	310.91	46.49	152.86	61.99
31)	0.359	6.10	6.70	90.66	314.57	314.57	46.94	153.29	62.63
32)	0.383	6.50	6.73	90.38	321.15	321.15	47.71	154.04	63.66
33)	0.406	6.91	6.76	90.02	329.19	329.19	48.69	154.99	64.97
34)	0.430	7.31	6.79	89.74	334.30	334.30	49.24	155.52	65.78
35)	0.454	7.71	6.82	89.31	341.61	341.61	50.09	156.35	67.04
36)	0.478	8.12	6.85	89.10	347.46	347.46	50.73	156.96	67.86
37)	0.502	8.53	6.88	88.74	355.49	355.49	51.67	157.88	69.13
38)	0.525	8.92	6.91	88.53	361.34	361.34	52.29	158.48	69.95
39)	0.549	9.33	6.94	88.18	367.19	367.19	52.90	159.07	70.89
40)	0.573	9.73	6.97	87.89	373.03	373.03	53.51	159.66	71.77
41)	0.597	10.14	7.00	87.61	379.61	379.61	54.20	160.33	72.73
42)	0.627	10.65	7.04	87.18	388.38	388.38	55.14	161.24	74.06
43)	0.656	11.16	7.08	86.90	397.88	397.88	56.17	162.24	75.34
44)	0.686	11.66	7.12	86.55	404.46	404.46	56.77	162.83	76.28
45)	0.716	12.16	7.16	86.19	409.58	409.58	57.16	163.21	77.01
46)	0.745	12.66	7.21	85.91	419.08	419.08	58.16	164.17	78.26
47)	0.774	13.16	7.25	85.55	426.39	426.39	58.84	164.83	79.27
48)	0.805	13.68	7.29	85.20	432.23	432.23	59.29	165.26	80.07
49)	0.834	14.18	7.33	84.91	439.54	439.54	59.94	165.89	80.98
50)	0.865	14.69	7.38	84.56	447.58	447.58	60.67	166.60	82.04
51)	0.894	15.19	7.42	84.28	454.89	454.89	61.30	167.22	82.94
52)	0.953	16.20	7.51	83.78	467.31	467.31	62.23	168.11	84.33
53)	0.983	16.70	7.56	83.49	474.62	474.62	62.82	168.69	85.19
54)	1.013	17.21	7.60	83.28	481.20	481.20	63.30	169.15	85.87
55)	1.042	17.71	7.65	83.14	488.51	488.51	63.87	169.71	86.57
56)	1.072	18.22	7.70	82.86	494.35	494.35	64.24	170.06	87.21
57)	1.102	18.74	7.74	82.50	500.93	500.93	64.68	170.50	87.99
58)	1.161	19.74	7.84	82.01	514.82	514.82	65.66	171.44	89.44
59)	1.191	20.24	7.89	81.86	519.93	519.93	65.89	171.67	89.81

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic
Project No. : 26814536
Boring No. : WI-66
Sample No. : 8 Bottom
Sample Type : Pitcher
Soil Description : Gray clayey sand with gravel (SC)
Remarks : TXCIU Test with Effective Pressure of 27.78 psi

Location : San leandro, CA
Test No. : WI-66-8B
Test Date : 06/24/04
Depth : 24.0 feet
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 28.13
Plastic Limit : 17.19
Specific Gravity : 2.648

INITIAL

Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.35
Saturation: 94.45 %
Dry Density : 122.36 (lb/ft^3)
Moisture : 12.50 %
Time : 0.00 (min)

INITIALIZATION

dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.35
Saturation: 94.45 %
Dry Density : 122.36 (lb/ft^3)
Moisture : 12.50 %
Total Vert. Stress : 107.78 (lb/in^
Total Hori. Stress : 107.78 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 107.78 (lb/in^
Effect.Hori. Stress: 107.78 (lb/in^

END OF CONSOLIDATION - A

dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.35
Saturation: 94.45 %
Dry Density : 122.36 (lb/ft^3)
Moisture : 12.50 %
Total Vert. Stress : 107.78 (lb/in^
Total Hori. Stress : 107.78 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 107.78 (lb/in^
Effect.Hori. Stress: 107.78 (lb/in^

END OF SATURATION

dH : 0.000 (in)
dV : 0.000 (in^3)
dVCorr : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.35
Saturation: 88.20 %
Dry Density : 122.36 (lb/ft^3)
Moisture : 11.67 %
Total Vert. Stress : 107.78 (lb/in^
Total Hori. Stress : 107.78 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 107.78 (lb/in^
Effect.Hori. Stress: 107.78 (lb/in^

END OF CONSOLIDATION - B

dH : 0.061 (in)
dV : 1.163 (in^3)
Time : 0.00 (min)
Height : 5.884 (in)
Area : 6.293 (in^2)
Void Ratio: 0.31
Saturation: 99.93 %
Dry Density : 126.20 (lb/ft^3)
Moisture : 11.67 %
Total Vert. Stress : 107.78 (lb/in^
Total Hori. Stress : 107.78 (lb/in^
Pore Pressure : 80.00 (lb/in^2
Effect.Vert. Stress: 27.78 (lb/in^2
Effect.Hori. Stress: 27.78 (lb/in^2

FAILURE DURING SHEAR

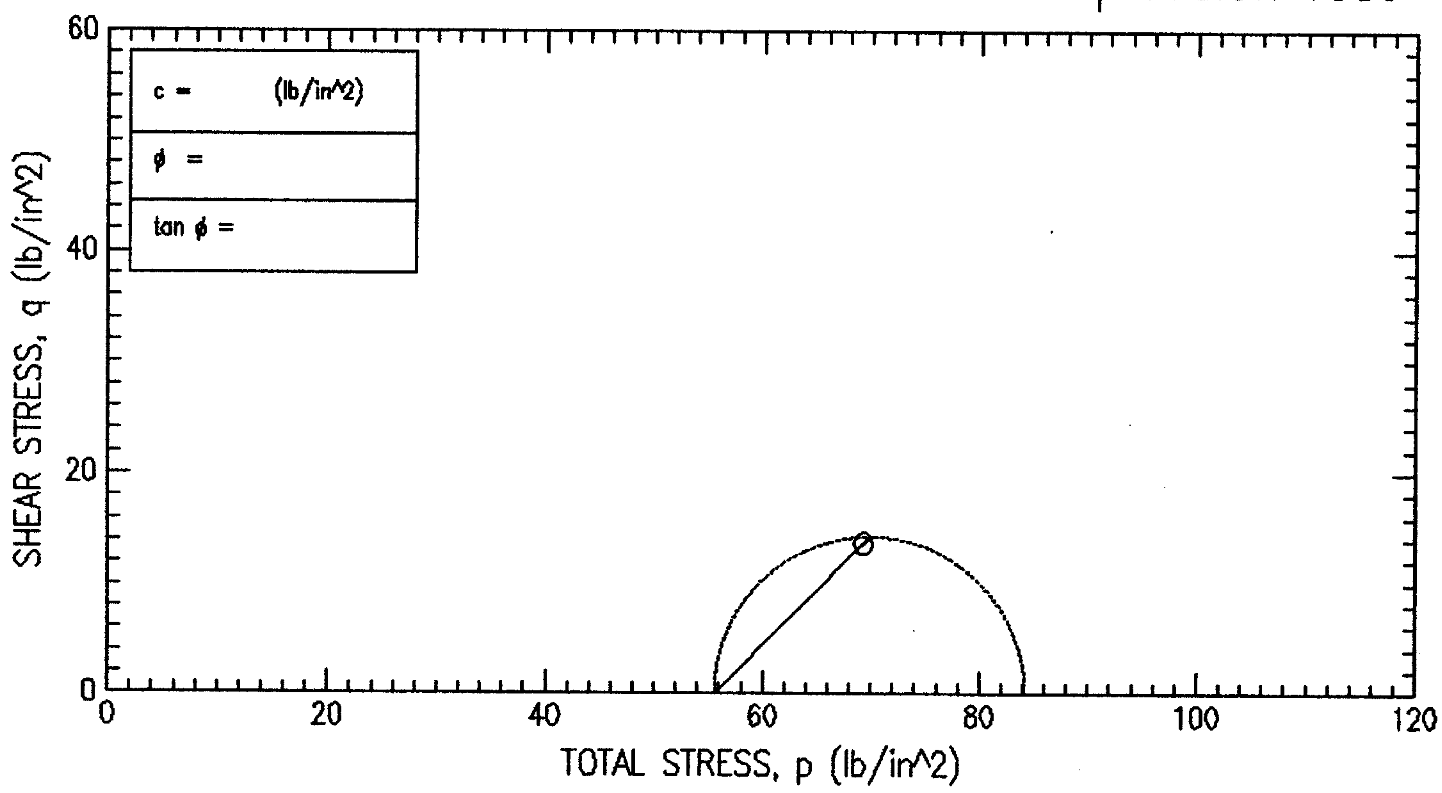
dH : 1.191 (in)
dV : 1.163 (in^3)
Strain : 20.24 %
Strength: 32.95 (lb/in^2)
Time : 1392.17 (min)
Height : 4.754 (in)
Area : 7.890 (in^2)
Void Ratio: 0.31
Saturation: 99.93 %
Dry Density : 126.20 (lb/ft^3)
Moisture : 11.67 %
Total Vert. Stress : 173.67 (lb/in^
Total Hori. Stress : 107.78 (lb/in^
Pore Pressure : 81.86 (lb/in^2
Effect.Vert. Stress: 91.81 (lb/in^2
Effect.Hori. Stress: 25.92 (lb/in^2

END OF TEST

dH : 1.191 (in)
dV : 1.163 (in^3)
Strain : 20.24 %
Time : 1392.17 (min)
Height : 4.754 (in)
Area : 7.890 (in^2)
Void Ratio: 0.31
Saturation: 99.93 %
Dry Density : 126.20 (lb/ft^3)
Moisture : 11.67 %
Total Vert. Stress : 173.67 (lb/in^
Total Hori. Stress : 107.78 (lb/in^
Pore Pressure : 81.86 (lb/in^2
Effect.Vert. Stress: 91.81 (lb/in^2
Effect.Hori. Stress: 25.92 (lb/in^2

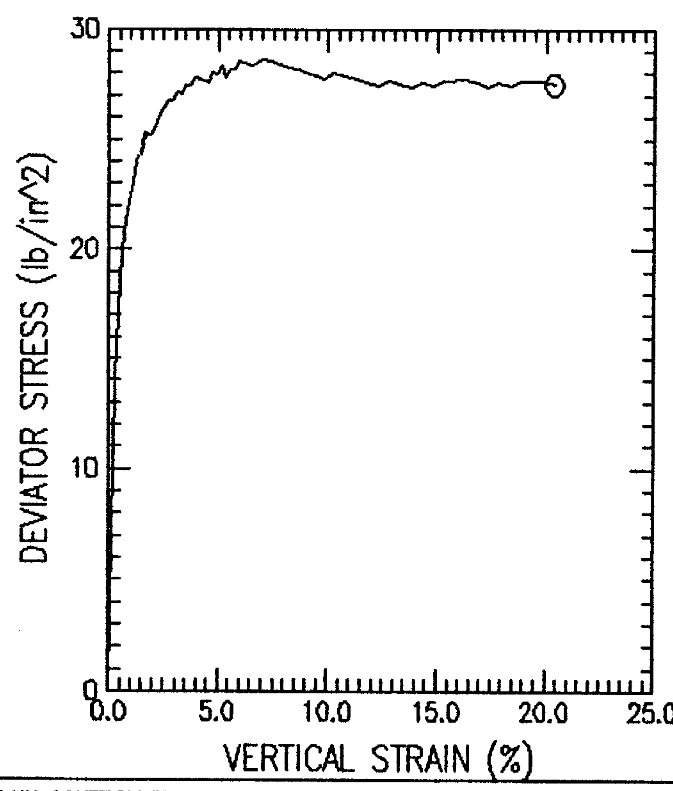
URS

Consolidated Undrained Triaxial Compression Test



FAILURE SKETCHES

WI-67-6A



SYMBOL		○				
TEST NO.		WI-67-6A				
INITIAL	WATER CONTENT (%)	28.58				
	DRY DENSITY (lb/ft^3)	92.82				
	SATURATION (%)	96.67				
	VOID RATIO	0.785				
BEFORE SHEAR	WATER CONTENT (%)	26.41				
	DRY DENSITY (lb/ft^3)	97.37				
	SATURATION (%)	99.96				
	VOID RATIO	0.701				
	BACK PRESS. (lb/in^2)	80.00				
MINOR PRIN. STRESS (lb/in^2)		55.56				
MAX. DEV. STRESS (lb/in^2)		30.05				
TIME TO FAILURE (min)		483.15				
RATE OF STRAIN INCR (%/min)		0.00				
INITIAL DIAMETER (in)		2.86				
INITIAL HEIGHT (in)		5.95				
B-VALUE		97.60				

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray fine sandy silty clay with gravel (CL)

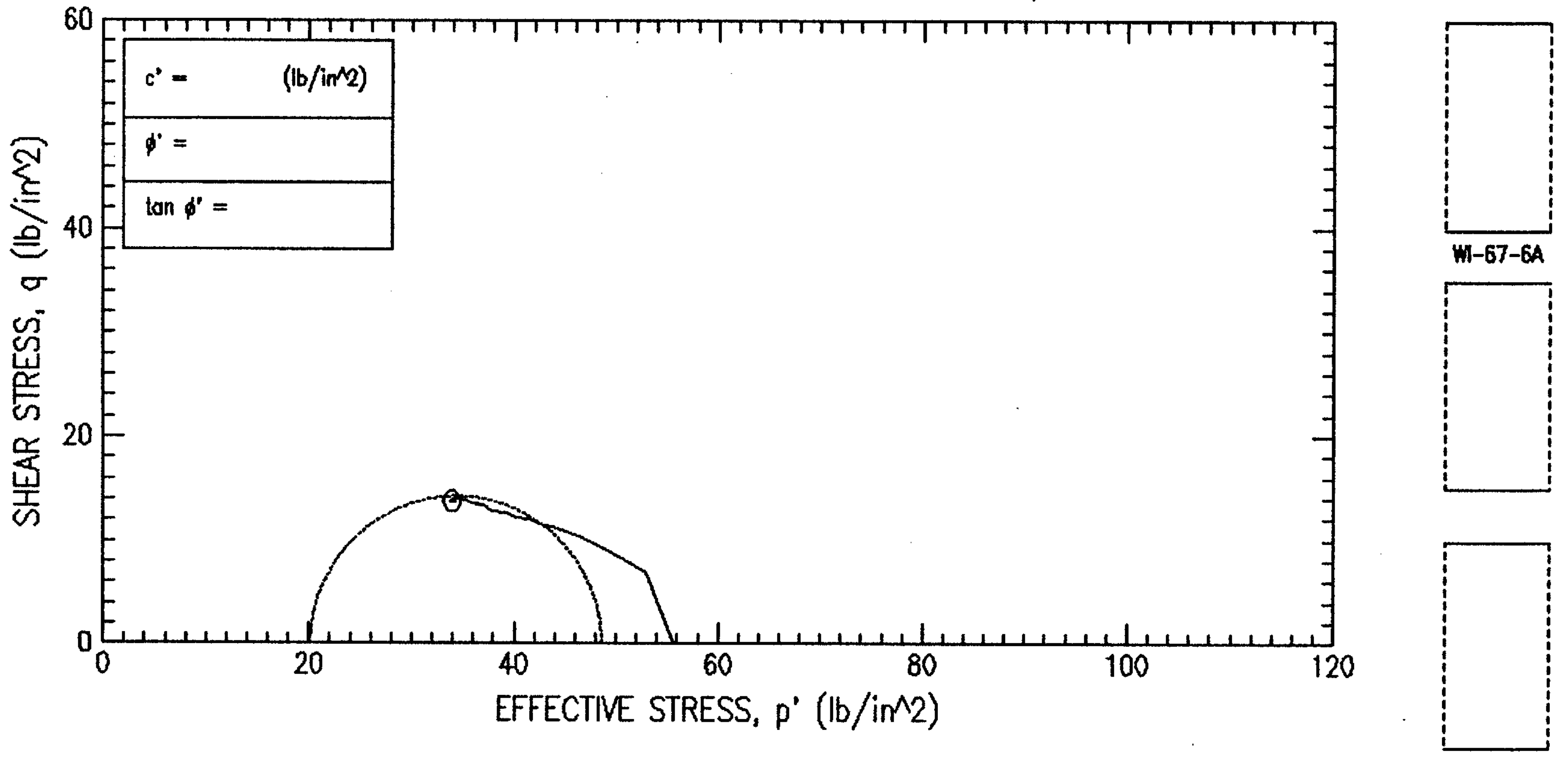
LL 37.10	PL 18.26	PI 18.84	GS 2.66	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

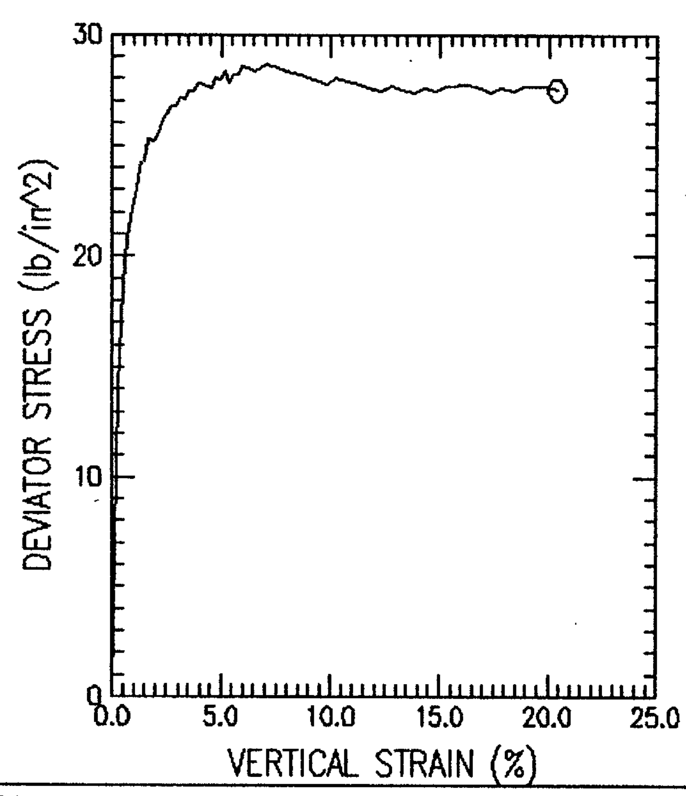
REMARKS:	PROJECT Chabot Dam Seismic				
1) TXCIU Test with Effective Pressure of 55.56 psi	PROJECT NO.26814536				
	BORING NO. WI-67	SAMPLE NO.	6A Bottom		
	TECH. S. Capps	DEPTH/ELEV	19.5-21.0		
	LABORATORY	DATE	06/24/04		
	TRIAXIAL COMPRESSION TEST REPORT				

Tue 07-06-:4, 10:19:58

URS

Consolidated Undrained Triaxial Compression Test





SYMBOL		O			
TEST NO.		WI-67-6A			
INITIAL	WATER CONTENT (%)	28.58			
	DRY DENSITY (lb/ft^3)	92.82			
	SATURATION (%)	96.67			
	VOID RATIO	0.785			
BEFORE SHEAR	WATER CONTENT (%)	26.41			
	DRY DENSITY (lb/ft^3)	97.37			
	SATURATION (%)	99.96			
	VOID RATIO	0.701			
	BACK PRESS. (lb/in^2)	80.00			
MINOR PRIN. STRESS (lb/in^2)		55.56			
MAX. DEV. STRESS (lb/in^2)		30.05			
TIME TO FAILURE (min)		483.15			
RATE OF STRAIN INCR (%/min)		0.00			
INITIAL DIAMETER (in)		2.86			
INITIAL HEIGHT (in)		5.95			
B-VALUE		97.60			

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray fine sandy silty clay with gravel (CL)

LL 37.10	PL 18.26	PI 18.84	GS 2.66	TYPE OF SPECIMEN Pitcher	TYPE OF TEST CU (R)

REMARKS:

1) TXCIU Test with Effective Pressure of 55.56 psi

PROJECT	Chabot Dam Seismic			
PROJECT NO.	26814536			
BORING NO. WI-67	SAMPLE NO.	6A Bottom		
TECH. S. Capps	DEPTH/ELEV	19.5-21.0		
LABORATORY	DATE	06/24/04		

TRIAXIAL COMPRESSION TEST REPORT

Tue 07-06-:4, 10:20:38

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic
Project No. : 26814536
Boring No. : WI-67
Sample No. : 6A Bottom
Sample Type : Pitcher
Location : San Leandro, CA
Test No. : WI-67-6A
Test Date : 06/24/04
Depth : 19.5-21.0
Elevation : NA
Tested by : S. Capps
Checked by : R. Taraya
Soil Description : Gray fine sandy silty clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	VERTICAL STRAIN (%)	TOTAL VERTICAL STRESS (lb/in^2)	TOTAL HORIZONTAL STRESS (lb/in^2)	EXCESS PORE PRESSURE (lb/in^2)	A PARAMETER	EFFECTIVE VERTICAL STRESS (lb/in^2)	EFFECTIVE HORIZONTAL STRESS (lb/in^2)	OBLIQUITY	EFFECTIVE p (lb/in^2)	q (lb/in^2)
1)	0.00	135.56	135.56	0.00	0.00	55.56	55.56	1.00	55.56	0.00
2)	0.27	149.55	135.56	9.70	0.69	59.85	45.86	1.31	52.85	7.00
3)	0.48	154.16	135.56	16.29	0.88	57.88	39.28	1.47	48.58	9.30
4)	0.69	156.43	135.56	19.65	0.94	56.78	35.91	1.58	46.35	10.44
5)	0.88	157.78	135.56	22.49	1.01	55.29	33.08	1.67	44.19	11.11
6)	1.09	158.65	135.56	24.78	1.07	53.87	30.78	1.75	42.33	11.55
7)	1.29	159.53	135.56	26.08	1.09	53.45	29.48	1.81	41.46	11.98
8)	1.49	159.94	135.56	27.69	1.14	52.25	27.87	1.87	40.06	12.19
9)	1.69	160.80	135.56	28.91	1.15	51.89	26.65	1.95	39.27	12.62
10)	1.89	160.75	135.56	29.37	1.17	51.38	26.19	1.96	38.78	12.59
11)	2.10	161.15	135.56	30.45	1.19	50.71	25.12	2.02	37.91	12.80
12)	2.30	161.55	135.56	31.13	1.20	50.42	24.43	2.06	37.43	13.00
13)	2.51	161.95	135.56	31.36	1.19	50.59	24.20	2.09	37.40	13.20
14)	2.71	162.35	135.56	32.21	1.20	50.15	23.36	2.15	36.75	13.40
15)	2.91	162.30	135.56	32.67	1.22	49.64	22.90	2.17	36.27	13.37
16)	3.12	162.69	135.56	32.67	1.20	50.03	22.90	2.18	36.46	13.56
17)	3.32	162.63	135.56	33.35	1.23	49.28	22.21	2.22	35.75	13.54
18)	3.52	163.03	135.56	33.66	1.23	49.37	21.90	2.25	35.64	13.73
19)	3.73	162.97	135.56	33.74	1.23	49.24	21.83	2.26	35.53	13.70
20)	3.93	163.36	135.56	34.12	1.23	49.24	21.44	2.30	35.34	13.90
21)	4.14	163.30	135.56	34.27	1.24	49.03	21.29	2.30	35.16	13.87
22)	4.34	163.24	135.56	34.35	1.24	48.89	21.21	2.30	35.05	13.84
23)	4.54	163.18	135.56	34.58	1.25	48.61	20.98	2.32	34.80	13.81
24)	4.74	163.57	135.56	34.73	1.24	48.84	20.83	2.34	34.84	14.00
25)	4.95	163.51	135.56	34.81	1.25	48.70	20.76	2.35	34.73	13.97
26)	5.14	163.89	135.56	34.96	1.23	48.93	20.60	2.38	34.77	14.17
27)	5.35	163.39	135.56	34.81	1.25	48.58	20.76	2.34	34.67	13.91
28)	5.55	163.77	135.56	35.11	1.24	48.66	20.45	2.38	34.55	14.10
29)	5.75	163.71	135.56	35.19	1.25	48.52	20.37	2.38	34.45	14.07
30)	5.96	164.08	135.56	35.34	1.24	48.74	20.22	2.41	34.48	14.26
31)	6.17	164.02	135.56	35.42	1.24	48.61	20.14	2.41	34.37	14.23
32)	6.57	163.90	135.56	35.34	1.25	48.56	20.22	2.40	34.39	14.17
33)	6.98	164.21	135.56	34.96	1.22	49.25	20.60	2.39	34.93	14.32
34)	7.38	164.09	135.56	35.34	1.24	48.74	20.22	2.41	34.48	14.26
35)	7.79	163.96	135.56	35.27	1.24	48.70	20.30	2.40	34.50	14.20
36)	8.20	163.83	135.56	34.81	1.23	49.03	20.76	2.36	34.89	14.14
37)	8.60	163.71	135.56	35.27	1.25	48.45	20.30	2.39	34.37	14.08
38)	9.01	163.58	135.56	35.34	1.26	48.24	20.22	2.39	34.23	14.01
39)	9.42	163.46	135.56	35.19	1.26	48.27	20.37	2.37	34.32	13.95
40)	9.82	163.33	135.56	35.42	1.28	47.92	20.14	2.38	34.03	13.89
41)	10.23	163.63	135.56	35.42	1.26	48.21	20.14	2.39	34.18	14.03
42)	10.74	163.47	135.56	35.50	1.27	47.97	20.07	2.39	34.02	13.95
43)	11.24	163.31	135.56	35.50	1.28	47.82	20.07	2.38	33.94	13.88
44)	11.75	163.15	135.56	35.50	1.29	47.66	20.07	2.37	33.86	13.79
45)	12.26	162.99	135.56	35.27	1.29	47.73	20.30	2.35	34.01	13.72
46)	12.77	163.24	135.56	35.57	1.29	47.67	19.99	2.38	33.83	13.84
47)	13.27	163.08	135.56	35.57	1.29	47.51	19.99	2.38	33.75	13.76
48)	13.78	162.92	135.56	35.42	1.29	47.50	20.14	2.36	33.82	13.68
49)	14.29	163.16	135.56	35.50	1.29	47.66	20.07	2.38	33.86	13.80
50)	14.80	162.99	135.56	35.04	1.28	47.96	20.53	2.34	34.24	13.72
51)	15.32	163.22	135.56	35.50	1.28	47.73	20.07	2.38	33.90	13.83
52)	16.32	163.28	135.56	35.34	1.28	47.94	20.22	2.37	34.08	13.86
53)	16.84	163.11	135.56	35.50	1.29	47.62	20.07	2.37	33.84	13.77
54)	17.34	162.94	135.56	35.50	1.30	47.45	20.07	2.36	33.76	13.69
55)	17.85	163.16	135.56	35.57	1.29	47.59	19.99	2.38	33.79	13.80
56)	18.36	162.99	135.56	35.57	1.30	47.42	19.99	2.37	33.70	13.71
57)	18.86	163.19	135.56	35.50	1.28	47.70	20.07	2.38	33.88	13.82
58)	19.88	163.22	135.56	35.42	1.28	47.80	20.14	2.37	33.97	13.83
59)	20.39	163.04	135.56	35.42	1.29	47.63	20.14	2.36	33.89	13.74

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic
Project No. : 26814536
Boring No. : WI-67
Sample No. : 6A Bottom
Sample Type : Pitcher
Location : San Leandro, CA
Test No. : WI-67-6A
Test Date : 06/24/04
Depth : 19.5-21.0
Elevation : NA
Tested by : S. Capps
Checked by : R. Taraya
Soil Description : Gray fine sandy silty clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)
Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)
Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

	CHANGE IN LENGTH (in)	VERTICAL STRAIN (%)	CORR. AREA (in^2)	PORE PRESSURE (lb/in^2)	DEV. LOAD (lb)	CORR. DEV. LOAD (lb)	DEV. STRESS (lb/in^2)	TOTAL VERTICAL STRESS (lb/in^2)	EFFECTIVE VERTICAL STRESS (lb/in^2)
1)	0.000	0.00	6.22	80.00	0.00	0.00	0.00	135.56	55.56
2)	0.016	0.27	6.24	89.70	91.59	91.59	14.68	149.55	59.85
3)	0.028	0.48	6.25	96.28	121.99	121.99	19.51	154.16	57.88
4)	0.040	0.69	6.27	99.65	137.19	137.19	21.90	156.43	56.78
5)	0.052	0.88	6.28	102.48	146.31	146.31	23.31	157.78	55.29
6)	0.064	1.09	6.29	104.78	152.39	152.39	24.22	158.65	53.87
7)	0.075	1.29	6.30	106.08	158.47	158.47	25.14	159.53	53.45
8)	0.087	1.49	6.32	107.69	161.51	161.51	25.57	159.94	52.25
9)	0.099	1.69	6.33	108.91	167.59	167.59	26.48	160.80	51.89
10)	0.111	1.89	6.34	109.37	167.59	167.59	26.42	160.75	51.38
11)	0.123	2.10	6.36	110.44	170.63	170.63	26.85	161.15	50.71
12)	0.135	2.30	6.37	111.13	173.67	173.67	27.27	161.55	50.42
13)	0.147	2.51	6.38	111.36	176.71	176.71	27.69	161.95	50.59
14)	0.159	2.71	6.40	112.20	179.75	179.75	28.10	162.35	50.15
15)	0.170	2.91	6.41	112.66	179.75	179.75	28.05	162.30	49.64
16)	0.183	3.12	6.42	112.66	182.79	182.79	28.46	162.69	50.03
17)	0.194	3.32	6.44	113.35	182.79	182.79	28.40	162.63	49.28
18)	0.206	3.52	6.45	113.66	185.83	185.83	28.81	163.03	49.37
19)	0.218	3.73	6.46	113.73	185.83	185.83	28.75	162.97	49.24
20)	0.230	3.93	6.48	114.12	188.88	188.88	29.16	163.36	49.24
21)	0.242	4.14	6.49	114.27	188.88	188.88	29.10	163.30	49.03
22)	0.254	4.34	6.51	114.35	188.88	188.88	29.03	163.24	48.89
23)	0.265	4.54	6.52	114.58	188.88	188.88	28.97	163.18	48.61
24)	0.277	4.74	6.53	114.73	191.92	191.92	29.38	163.57	48.84
25)	0.290	4.95	6.55	114.80	191.92	191.92	29.31	163.51	48.70
26)	0.301	5.14	6.56	114.96	194.96	194.96	29.72	163.89	48.93
27)	0.313	5.35	6.57	114.80	191.92	191.92	29.19	163.39	48.58
28)	0.325	5.55	6.59	115.11	194.96	194.96	29.59	163.77	48.66
29)	0.337	5.75	6.60	115.19	194.96	194.96	29.53	163.71	48.52
30)	0.349	5.96	6.62	115.34	198.00	198.00	29.92	164.08	48.74
31)	0.361	6.17	6.63	115.42	198.00	198.00	29.86	164.02	48.61
32)	0.384	6.57	6.66	115.34	198.00	198.00	29.73	163.90	48.56
33)	0.408	6.98	6.69	114.96	201.04	201.04	30.05	164.21	49.25
34)	0.432	7.38	6.72	115.34	201.04	201.04	29.92	164.09	48.74
35)	0.456	7.79	6.75	115.26	201.04	201.04	29.79	163.96	48.70
36)	0.480	8.20	6.78	114.80	201.04	201.04	29.66	163.83	49.03
37)	0.503	8.60	6.81	115.26	201.04	201.04	29.53	163.71	48.45
38)	0.527	9.01	6.84	115.34	201.04	201.04	29.40	163.58	48.24
39)	0.551	9.42	6.87	115.19	201.04	201.04	29.26	163.46	48.27
40)	0.575	9.82	6.90	115.42	201.04	201.04	29.13	163.33	47.92
41)	0.598	10.23	6.93	115.42	204.08	204.08	29.44	163.63	48.21
42)	0.628	10.74	6.97	115.49	204.08	204.08	29.27	163.47	47.97
43)	0.658	11.24	7.01	115.49	204.08	204.08	29.11	163.31	47.82
44)	0.688	11.75	7.05	115.49	204.08	204.08	28.94	163.15	47.66
45)	0.717	12.26	7.09	115.26	204.08	204.08	28.77	162.99	47.73
46)	0.747	12.77	7.13	115.57	207.12	207.12	29.03	163.24	47.67
47)	0.777	13.27	7.18	115.57	207.12	207.12	28.87	163.08	47.51
48)	0.806	13.78	7.22	115.42	207.12	207.12	28.70	162.92	47.50
49)	0.836	14.29	7.26	115.49	210.16	210.16	28.95	163.16	47.66
50)	0.866	14.80	7.30	115.03	210.16	210.16	28.77	162.99	47.96
51)	0.896	15.32	7.35	115.49	213.20	213.20	29.01	163.22	47.73
52)	0.955	16.32	7.44	115.34	216.24	216.24	29.08	163.28	47.94
53)	0.985	16.84	7.48	115.49	216.24	216.24	28.90	163.11	47.62
54)	1.015	17.34	7.53	115.49	216.24	216.24	28.72	162.94	47.45
55)	1.044	17.85	7.57	115.57	219.28	219.28	28.95	163.16	47.59
56)	1.074	18.36	7.62	115.57	219.28	219.28	28.77	162.99	47.42
57)	1.104	18.86	7.67	115.49	222.32	222.32	28.99	163.19	47.70
58)	1.163	19.88	7.77	115.42	225.36	225.36	29.02	163.22	47.80
59)	1.193	20.39	7.82	115.42	225.36	225.36	28.83	163.04	47.63

URS

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : Chabot Dam Seismic
Project No. : 26814536
Boring No. : WI-67
Sample No. : 6A Bottom
Sample Type : Pitcher
Soil Description : Gray fine sandy silty clay with gravel (CL)
Remarks : TXCIU Test with Effective Pressure of 55.56 psi

Location : San Leandro, CA
Test No. : WI-67-6A
Test Date : 06/24/04
Depth : 19.5-21.0
Elevation : NA

Tested by : S. Capps
Checked by : R. Taraya

Height : 5.945 (in)
Area : 6.424 (in^2)
Volume : 38.192 (in^3)

Piston Diameter : 0.000 (in)
Piston Friction : 0.00 (lb)
Piston Weight : 0.00 (gm)

Filter Correction : 0.00 (lb/in^2)
Membrane Correction : 0.00 (lb/in)
Area Correction : Uniform

Liquid Limit : 37.1
Plastic Limit : 18.26
Specific Gravity : 2.655

INITIAL
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.78
Saturation: 96.67 %
Dry Density : 92.82 (lb/ft^3)
Moisture : 28.58 %
Time : 0.00 (min)

INITIALIZATION
dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.78
Saturation: 96.67 %
Dry Density : 92.82 (lb/ft^3)
Moisture : 28.58 %
Total Vert. Stress : 135.56 (lb/in^
Total Hori. Stress : 135.56 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 135.56 (lb/in^
Effect.Hori. Stress: 135.56 (lb/in^

END OF CONSOLIDATION - A
dH : 0.000 (in)
dV : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.78
Saturation: 96.67 %
Dry Density : 92.82 (lb/ft^3)
Moisture : 28.58 %
Total Vert. Stress : 135.56 (lb/in^
Total Hori. Stress : 135.56 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 135.56 (lb/in^
Effect.Hori. Stress: 135.56 (lb/in^

END OF SATURATION
dH : 0.000 (in)
dV : 0.000 (in^3)
dVCorr : 0.000 (in^3)
Time : 0.00 (min)
Height : 5.945 (in)
Area : 6.424 (in^2)
Void Ratio: 0.78
Saturation: 89.35 %
Dry Density : 92.82 (lb/ft^3)
Moisture : 26.41 %
Total Vert. Stress : 135.56 (lb/in^
Total Hori. Stress : 135.56 (lb/in^
Pore Pressure : 0.00 (lb/in^2)
Effect.Vert. Stress: 135.56 (lb/in^
Effect.Hori. Stress: 135.56 (lb/in^

END OF CONSOLIDATION - B
dH : 0.094 (in)
dV : 1.783 (in^3)
Time : 0.00 (min)
Height : 5.851 (in)
Area : 6.223 (in^2)
Void Ratio: 0.70
Saturation: 99.96 %
Dry Density : 97.37 (lb/ft^3)
Moisture : 26.41 %
Total Vert. Stress : 135.56 (lb/in^
Total Hori. Stress : 135.56 (lb/in^
Pore Pressure : 80.00 (lb/in^2
Effect.Vert. Stress: 55.56 (lb/in^2
Effect.Hori. Stress: 55.56 (lb/in^2

FAILURE DURING SHEAR
dH : 0.408 (in)
dV : 1.783 (in^3)
Strain : 6.98 %
Strength: 15.03 (lb/in^2)
Time : 483.15 (min)
Height : 5.537 (in)
Area : 6.690 (in^2)
Void Ratio: 0.70
Saturation: 99.96 %
Dry Density : 97.37 (lb/ft^3)
Moisture : 26.41 %
Total Vert. Stress : 165.61 (lb/in^
Total Hori. Stress : 135.56 (lb/in^
Pore Pressure : 114.96 (lb/in^
Effect.Vert. Stress: 50.65 (lb/in^2
Effect.Hori. Stress: 20.60 (lb/in^2

END OF TEST
dH : 1.193 (in)
dV : 1.783 (in^3)
Strain : 20.39 %
Time : 1415.87 (min)
Height : 4.752 (in)
Area : 7.817 (in^2)
Void Ratio: 0.70
Saturation: 99.96 %
Dry Density : 97.37 (lb/ft^3)
Moisture : 26.41 %
Total Vert. Stress : 164.39 (lb/in^
Total Hori. Stress : 135.56 (lb/in^
Pore Pressure : 115.42 (lb/in^
Effect.Vert. Stress: 48.97 (lb/in^2
Effect.Hori. Stress: 20.14 (lb/in^2

Appendix G

Site Geology

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25 March, 2004

Lelio Mejia, Ph.D., P.E.
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Dear Dr. Mejia,

The following memorandum is a description of the site geology at Lake Chabot Dam.

Please contact me if you have any questions.

Sincerely,

John Wakabayashi

SITE GEOLOGY, LAKE CHABOT DAM

General

Lake Chabot dam is situated in a narrow canyon incised by San Leandro Creek. The bedrock at the dam site is composed of the Upper Jurassic Knoxville Formation of the Great Valley Group, and volcanic and intrusive rocks of the Middle-to-Upper Jurassic Coast Range ophiolite. Most of the faults within and between these Mesozoic rocks formed prior to the late Cenozoic and are no longer active (e.g. Wakabayashi and Unruh, 1995; Coleman, 2000, and references therein), but it is difficult to distinguish these older faults from younger, potentially active structures on the basis of geologic relationships in bedrock alone. This is because most of the older deformation took place under brittle conditions, so the physical appearance and characteristics of the fault zones produced at different times are similar. In addition, there are no stratigraphic overlap relationships or intrusive relationships to constrain the age of faults or shears in the dam site area. Our investigation shows that Quaternary alluvium deposits are found in the stream valley itself, and the largest such deposits in the area are apparently beneath the reservoir or beneath the dam embankment.

The site geology is shown on Figure 1. The bedrock will be described in approximate upstream to downstream order, followed by a description of the Quaternary deposits, and a discussion of faults in the dam site area.

Great Valley Group: Upper Jurassic Knoxville Formation

North and east of the dam are outcrops of the Upper Jurassic Knoxville Formation of the Great Valley Group. This unit may underlie the upstream toe of the dam. Most of the exposures consist of weak and friable shales or siltstones with some interbeds of sandstones or siltstones that are harder and stronger. The freshest sandstones are only moderately hard and strong in outcrops observed in the dam site area. Hard and strong conglomerate crops out below Lake Chabot dam road (about 400 m ESE of the dam), but these conglomerates do not appear in the part of the Knoxville nearest to the dam. The Knoxille Formation is folded and bedding orientations, where observable, vary considerably (Fig. 1).

Coast Range Ophiolite: Jurassic Leona Rhyolite and Major Bounding Contacts

The Jurassic Leona rhyolite of the Coast Range ophiolite crops out in two main bodies in the site area. The two outcrop areas of the Leona rhyolite will be referred to as the northern and southern exposures for purposes of discussion. The northern exposure of the Leona rhyolite comprises both abutments of Lake Chabot Dam and underlies the dam axis. The Leona rhyolite is not a true rhyolite as it is rather low in potassium, so it has been called a "quartz keratophyre" (Bailey et al., 1970; Hopson et al., 1981). This unit was once thought to be Plio-Pleistocene in age, but the work of Bailey et al. (1970) and several subsequent studies demonstrated that this unit was depositionally overlain by the Upper Jurassic Knoxville Formation. The Leona is hard and strong. Outcrop fracture density ranges from widely spaced (30 cm to 1 m) to closely spaced (3 cm to 10 cm), and local faults or shear zones up to several centimeters wide can be observed in several outcrops. Bedding orientation could not be ascertained in this massive rock.

The contact between the northern Leona rhyolite exposure and the Knoxville Formation north of it (Fig. 1) has been mapped as a fault or "cross fault" (Marliave, 1965). The actual contact is not exposed, however, and there is no evidence to demonstrate that the contact is a fault. The original Jurassic contact of the Knoxville Formation on Leona rhyolite is a depositional one and good exposures of the depositional contact are observed several km north of the dam site (Wakabayashi, 1999). The contact directly north of the dam appears to be folded. The trace of the contact over topography on the peninsula northeast of the dam indicates an average E-W strike and moderate northerly dip, whereas the strike of the contact is clearly more northwesterly west of the reservoir (Fig. 1).

East and southeast of the dam the northern exposure of Leona rhyolite is in contact with Knoxville Formation rocks along its southern border (Fig. 1). The contact is not exposed and it is not clear whether it is a depositional contact, the same contact as the one bounding the rhyolite on the north repeated by folding, or whether the contact is a fault. This contact appears to be truncated by a serpentinite-bearing shear zone east of, or below, the downstream toe of the dam (Fig. 1). This serpentinite-bearing zone appears to locally form the southern boundary of the northern exposure of Leona rhyolite west of the dam (Fig. 1). The shear zone consists of pervasively sheared, friable serpentinite. Locally, the serpentinite encloses lenses of hard strong gabbro up to several meters in size. The best exposure of this shear zone is near the bottom of the cut face north of the spillway and in the cliff to the west, just below the access road to the dam. The location of this shear zone northwest of the dam access road is uncertain as no exposures were seen (Fig. 1). The exposures of the shear zone east of San Leandro Creek are widely scattered and poor. Although serpentinite is found in two places along Lake Chabot Road and on a small peninsula 550 m ESE of the dam (Fig. 1), there is insufficient exposure to determine whether the serpentinite is actually a continuous zone between these outcrops as shown on Figure 1. The serpentinite-bearing zone appears to vary in orientation, so the zone has probably been folded. Where exposed north of the spillway, the serpentinite appears to strike about N55°W and dip about 60° to the northeast, whereas the trace of this unit east of San Leandro Creek suggests a more westerly strike and a southerly dip (Fig. 1).

The southern exposure of the Leona rhyolite is located entirely south and east of the canyon downstream of the dam (Fig. 1). The eastern part of this exposure is bounded to the north by Knoxville Formation along a contact that was not observed in this study. This contact would appear to dip westward based on its trace across topography. The western part of the northern boundary of the southern Leona rhyolite exposure appears to be a fault that locally parallels the axis of the stream valley downstream of the dam (Fig.1).

Coast Range ophiolite: Jurassic basalt.

Jurassic basalt of the Coast Range ophiolite is exposed west of the dam. The best exposures of this unit are along the cut face north of the spillway (Fig. 1). The basalt here is hard, strong, with generally close fracture spacing (3 cm to 10 cm). The basalt can be distinguished from Franciscan basalt on the basis of common patches of epidote, which are common for basalts of the Coast Range ophiolite but lacking in similar basalts of the Franciscan (e.g. Evarts and Schiffmann, 1983; Blake et al. 1988). This unit also includes diabase dikes, and the chilled margins of some of these dikes are visible in the spillway cut. The north and east margin of this unit is in contact with Leona rhyolite. It is likely that this contact is a depositional one with the Leona rhyolite atop the basalt as no obvious shearing along the contact was noted in the good exposure along the spillway cut. The southwestern contact of the basalt unit is the serpentinite shear zone described above. The western margins of the basalt unit and contact geometry are uncertain.

Coast Range ophiolite: Jurassic gabbro

Jurassic gabbro of the Coast Range ophiolite crops out west (downstream) of the dam. This gabbro is generally hard and strong and fracture spacing ranges from widely-spaced to local zones with very close fracture spacing (less than 3 cm). Local zones of sheared gabbro or serpentinite are present. The gabbro on the north wall of the San Leandro Creek canyon is bounded on its north side by the serpentinite shear zone described above and on the south by a fault that approximately coincides with the stream valley axis (Fig.1).

Quaternary Units: Colluvium and Alluvium

Quaternary units present in the site area include alluvium and colluvium. Colluvium mantles most of the slopes in the area where bedrock outcrops are not seen, but without artificial cuts or data from borings it is difficult to assess its depth, so colluvial deposits are not shown on Figure 1. Alluvium is present in the stream bottom downstream of the major deposits of fill, which include the dam embankment (Fig. 1). This part of the stream bottom is the narrowest part of the canyon. No bedrock exposures were seen in the streambed, so the streambed must consist of alluvium, although the thickness of the alluvium is not known in this area.

Beneath the dam embankment, several borings have encountered alluvium or colluvium, which apparently ranges in composition from gravelly sandy clay to gravelly sand and clayey gravel. The contact between embankment fill and native alluvium and colluvium was noted on the logs of some borings, but these constitute a minority of the borings drilled through the embankment. It is possible to estimate the thickness of alluvium or colluvium, by comparing the 1886 ground surface elevation (shown on EBMUD, 1934, with reference features on the dam that can be tied to later maps) to the elevation at which bedrock was encountered in a boring (with borings located on pre-1980 topography from EBMUD, 1979). If the 1886 surface elevation for the location is higher than the elevation of the top of bedrock, the difference between the two elevations may be native alluvium or colluvium. For some borings, such as WI-26, the interpreted top of bedrock appears to be actually higher, within uncertainty, than the 1886 topography. This probably results from inaccuracy in the 1886 topography and errors resulting from mis-registering the boring locations on the older topography. The uncertainty in estimating alluvium and colluvium thickness by this method may be greater than 3m (10 feet). The embankment fill was apparently placed largely on the original ground surface except for the core trench, which was excavated into bedrock (reviewed in Lessman, 2002). Outside of this core trench area, data from borings indicates an irregular distribution of native alluvium and colluvium beneath the embankment ranging in thickness from 0 to 11 m (0 to 37 feet). Most of the alluvial and/or colluvial deposits encountered in borings appear to be 4.5 m (15 feet) in thickness or less. There does not appear to be a continuous sheet of native deposits beneath the embankment (exclusive of the core trench), as some boreholes may have encountered only fill over bedrock (WI-12, WI-34, WI-36, WI-37)[1]. The boring that appears to record the greatest thickness of alluvium or colluvium is WI-13, where the difference between the 1886 ground surface and the elevation of the top of bedrock recorded in the boring log is about 11 m (37 feet). This boring is located north of the former channel. The difference in elevation between the original ground surface at the location of the boring and the former channel bottom was about 14 m (45 feet). This may suggest the presence of a buried stream terrace deposit that also may be draped with colluvium.[1]

Faults in the Damsite Area

As noted above there are several faulted contacts of bedrock units in the site area as well as some contacts that may be either depositional or tectonic. Faulted Quaternary deposits have not been identified along any of the faults at the site (the Hayward fault is considered outside of the dam site area and is not part of the geology discussed in this memorandum). The various geologic contacts will be discussed in approximate upstream to downstream order, followed by a

[1] See Figure 1 of URS Task A Memorandum dated March 2004 for locations of borings.

discussion of possible fault features that may not coincide with a contact between different bedrock types. Only features that potentially pass beneath part of the dam are discussed.

The contact between the northern exposure of Leona rhyolite and the Knoxville Formation to its north may pass beneath the upstream toe of the dam and it is not clear whether the contact is tectonic or depositional. The contact is folded, so if it is a fault, then it is unlikely to have been active in late Quaternary time. In addition, no geomorphic features suggestive of late Quaternary reactivation of this contact were noted during inspection of air photos or in the field. This contact was trenched and considered inactive by (Thronson, 1966), although the justification for this conclusion is not clear (reviewed by Lessman, 2002). Offset Quaternary soils in the trench were not reported by either Thronson (1966) or Peak (1966), and the trench was located in a swale that is likely to have Quaternary colluvium or alluvium deposits.

The serpentinite shear zone that is exposed in the spillway cut passes beneath the downstream toe of the dam. This fault zone probably formed during the formation of the Coast Range ophiolite near an oceanic spreading center in the Jurassic or during its subsequent Jurassic and Cretaceous history. This fault zone is folded, so it is unlikely to have been reactivated during late Quaternary time. No geomorphic features suggestive of late Quaternary reactivation of this contact were noted in air photos or in the field along this feature.

The fault that locally follows the stream valley axis and separates gabbro from Leona rhyolite may pass beneath the downstream toe of the dam. The exposures of the serpentinite shear zone east and southeast of the dam are not sufficient to determine whether the serpentinite shear zone truncates this fault or whether this fault truncates and offsets the serpentinite shear zone. If the former, then this feature would be offset by what appears to be an inactive fault so it would itself be inactive. If this fault offsets the serpentinite, it is somewhat more difficult to constrain activity on this feature on the basis of surface field relationships alone. The fault must change strike or step over in order not to show up in the downstream part of the spillway cut, so the fault may be folded and thus unlikely to have accommodated late Quaternary movement. Part of the stream valley segment occupied by this fault is fairly linear, but no geomorphic features consistent with late Quaternary fault movement were observed in air photos or in the field along the hypothetical projection of this feature southeast and east of the dam.

The map of active traces of the Hayward fault (Lienkaemper, 1992) shows an eastern splay of the Hayward fault zone that passes through the western wall of a now-inactive quarry south of Lake Chabot dam, and projects northwestward to cross San Leandro Creek about 350 m downstream (west) of the dam (Fig. 1). Our interpretation of air photos, as well as air photo interpretation by URS (2000), identified a lineament marked by a prominent linear sidehill bench and linear drainage corresponding to the southern part of the mapped fault trace of Lienkaemper (1992), but the northernmost part of this lineament appears to trend toward the eastern, rather than western part of the quarry wall before losing geomorphic expression about 150 meters south of the quarry rim. If a fault continued northward along this trend, it might pass beneath Lake Chabot Dam axis at a high angle to the axis, so we will discuss this feature in more detail.

Our field investigation of the quarry shows the likely reason for this apparent discrepancy in interpretations of the northern part of the lineament. The air photos examined by us and by URS (2000) were taken in 1953 and the topography on the US Geologic Survey 7.5 minute quadrangle we used to record our interpretations was surveyed in 1959. The quarry continued operation until 1986, resulting in considerable topographic modification. By 1986, the rim of the quarry was much further south than in 1953 or 1959, so that the prominent lineament extended to the rim.

Detailed geologic investigations appear to indicate that the fault associated with the lineament indeed bends along its northern reach to a more northwesterly strike as depicted in Lienkaemper (1992). This feature was identified as a bedrock fault in trenches by Terrasearch (1990) and traced through the quarry by exposures on the quarry wall and test pits in the floor of the quarry, although the activity of this fault could not be determined because of the lack of late Quaternary deposits. Detailed mapping of the walls and floor of the quarry was conducted by Berlogar Geotechnical Consultants (BGC) in 1998 (BGC, 1998). Their mapping and test pits showed that the fault formed a sheared contact between Leona rhyolite on the east and basalt on the west. They traced the fault from the top of the western quarry wall and northwestward across the floor of the quarry to Lake Chabot road. They found that the fault was continuous with lineament to the south observed in other studies. The location they mapped for this fault is the same location shown on the Lienkaemper (1992) map. BGC (1998) measured the strike and dip of the fault as N50°W, 85°SW, N54°W, 88°NE, N52°W, 65°NE, and N54°W, 75°NE, respectively, in four test pits. They estimated the dip, averaged over the height of the quarry wall, as 60-70°. The orientation of this shear zone and its location in the western quarry wall coincides with a bedrock shear mapped in reconnaissance by Wakabayashi (1984), who measured the strike and dip of the feature as N60°W, 70°NE. No other shears were noted in the quarry wall or floor by either BGC (1998) or in another geotechnical study of the quarry site by Lowney Associates (1997). Wakabayashi (1984) mapped a "major breccia zone and fault", in the eastern wall of the quarry, one of the only two major faults he saw in the quarry walls, and measured a strike and dip of N55°W, 70°NE for it (the isolated shear symbol in the eastern part of the quarry shown on Fig. 1).

Based on the reviewed information, it appears that the lineament and corresponding bedrock fault coincides with the fault as shown by Lienkaemper (1992) and this fault does not pass beneath Lake Chabot Dam. The fault appears to change strike from approximately N10-20°W south of the quarry to ~N50-55°W within the quarry. An enlarged color air photo (post-1986) on display at the office of the San Leandro Rock Company (owners of the quarry property) shows a vegetation lineament in the quarry wall that diverges eastward from the fault near the rim of the quarry. This lineament may pass through the lower quarry walls near the position that Wakabayashi (1984) mapped the eastern fault. Our field investigation could not find the eastern fault mapped by Wakabayashi (1984) and we did not find a fault in the position of the vegetation lineament. Growth of vegetation and small-scale raveling of the slope have degraded the upper quarry exposures so that structures are not as easy to see as in 1984. The strike and dip of the eastern fault appears incompatible with the trace of the vegetation lineament. The vegetation lineament, if a fault, should have an approximate north-south strike. We conclude that the eastern fault mapped by Wakabayashi (1984) does not connect to the prominent lineament south of the quarry. If projected northwestward, the eastern fault may project beneath the downstream toe of Lake Chabot dam (Fig. 1), although a straight line projection passes slightly west of the toe). No geomorphic features suggestive of late Quaternary faulting were observed along the projection of this feature northwest or southeast of the quarry wall.

Studies of Marliave (1978), WCC (1978) and Weaver (1979) concluded that faults passing beneath the dam are inactive and that any sympathetic movement on these structures during an earthquake on the Hayward would be less than 30 cm. Although our interpretations of the geology at the Lake Chabot dam site from this study differ from previous studies, the conclusions reached by previous studies regarding the potential for movement on structures passing beneath the dam are not significantly changed.

Allen (1966), in his seismic assessment of Lake Chabot Dam, stated that creation of a new fault in an earthquake had never been documented. This statement is still valid after decades of paleoseismic studies conducted following earthquakes. In all cases where fault movement occurred, whether on a seismogenic fault or as sympathetic slip, trenching investigations revealed that such faults had experienced prior movement in the late Quaternary. Thus, Allen's (1966) assertion could be strengthened to include reactivation of older faults and say that fault movement, sympathetic or otherwise, has never occurred on a fault that has not experienced prior late Quaternary movement.

There is no evidence for late Quaternary activity associated with any of the faults passing beneath the dam. Bedrock structural relationships (folded faults) suggest that these faults are inactive, although we found no cross cutting or overlapping geologic relationships that allow us to conclusively demonstrate the lack of late Quaternary movement on the faults. Accordingly, we conclude that the likelihood for sympathetic movement on faults passing beneath the dam is very low.

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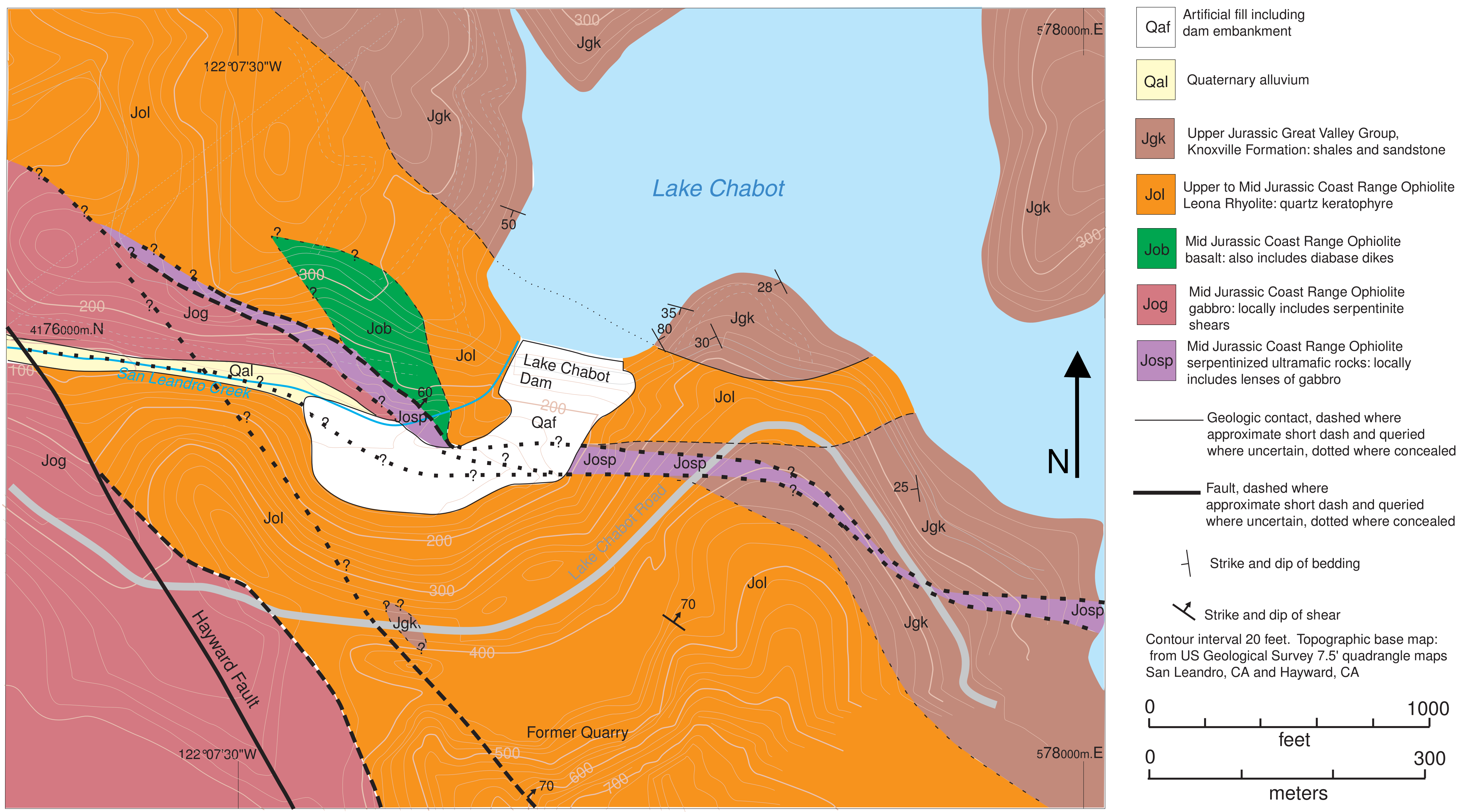

Figure 1: Geologic map of Lake Chabot dam site area. Geologic mapping by Wakabayashi 1984, 2004, except for northern extension of western fault in quarry from Lienkaemper (1992).

Appendix H

Seismotectonic Setting and Seismic Sources

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April 13, 2004

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Principal and Vice President
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RE: Characterization of Seismotectonic Setting and Seismic Sources, EBMUD Chabot Dam

Dear Dr. Mejia:

This letter report presents our review of the seismotectonic environment of the East Bay hills, and a characterization of local and regional faults that are potentially significant for evaluating strong vibratory ground motion at Chabot dam.

Seismotectonic Setting of Chabot Dam

Chabot Dam is located within the tectonically and seismically active region between the Pacific plate on the west and the Sierra Nevada-Central Valley ("Sierran") microplate on the east. Geodetic data demonstrate that net motion between the two plates is obliquely convergent. The NUVEL-1A global plate motion model predicts that, relative to a point in the stable interior of North America, the Pacific plate moves about 47 mm/yr toward N34°W (DeMets et al., 1994). The dextral San Andreas and Hayward faults, which are the most active structures of the plate boundary at the latitude of the Bay Area, strike about N34°W, and thus are parallel to this motion. In contrast, space-based geodesy indicates that the Sierran microplate has a more westerly direction of motion at this latitude than the average strike of the San Andreas and Hayward faults (Argus and Gordon, 1991; 2001). The oblique motion of the Sierran microplate relative to the strike of the San Andreas and Hayward faults results in a small component of net convergence normal to these structures, which is accommodated by both strike-slip and thrust faulting in the eastern San Francisco Bay area (see summary in Unruh, 2001).

Chabot Dam is located within the East Bay hills, a belt of youthful, elevated topography bounded by the Hayward fault on the west and the Northern Calaveras fault on the east (Figure 1). Both of these faults are part of the San Andreas system of right-lateral strike-slip faults that accommodate most of the relative motion between the Pacific plate and Sierran microplate at this latitude. The late Cenozoic structure of the East Bay hills is characterized by northwest-trending folds and thrust faults, (Aydin, 1982; Crane, 1995) and by NNW-striking dextral faults and lineament zones such as the Contra Costa shear zone (Unruh and Kelson, 2002; William Lettis & Associates, 2003).

Based on variations in fault and fold geometry, the 1999 Working Group on Northern California Earthquake Probabilities (Thrust Fault Subgroup, 1999) divided the East Bay hills into three areal source zones: (1) the western East Bay hills domain; (2) the southern East Bay hills domain; and (3) the northern East Bay hills domain. The western East Bay hills domain is characterized by folds and thrust faults that are subparallel to the Hayward fault. The most prominent examples of these faults are the Moraga, Miller Creek and Palomares faults, which form the eastern structural boundary of the western East Bay hills domain. The southern and northern East Bay hills domains are characterized by folds and thrust faults that are oblique to the strike of the northern Calaveras fault. Examples of these structures include the Bollinger thrust fault and Las Trampas anticline. Based on work by Unruh and Kelson (2002), we treat the Northern and Southern domains of the East Bay hills as a single structural domain for this study.

The main trace of the Hayward fault, which we interpret to directly overlie the zone of maximum energy release at depth during a large earthquake, approaches within 500 m of the center of Chabot Dam. The Hayward fault is associated with small earthquakes and was the source of a large earthquake on 21 October 1868 (see summary in Lettis, 2001). The Northern Calaveras fault on the eastern margin of the East Bay hills also is associated with small earthquakes, and paleoseismic trenching studies indicate that the fault has produced multiple surface-rupturing earthquakes during the Holocene (Kelson, 2001). Other active faults within about 50 km of Chabot Dam that have been sources of historical earthquakes, or are regarded as potential sources of large earthquakes (e.g., WGCEP, 2003), include the San Andreas, San Gregorio, Greenville, Mt. Diablo and Concord-Green Valley faults (Table 1).

The interior of the East Bay hills is characterized by low to moderate levels of background seismicity. In 1977, a swarm of small earthquakes occurred in the northern East Bay hills along an approximately 6 km long, north-northwest-trending alignment subparallel to the northern Calaveras fault (Ellsworth et al., 1982; Oppenheimer and Macgregor-Scott, 1992). These events occurred in the general vicinity of Briones Regional Park and Briones Reservoir, and are informally referred to as the "Briones swarm". A cross section of hypocenters normal to the trend of the swarm (Figure 3 in Oppenheimer and Macgregor-Scott, 1992) shows a well-defined planar alignment in the 6 to 12 km depth range, and focal mechanisms indicate primarily right lateral strike-slip displacement.

Seismic Sources

The major seismic sources evaluated for this study, distances from Chabot Dam, and maximum earthquake magnitudes, are summarized in Table 1. We discuss the sources and their characterization in detail below.

<u>Faults of the San Andreas System</u>

At the latitude of Chabot Dam, the major right-lateral strike-slip faults of the San Andreas system include the San Gregorio-Seal Cove, San Andreas, Hayward-Rodgers Creek, Northern Calaveras, Concord-Green Valley and Greenville faults (Figure 1). All of these faults are considered to be capable of generating large earthquakes by WGCEP (1999; 2003), and the San Andreas and Hayward faults in particular are estimated to have the highest probabilities of generating M > 6.7 earthquakes in the next 30 years (WGCEP, 2003).

At a site-source distance of 500 m, the Hayward fault is the most proximal source of large earthquakes to Chabot Dam (Table 1). The Hayward fault is considered by most workers to be part of a system of generally collinear strike-slip faults that includes the Rodgers Creek fault north of San Pablo Bay; however, the Hayward fault is physically separated from the Rodgers Creek fault by a 4- to 6-km-wide right stepover across San Pablo Bay. As summarized in Lettis (2001), the 87-km-long (+10 km) Hayward fault traditionally has been divided into two segments, primarily based on the interpretation that large earthquakes occurred in 1836 and 1868 on distinct northern and southern rupture segments of the fault, respectively. Recent work suggests that the 1836 earthquake did not occur on the Hayward fault, however, and WGCEP (1999) did not identify any specific physical feature along the fault that could serve as a rupture segmentation point (Lettis, 2001).

In evaluating the maximum earthquake for the Hayward fault, we conservatively assume that the potential rupture length is 97 km, which includes the full 87 km length of the fault plus the uncertainty in the northern and southern termination points. Using a rupture width of 12 km (based on the lower depth limit of seismicity in the vicinity of the Hayward fault; Lettis, 2001) and empirical relations between rupture area and earthquake magnitude for all earthquakes in Wells and Coppersmith (1994), we calculate a median magnitude of **M** 7.1 for the Hayward fault. The same median magnitude is obtained from using the regression relations on magnitude and rupture area for strike-slip faults only (Wells and Coppersmith, 1994).

This result strongly implies that in order for larger earthquakes to occur on the Hayward fault, coseismic rupture must include parts of the adjacent Rodgers Creek and/or Calaveras fault. If it is assumed that rupture width along the fault is a constant 12 km, then the regression relations in Wells and Coppersmith (1994) imply that a **M** 7 1/4 earthquake would require a 146 km rupture, and a **M** 7 1/2 earthquake would require a 263 km rupture. For comparison, the 146 km length for a hypothetical **M** 7 1/4 earthquake is very close to the combined 150 km length of the Hayward and Rodgers Creek fault (Lettis, 2001). This result is in agreement with the **M** 7.26 magnitude assigned to a combined rupture of the Hayward fault and the Rodgers Creek fault by WGCEP (2003), using regression relations on rupture dimensions and earthquake magnitude for a restricted dataset of strike-slip events only (Ellsworth, 2003), and including a correction factor that accounts for strain released by fault creep during the period between large earthquakes.

Given the uncertainty in maximum rupture length for the Hayward fault, we conservatively adopt **M** 7 1/4 as the maximum earthquake magnitude (Table 1). This magnitude assumes full and complete rupture of the entire Hayward fault, as well as additional rupture totaling about 50 km in length on adjacent faults. Such an earthquake could be produced by a combined Hayward-Rodgers Creek fault rupture, or an approximately 150-km-long "floating" rupture that breaks all of the Hayward fault and parts of both the Rodgers Creek and Calaveras faults. This magnitude also allows for some uncertainty in the maximum rupture width. For example, if a large earthquake on the Hayward fault ruptures to 15 km depth rather than 12 km, as inferred from the present depth distribution of seismicity (Lettis, 2001), then the associated rupture length for a **M** 7 1/4 earthquake from the Wells and Coppersmith regressions on rupture area and magnitude is 117 km. This predicted rupture length encompasses the full 87 $\pm$ 10 km length of the Hayward fault, and still would require additional rupture on the adjacent Rodgers Creek and/or Calaveras fault.

The next most-proximal known source of large earthquakes to Chabot Dam is the Calaveras fault, which is divided into three primary sections (Kelson, 2001): (1) the Southern Calaveras fault, which extends for about 24 km from the Pacines fault to San Felipe Lake; (2) the Central Calaveras fault, which extends for about 64 km from San Felipe Lake to Calaveras Reservoir; and (3) the Northern Calaveras fault, which extends for about 42 km from Calaveras Reservoir to a point near the town of Danville, where the fault dies out as a well-defined geomorphic feature. From Kelson (2001), we adopt the full measured length of the Northern Calaveras fault plus uncertainty (42 km $\pm$10 km) for the purposes of estimating maximum magnitude. Using a 52 km rupture length and 15 km rupture width, empirical relations between rupture area and earthquake magnitude in Wells and Coppersmith (1994) provide a maximum magnitude of **M** 7 for the Northern Calaveras fault (Table 1).

Based on maximum magnitudes determined by WGCEP (1999; 2003), the San Andreas and San Gregorio-Seal Cove faults both are capable of producing larger earthquakes than the Hayward and Northern Calaveras faults (**M** 8 and **M** 7 1/2, respectively), but are located 30 km or more from Chabot Dam (Table 1). Other major strike-slip faults of the San Andreas system (i.e., Concord-Green Valley and Greenville faults) are capable of producing large earthquakes, but smaller than those of the Hayward and Northern Calaveras faults, and at greater site-source distances (Table 1).

<u>Faults in the East Bay Hills</u>

a) Moraga, Miller Creek and Palomares Faults

The western East Bay hills was defined by the Thrust Fault Subgroup (1999) to be an elongated, 4- to 6-km-wide domain bounded by the Hayward fault on the west, and by the Moraga, Miller Creek and Palomares reverse faults on the east. Geologic maps by Dibblee (1980), Crane (1988), Graymer et al. (1994; 1996) and Graymer (2000) generally show that the Moraga, Miller Creek and Palomares faults share a common northwest strike, subparallel to the Hayward fault, and all dip to the southwest, toward the Hayward fault. Depictions of the faults differ significantly among these workers, however, indicating that there is uncertainty regarding the exact location of these structures, as well as their linkages (if any) to each other.

The Miller Creek fault, which approaches to within 4 km of Chabot Dam, is the most prominent and best studied of the structures that form the eastern boundary of the western East Bay hills domain (Wakabayshi et al., 1992). The fault generally juxtaposes Cretaceous and Miocene marine strata on the west with late Neogene continental deposits on the east. Based on trench exposures and topographic expression, the fault dips between about 60° and 80° southwest, with a preferred dip range of 70° to 80° (J. Wakabayashi, written communication, 2004). The Miller Creek fault may be the southern continuation of the Moraga fault (e.g., Graymer, 2000), or a distinctly different structure (e.g., Crane, 1988). Total length of the fault is difficult to determine with confidence because map depictions vary among workers. Wakabayshi et al. (1992) interpret that the Miller Creek fault is at least 10 km long.

Paleoseismic investigation of the Miller Creek fault provides additional information on the activity and kinematics of this structure (Wakabayshi and Sawyer, 1998a; 1998b). Trench exposures in the Upper San Leandro Reservoir area reveal that late Quaternary (probably Holocene; J. Wakabayashi, personal communication, 2004) colluvial deposits overlying the Miller Creek fault are sheared and deformed, indicating that the fault is active and capable of producing surface rupture. Slickenside lineations exposed in the trench indicate that movement on the fault is characterized primarily by strike-slip displacement with a component of reverse (up on the west) motion (Wakabayshi and Sawyer, 1998a; 1998b). Significantly, a second trench located less than 3 km from the first revealed evidence for no late Quaternary displacement on the fault (Wakabayshi and Sawyer, 1998a; 1998b).

The Thrust Fault Subgroup (1999) considered two end-member models to explain observed late Quaternary activity of the Miller Creek fault, and by analogy potential activity of the Moraga and Palomares faults:

1) Triggered, Aseismic Slip: This model assumes that the Moraga, Miller Creek and Palomares faults are not independent seismic sources. Cumulative stratigraphic offset documented by geologic mapping, and Quaternary displacements observed in trench exposures, are the result of aseismic, triggered slip during moderate to large magnitude earthquakes on the Hayward fault to the west.
2) Independent Seismic Sources: This model assumes that the Moraga, Miller Creek and Palomares faults move independently of the Hayward fault, and are capable of generating surface-rupturing earthquakes.

In the case of the latter model, the Thrust Fault Subgroup (1999) noted that the Moraga, Miller Creek and Palomares faults are limited in potential rupture width by their proximity to the Hayward fault; that is, the structures cannot extend farther west than their downdip intersection with the Hayward fault. For a range for potential fault geometries, the Thrust Fault Subgroup (1999) estimated that the Moraga, Miller Creek and Palomares faults are capable of generating earthquakes ranging in magnitude from about **M** 5 1/2 to **M** 6 1/2, and placed the highest weight on **M** 6 for the maximum earthquake.

In our judgment, we believe that it is very unlikely the Moraga, Miller Creek and Palomares faults, either individually or in a combined multi-segment rupture, are independent sources of **M** 6 1/2 or larger earthquakes, primarily because of the constraint on maximum rupture width due to the proximity of the structures to the Hayward fault. For example, a cross section in Wakabayashi et al. (1992) located several kilometers north of Lake Chabot shows an interpretation of the Miller Creek fault dipping 50° to 70° toward the southwest and joining the Hayward fault at the base of the seismogenic crust. This interpretation illustrates the *maximum* potential rupture width of the Miller Creek fault, because a more shallow fault dip will result in the Miller Creek fault intersecting the Hayward fault at shallower depths. The rupture width of the Miller Creek fault shown in the Wakabayashi et al. (1992) cross section is 12 km. If it is assumed that the aspect ratio (i.e., rupture length divided by rupture width) of an earthquake rupture on the Miller Creek fault is 1, then the maximum rupture length is about 12 km, and potential rupture area is 144 km^2. Regression relations in Wells and Coppersmith (1994) provide an associated median earthquake magnitude of about **M** 6.2. Given that the physical relationship of the Miller Creek fault to the Hayward fault limits the rupture width to about 12 km, larger earthquakes are possible only if the rupture length significantly exceeds 12 km. The fact that two trenches located 3 km apart on the Miller Creek fault did not produce consistent evidence for late Quaternary displacement on what is arguably the best-expressed fault in this system (Wakabayashi et al, 1992) strongly suggests that laterally continuous ruptures in excess of 12 km do not occur on these faults.

Based on these considerations, we adopt **M** 6 1/4 as the maximum earthquake for these structures. This interpretation is conservative because: (1) it assumes that the faults are independent earthquake sources, despite uncertainty regarding their earthquake potential (i.e., Thrust Fault Subgroup, 1999); and (2) it adopts a slightly higher magnitude than predicted by the regression relations in Wells and Coppersmith (1994) for what we believe to be the maximum likely rupture dimensions.

b) Contra Costa Shear Zone

The Northern Calaveras fault dies out as a significant strike-slip fault in the vicinity of Danville, California, and dextral slip on this structure is transferred, at least in part, to the interior of the East Bay hills by a complex system of strike-slip faults and poorly integrated shear zones that are connected by restraining stepovers (Unruh and Kelson, 2002). For convenience, we refer to these structures collectively as the "Contra Costa shear zone". The faults and lineaments in the East Bay hills that we associated with the Contra Costa shear zone are highlighted with orange shading on Figure 1. The southern part of the Contra Costa shear zone is a series of strike-slip faults that includes the Cull Canyon, Lafayette and Reliez Valley faults (Figure 1). These structures strike about N15°W, subparallel to the Northern Calaveras fault, and they obliquely cross the interior of the East Bay hills east of the Moraga-Miller Creek-Palomares fault system. The Lafayette and Reliez Valley faults die out as well-defined structures at the latitude of the town of Pleasant Hill. North of this point, dextral slip in the Contra Costa shear zone appears to be distributed among a system of poorly integrated NNW-trending lineament zones that exhibit geomorphic features consistent with late Cenozoic strike-slip faulting (Unruh and Kelson, 2002; see Figure 1).

In the following sections, we describe the strike-slip faults and lineaments of the Contra Costa shear zone and characterize them as seismic sources. We also assess restraining stepovers among individual strands of the Contra Costa shear zones as potential sources of earthquakes from blind thrust faults. Finally, we discuss an alternative tectonic model (Geomatrix, 2001) for accommodation of dextral slip north of the termination of the Calaveras fault by activity on the Franklin and Southhampton faults, rather than the Contra Costa shear zone.

Cull Canyon, Lafayette and Reliez Valley faults
In terms of proximity to Chabot Dam, the most significant potential seismic sources associated with the Contra Costa shear zone are the Cull Canyon, Lafayette and Reliez Valley faults, which together comprise an approximately 25-km-long, NNW-trending zone of late Cenozoic dextral faulting (Crane, 1988; Unruh and Kelson, 2002). This entire zone is well expressed on Landsat satellite imagery as a lineament that cuts across the WNW-trending structural and topographic grain of the East Bay hills. The closest approach of Chabot Dam to the Cull Canyon fault at the southern end of this zone is 6 km (Table 1).

The Cull Canyon fault is mapped by Crane (1988) along the linear, north-northwest-trending valley of Cull Creek in the East Bay hills south of Kaiser Creek. Crane (1988) interpreted the axis of the NW-trending Kaiser Creek syncline at the latitude of Upper San Leandro Reservoir (6 km northeast of Lake Chabot) to be offset about 2 km in a right-lateral sense by the Cull Canyon fault. As mapped by Crane (1988), the fault follows Cull Canyon south to about the latitude of Lake Chabot, and it dies out in a zone of folding between Cull Creek and Crow Creek in the hills northeast of Castro Valley. Total length of the Cull Canyon fault south of Kaiser Creek is about 8 km.

It is important to note that neither Dibblee (1980) nor Graymer (2000) map a fault in Cull Creek canyon. Although Dibblee (1980) did not interpret a fault in the canyon, he depicted stratigraphic contacts that cross the canyon as being deflected in a right-lateral sense. Similarly, Graymer's map (2000) shows no discrete fault along Cull Creek, but some stratigraphic and structural contacts are deflected right-laterally across the canyon. Although these varying map interpretations indicate that there is uncertainty regarding the existence of a fault along Cull Creek, the fact that all three maps show some right-lateral deflection of stratigraphic units and contacts is consistent with the hypothesis that the canyon may be localized along a zone of dextral shearing and nascent strike-slip faulting.

In the vicinity of Kaiser Creek, the Cull Canyon fault merges with a N15°W-striking fault that can be traced northward through the city of Lafayette to Briones Regional Park (Crane, 1988). Dibblee (1980) also mapped a similar structure in this location called the "Lafayette fault". Crane (1988) refers only to the reach of this fault north of Lafayette as the "Lafayette fault". Following Dibblee, we consider the Lafayette fault to extend from Kaiser Creek to Briones Regional Park. Thus defined, the total length of the Lafayette fault is about 17 km. The Lafayette fault consistently displaces contacts between late Neogene stratigraphic units in a right-lateral sense (Dibblee, 1980; Crane, 1988), and is associated with strongly pronounced geomorphic features suggestive of Quaternary strike-slip activity along most of its length (Unruh and Kelson, 2002).

As documented by Dibblee (1980), Crane (1988) and Graymer et al. (1994), the NNW-striking Reliez Valley fault extends from the vicinity of Las Trampas Creek in western Walnut Creek to Briones Regional Park, for a total length of about 8 km. The Reliez Valley fault is subparallel to and located about 0.5 km east of the Lafayette fault; the two structures merge at their northern ends. We interpret that the two faults merge downward into a single shear zone, and we regard them to be a single fault for the purpose of evaluating their seismic potential.

Lineament Zones in the Northern East Bay Hills

Based on analysis of air photos and limited field reconnaissance, Unruh and Kelson (2002) proposed that dextral slip on the Lafayette and Reliez Valley faults is transferred in a left-restraining step across the Briones hills to the NNW-trending Russell Peak and Dillon Point-McEwan Road lineament zones, which can be traced north of the Carquinez Strait to the Vallejo area (Figure 1). Unruh and Kelson (2002) also documented the Larkey lineament zone, which can be traced for about 8 km along the eastern edge of the East Bay hills at the latitude of Walnut Creek and Pleasant Hill. Unruh and Kelson (2002) interpreted the Russell Peak, Dillon Point-McEwan Road, and Larkey lineament zones to be strike-slip shear zones that lack surface expression as through-going faults. These structures may transfer dextral slip northward to the Quaternary-active West Napa fault (Figure Map). Closest approach of these lineament zones to Chabot Dam is 17 km.

The Russell Peak, Dillon Point-McEwan Road and Larkey lineament zones are defined by alignments of geomorphic features such as truncated bedding, saddles, linear drainages, linear troughs, springs and vegetation alignments that are commonly associated with active faults. The lineaments locally coincide with parts of previously mapped faults. For example, the Dillon Point lineament coincides with a north-striking section of the Southhampton fault along the western margin of Southhampton Bay. Also, the lineaments are locally associated with background seismicity. In particular, the southern end of the Dillon Point-McEwan Road lineament is spatially associated with the Briones swarm of small earthquakes, described previously.

Las Trampas Anticline
The northern termination of the Calaveras fault coincides with the southern end of the NW-trending, northeast-vergent Las Trampas anticline (Ham, 1952). Unruh and Kelson (2002) interpreted the Las Trampas anticline to be a fault-propagation fold underlain by a blind, southwest-dipping thrust fault. The anticline and inferred underlying thrust fault terminate to the northwest against the Lafayette and Reliez Valley faults (Figure 1). The Las Trampas anticline and blind thrust fault, therefore, appears to transfer slip from the northern end to the Calaveras fault to strike-slip faults of the Contra Costa shear zone in the interior of the East Bay hills (Unruh and Kelson, 2002).

Seismic Potential of the Contra Costa Shear Zone
To date, detailed paleoseismic studies have not been performed to assess late Quaternary activity and structural linkage of faults and lineaments in the Contra Costa shear zone. Specifically, no data exist to determine whether or not the faults have displaced stratigraphic units 35,000 years in age or younger, which is the criterion for an Active Seismic Source established by the California Division of Safety of Dams (Fraser, 2001). Based on the strong geomorphic expression of these features, their probable association with seismicity, and the fact that they have attributes consistent with activity in the current tectonic regime, we conclude that they are "Conditionally Active", per DSOD criteria (Fraser, 2001; Table 1). For the purposes of this study, we conservatively consider earthquake scenarios involving ruptures of multiple fault segments within this zone.

The Cull Canyon, Lafayette and Reliez Valley faults are the most proximal elements of the Contra Costa shear zone to Chabot Dam (Figure 1). Given the present uncertainty about the activity and seismic potential of these structures, we conservatively assume that all three faults may rupture together in a single event. Using a 25 km rupture length and 15 km rupture width, empirical relations between rupture area and earthquake magnitude in Wells and Coppersmith (1995) provide a median magnitude of **M** 6.6 for combined rupture of the Cull Canyon, Lafayette and Reliez Valley faults (Table 1).

Individual lineaments of the Contra Costa shear zone in the northern East Bay hills range from about 1.2 to 8.0 km in length, and thus are unlikely to be sources of significant earthquakes unless multiple segments rupture in a single event. WLA (2003) characterized these structures for a probabilistic source model, and found that the maximum length for a combined rupture of the Larkey lineament, Lafayette fault and Dillon Point-McEwan Road lineament is 23 km. For this scenario, we assume that the discontinuous lineaments are the surface expression of a continuous vertical shear zone in the subsurface with a rupture width of 15 km. From empirical relations in between magnitude and rupture area in Wells and Coppersmith (1994), we estimate **M** 6 1/2 as the maximum earthquake for the Contra Costa shear zone in the northern East Bay hills.

Other potential seismic sources in the East Bay hills include blind thrust faults that may underlie large, map-scale folds like the Las Trampas anticline. Based on its mapped length and apparent structural continuity, Unruh and Kelson (2002) inferred that the Las Trampas anticline is underlain by a 12-km-long blind thrust fault. If it is assumed that an earthquake on the fault will have a minimum 1:1 rupture aspect ratio, then the blind Las Trampas thrust fault may be capable of generating a **M** 6.2 earthquake (per empirical relations in Wells and Coppersmith, 1994). In general, the Contra Costa shear zone lineaments in the northern East Bay hills bound narrow (1- to 3-km-wide) blocks that are internally deformed by reverse faulting and northeast- and southwest-vergent folding (Unruh and Kelson, 2002). Given the relatively small dimensions of these blocks, we conclude that blind thrust faults associated with them are unlikely to be sources of **M** 6 (or larger) earthquakes; however, these structures may be sources of smaller "background" earthquakes.

Franklin and Southhampton faults
The Franklin and Southhampton faults in the northern East Bay Hills form the boundaries of the northwest-trending "Franklin High" structural block (Crane, 1995). The Franklin fault is the southwestern structural margin of this block, and it juxtaposes older rocks on the northeast (Cretaceous and Eocene marine strata) against Miocene strata of the Monterey and San Pablo Groups to the southwest. Crane (1995) shows the Franklin fault to be a northeast-dipping thrust or reverse fault. The Southhampton fault is the northeastern structural boundary of the "Franklin High", and is mapped by Crane (1988; 1995) as a southwest-dipping thrust fault. The closest approach of these structures to Chabot Dam is 20 km (Table 1).

Previous work by Geomatrix Consultants (2001) has documented evidence for late Quaternary activity of the Franklin and Southhampton faults, and characterized them as potential sources of **M** 6 3/4 earthquakes. In an alternative interpretation, Unruh and Kelson (2002) proposed that the Franklin and Southhampton faults were pre-existing, northwest-striking Tertiary structures that locally have been deformed by late Cenozoic strike-slip displacement on branches of the Contra Costa shear zone. In particular, Unruh and Kelson (2002) observed that north-striking reaches of the Southhampton fault coincide with lineaments of the Contra Costa shear zone, and concluded that the Southhampton fault locally has been deformed and/or reactivated by late Cenozoic dextral shearing.

Both of these interpretations are based on geologic observations, and thus have an empirical basis for validity. Both interpretations assume that active seismic sources capable of generating significant earthquakes are present in the northern East Bay hills. We favor the Unruh and Kelson (2002) interpretation for several reasons:

- There are significant differences in the mapping of the Franklin and Southhampton faults among various workers (Crane, 1988; Graymer et al., 1994), which we interpret to indicate that the fault traces are not consistently well defined along their entire length. Consequently, we infer that the likelihood of the Franklin and Southhampton faults rupturing along their entire map length, which is necessary to generate a **M** 6 3/4 earthquake, is very low.

- The fault traces are comprised of alternating short NNW-SSE- and NW-SE-striking reaches. This pattern is unusual for active strike-slip faults that typically break in relatively collinear, 20+ km rupture segments. This pattern can be simply explained, however, by activity of the Contra Costa shear zone lineaments.

WLA

- The average strike of the Franklin and Southhampton faults is NW-SE, more toward the west than the NNW-striking Northern Calaveras and Concord-Green Valley faults. In contrast, faults and lineaments of the Contra Costa shear zone also strike NN, subparallel to the Northern Calaveras fault. We interpret this difference in strike azimuth as evidence that the Contra Costa shear zone is more favorably oriented for activity in the modern tectonic setting.

Given these observations, we believe that a magnitude of **M** 6 1/2 for the northern part of the Contra Costa shear zone adequately encompasses the potential hazard to Chabot Dam from an earthquake on the Franklin and Southhampton faults, if the Geomatrix (2001) tectonic model is more correct than the Unruh and Kelson (2002) model.

Mt. Diablo Thrust Fault

The Mt. Diablo thrust fault is interpreted to be a blind fault that underlies Mt. Diablo anticline, a 25-km-long, west-northwest-trending fold north of Livermore Valley (Unruh and Sawyer, 1997). Mt. Diablo anticline and thrust fault are interpreted to transfer dextral slip from the Greenville fault, which forms the eastern structural margin of Livermore Valley south of Mt. Diablo, to the Concord-Green Valley fault north of Mt. Diablo. Activity of the blind Mt. Diablo thrust fault is indirectly inferred from geomorphic evidence for late Quaternary uplift and folding of Mt. Diablo anticline (Unruh and Sawyer, 1997). WGCEP (2003) formally adopted the model for uplift of Mt. Diablo above a potentially seismogenic fault, and included the blind Mt. Diablo thrust fault in its source model for large earthquakes in the San Francisco Bay region.

For site-source distance to Chabot Dam, we measure the closest approach of the dam to the western limb of the anticline overlying the Mt. Diablo thrust fault near the town of Danville in eastern San Ramon Valley, based on the assumption that the fold limb directly overlies the fault at depth. Chabot Dam is 25 km from western edge of the fold; we adopt this as the site-source distance from the dam to the Mt. Diablo thrust fault (Table 1). This is a conservative estimate of site-source distance because the straightline distance between the dam and fault tip through the crust is slightly longer than the horizontal distance along the earth's surface.

We use the dimensions and geometry of Mt. Diablo anticline to infer the dimensions of the underlying blind thrust fault. We conservatively assume that the rupture length is the same as the maximum mapped length of the fold axis (i.e., 25 km). Based on a geologic cross-section of the fold and thrust fault in Unruh (2001), we assume that a rupture will extend from the base of the brittle crust (about 17 km depth) up-dip to a depth of approximately 8 km, which corresponds to a rupture width of about 20 km, resulting in a potential rupture area of 500 km^2. From empirical relationships between earthquake magnitude and rupture area in Wells and Coppersmith (1995) for all earthquakes, we estimate a median magnitude of **M** 6 3/4 for the Mt. Diablo thrust fault. For comparison, WGCEP (1999) adopted a maximum magnitude of **M** 6.7 for the Mt. Diablo thrust fault.

Summary

The Hayward fault, which is capable of generating a magnitude **M** 7 1/4 earthquake at a site-source distance of 500 m, is the most significant seismic source for evaluation of deterministic ground motions at

Chabot Dam. Proximal faults in the East Bay hills, including the combined Cull Canyon-Lafayette-Reliez Valley faults and the Northern Calaveras fault, may produce smaller maximum earthquakes at greater distances. Regional sources capable of producing larger earthquakes than the Hayward fault include the San Andreas and San Gregorio-Seal Cove faults (Table 1), but both these structures are located at significantly greater distances from Chabot Dam. It is possible that the long duration of strong shaking from a **M** 8 earthquake on the San Andreas fault at a site-source distance of 30 km (Table 1) could be significant for the stability of Chabot Dam.

Closing

We appreciate the opportunity to assist URS in characterizing the geologic and seismotectonic setting of Chabot Dam. Please feel free to call me (925-256-6070) or send email (unruh@lettis.com) if you have any questions or comments about this report.

Sincerely,
WILLIAM LETTIS & ASSOCIATES, INC.

Jeffrey R. Unruh, Ph.D., R.G.
Principal Geologist

WLA

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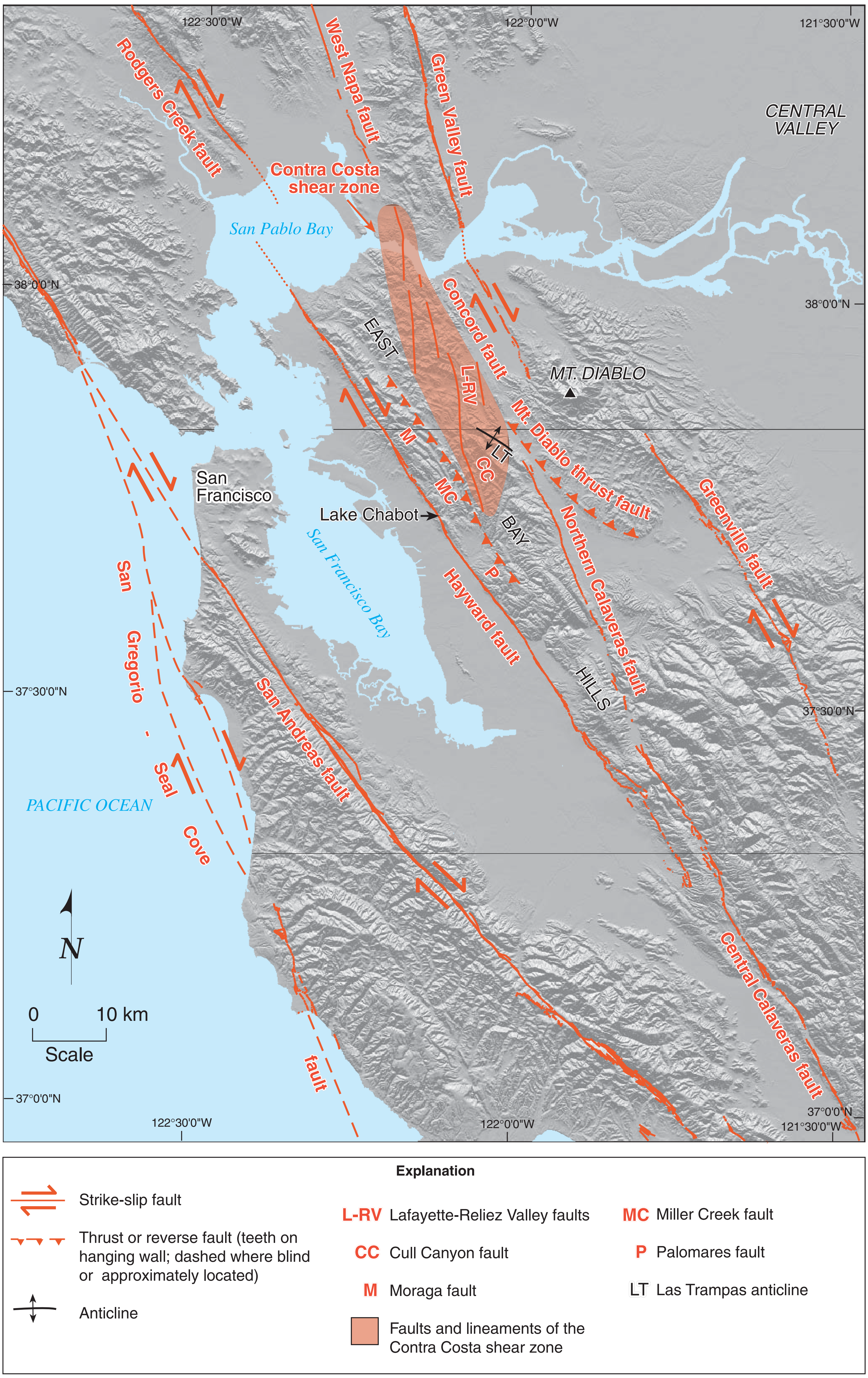
122°30'0"W
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Rodgers Creek fault
West Napa fault
Green Valley fault
CENTRAL VALLEY
Contra Costa shear zone
San Pablo Bay
Concord fault
EAST
L-RV
MT. DIABLO
M
LT
CC
MC
Mt. Diablo thrust fault
Greenville fault
San Francisco
Lake Chabot
BAY
San Francisco Bay
P
Northern Calaveras fault
Hayward fault
San
Gregorio
Seal
Cove
fault
HILLS
San Andreas fault
PACIFIC OCEAN
N
0
10 km
Scale
Central Calaveras fault
Explanation
Strike-slip fault
Thrust or reverse fault (teeth on hanging wall; dashed where blind or approximately located)
Anticline
L-RV Lafayette-Reliez Valley faults
CC Cull Canyon fault
M Moraga fault
Faults and lineaments of the Contra Costa shear zone
MC Miller Creek fault
P Palomares fault
LT Las Trampas anticline

Figure 1

Table 1: Earthquake Sources, Chabot Dam

Fault or Seismic Source	Maximum Magnitude	Closest Approach	Activity (per Fraser, 2001)
San Andreas Fault	Mw 8	30 km	Active: large historic earthquake
San Gregorio-Seal Cove Fault	Mw 7 ½	41 km	Active: Holocene surface rupture
Hayward-Rodgers Creek Fault	Mw 7 ¼	0.5 km	Active: historic earthquake
Miller Creek Fault	Mw 6 ¼	4 km	Active: Holocene surface rupture
Northern Calaveras Fault	Mw 7	13 km	Active: Holocene surface rupture
Contra Costa Shear Zone			Conditionally Active
• *Cull Canyon-Lafayette-Reliez Valley faults*	Mw 6 ½	6 km	Late Quaternary activity suggested by strong geomorphic expression; individual lineament zones associated with clusters of small earthquakes
• *Lineament zones, northern East Bay hills*	Mw 6 ½	17 km	
Greenville Fault	Mw 7	33 km	Active; historic earthquake
Concord-Green Valley Fault	Mw 6 ¾	24 km	Active: Holocene surface rupture; active creep
Mt. Diablo Thrust Fault	Mw 6 ¾	15 km	Active: Holocene growth of Mt. Diablo anticline above fault

Appendix I

3-D GIS Model - Existing Boring Data

URS # Memorandum

Date: March 31, 2004

To: Atta Yiadom
East Bay Municipal Utility District

From: Lelio Mejia, Ted Feldsher

Subject: ***3-D GIS Model – Existing Boring Data***
Task B Technical Memorandum
Dynamic Stability of Chabot Dam

Purpose

In accordance with the scope of work for Task B, we have incorporated the available subsurface geotechnical data for Chabot Dam into a 3-D GIS model. This memorandum summarizes the model features and presents graphical views of the data. In addition to the graphical views of the model, we are submitting, under separate cover, the electronic data in the form of shape files. The goal of the GIS modeling effort is to help assess the distribution and geometry of soil conditions important to the seismic stability analysis of the dam. Once additional data are available from the upcoming phase of investigations, they will be entered into the model and updated shape files will be submitted.

A geologic map of the dam foundation and our understanding of the site geology, also developed under Task B, are presented in a separate memorandum.

GIS Model Topographic Data

The topographic representation of the dam's current ground surface, excluding the upstream slope area under the reservoir, is based on District Drawing No. 6948-G-1.03.1, titled "As Built Topography," dated December 7, 1982. Since data for this drawing were not available in electronic format, we digitized selected contours for input to the model. For the upstream slope area beneath the reservoir, we digitized contours from District Drawing No. 1487-R-1, dated March 10, 1967. Thus, the GIS model includes bathymetric survey data for the dam's upstream slope and reservoir bottom.

Additional drawings available from the District show contours of the site reportedly surveyed prior to the original construction of the dam. These include Drawing No. 1497-R-1, dated 1934 and Drawing R-168 dated 1886. The 1934 drawing reproduces the pre-dam contours on the current site datum used by the District (NGVD). Although the 1934 drawing does not include horizontal coordinate data, it shows the spillway structure. The same spillway structure is also shown on District Drawing 6948-G-1.05, which includes horizontal coordinate data. Electronically overlaying these several drawings allowed us to approximately locate the pre-dam contours relative to the existing contours. The results are incorporated into the GIS model.

GIS Model Geotechnical Data

The available geotechnical data was discussed in our Data Review Memorandum (Task A). As noted therein, the previous subsurface field investigations at Chabot Dam included a total of at least 67 borings. As part of our review of the data, we entered each available boring log and lab test result into a geotechnical database using the software "gINT" (gINT Software © 1985-2004). This database includes drilling and sampling types, material descriptions and lithologies, blow counts, and laboratory data such as gradations, Atterberg limits, dry densities, and shear strength test results. The gINT database was exported into an Excel spreadsheet format, and was imported into the GIS program ARCView-ARCGIS. The borings included in the GIS database are shown in plan view in Figure 1, which also shows the digitized 10-foot contours of the existing ground surface and of the pre-dam surface below.

GIS Model Outputs

To date we have used the GIS model to develop an understanding of the 3-D geometry of the dam, and of the spatial distribution within the dam and foundation of: a) previous borings and SPT sampling, b) sandy and gravelly soils, and c) foundation soil thickness. This information is being used to develop the program of field explorations to be undertaken in Task C.

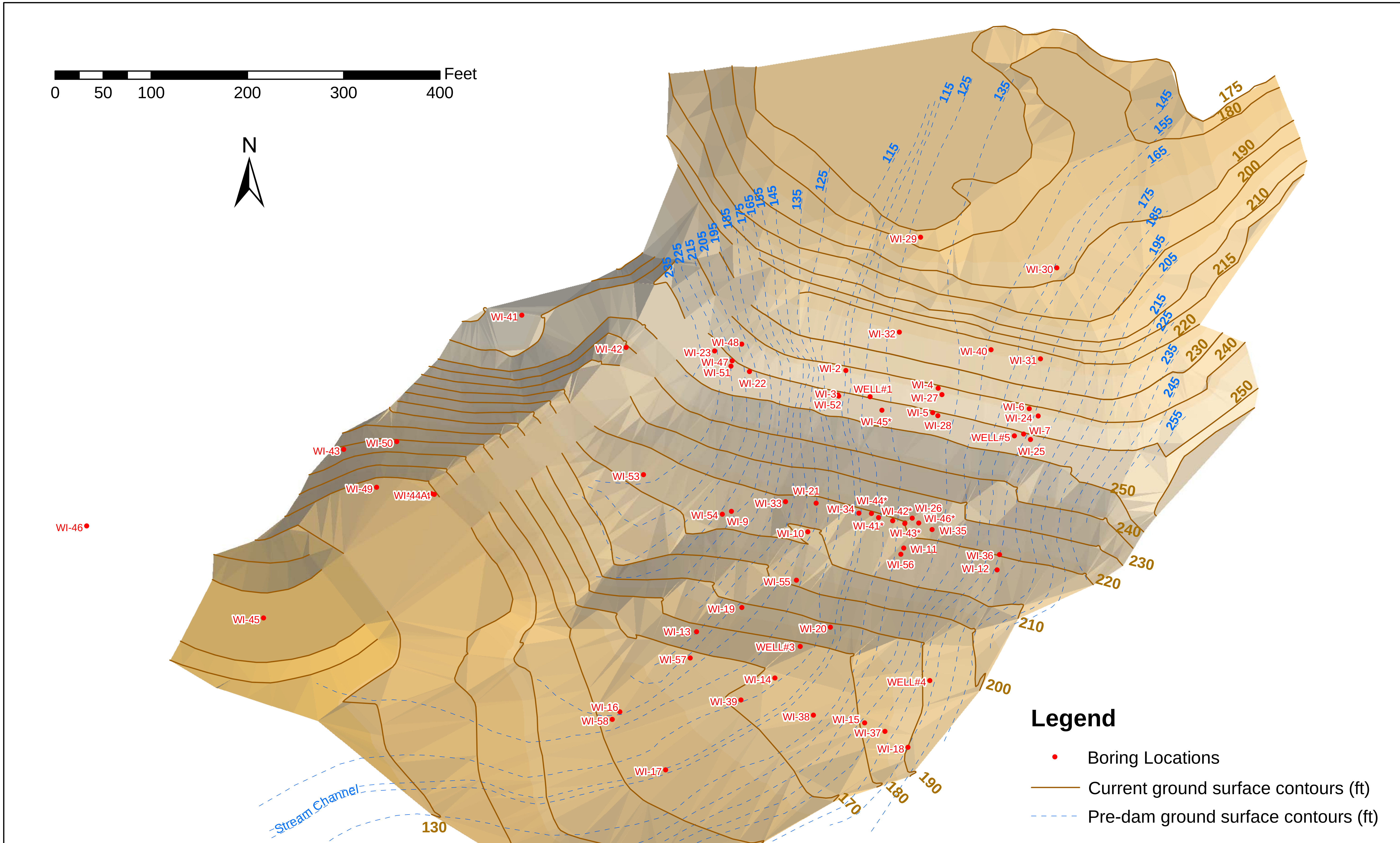
Locations of SPT Sampling: Figure 2 shows the locations where SPT blow counts were previously taken. There are a significant number of SPT blow counts available within the downstream shell of the dam and the downstream hydraulic fill. Fewer SPT blow counts are available beneath the crest of the dam and in the upstream shell. As discussed in our Task A memorandum, the available SPT blow counts lack correction for the gravel content of the dam and foundation materials and for hammer efficiency, and therefore, need to be supplemented.

Locations of Sandy and Gravelly Soils: Figure 3 shows the locations of sandy and gravelly soils within the dam and foundation. The locations of samples classified as clean sand or gravel, silty sand or gravel, and clayey sand or gravel are highlighted individually using a different color for each group. Consistent with our understanding of the dam's construction history, the predominantly granular soil zones appear to be mostly concentrated in the hydraulic fill zone near the downstream toe of the dam. A future refinement to the database will include an assessment of the distribution of materials with a potential for liquefaction or potential for development of excess pore pressures and strength loss.

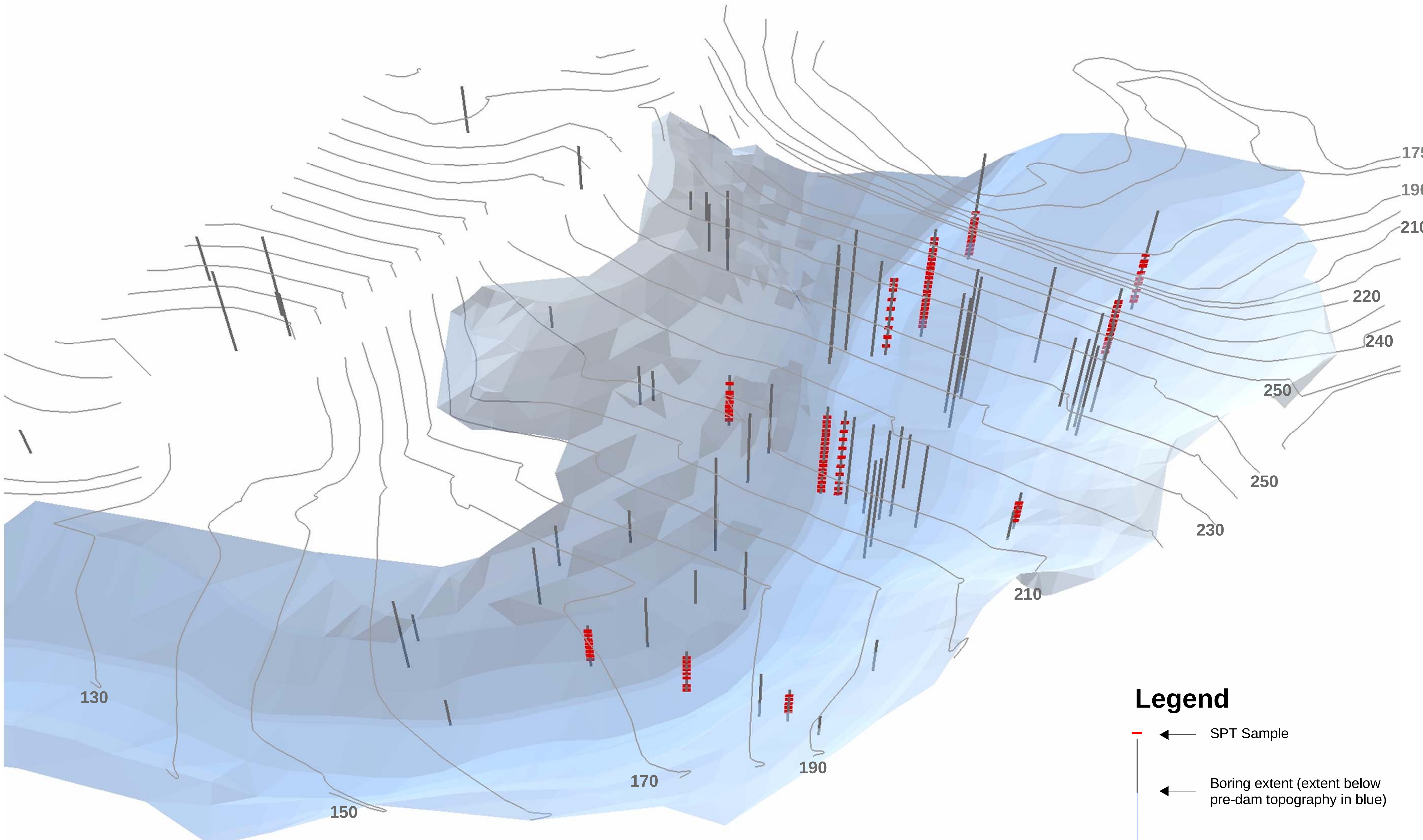
Thickness of Foundation Soils: The distribution of foundation soil thickness has been inferred from the GIS model by comparing the logged elevation of bedrock in previous borings with the pre-dam topography. Many of the available borings were drilled to bedrock, and provide reliable rock depth information. However, most of the logs do not reliably identify the presence of foundation soil beneath the embankment fill. Figure 4 shows the inferred distribution of native soils in the dam foundation, based on a comparison between the logged bedrock depths and the 1886 contours of the pre-dam topography. As shown, the bedrock depths are substantially below the pre-dam surface in many cases. For example, at boring WI-13, the depth of alluvium/colluvium appears to be about 37 feet. Although the actual depths of soil excavated prior to dam construction are unknown, the available construction information suggests that little excavation other than near-surface stripping was done beyond the limits of the central core trench. In a few locations, the logged bedrock elevations are above the 1886 contours. This may be a result of inaccuracies in the boring locations or in the original topography. At those locations, the thickness of foundation soils was assumed to be very small and is not shown.

Closure

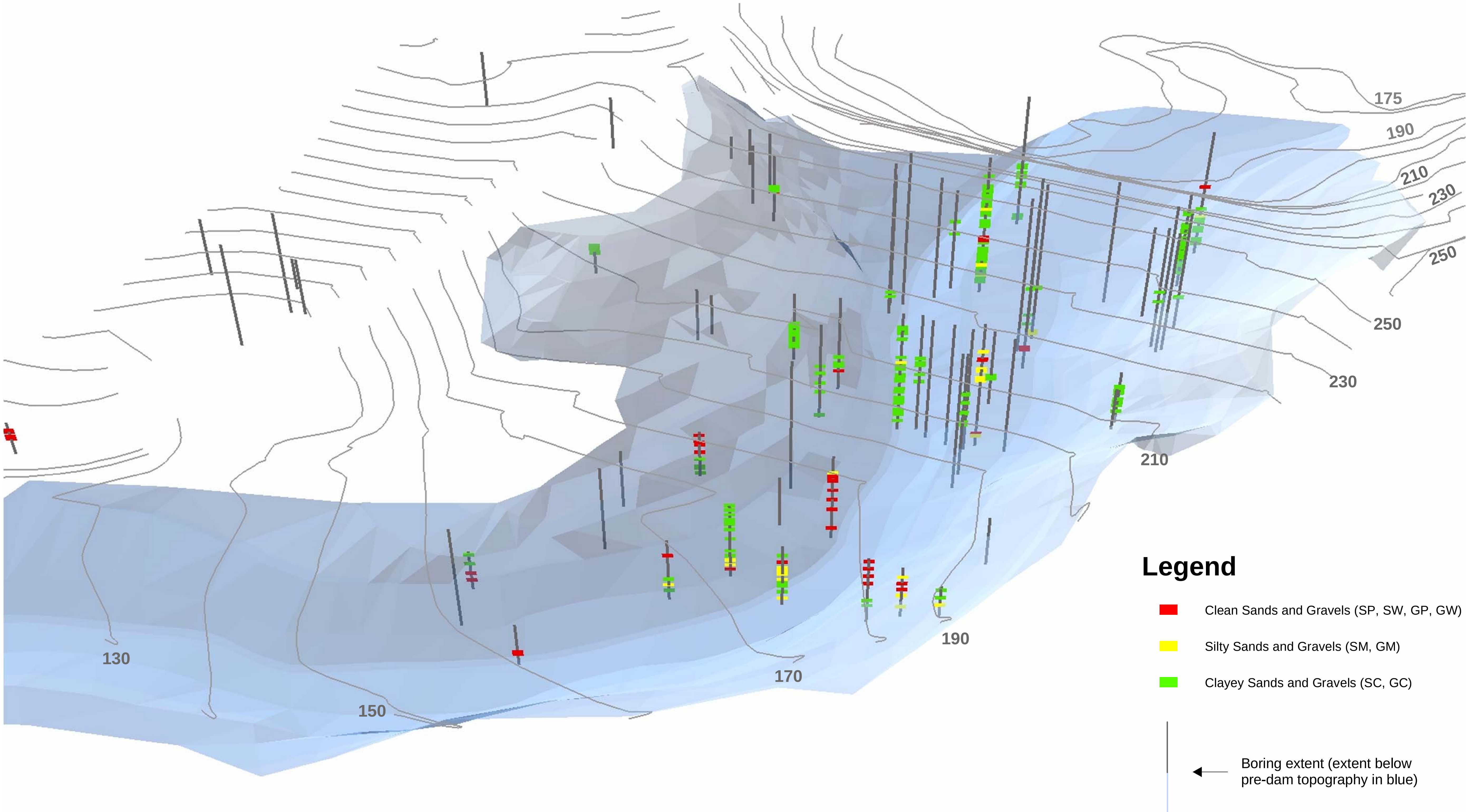
Once the GIS database is updated with the information from the new field explorations, it will be used to further our understanding of the embankment and foundation conditions including the distribution of soils susceptible to liquefaction or strength loss, and to develop models for evaluating the seismic stability of the dam.



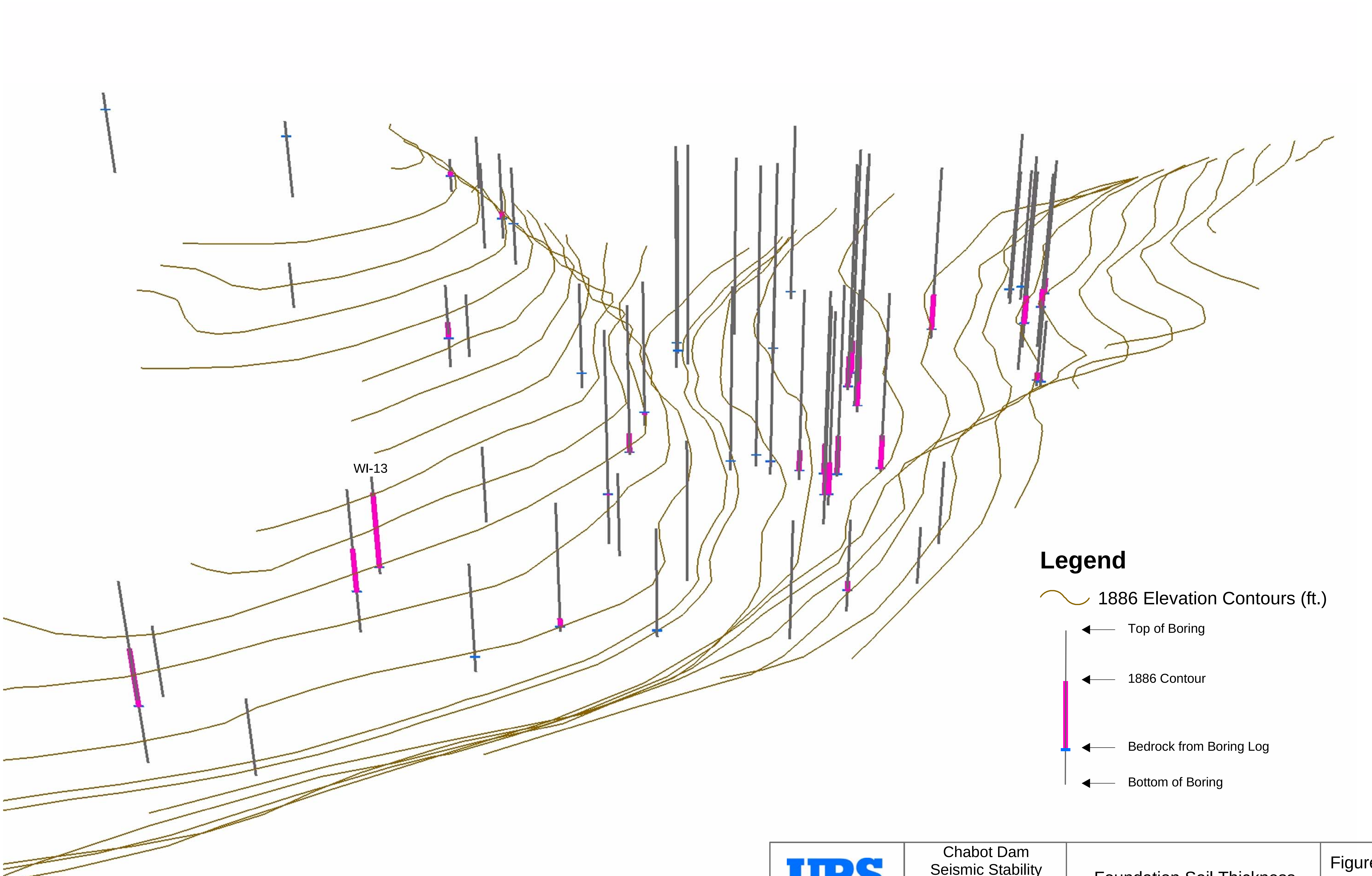
URS	Chabot Dam Seismic Stability 26814536	Boring Locations in GIS Model	Figure 1



URS	Chabot Dam Seismic Stability 26814536	Locations of SPT Samples	Figure 2



URS	Chabot Dam Seismic Stability 26814536	Locations of Sandy and/or Gravelly Soils	Figure 3



URS

Chabot Dam
Seismic Stability
26814536

Foundation Soil Thickness

Figure 4