VOLUME 2

REPORT OF
GEOTECHNICAL INVESTIGATION
PROPOSED METRO PASADENA LINE
UNION STATION IN LOS ANGELES TO EAST OF
SIERRA MADRE VILLA AVENUE IN PASADENA, CALIFORNIA
FOR THE
LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY (MTA)

(L92045.AE4)

JUNE 9, 1993



LAW/CRANDALL, INC.
ENGINEERING AND ENVIRONMENTAL SERVICES
ONE OF THE LAW COMPANIES

R05
A2145

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APPENDIX A

APPENDIX A
FIELD EXPLORATIONS

BORINGS

The soil conditions along the alignment were explored by drilling 122 borings at the locations shown on Plates 1.1 through 1.32 (Volume 1). Borings 1 through 29 were drilled for our prior preliminary geotechnical investigations.

The borings were drilled to depths of about 7 to 101 feet below the existing grade using 16-, 18-, 20- and 24-inch-diameter bucket-type drilling equipment and 5-inch-diameter rotary wash-type equipment. Boring 75 was drilled using hand auger equipment. Caving and raveling of the bucket boring walls occurred during drilling, as indicated on the boring logs; casing or drilling mud was not used to extend the bucket borings to the depths drilled. Drilling mud was used with the rotary wash-type equipment to prevent caving. Each of the borings was backfilled upon completion of drilling.

LOGGING AND SOIL SAMPLING

The soils encountered were logged by our field representative under the supervision of a certified engineering geologist, and undisturbed samples were obtained for laboratory inspection and testing. The undisturbed samples were obtained with the Crandall sampler at depth intervals of about 3 to 5 feet and at major changes in soil stratigraphy. The Crandall sampler is a brass ring-lined 3.188-inch (outside diameter) tube driven with a kelly bar. The inside diameter of the sampler is 2.625 inches. Bulk samples of the upper soils were obtained to permit the performance of laboratory compaction and other tests.

The logs of the borings are presented on Plates A-1.1 through A-1.122; the depths at which undisturbed samples were obtained are indicated to the left of the boring logs. The number of blows required to drive the Law/Crandall sampler 12 inches is indicated on the logs. The weights and stroke to drive the Law/Crandall Sampler, as well as the weight and stroke used in the Standard Penetration Tests, are defined on Plate A-1.123, Key to Logs of Borings.

PIEZOMETERS

After completion of drilling, piezometers (PVC pipe with the lower portion perforated) were installed in Borings 1, 3, 10, 11, 13, 33 through 36, 47, 49, 53, 56, 69, and 70 to permit future water level measurements and sampling. Detailed descriptions of the piezometer installations are presented on the boring logs, and details of the monitoring well construction are presented on Plates A-1.124 through A-1.137.

CLASSIFICATION

The overburden soils are classified in accordance with the Unified Soil Classification System described on Plate A-2.

OVA MONITORING

The soil samples were monitored with an organic vapor analyzer (OVA). The results are shown on the boring logs.

WATER SAMPLING

Ground water samples were obtained from the monitoring wells (piezometers) on various dates. Prior to sampling, each well was developed by pumping approximately 55 gallons of ground water using a submersible pump. To minimize cross-contamination, the pumping system was purged prior to each use with a residue-free detergent soap (TSP brand) solution, followed by a tap water and distilled water rinse/purge. Each of the samples was obtained using a clean disposable bailer, carefully transferred to the appropriate laboratory-supplied containers, labeled, recorded on a Chain-of-Custody document, and placed in a chilled ice chest. The samples were then delivered to BC Analytical Laboratory in Glendale and to CKY Incorporated Analytical Laboratories in Torrance for chemical analyses.

BORING 1

Coordinates
N-4,133,660
E-4,217,025

DATE DRILLED: May 18, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 3:30 pm
ELEVATION 293

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
290	0							GP	6" Asphaltic Paving ARTIFICIAL FILL (af) (to 14-1/2') GRAVEL (Rail Road Ballast)
	5							SW	SAND - well graded, lenses of Clayey Silt, grey and brown
285									Some pieces of wood, strong odor
				22.9	104	25		ML	CLAYEY SILT - some Siltstone fragments, some Sand, brown
	10								
280				17.1	103	12		ML SM	SANDY SILT and SILTY SAND - fine, grey
	15							SM	ALLUVIUM (Qal) SILTY SAND - fine, grey
				16.2	103	5			
275								SP	SAND - fine to medium, grey
	20			10.3	105	15			
270									
				12.1	120	40			Some Gravel and Cobbles
	25								
265				—	—	40		SM	SILTY SAND - fine to coarse, about 15% Gravel, some Cobbles, grey
				9.6	119	50 for 11"			
	30		50 for 5"						
260									
	35			10.3	110	50 for 11"			Fine to medium Sand
255									
	40		80						

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS MS CHKD

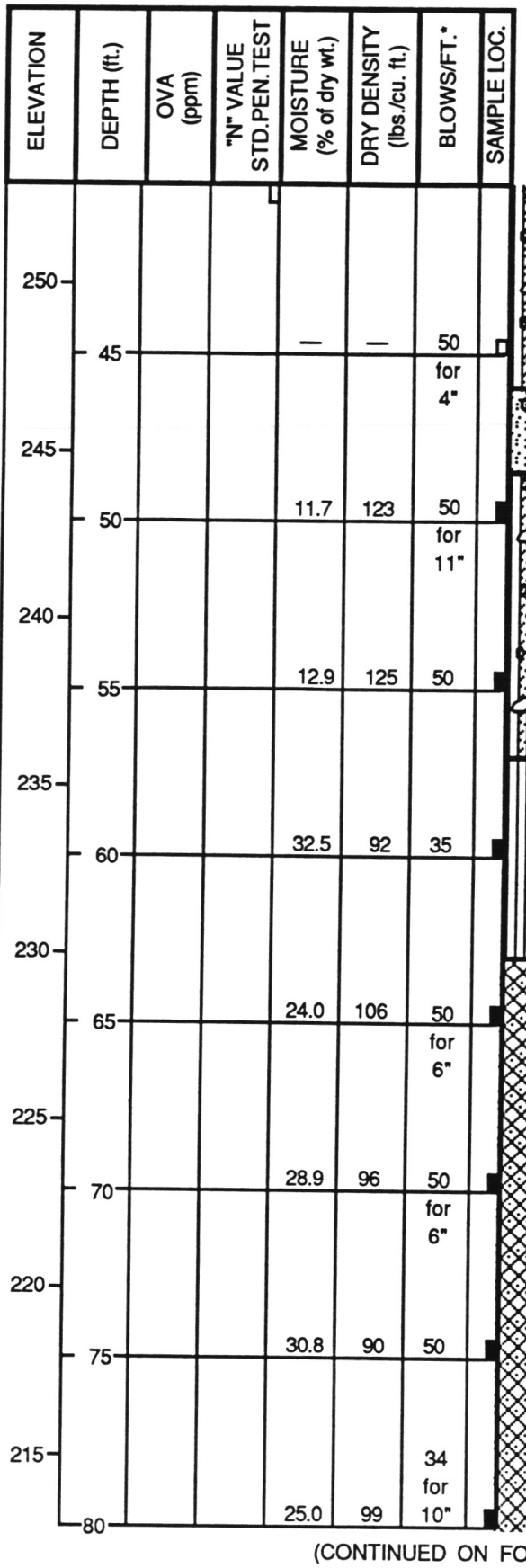
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.1a

BORING 1 (Continued)

DATE DRILLED: May 18, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:20 am; Finish: 3:30 pm



ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
250							
	45			—	—	50 for 4"	
245							
	50			11.7	123	50 for 11"	
240							
	55			12.9	125	50	
235							
	60			32.5	92	35	
230							
	65			24.0	106	50 for 6"	
225							
	70			28.9	96	50 for 6"	
220							
	75			30.8	90	50	
215							
	80			25.0	99	34 for 10"	

SW — SAND - well graded, some Gravel, grey

SM — SILTY SAND - fine to coarse, about 20% Gravel, few Cobbles, grey

Fine to medium Sand

ML — OLDER ALLUVIUM (Qalo)
SANDY SILT - grey

Thin layers of Silty Sand

PUENTE FORMATION (Tpss)
SILTSTONE with INTERBEDDED SANDSTONE - well bedded, poorly cemented, grey

(CONTINUED ON FOLLOWING PLATE)

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.1b

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 1 (Continued)

DATE DRILLED: May 18, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 3:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
210							
	85			29.1	93	29 for 10"	
205							
	90			32.9	86	24 for 10"	
200							
	95			25.4	100	37 for 10"	
195						30 for 10"	
	100			24.7	94		

NOTE:

Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 40' and 100'. Backfilled with Sand to within 38' of ground surface. Bentonite plug placed between depths of 35' and 38' and was grouted with cement above 35'. Water level measured in the well at a depth of 40' on 5/27/92 and at 39' on 1/27/93.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 340 lbs.; Stroke = 18"

SEE PLATE A - 123 FOR KEY TO LOGS OF BORINGS

LOG OF BORING

LAW/CRANDALL, INC.

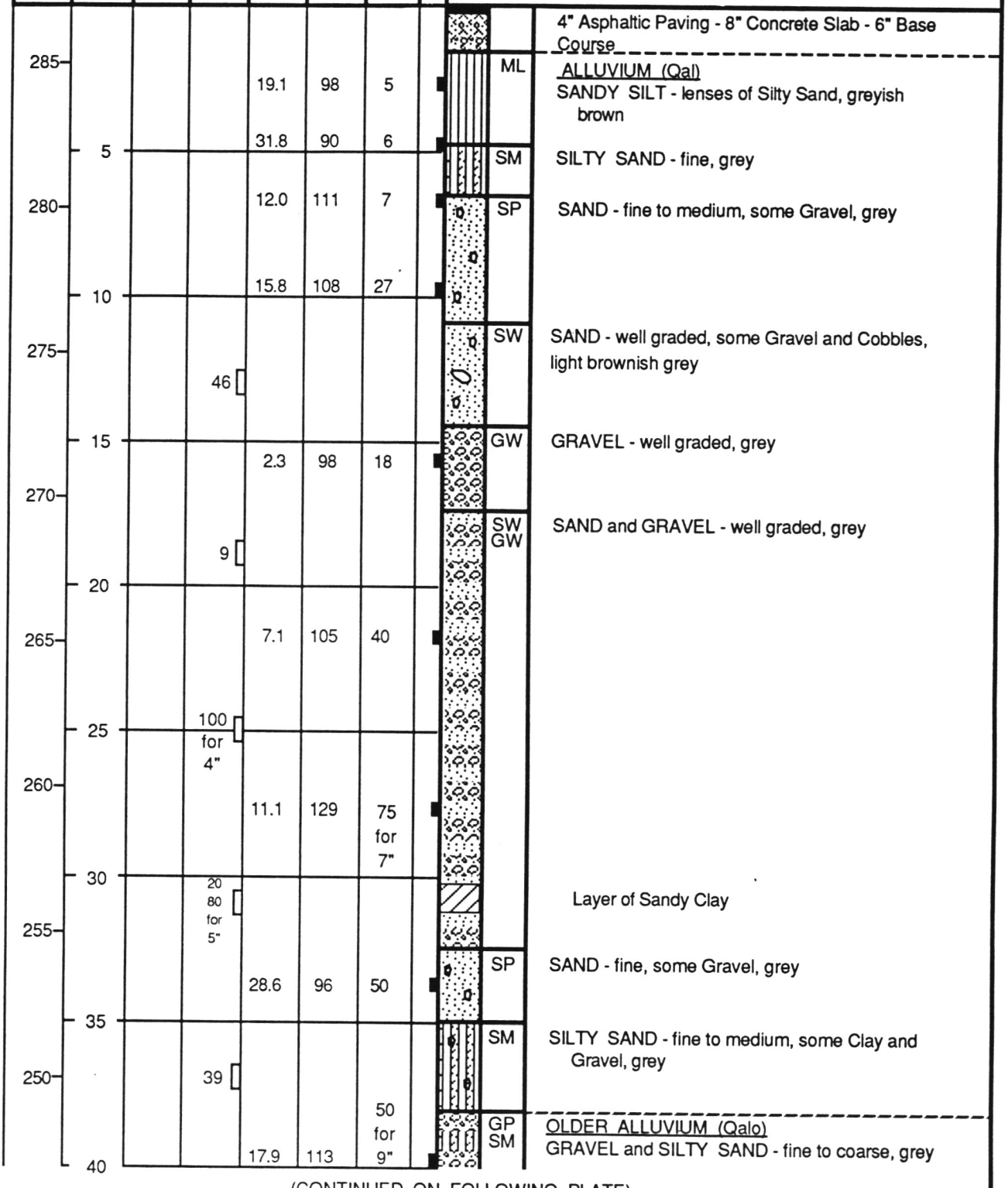
PLATE A - 1.1c

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD

BORING 2

Coordinates
N-4,134,525
E-4,216,940

DATE DRILLED: April 25, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:00 am; Finish: 2:00 pm
ELEVATION 287



Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

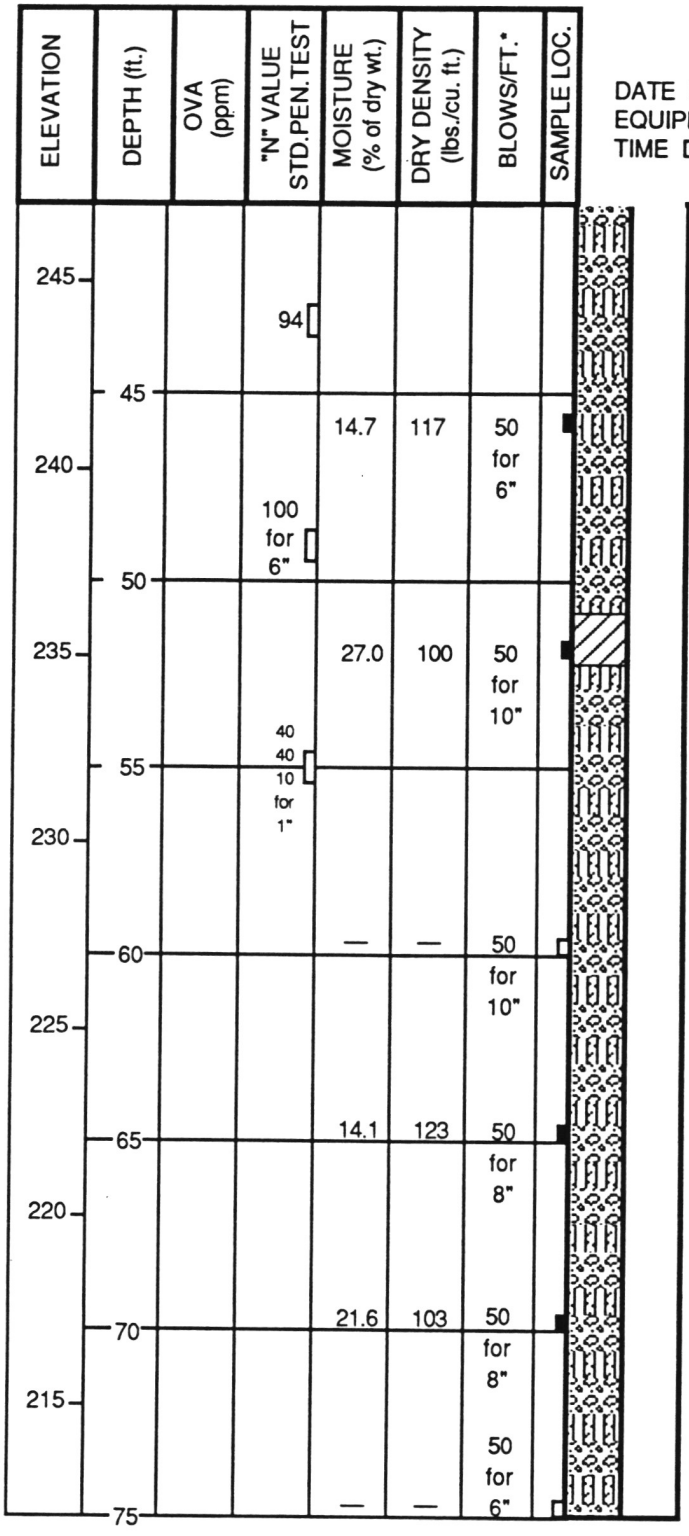
PLATE A - 1.2a

BORING 2 (Continued)

DATE DRILLED: April 25, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:00 am; Finish: 2:00 pm

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.



Layer of Silty Clay

Fine to medium

NOTE:

Drilling mud used in drilling process. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 300 lbs.; Stroke = 18"

LOG OF BORING

LAW/CRANDALL, INC.

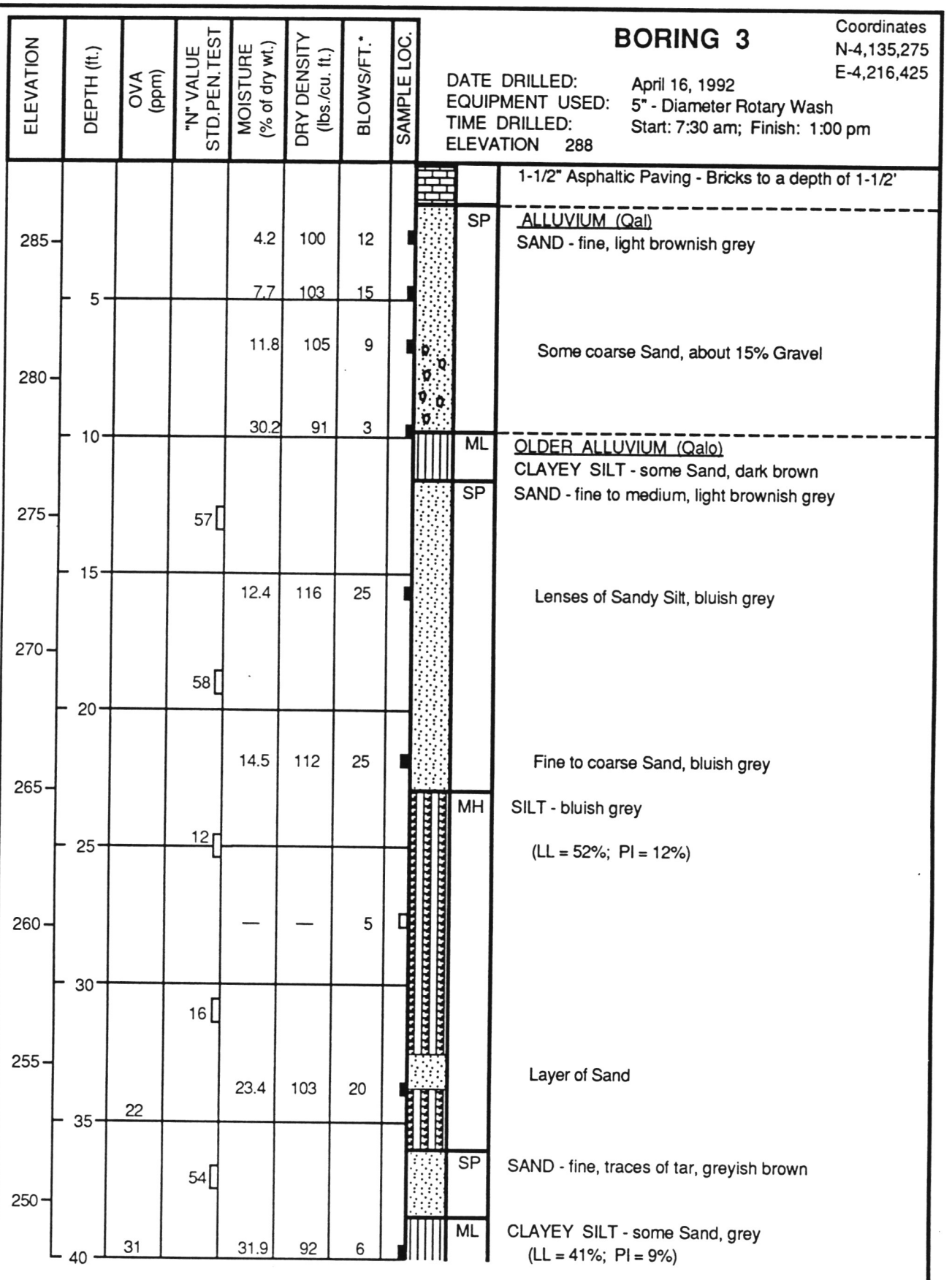
PLATE A - 1.2b

JOB L92045.AE4 DATE 10/11/92 F.T. LS DR. lk O.E. MS CHKD RK

BORING 3

Coordinates
N-4,135,275
E-4,216,425

DATE DRILLED: April 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:30 am; Finish: 1:00 pm
ELEVATION 288



Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.3a

BORING 3 (Continued)

DATE DRILLED: April 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:30 am; Finish: 1:00 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
245			58				
	45	15		27.0	95	40	
240			50				
	50			—	—	22	
235			69				
	55						
230							
	60	18		23.2	99	50	
225							
	65			25.2	100	50	
220							
	70			22.9	101	50 for 10"	
215							
	75			22.9	103	50 for 11"	
210							
	80	70		19.5	103	50 for 10"	

SP SAND - fine, bluish grey

ML SANDY SILT - thin layers of Silty Sand, bluish grey

PUENTE FORMATION (Tpsl)
SILTSTONE with minor INTERBEDDED
SANDSTONE - fine to medium, poorly bedded, poorly to moderately cemented, dark grey

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 10/11/92 F.T. LS DR. lk O.E. MS CHKD

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.3b

JOB L92045.AE4 DATE 11/10/92 F.T. LS DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 3 (Continued)

DATE DRILLED: April 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:30 am; Finish: 1:00 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
205							
	85	30		23.5	99	50 for 10"	
200							
	90	10		32.4	90	50 for 8"	
195							
	95			21.9	102	50 for 8"	
190						50 for 8"	
	100	70		19.9	105		

NOTE:

Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 20' and 100'. Backfilled with Sand to within 20' of ground surface. A bentonite plug was placed between depths of 16' and 20' and was grouted with cement above 16'. Top is capped. Water level measured in the well at a depth of 21-1/2' on 5/5/92.

*Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 18"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.3c

BORING 4

Coordinates
N-4,136,525
E-4,216,630

DATE DRILLED: April 14 & 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
20" - Diameter Bucket
TIME DRILLED: Start: 8:00 am; Finish: 11:00 am (RW)
Start: 8:00 am; Finish: 9:50 am (B)
ELEVATION 295

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				15.1	99	6		ML SM	3" Asphaltic Paving ARTIFICIAL FILL (af) (to 4-1/2') SANDY SILT and SILTY SAND - fine to medium, brownish grey
				13.0	112	7			
290	5			12.0	102	11		SP SM	ALLUVIUM (Qal) SAND and SILTY SAND - fine, light brownish grey
				8.9	95	14			
								SP	SAND - fine to coarse, about 10% Gravel, light browish grey
285	10			11.0	100	17			
			45 55 for 5"						About 15% Gravel
280	15								Thin layer of fine Sand
				10.3	122	40			
275	20		80						
				32.5	91	12		ML	OLDER ALLUVIUM (Qalo) SANDY SILT - some Clay, lenses of Sand, greenish grey and brown
270	25		29					SP	SAND - fine to medium, light greyish brown
				13.1	118	50			Some coarse Sand
265	30							SW	SAND - well graded, about 20% Gravel, light bluish grey
			45						
260	35			16.7	115	23			Thin layer of Sandy Silt
			85						Lenses of Sandy Silt
255	40								

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. LS DR. lk O.E. MS CHKD

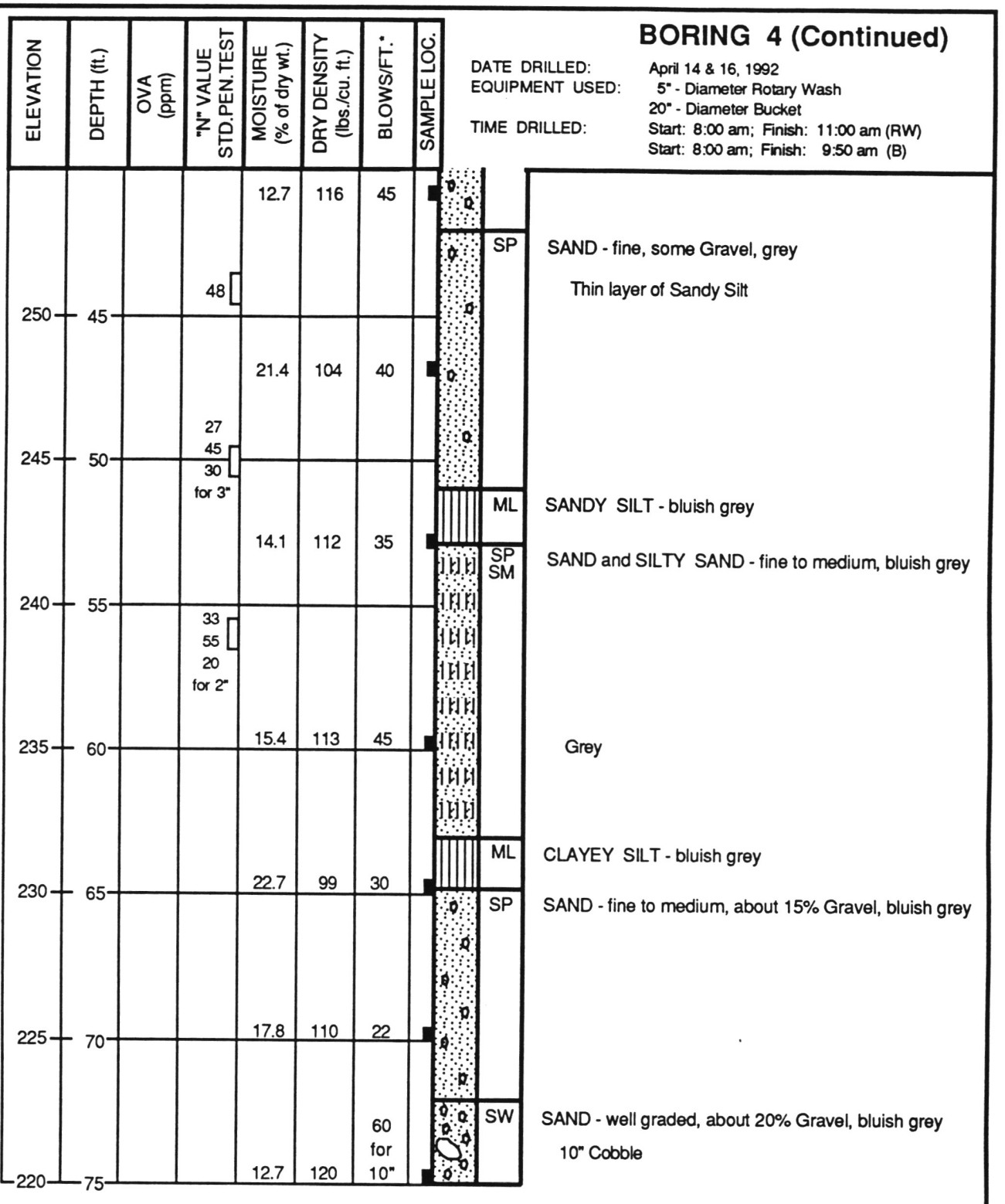
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.4a

BORING 4 (Continued)

DATE DRILLED: April 14 & 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
20" - Diameter Bucket
TIME DRILLED: Start: 8:00 am; Finish: 11:00 am (RW)
Start: 8:00 am; Finish: 9:50 am (B)



NOTE:
Drilling mud used in drilling process. Mud removed to a depth of 40' after completion of drilling. Water level measured at 33-1/2' 30 minutes after removal of mud. To obtain water level measurement, a bucket boring was drilled adjacent to the rotary wash. Water level measured in the bucket boring at a depth of 32' 20 minutes after completion of drilling.

* Number of blows required to drive Law/Crandall sampler 12". Driving Weight = 400 lbs.; Stroke = 18"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. LS DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.4b

BORING 5

Coordinates
N-4,137,280
E-4,217,210

DATE DRILLED: April 16, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:00 am; Finish: 2:15 pm
ELEVATION 300

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				9.7	118	3		SM	3" Asphaltic Paving ARTIFICIAL FILL (af) (to 3-1/2') SILTY SAND - fine to coarse, about 30% Gravel, pieces of brick and asphaltic paving, dark brown
295	5			11.5	121	7		SM	ALLUVIUM (Qal) SILTY SAND - fine to medium, light brown
				4.5	113	7		SP SM	SAND and SILTY SAND - fine to coarse, about 10% Gravel and Cobbles (to 8" in size), light brownish grey Some Boulders (to12" in size)
290	10								About 30% Gravel and Cobbles
				12.8	104	12			About 20% Gravel and Cobbles
285	15			6.8	107	15			
				3.8	113	16			
280	20								
				5.2	122	20			
275	25								
				9.4	110	20		SM	OLDER ALLUVIUM (Qalo) SILTY SAND - fine to medium, about 30% Gravel and Cobbles (to 6" in size), light grey
270	30								

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. GMC/SJ DR. lk O.E. MS CHKD RK

NOTE:

Water not encountered. Caving from 5' to 9' (to 3-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 24' = 1,680 lbs. Below 24' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.5

JOB L92045.AE4 DATE 11/10/92 F.T. GMC/SJ DR. lk O.E. MS CHKD

BORING 6

Coordinates
N-4,137,695
E-4,217,760

DATE DRILLED: April 17, 1992
EQUIPMENT USED: 20" - Diameter Bucket
TIME DRILLED: Start: 8:20 am; Finish: 10:25 am
ELEVATION 301

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
300				7.3	111	5		SM	3" Asphaltic Paving ARTIFICIAL FILL (af) (to 3-1/2') SILTY SAND - fine to coarse, pieces of glass, about 20% Gravel and Cobbles, dark brown
				4.0	92	2		SM	ALLUVIUM (Qal) SILTY SAND - fine, light brownish grey
	5								Strong gasoline odor
295				14.4	98	< 1			
				3.1	112	7			Fine to medium Sand, about 30% Gravel and Cobbles
	10								
290				4.9	118	10			Less Gravel and Cobbles
									More Gravel and Cobbles
	15								
285		10		12.9	102	5			Slight gasoline odor Layer of Sand
	20							SW	SAND - well graded, about 30% Gravel, slight gasoline odor, grey
280				5.6	118	20			Strong gasoline odor, greenish grey
									Grey
	25								
275				3.8	122	25			Cemented layer
	30	>1000		32.6	96	18		ML	OLDER ALLUVIUM (Qalo) CLAYEY SILT - strong gasoline odor, dark grey

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Water level measured at a depth of 29' after completion of drilling.
Caving from 27' to 29' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.6

BORING 7

Coordinates
N-4,137,975
E-4,217,965

DATE DRILLED: April 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 1:33 pm; Finish: 4:48 pm
ELEVATION 342

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
340	0			7.8	119	4	
				8.5	115	3	
	5			16.0	109	3	
335				14.0	109	2	
	10			11.9	107	1	
330							
	15			15.6	112	4	
325							
	20			3.1	125	9	
320							
	25			5.7	114	9	
315							
	30			—	—	5	
310							
	35			19.3	107	20	
305							
	40						

SM ML — ARTIFICIAL FILL (af) (to 6-1/2')
SILTY SAND and SANDY SILT - about 20% Gravel and Cobbles, pieces of brick, dark brown

More pieces of brick

ML — OLDER ALLUVIUM (Qalo)
SANDY SILT - brown

ML — CLAYEY SILT - some Sand, brown

NOTE:
Slight water seepage encountered at a depth of 32-1/2'. 1" of water at the bottom of the boring 10 minutes after completion of drilling. Caving below 17' (to 4' in diameter).

*Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,680 lbs.; Below 26' = 800 lbs.; Stroke = 12"

SW — SAND - well graded, some Silt, about 30% Gravel and Cobbles, light greyish brown
Some Cobbles (to 6" in size)

Few Cobbles and Boulders (to 13" in size)

SM — SILTY SAND - fine, reddish brown

Layer of well graded Sand, some Gravel and Cobbles

PUENTE FORMATION (Tpss)
SANDSTONE - fine to medium grained, scattered Cobbles, poorly bedded, moderately cemented, bluish grey
(BORING TERMINATED AT A DEPTH OF 36' DUE TO DIFFICULT DRILLING THROUGH CEMENTED LAYER)

JOB L92045.AE4 DATE 11/10/92 F.T. SEJ/LS DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.7

BORING 8

Coordinates
N-4,138,100
E-4,218,430

DATE DRILLED: April 14, 1992
EQUIPMENT USED: 20" - Diameter Bucket
TIME DRILLED: Start: 11:00 am; Finish: 2:20 pm
ELEVATION 305

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
				10.9	118	4		SM — 2" Asphaltic Paving ARTIFICIAL FILL (af) (to 3') SILTY SAND - fine, about 20% Gravel, dark brown
				2.1	94	4		SW — ALLUVIUM (Qal) SAND - well graded, about 10% Gravel, light greyish brown
300	5			4.4	94	<1		SP — SAND - fine, some Gravel and Cobbles, strong gasoline odor, dark grey
				— 16.8	— 112	4 6		PUENTE FORMATION (Tpss) INTERBEDDED SANDSTONE and SILTSTONE - fine to medium grained, poorly bedded, poorly to moderately cemented. light bluish grey Strong sulfur odor
295	10	175		22.8	103	3		
290	15			18.2	109	5		SILTY SANDSTONE - fine to medium grained, poorly bedded to massive, poorly to moderately cemented, light grey Strong sulfur odor Light brown and light grey
285	20			18.9	106	9		Siltstone layers, grey Dark brown, strong gasoline odor and stains
280	25			17.0	113	12		
275	30			13.7	103	20 for 10"		Moderately to well cemented
270	35			15.7	113	35 for 6"		
265	40	25		8.8	111	25 for 10"		

NOTE:
Water seepage encountered at depths of 14', 19' and 34'. Water level measured at a depth of 38' after completion of drilling and at 36' 20 minutes later. Patchy caving at 19'.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 25' = 1,680 lbs. Below 26' = 800 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. GMC/SJ DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.8

BORING 9

Coordinates
N-4,138,345
E-4,218,650

DATE DRILLED: April 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:35 am; Finish: 1:25 pm
ELEVATION 346

JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
345	0			5.9	110	3	■	SM ML
				5.8	115	5	■	
340	5			3.9	108	3	■	
				21.0	97	3	■	
335	10							
				12.6	111	2	■	SW
330	15							CL
				15.3	107	7	■	
325	20							
				26.4	98	11	■	
320	25							
				15.6	112	25 for 10"	■	
315	30							
				17.5	112	25	■	
310	35							
				19.6	104	30 for 10"	■	
	40							

ARTIFICIAL FILL (af) (to 14')
SILTY SAND and SANDY SILT - fine to coarse, about 20% Gravel and Cobbles (to 6" in size), about 10% debris (including pieces of glass, brick, and concrete), brown

More debris, large Cobbles (to 10" in size)

Some Sandstone fragments

OLDER ALLUVIUM (Qalo)
SAND - well graded, about 20% Gravel, brown and grey

SILTY CLAY - brown

PUENTE FORMATION (Tpss)
SANDSTONE - medium to coarse grained, poorly bedded, poorly cemented, yellowish brown
— Bedding: N84W, 64SW
— Light grey to yellowish brown

INTERBEDDED SANDSTONE and SILTSTONE - well beddded, poorly to moderately cemented, light grey and brown

SANDSTONE - medium to coarse grained, poorly bedded, moderately cemented, yellowish brown and grey

Bedding: N72W, 56SW

Fine to medium grained, dark bluish grey

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.9a

BORING 9 (Continued)

DATE DRILLED: April 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:35 am; Finish: 1:25 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
305							
	45			16.6	113	25	
300							
	50			20.5	106	30	
295							
	55						



Medium to coarse grained

Fine to medium grained

NOTE:

Water level measured at a depth of 41' after completion of drilling and at 32' 2 hours later. No caving. Downhole logged.

*Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,680 lbs. Below 26' = 800 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.9b

BORING 10

Coordinates
N-4,138,480
E-4,219,200

DATE DRILLED: April 14 & 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket to 30'
5" - Diameter Rotary Wash to 100'
TIME DRILLED: Start: 7:30 am; Finish: 10:40 am (B)
Start: 6:45 am; Finish: 11:50 am (RW)
ELEVATION 309

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MSM CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS / FT. *	SAMPLE LOC.		
				4.3	108	3	■	SM	ARTIFICIAL FILL (af) (to 4') SILTY SAND - fine, some Gravel, brown
305				2.6	103	3	■		
	5			2.3	117	3	■	SW	ALLUVIUM (Qal) SAND - well graded, about 40% Gravel and Cobbles (to 6" in size), light brown
300				2.6	109	5	■		
	10			14.8	107	15	■		PUENTE FORMATION (Tpss) SANDSTONE - fine grained, poorly bedded, poorly cemented, yellow brown
295									SILTSTONE - some fine Sand, massive, poorly cemented, bluish grey
	15			28.6	92	7	■		
290									SANDSTONE with INTERBEDDED SILTSTONE - well bedded, poorly cemented, fine grained, light bluish grey,
	20			24.1	101	10	■		
				—	—	—	□		Petroliferous Sandstone, dark brown Scattered Cobbles (to 4" in size)
285	25			18.7	111	15	■		
280									Moderately cemented
	30			—	—	30	□		(BUCKET BORING TERMINATED AT A DEPTH OF 30' DUE TO DIFFICULT DRILLING THROUGH HARD CEMENTED LAYERS)
275				17.4	115	60 for 10"	■		
	35								SILTSTONE with minor INTERBEDDED SANDSTONE - fine grained, moderately bedded, poorly cemented, bluish grey
270	40			24.5	100	35	■		

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.10a

BORING 10 (Continued)

DATE DRILLED: April 14 & 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket to 30'
5" - Diameter Rotary Wash to 100'
TIME DRILLED: Start: 7:30 am; Finish: 10:40 am (B)
Start: 6:45 am; Finish: 11:50 am (RW)

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD MS 12/1/92

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
265	45			21.3	108	50 for 9"	
260	50			21.8	104	50 for 10"	
255	55			15.6	117	60 for 8"	
250	60			19.9	108	50 for 10"	
245	65			19.0	106	60 for 6"	
240	70			19.4	111	60 for 4"	
235	75			22.8	104	60 for 5"	
230	80			15.8	117	75 for 4"	

SANDSTONE with minor INTERBEDDED SILTSTONE - fine grained, poorly bedded, moderately cemented, bluish grey and dark brown

Well cemented layer, 6" thick

(CONTINUATION FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.10b

BORING 10 (Continued)

DATE DRILLED: April 14 & 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket to 30'
5" - Diameter Rotary Wash to 100'
TIME DRILLED: Start: 7:30 am; Finish: 10:40 am (B)
Start: 6:45 am; Finish: 11:50 am (RW)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
225							
	85			22.6	105	60 for 6"	
220							
	90			17.7	108	75 for 4"	
215							
	95			17.0	113	75 for 6"	
210						75 for 4"	
	100			17.5	112		

Well cemented layer, 6" thick

NOTE:

BUCKET BORING:
Slight water seepage encountered at 28'. About 6" of water at the bottom of boring 30 minutes after completion of drilling. Caving from 4' to 9' (to 3' in diameter).

ROTARY WASH BORING:
Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 20' and 100'. Backfilled with Sand to within 20' of ground surface. Bentonite plug was placed between 16' and 20' and was grouted with cement above 16'. Water level measured in the well at 16-1/2' on 5/5/92 and at 18-1/2' on 12/4/92.

Number of blows required to drive Law/Crandall Sampler 12". Driving weight: 0' to 26' = 1,680 lbs. Between 26' to 30' = 800 lbs.; Stroke = 12" ; Below 30' = 400 lbs. ; Stroke = 18"

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.10c

BORING 11

DATE DRILLED: August 25 & 26, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION 332

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		
								SW	3" Gravel (Rail Road Ballast)
330				9.4	112	9	■		ARTIFICIAL FILL (af) (to 17') SAND - well graded, about 30% Gravel, few Cobbles, brown
				18.0	81	10	■	ML	SANDY SILT - brown
	5			—	—	14	□		
325				—	—	24 for 6"	□		COBBLES and BOULDERS - large amount of debris (including pieces of wood and tire), light grey
	10								
320									
	15								
315								SP	ALLUVIUM (Qal) SAND - fine to medium, some Gravel, light brown
				17.9	113	50 for 8"	■		
	20								
310				11.2	115	50 for 11"	■		
			47 □						PUENTE FORMATION (Tpss) SILTSTONE - well bedded, light yellowish brown SANDSTONE - poorly bedded to massive, poorly cemented, light brown
	25								
305				17.1	88	85 for 6"	■		
	30								Well cemented layer
300		10		14.1	111	100 for 5"	■		
	35								Well cemented layer SILTSTONE - poorly bedded, light brown to light grey
295				22.4	105	100 for 9"	■		
	40								SANDSTONE - fine grained, light brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS MS CHKD JB/LK

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

BORING 11 (Continued)

DATE DRILLED: August 25 & 26, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash

JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
290							
	45	5		16.9	113	100 for 6"	■
285							
	50	25		19.6	109	150 for 5"	■
280							
	55			16.9	116	150 for 3"	■
275							
	60	5		11.7	117	150 for 4"	■
270							
	65	5		22.2	102	150 for 7"	■
265							
	70	15		17.1	113	150 for 5"	■
260							
	75			—	—	170 for 5"	□
255							
	80						

Well cemented layers

SILTSTONE - well bedded, poorly to moderately cemented, dark greyish brown

SANDSTONE - minor interbeds of Siltstone, poorly bedded, fine grained, light grey

Moderately to well cemented

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.11b

BORING 11 (Continued)

DATE DRILLED: August 25 & 26, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-klps/ft.)	SAMPLE LOC.
250				21.1	108	150 for 6"	
	85						
245				—	—	160 for 3"	
	90						
240				12.3	117	150 for 6"	
	95						
235							
	100	40		18.6	110	150 for 6"	
230							
	105						

SILTSTONE - well bedded, grey

Locally well cemented

Well cemented

SANDSTONE - with minor interbeds of Siltstone, poorly bedded, some cemented layers, light grey

SILTSTONE - well bedded, light grey

SANDSTONE - poorly bedded, fine grained, light grey

NOTE:

Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 100' pipe perforated between depths of 20' and 90'. Backfilled with Sand to within 11' of ground surface. A bentonite plug was placed between depth of 4' and 11' and was grouted with cement above 4'. Top is capped. Water level measured in the well at a depth of 43-1/2' on 9/1/92, at 44' on 9/22/92, and at 44-1/2' on 12/4/92.

* Number of blows required to drive Law/Crandall Sampler 12". Driving weight: 300 lbs.; Stroke = 24"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

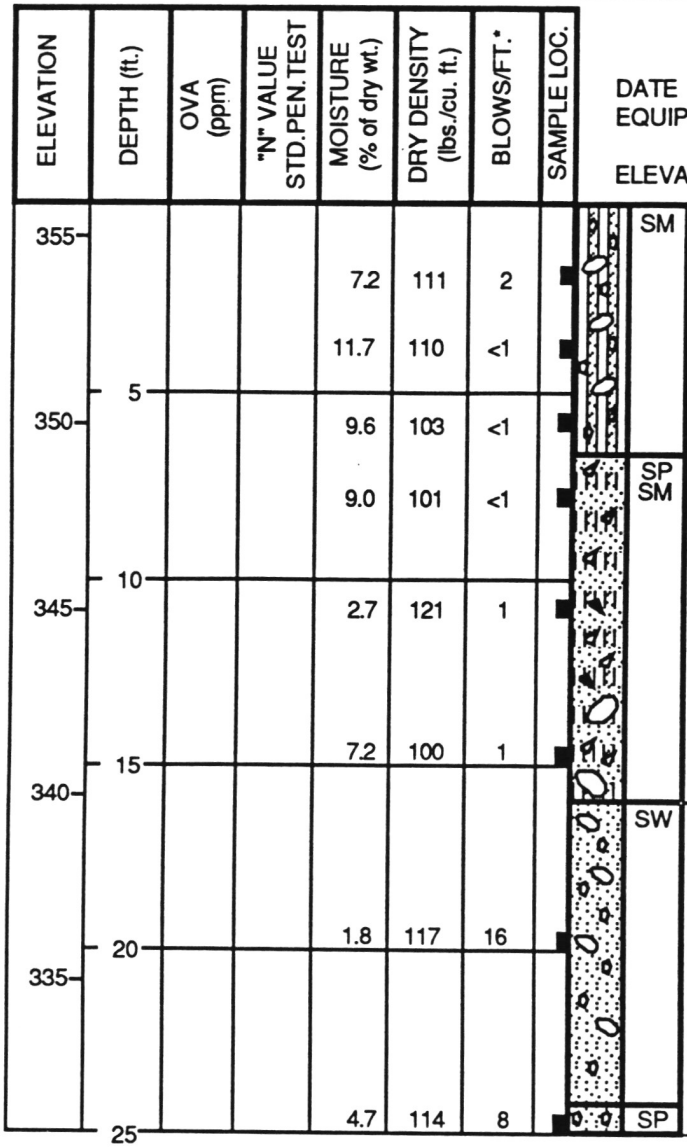
PLATE A - 1.11c

BORING 12

Coordinates
N-4,141,910
E-4,221,265

DATE DRILLED: August 25, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 356



ARTIFICIAL FILL (af) (to 16')
SILTY SAND - fine to medium, about 30% Gravel, some Cobbles (to 10" in size), few pieces of brick, asphalt, concrete and tile, brown

SAND and SILTY SAND - fine to coarse, about 30% Gravel, brown

Pieces of concrete and bricks

Few Boulders (to 14" in size)

ALLUVIUM (Qal)
SAND - well graded, about 30% Gravel, some Cobbles (to 8" in size), greyish brown

SAND - fine to medium, about 20% Gravel, light brown
(BORING TERMINATED AT A DEPTH OF 25' DUE TO AN OBSTRUCTION)

NOTE: Boring was terminated at depth of 5' due to existing 10" - diameter metal pipe at a depth of 5' and redrilled at a new location about 140' to the south. Water not encountered. Raveling from 0' to 9' and caving from 9' to 24' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving weight 1,600 lbs. Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.12

BORING 13

DATE DRILLED: August 28 & 31, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION 392

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		
390	0			14.0	102	7	■	ML	ARTIFICIAL FILL (af) (to 2') SANDY SILT - mottled brown
				5.3	138	23	■	SW GW	ALLUVIUM (Qal) SAND and GRAVEL - well graded, some Cobbles and Boulders (to 24" in size), light brown
385	5			5.0	114	35	■		
380	10		50 50 for 3"	—	—	75 for 6"	□		
375	15			9.1	148	75 for 8"	■		
370	20			— 14.1	— 123	60 for 10" 60 for 6"	□ ■		PUENTE FORMATION (Tpss) SANDSTONE - poorly bedded to massive, poorly cemented, moderately hard, light brown
365	25			14.9	116	50 for 11"	■		SILTSTONE - well bedded, moderately to well cemented, light brown
360	30	15		19.2	107	50 for 11"	■		SANDSTONE - poorly bedded, well cemented, light yellowish brown
355	35			14.7	114	100 for 6"	■		Few Siltstone interbeds
	40								

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.13a

JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 13 (Continued)

DATE DRILLED: August 28 & 31, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
350				16.3	108	100 for 5"	
	45			17.2	111	100 for 5"	
345							
	50			—	—	100 for 4"	
340							
	55						

SILTSTONE - some interbeds of Sandstone, well bedded, moderately cemented, light brown

(BORING TERMINATED AT A DEPTH OF 51' DUE TO DIFFICULT DRILLING THROUGH CEMENTED LAYER)

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 50'. Pipe perforated between depths of 17' and 47'. Backfilled with Sand to within 15' of ground surface. A bentonite plug was placed between depth of 8' and 15' and was grouted with cement above 8'. Top is capped. Water level measured at a depth of 27' on 9-22-92.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.13b

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD SF

BORING 14

DATE DRILLED: August 25, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 430

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
				9.5	109	1	
				11.4	102	1	
425	5			2.6	113	14	
				13.5	110	3	
420	10			8.3	113	22	
415	15			7.4	117	24	
410	20			10.3	119	24	

ML 1" Asphaltic Paving

TOPSOIL
SANDY SILT - brown
Some Cobbles (to 9" in size)

SP SM ALLUVIUM (Qal)
SAND and SILTY SAND - fine to coarse, about 30% Gravel, greyish brown

ML SANDY SILT - some Clay, about 20% Gravel, brown

PUENTE FORMATION (Tpss)
SANDSTONE - poorly bedded, poorly to moderately cemented, fine grained, light yellowish brown

NOTE: Water not encountered. Raveling from 1/2' to 7-1/2' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 1,600 lbs. Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.14

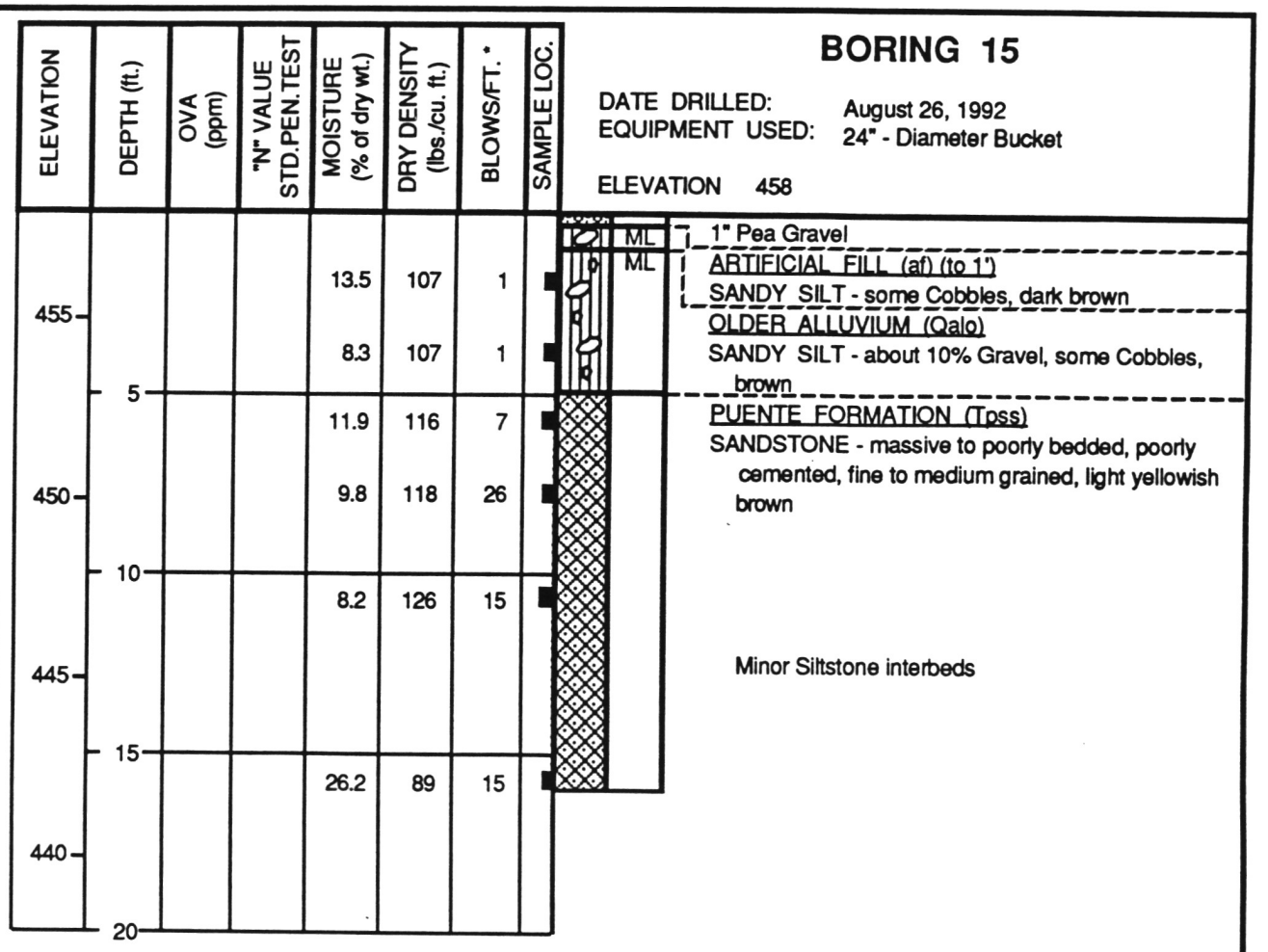
JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 15

DATE DRILLED: August 26, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 458



NOTE: Water not encountered. No caving.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.15

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

BORING 16

Coordinates
N-4,151,290
E-4,226,885

DATE DRILLED: August 24, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 510

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
				13.6	105	1	
				5.2	119	5	
505	5	15		3.1	119	4	
				3.4	116	6	
500	10	30		4.9	134	12	
		10		5.2	120	10	
495	15					for 8"	
490	20			6.1	129	8	
485	25			4.9	125	16	
480	30	5		6.0	112	16	

ML
SM
SP

5" Asphaltic Paving
ARTIFICIAL FILL (af) (to 2')
SANDY SILT - some Cobbles (to 8" in size),
A Boulder 18" in size
OLDER ALLUVIUM (Qalo)
SILTY SAND and SAND - fine to coarse, about 25% Gravel, light brown

Lenses of Silt

About 40% Gravel and Cobbles

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Water not encountered. Raveling from 3' to 29' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

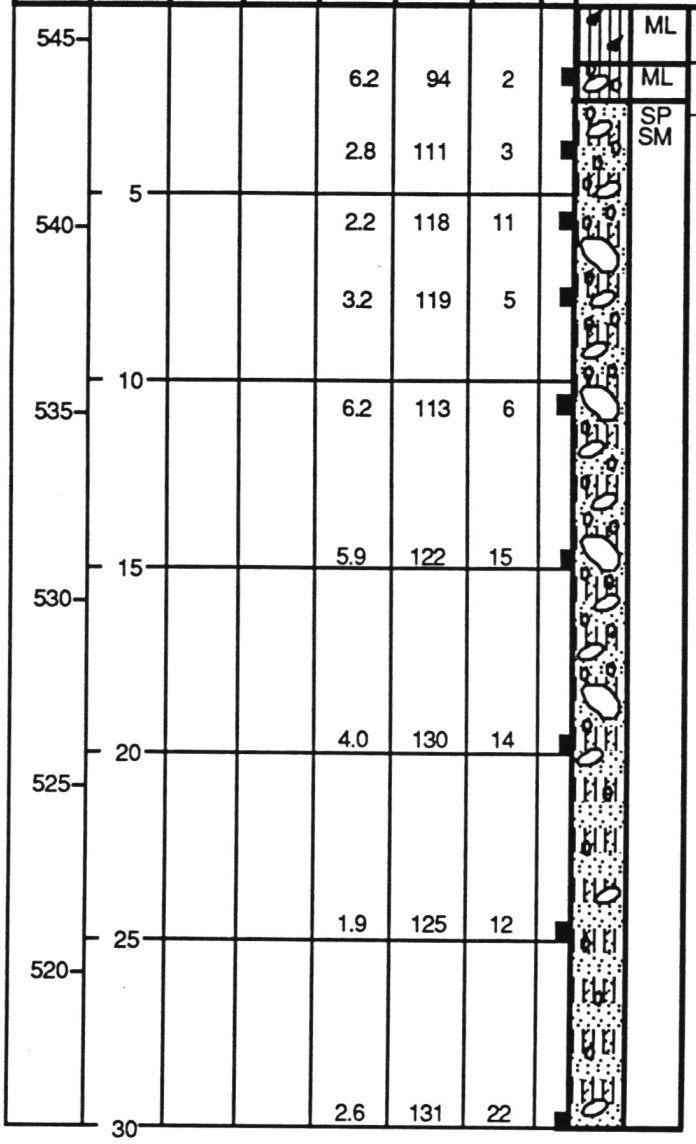
PLATE A - 1.16

BORING 17

Coordinates
N-4,152,815
E-4,229,470

DATE DRILLED: August 26, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 546



ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.	
545	0			6.2	94	2		ML — ARTIFICIAL FILL (af) (to 1-1/2')
								ML — SANDY SILT - pieces of brick, brown
				2.8	111	3		OLDER ALLUVIUM (Qalo)
540	5			2.2	118	11		SP SM — SANDY SILT - about 20% Gravel, some Cobbles (to 12" in size), brown
				3.2	119	5		SAND and SILTY SAND - fine to coarse, about 30% Gravel and Cobbles, few Boulders (to 24" in size), brown
535	10			6.2	113	6		Reddish brown
				5.9	122	15		Light brown
530	15							
				4.0	130	14		About 10% Gravel and Cobbles
525	20							
				1.9	125	12		Grey
520	25							Less Cobbles
				2.6	131	22		
	30							

NOTE:

Water not encountered. Raveling from 3' to 9' (to 3-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD BAK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.17

BORING 18

Coordinates
N-4,152,985
E-4,231,555

DATE DRILLED: August 26, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 560

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
				4.4	99	10	
		5		2.3	115	7	
555	5			3.9	120	8	
				5.8	123	10	
550	10	5		4.7	117	14	
545	15			6.1	123	11	
540	20			3.0	136	22	
535	25			3.7	127	22	
530	30			4.6	118	17	

SP SM — OLDER ALLUVIUM (Qalo)
SAND and SILTY SAND - fine to coarse, about 30% Gravel, some Cobbles (to 10" in size), brown

SW — SAND - well graded, about 30% Gravel, brown

NOTE:

Slight water seepage (perched water) at a depth of 19-1/2'. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. ST/GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.18

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 19

Coordinates
N-4,152,705
E-4,234,840

DATE DRILLED: August 28, 1992
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 590

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
				12.0	116	3	
				22.8	107	6	
585	5	5		22.5	103	11	
				21.6	104	5	
580	10	30		19.4	108	7	
575	15	20		19.3	109	10	



7" Asphaltic Paving

ARTIFICIAL FILL (af) (to 2-1/2')
SANDY SILT - about 10% Gravel, few pieces of brick, some Cobbles (to 12' in size), some Clay, Boulder (18" in size), brown

OLDER ALLUVIUM (Qalo)
SILTY SAND - fine to medium, about 20% Gravel, brown

TOPANGA FORMATION (Ttss)
SILTSTONE - moderately to well bedded, moderately cemented, dark brown

Bedding: N41W, 47SW

NOTE:

Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 1,600 lbs. Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.19

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

BORING 20

Coordinates
N-4,153,250
E-4,236,640

DATE DRILLED: September 1, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 623

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
620	0			12.9	97	<1	SM
				5.8	—	10	ML
	5	5		3.9	119	7	SP
615				3.6	126	6	SM
	10			4.2	126	10	
610		5		6.1	128	10	
	15						
605				5.6	128	12	
	20						
600				5.1	133	15	
	25						
595		5		5.7	113	20	
	30						

ARTIFICIAL FILL (af) (to 4-1/2')
SILTY SAND and SANDY SILT - some Clay, about 30% Gravel and Cobbles, pieces of glass and asphaltic paving, light brown

OLDER ALLUVIUM (Qalo)
SAND and SILTY SAND - fine to coarse, about 30% Gravel and Cobbles (to 8" in size), light brown

Some Cobbles (to 12" in size)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Water not encountered. Raveling from 5' to 15' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.20

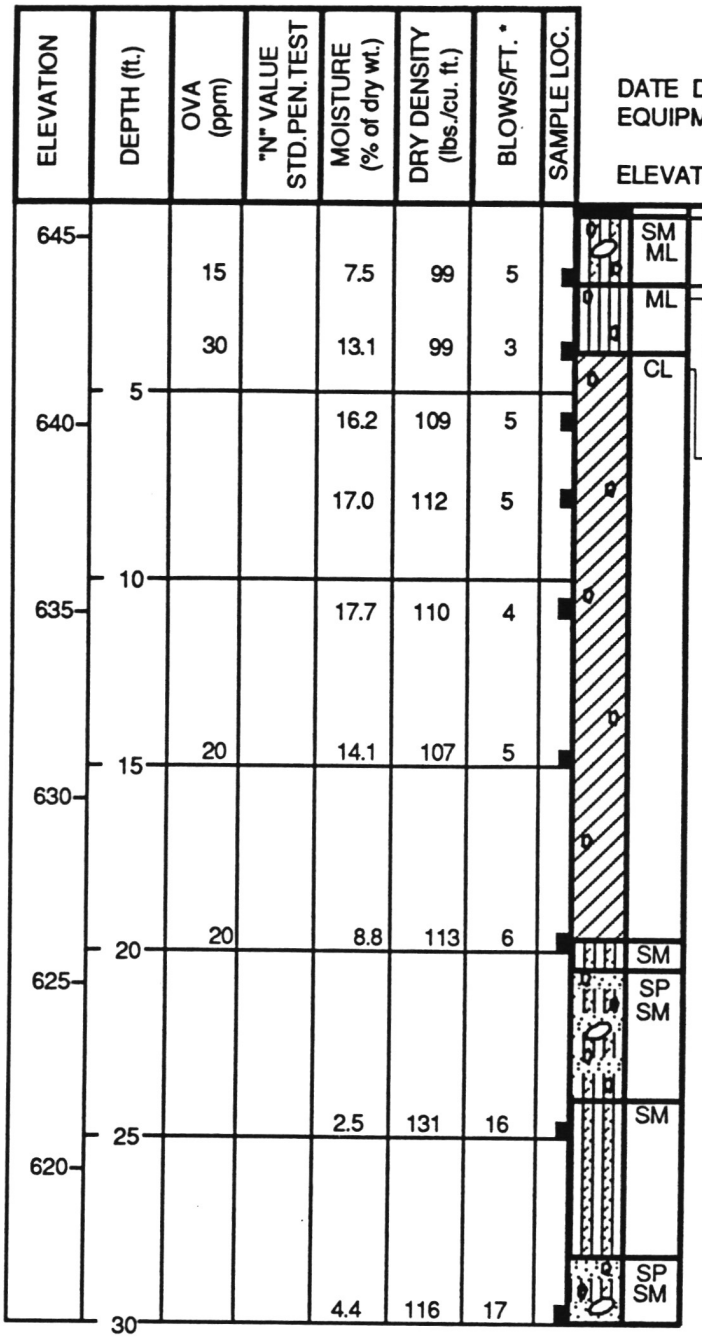
JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 21

DATE DRILLED: August 28, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 646



2" Asphaltic Paving

ARTIFICIAL FILL (af) (to 2')

SILTY SAND and SANDY SILT - about 10% Gravel, some Cobbles (to 8" in size), some roots, brown

OLDER ALLUVIUM (Qalo)

SANDY SILT - about 10% Gravel, brown

SANDY CLAY - few Gravel, brown (LL = 33%; PI = 15%)

Lenses of Clayey Silt

SILTY SAND - fine, about 20% Gravel, brown

SAND and SILTY SAND - fine to coarse, about 30% Gravel, some Cobbles (to 6" in size), light brown

SILTY SAND - fine, light brown

SAND and SILTY SAND - fine to coarse, about 20% Gravel, some Cobbles (to 4" in size), brown

NOTE:

Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 25' = 1,600 lbs. Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.21

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/MC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 22

Coordinates
N-4,154,465
E-4,240,170

DATE DRILLED: September 1, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 672

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		
670	0			10.0	104	1		ML	ARTIFICIAL FILL (af) (to 3') SANDY SILT - about 20% Gravel, few Cobbles (to 6" in size), pieces of wood, some roots, dark brown
				12.8	112	2		ML	OLDER ALLUVIUM (Qalo) SANDY SILT - about 10% Gravel, brown
665	5	10		13.4	112	1			
				14.9	111	2		SM	SILTY SAND - fine to medium, about 10% Gravel, brown
660	10			16.5	113	3			
				17.4	111	3			
655	15								
650	20	5		12.3	101	3			
	25	5		16.9	109	4			
645								ML	SANDY SILT - some Gravel, brown
	30	10		12.6	105	7			

NOTE:

Water not encountered. Slight raveling from 1' to 2' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.22

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

BORING 23

DATE DRILLED: August 31, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 700

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
				7.7	113	2	
				7.8	109	1	
695	5	5		8.2	110	1	
				8.8	116	1	
690	10			13.9	104	1	
685	15	5		16.1	104	2	
680	20	10		7.4	118	3	
675	25	5		12.9	111	6	
670	30	5		18.8	102	12	



SM — ARTIFICIAL FILL (af) (to 4')
SILTY SAND -fine to coarse, about 20% Gravel and Cobbles (to 6" in size), pieces of brick, brown

SM / SP — OLDER ALLUVIUM (Qalo)
SILTY SAND and SAND - fine to coarse, about 30% Gravel, brown

SM — SILTY SAND - fine to medium, few Gravel, brown

ML — SANDY SILT - greyish brown

SP / SM — SAND and SILTY SAND - fine to coarse, about 20% Gravel, reddish brown

SM — SILTY SAND - fine to medium, some Gravel, reddish brown

About 20% Gravel and Cobbles (to 6" in size), light brown

Layer of Sandy Silt

About 15% Gravel

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.23

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

BORING 24

Coordinates
N-4,156,935
E-4,242,210

DATE DRILLED: August 31, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 734

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		
		10		9.5	108	<1		SM	ARTIFICIAL FILL (af) (to 4-1/2') SILTY SAND - fine to coarse, about 30% Gravel, some Cobbles and Boulders (to 13" in size), some debris, light brown
730		10		9.9	111	<1			
	5	5		17.6	103	2		SM	TERRACE DEPOSITS (Qt) SILTY SAND - fine to medium, about 20% Gravel, light brown
		15		9.8	109	6			Fine Sand
725									
	10	10		18.3	96	4			Some coarse Sand
720									
	15	5		4.3	112	12		SM SP	SILTY SAND and SAND - fine to coarse, about 30% Gravel, light brown
715									
	20			2.7	110	12			
									Some Cobbles
710									
	25	5		4.4	110	12			
705									
	30	5		4.5	121	17			More Gravel

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

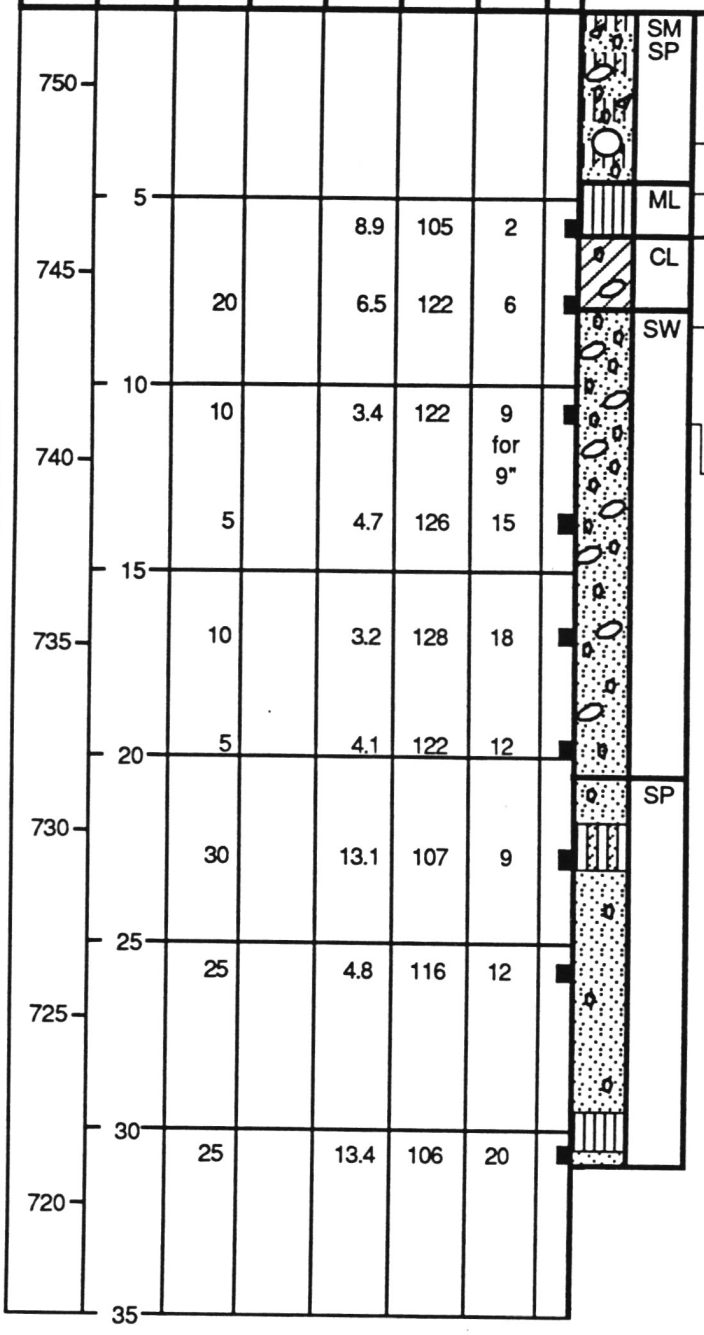
PLATE A - 1.24

BORING 25

Coordinates
N-4,158,745
E-4,243,030

DATE DRILLED: September 1 & 9, 1992
EQUIPMENT USED: 18" - Diameter Bucket

ELEVATION 752



SM
SP

ARTIFICIAL FILL (af) (to 6')
SILTY SAND and SAND - fine to coarse,
3/4" - diameter PVC pipe at a depth of 1', about
20% Gravel and Cobbles, some debris, light brown

(ENCOUNTERED A 10" - DIAMETER METAL PIPE AT A DEPTH OF 3-1/2')

ML

SANDY SILT - some rootlets, light brown

CL

OLDER ALLUVIUM (Qalo)
SANDY CLAY - about 10% Gravel and Cobbles (to 6" in size), large amount of roots, some organic matter, dark grey to black

SW

SAND - well graded, about 40% Gravel and Cobbles (to 8" in size), light greyish brown

About 20 % Gravel and Cobbles

Lenses of Sandy Silt

SP

SAND - fine, some Gravel, light brownish grey

Layer of Silty Sand
Fine to coarse Sand

Layer of Sandy Silt

NOTE:

Due to existing utility lines, the upper 5' of the boring was hand dug. Water not encountered. Raveling from 8' to 20' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 25' = 1,600 lbs. Below 25' = 800 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD 9/3/92

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.25

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

BORING 26

Coordinates
N-4,161,920
E-4,243,010

DATE DRILLED: August 31, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 780

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
		20		11.2	94	2 for 8"	
		15		23.7	92	<1	
775	5	10		21.6	105	<1	
		15		16.2	110	1	
770	10	30		21.6	98	2	
		10		23.2	101	3	
765	15						
		10		15.6	116	4	
760	20						
		30		11.0	120	7	
755	25						
		5		8.0	103	16	
750	30						

SM — 2" Gravel and Sand - 2" Asphaltic Paving
ARTIFICIAL FILL (af) (to 3')
SILTY SAND - fine to coarse, some Gravel and Cobbles, large amount of debris and trash

ML — (DUE TO OBSTRUCTION BORING MOVED 3' TO THE EAST AND REDRILLED)

CL — OLDER ALLUVIUM (Qalo)
SANDY SILT - dark brown
SANDY CLAY - some Gravel and Cobbles, dark brownish grey
(LL = 40%; PI = 17%)
(LL = 35%; PI = 16%)

SM — SILTY SAND - fine, light grey

ML — SANDY SILT - some Clay, brown

SM — SILTY SAND - fine to medium, about 20% Gravel, brown

SP SM — SAND and SILTY SAND - fine to coarse, about 30% Gravel, light brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.26

BORING 27

Coordinates
N-4,163,555
E-4,243,010

DATE DRILLED: August 27, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 814

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
810	0	5		5.6	100	2	SM
				—	—	3	
	5			3.4	111	3	SP
				3.2	108	6	
805				2.1	105	6	
	10	5		10.2	109	3	
800		10		14.4	113	6	ML
	15						
795				19.1	108	4	
	20						
790		5		20.2	108	7	
	25						SP
785				4.0	112	14	SW
	30						
780				3.9	113	12	
	35						
775				7.4	117	20	
	40						

ARTIFICIAL FILL (af) (to 4')
SILTY SAND - fine to medium, about 20% Gravel, some Cobbles (to 12" in size), few pieces of glass and wood, brownish grey

OLDER ALLUVIUM (Qalo)
SAND - fine to coarse, about 20% Gravel, some Cobbles (to 3" in diameter), light brown

SANDY SILT - about 20% Gravel, brown

SAND - fine, light brown

SAND - well graded, about 15% Gravel, some Cobbles (to 6" in size), light brownish grey

NOTE:
Water not encountered. Raveling from 0' to 9' (to 3' in diameter).

*Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.27

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS CHKD RJC

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 28

Coordinates
N-4,164,975
E-4,243,005

DATE DRILLED: September 3, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 834

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				9.8	97	1		SM ML	ARTIFICIAL FILL (af) (to 6') SILTY SAND and SANDY SILT - about 30% Gravel and Cobbles (to 10" in size), some debris, few roots, dark brown and grey
830	5			8.2	92	2			
				8.3	99	3		SM	OLDER ALLUVIUM (Qalo) SILTY SAND - fine to coarse, about 30% Gravel and Cobbles, light brown
				4.8	—	4			
825	10			8.6	108	4			
820	15			9.6	114	5			
815								ML	SANDY SILT - few Gravel, brown
	20			13.7	100	5		SM	SILTY SAND - fine to medium, about 10% Gravel, brown
810								SP SM	SAND and SILTY SAND - fine to coarse, about 30% Gravel and Cobbles (to 12" in size), light brown
	25			6.3	121	14			
805									About 15% Gravel
	30			4.5	101	12			
800								SM	SILTY SAND - fine, about 10% Gravel, brown
	35			18.0	110	6			
795								SP SM	SAND and SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 6" in size), light brown
	40			6.7	119	14			

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.28a

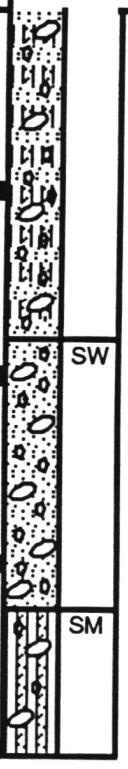
JOB L92045.AE4 DATE 11/10/92 F.T. GMC DR. lk O.E. MS CHKD JAK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 28 (Continued)

DATE DRILLED: September 3, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.
790	45			4.6	116	12	
785	50			3.9	125	16	
780	55			3.1	127	16	
775	60			6.2	113	12	



About 30% Gravel

SW — SAND - well graded, about 30% Gravel and Cobbles, light brown

SM — SILTY SAND - fine, about 20% Gravel and Cobbles, light brown

Layer of Sandy Silt

NOTE:

Water not encountered. Raveling from 2-1/2' to 6' and from 40' to 56' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 24' = 1,680 lbs. Between 24' and 50' = 840 lbs.; Below 50' = 1,340 lbs.; Stroke = 12"

LOG OF BORING

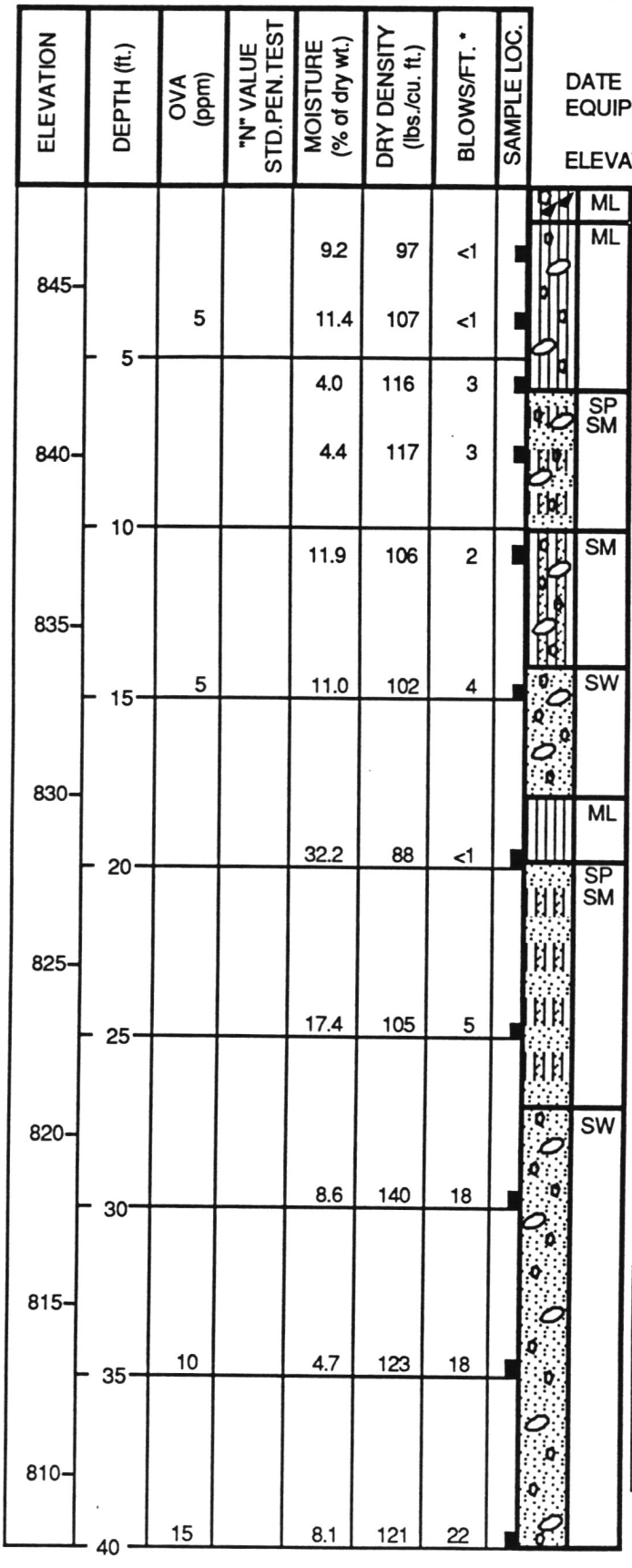
LAW/CRANDALL, INC.

PLATE A - 1.28b

BORING 29

DATE DRILLED: August 27, 1992
EQUIPMENT USED: 24" - Diameter Bucket

ELEVATION 848



ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT. *	SAMPLE LOC.		
								ML	ARTIFICIAL FILL (af) (to 1')
				9.2	97	<1	■	ML	SANDY SILT - pieces of Rocks and bricks, brown
845									OLDER ALLUVIUM (Qalo)
		5		11.4	107	<1	■		SANDY SILT - about 20% Gravel, some Cobbles (to 8" in size), brown
	5			4.0	116	3	■		
								SP SM	SAND and SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 8" in size), light brown
840				4.4	117	3	■		
	10			11.9	106	2	■	SM	SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 8" in size), light brown
835									
	15	5		11.0	102	4	■	SW	SAND - well graded, about 20% Gravel and Cobbles (to 8" in size), light brown
830								ML	SANDY SILT - light brown
	20			32.2	88	<1	■	SP SM	SAND and SILTY SAND - fine to medium, light brown
825									
	25			17.4	105	5	■		
820								SW	SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), light brown
	30			8.6	140	18	■		Lenses of Silty Sand
815									
	35	10		4.7	123	18	■		
810									
	40	15		8.1	121	22	■		About 10% Gravel

NOTE:
Slight water seepage (perched water) at a depth of 18'. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. SJ/GMC DR. lk O.E. MS/MS CHKD JB/JK

LOG OF BORING

LAW/CRANDALL, INC.

JOB L92045.AE4 DATE 2/2/93 F.T. AR DR. k O.E. MS CHKD

BORING 30

Coordinates
N-4,132,245
E-4,216,730

DATE DRILLED: January 28, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:15 am; Finish: 10:00 am
ELEVATION 293

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									5" Asphaltic Paving - 30" Base Course
290		40		14.8	109	3		SM ML	ARTIFICIAL FILL (af) (to 21') SILTY SAND and SANDY SILT - fine to coarse, some Gravel and Siltstone fragments, pieces of brick, light brown
	5	50		20.4	106	2			
285		30		27.2	89	1			Some Cobbles (to 6" in size) Grey to dark grey
	10	25		15.1	106	2			
280		10		20.7	100	3			Pieces of wood and brick
	15	20		12.8	116	2			
275		55		11.6	113	2			More pieces of brick Pieces of wire
	20	120		14.2	102	2		SM	ALLUVIUM (Qal) SILTY SAND - fine to medium, dark grey
270									
	25	55		10.2	115	10		SW	SAND - well graded, lenses of Silty Sand, about 10% Gravel and Cobbles (to 6" in size), grey
265								SP	SAND - fine to medium, few Gravel and Cobbles, light grey
	30	20		4.6	115	15			

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 24' = 1,680 lbs.; Below 24' = 840 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.30

JOB L92045.AE4 DATE 2/2/93 F.T. AR DR. lk O.E. MS CHKD

BORING 31

Coordinates
N-4,132,850
E-4,216,830

DATE DRILLED: January 28, 1993
EQUIPMENT USED: 20" - Diameter Bucket
TIME DRILLED: Start: 10:10 am; Finish: 11:30 am
ELEVATION 293

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
290	0			21.2	100	<1		SM ML	ARTIFICIAL FILL (af) (to 16') SILTY SAND and SANDY SILT - fine to medium, some coarse, few Gravel, pieces of wood and brick, brown
				15.2	112	< 1			
	5			16.0	113	2			Dark grey
285		45		12.9	119	5			Brown and grey
	10			11.7	115	3			Chunks of concrete (to 6" in size)
280		10		12.2	109	3			More pieces of brick and wood, some nails
	15	25		7.7	124	6		SM	ALLUVIUM (Qal) SILTY SAND - fine to medium, few Gravel, grey
275		55		10.4	99	1			
	20	55		10.3	98	3		SP	SAND - fine to coarse, some Silt, light brown
270	25	20		10.4	112	3		SW	SAND - well graded, lenses of fine Sand, about 15% Gravel and Cobbles (to 7" in size), light brown
265									
	30	40		2.4	109	11		SP	SAND - fine to medium, light brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 24' = 1,680 lbs.; Below 24' = 840 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.31

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD

BORING 32

Coordinates
N-4,133,910
E-4,217,135

DATE DRILLED: January 27, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:30 am; Finish: 1:45 pm
ELEVATION 294

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
				—	—	2		SM
						2		
290		10		23.6	98	for 8"		
	5							SP SM
		15		7.7	110	3		
		15		17.8	111	9		
285								
	10	15		11.7	123	4		
		90		11.4	101	< 1		SM
280								
	15	50		11.9	101	3		
275								SP
	20	15		4.5	118	5		
270								
	25	50		3.0	113	10		SW
265								
	30	20		3.8	112	15		

4-1/2" Asphaltic Paving

ARTIFICIAL FILL (af) (to 12')

SILTY SAND - fine to medium, pieces of brick and Siltstone fragments, light brown

SAND and SILTY SAND - fine to coarse, about 15% Gravel and Cobbles (to 6" in size), pieces of asphaltic paving and brick, brown

Brown to dark brown

Pieces of brick

ALLUVIUM (Qal)

SILTY SAND - fine, some rootlets, dark grey

Fine to medium Sand, greyish brown

SAND - fine to medium, some coarse, light brown

About 10% Gravel and Cobbles (to 6" in size)

Lenses of Silt

SAND - well graded, about 15% Gravel and Cobbles (to 10" in size), light brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. Raveling from 20' to 26' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.32

BORING 33

Coordinates
N-4,134,350
E-4,217,105

DATE DRILLED: February 11, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:38 am; Finish: 4:00 pm
ELEVATION 276

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
275	0	5		2.3	114	25		SW	3" Asphaltic Paving - 5" Concrete Slab 3" Base Course ALLUVIUM (Qal) SAND - well graded, about 15% Gravel, some Silt, light greyish brown
		25		3.6	123	30			Lenses of Sandy Silt
270	5			4.6	116	35			
		10		9.0	122	50			About 30% Gravel and Cobbles (to 6" in size)
265	10		8 34 60 for 3"						
		25		14.0	103	60 for 11"			Lenses of fine Sand Light grey to grey
260	15		30 62 10 for 1"						
		25 5		11.7	106	50			Oil stains encountered at random between depths of 20' and 76'
255	20								
		15	54						
250	25			—	—	40			
245	30	20	44					SP GM	SAND and SILTY GRAVEL - fine to coarse, light brown
240	35			12.8	122	30		SW	SAND - well graded, about 15% Gravel, grey
			33 50 20 for 3"						Layer of Sandy Silt, some oil stains
	40	5							

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.33a

BORING 33 (Continued)

DATE DRILLED: February 11, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:38 am; Finish: 4:00 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
235				13.6	123	60 for	
	45					10"	
230		5	68				
	50						
225				12.7	121	70 for 10"	
			80				
	55	40	20 for 2"				
220							
	60						
215		5		12.9	123	60	
	65						
210		500+		28.4	93	30	
	70						
205		1500	23 35 45 for 4"				
	75						
200		1000		17.2	108	35 for 10"	
	80						

SP SM

OLDER ALLUVIUM (Qalo)
SAND and SILTY SAND - fine to medium, some Gravel, grey

SP

SAND - fine to coarse, about 20% Gravel, grey

PUENTE FORMATION (Tpss)
SILTSTONE - with interbeds of fine grained Sandstone, poorly bedded to massive, grey and dark grey

Some oil stains at 75'

NOTE:
Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 75'. Pipe perforated between depths of 15' and 75'. Backfilled with Sand to within 15' of ground surface. Bentonite plug was placed between 9' and 15' and was grouted with cement above 9'. Water level measured in the well at 19' on 2/15/93.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.33b

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD 03 JUL

BORING 34

Coordinates
N-4,134,890
E-4,216,425

DATE DRILLED: December 14, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 2:30 pm
ELEVATION 285

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
		55		34.0	66	6		ML	ARTIFICIAL FILL (af) (to 2') SANDY SILT - some Peat, greyish brown
		15		7.5	108	8		SP	ALLUVIUM (Qal) SAND - fine to medium, layer of Silt, few Gravel, light greyish brown
280	5	10		9.7	119	50			
		10		4.4	122	60		SW	SAND - well graded, about 20% Gravel, light greyish brown
275	10	35		6.8	115	45			
		40	25 75 for 5"						
270	15	25		11.4	100	22		SM	SILTY SAND - fine to medium, light grey
		325	35						
265	20	5		11.7	97	42			
260	25	50	43						
		10		19.3	110	75 for 9"		SP	SAND - fine to medium, some coarse, about 10% Gravel, light blue
255	30	50	45					SM	SILTY SAND - fine to medium, bluish grey
250	35	20		21.7	105	35			
								ML	OLDER ALLUVIUM (Qalo) CLAYEY SILT - some Sand, grey
		175	26						Layer of Silty Sand
245	40								

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.34a

BORING 34 (Continued)

DATE DRILLED: December 14, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 2:30 pm

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD JB SK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				—	—	50	
240	45		39				
235	50	90		24.4	100	50	
230	55		77				
225	60	200		24.6	101	35 for 10"	
220	65		23 35 30 for 4"				
215	70	12,500		21.7	102	35 for 10"	
210	75		77				
205	80						

Some Gravel

PUENTE FORMATION (Tpss)

SILTSTONE - with interbeds of fine grained Sandstone, poorly bedded to massive, grey and bluish grey

SANDSTONE - fine grained, poorly bedded to massive, bluish grey

Siltstone interbeds, bluish grey

Grey

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.34b

BORING 34 (Continued)

DATE DRILLED: December 14, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 2:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		500		24.8	101	40 for 10"	
200	85		30 45 25 for 2"				
195	90	500		24.0	100	35 for 10"	
190	95		35 50 10 for 1"				
185	100	500		22.6	100	35 for 10"	
180	105						

Grey and brown

Grey

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 20' and 100'. Backfilled with Sand to within 15' of ground surface. A bentonite plug was placed between depths of 10' and 15' and was grouted with cement above 10'. Water level measured in the well at a depth of 24-1/2' on 12/30/92.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 18"

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.34c

BORING 35

Coordinates
N-4,135,705
E-4,216,500

DATE DRILLED: January 12, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 1:30 pm
ELEVATION 288

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									4-1/2" Asphaltic Paving - 5" Concrete
285		25		3.3	102	17		SP	ALLUVIUM (Qal) SAND - fine, about 10% Gravel, light greyish brown
	5			9.4	127	12		SW	SAND - well graded, about 30% Gravel and Cobbles, light greyish brown
280				19.6	108	8			Layer of Sandy Silt, dark brown
	10	5	29						
275				6.2	111	35			Thin layers of Cobbles
	15								
270			100					SP SM	SAND and SILTY SAND - fine to coarse, about 30% Gravel and Cobbles, light grey
	20	20		10.0	120	60			
265		5	18					ML	OLDER ALLUVIUM (Qalo) CLAYEY SILT - some Sand, light bluish grey
	25			36.6	87	9			
260									
	30	150	21						
255								SM	SILTY SAND - fine, hydrocarbon odor and stains, brown and black
	35	500+		10.1	117	50			
250								ML	CLAYEY SILT - grey
	40	500+	43						Layers of fine Sand

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. GMC DR. lk O.E. MS CHKD BK

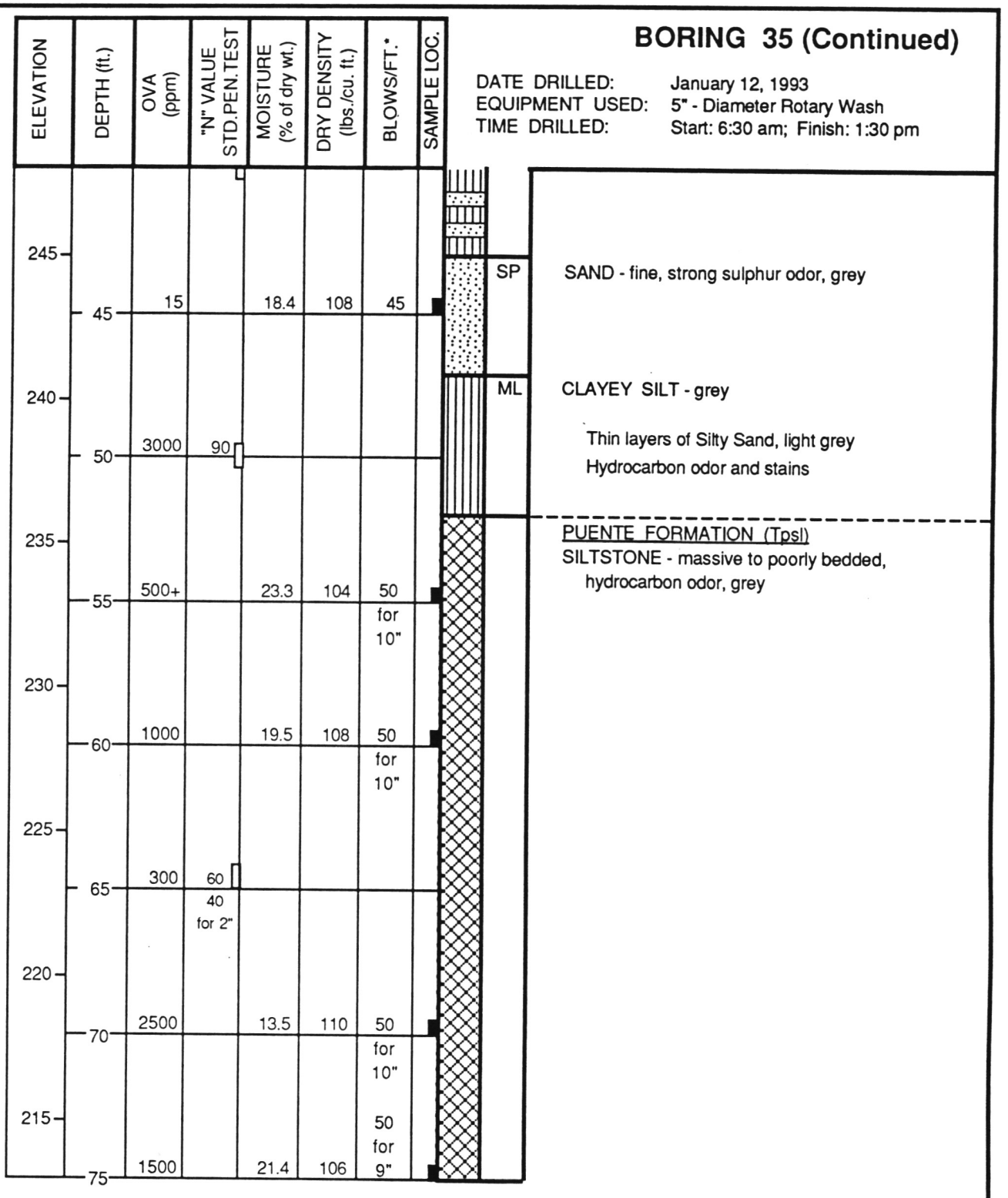
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.35a

BORING 35 (Continued)

DATE DRILLED: January 12, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 1:30 pm



NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 75'. Pipe perforated between depths of 15' and 75'. Backfilled with Sand to within 12' of ground surface. A bentonite plug was placed between depth of 9' and 12' and was grouted with cement above 9'. Top is capped. Water level measured at a depth of 25-1/2' on 1-20-93.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 24"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. GMC DR. lk O.E. MS CHKD BK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.35b

JOB L92045.AE4 DATE 1/5/93 F.T. GMC DR. lk O.E. MS CHKD JB BJK

BORING 36

Coordinates
N-4,136,180
E-4,216,670

DATE DRILLED: December 8, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 9:20 am; Finish: 12:30 pm
ELEVATION 293

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				14.0	122	15		ML CL	ARTIFICIAL FILL (af) (to 2') SILT and CLAY - some Gravel and Cobbles, pieces of asphaltic paving, glass, and wood, brown
290								SW GW	ALLUVIUM (Qal) SAND and GRAVEL - well graded, some Cobbles, light brownish grey
	5			5.5	122	25			
285				—	—	15			Thin layers of Sandy Silt
				—	—	12			
	10			3.6	136	40			Thin layers of fine Sand
280			37						Lenses of Sandy Silt
	15	10		5.9	115	15		SP	SAND - fine to medium, some Gravel, light brownish grey
275			10					SM	SILTY SAND - thin layers of Sand and Sandy Silt, brown
	20			36.7	86	17			
270								SW	OLDER ALLUVIUM (Qalo) SAND - well graded, some Gravel and Cobbles, light brownish grey
	25		25 45 55 for 4"						
265		10		10.4	122	50			
	30		85					SP SM	SAND and SILTY SAND - fine to medium, some coarse, few Gravel, light brownish grey
260				11.2	119	50			
	35					for 11"			
255			23					ML	CLAYEY SILT - grey
	40							SM	SILTY SAND - fine, light grey

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.36a

BORING 36 (Continued)

DATE DRILLED: December 8, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 9:20 am; Finish: 12:30 pm

JOB L92045.AE4 DATE 1/5/93 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				29.6	93	18			Lenses of Sandy Silt and Sand
250	45		73						
				21.2	110	48		SP	SAND - fine to medium, few Gravel, light grey
245	50		80						
240		20		16.7	116	50 for 11"			
	55		100						
235				16.5	113	60 for			Lenses of Silty Sand
	60					10"		SW	SAND - well graded, about 20% Gravel, light bluish grey
230			100						
				21.1	113	40			Lenses of Silt
	65							SP	SAND - fine to medium, some coarse, some Gravel, light bluish grey
225			100						
	70			13.3	121	60			
220									
				18.6	108	45			Lenses of Silt
215	75								
	80	15		11.2	122	60			

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.36b

BORING 36 (Continued)

DATE DRILLED: December 8, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 9:20 am; Finish: 12:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
210								SAND - well graded, about 20% Gravel, light bluish grey
	85			—	—	75 for 6"		
205								
	90			12.5	123	60 for 10"		Few Cobbles
200								
	95	10		12.6	121	60 for 10"		About 30% Gravel
195								
	100	5		10.3	128	60 for 10"		
190								
	105							

SW

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 20' and 100'. Backfilled with Sand to within 15' of ground surface. Bentonite plug placed between depths of 10' and 15' and was grouted with cement above 10'. Water level measured in the well at a depth of 29' on 12/30/92.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 24"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/5/93 F.T. GMC DR. lk O.E. MS CHKD

LOG OF BORING

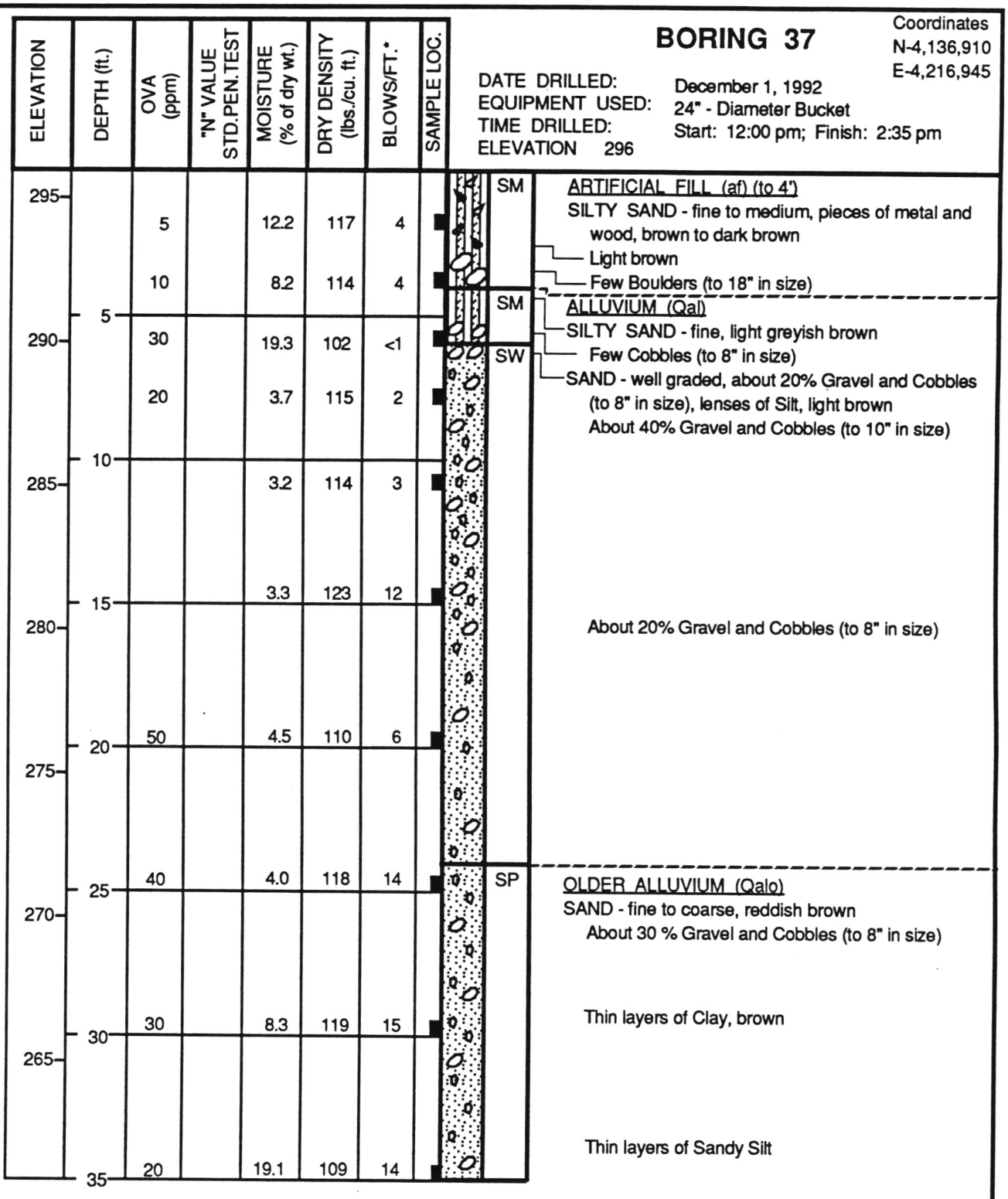
LAW/CRANDALL, INC.

PLATE A - 1.36c

BORING 37

Coordinates
N-4,136,910
E-4,216,945

DATE DRILLED: December 1, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 12:00 pm; Finish: 2:35 pm
ELEVATION 296



Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water seepage encountered at a depth of 34'. About 2" of water at the bottom of boring 15 minutes after completion of drilling. Raveling from 8' to 16' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 24' = 1,600 lbs.; Below 24' = 800 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.37

BORING 38

Coordinates
N-4,137,735
E-4,218,080

DATE DRILLED: November 25, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 9:00 am; Finish: 11:10 am
ELEVATION 302

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									3" Asphaltic Paving - 15" Base Course - 6" Oil/tar surface
300		10		11.1	118	7	■	SM	ARTIFICIAL FILL (af) (to 3')
								SM	SILTY SAND - fine, some Clay, light brown
	5	15		2.7	120	8	■	SW	ALLUVIUM (Qal)
									SILTY SAND - fine to medium, few Gravel, light brown
295		60		6.0	97	4	■	SP	SAND - well graded, about 10% Gravel, light brownish grey
									SAND - fine, few Gravel, light greyish brown
	10	30		1.3	117	4	■	SW	SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), brown
290									
		30		2.7	130	10	■		Lenses of Sandy Silt
	15								About 40% Gravel and Cobbles (to 12" in size)
285									
		30		5.0	124	14	■		
	20								About 20% Gravel, some Cobbles (to 6" in size)
280									
		140		3.9	118	8	■		Lenses of Silt, grey
	25							SP	OLDER ALLUVIUM (Qalo)
275									SAND - fine, few Gravel, light grey
		15		6.5	104	20	■		
	30								
270									
		70		18.7	109	15	■		
	35								

NOTE: Water seepage encountered at a depth of 35'. Caving and raveling from 8' to 20' (to 3-1/2' in diameter). Sloughing at 35' due to water seepage.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD BK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.38

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD BK

BORING 39

Coordinates
N-4,137,695
E-4,218,345

DATE DRILLED: November 25, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 12:15 pm; Finish: 2:45 pm
ELEVATION 302

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
300	0	10		12.9	113	2		SM
		60		4.9	98	9		SP
	5	10		16.5	91	2		
295		10		3.3	95	2		
	10	15		0.5	121	6		SW
290								
	15	160		19.1	100	5		
285								
	20	15		2.7	126	12		
280								
	25	20		3.2	119	8		
275								
	30	180		2.9	119	14		

ARTIFICIAL FILL (af) (to 3')
SILTY SAND - fine to medium, some Gravel, pieces of wood, brown

ALLUVIUM (Qal)
SAND - fine, about 10% Gravel and Cobbles (to 8" in size), light brown
Few lenses of Silt
Layer of Silt

SAND - well graded, about 30% Gravel, some Cobbles (to 10" in size), light brown

Layers of fine Sand

Grey

Large amount of Cobbles (to 12" in size)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. Raveling from 11' to 29' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.39

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. k O.E. MS CHKD JAK

BORING 40

DATE DRILLED: November 30, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 11:05 am; Finish: 1:45 pm
ELEVATION 302

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
300		10		4.4	109	6	
				5.4	117	7	
	5	15		6.6	112	4	
295		15		6.6	114	7	
	10	10		25.8	92	8	
290		5		9.6	123	10	
	15						
285							
	20	50		2.7	107	8	
280							
	25	5		2.8	119	9	
275							
	30	25		3.5	131	14	

SM — ARTIFICIAL FILL (af) (to 2')
SILTY SAND - fine to medium, about 20% Gravel and Cobbles (to 6" in size), brown and grey

SW — ALLUVIUM (Qal)
SAND - well graded, about 10% Gravel and Cobbles (to 8" in size), light brown

SP — SAND - fine to medium, about 10% Gravel, light greyish brown

SW — SAND - well graded, slight gasoline odor, about 20% Gravel and Cobbles (to 8" in size), light brownish grey
Layer of Silty Sand, hydrocarbon odor, grey

About 30% Gravel and Cobbles (to 10" in size)

Light grey

About 40% Gravel and Cobbles (to 10" in size)

Lenses of Sandy Silt, grey
Slight hydrocarbon odor

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. Raveling from 8' to 29' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.40

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD AK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 41

DATE DRILLED: November 30, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 2:00 pm; Finish: 4:10 pm
ELEVATION 302

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
300	0	5		6.0	108	1	
				7.0	113	3	
295	5			16.8	112	2	
				3.5	106	4	
290	10			2.3	113	5	
	15	5		13.5	109	3	
285				8.8	115	5	
280	20						
				3.1	126	9	
275	25						
	30			2.5	124	12	

SM — ARTIFICIAL FILL (af) (to 2')
SILTY SAND - fine to medium, some Gravel and Cobbles (to 6" in size), light brown and brown

SW — ALLUVIUM (Qal)
SAND - well graded, about 20% Gravel and Cobbles (to 8" in size), light greyish brown
Layer of fine Sand
Thin layers of Sandy Silt

About 30% Gravel and Cobbles

Thin layer of Silty Sand

Dark brown

Grey

Slight hydrocarbon odor

NOTE: Water not encountered. Slight caving and raveling from 8' to 15' and from 19' to 29' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.41

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD DK

BORING 42

Coordinates
N-4,137,830
E-4,218,580

DATE DRILLED: November 30, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIMED DRILLED: Start: 6:45 am; Finish: 10:10 am
ELEVATION 302

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
300	0							SM ML	ARTIFICIAL FILL (af) (to 2') SILTY SAND and SILT - about 10% debris (including pieces of brick and wood), brown
				2.4	111	5		SP	ALLUVIUM (Qal) SAND - fine, light brownish grey Few Gravel and Cobbles (to 6" in size) Fine to medium
	5			3.2	117	5			
295				1.9	127	6		SW	SAND - well graded, about 20% Gravel and Cobbles (to 8" in size), light brownish grey Thin layers of Silty Sand
	10	10		7.4	96	7 for 10"			About 40% Gravel and Cobbles (to 12" in size) Some Boulders (to 24" in size)
290		10		3.0	113	6			
	15							SP	SAND - fine to medium, about 10% Gravel and Cobbles (to 6" in size), light brownish grey
285		20		3.2	126	8			
	20							SW	SAND - well graded, about 15% Gravel and Cobbles (to 6" in size), hydrocarbon odor, light brownish grey Grey
280		100		4.0	115	8			
	25								
275									Some hydrocarbon odor
	30	60		3.9	117	17			

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. Caving and raveling from 7' to 15' and patchy raveling below 15' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.42

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD RJC

BORING 43

DATE DRILLED: December 1, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 6:45 am; Finish: 11:45 am
ELEVATION 302

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
300				—	—	2	
				0.9	122	3	
295	5	5		1.5	111	3	
				1.9	119	5	
290	10			3.0	113	10	
		10		1.6	124	12	
285	15						
		5		30.3	98	9	
280	20						
		35		7.3	89	9	
275	25						
270	30	10		3.8	112	20	
	35						

SM — ARTIFICIAL FILL (af) (to 3')
SILTY SAND - fine, about 20% Gravel and Cobbles (to 8" in size), some debris (including pieces of concrete, brick, and metal), some rail road ballast, mottled brown

SW — ALLUVIUM (Qal)
SAND - well graded, about 40% Gravel and Cobbles, light brownish grey
Some Cobbles (to 10" in size)

SM — SILTY SAND - fine, light brown and light grey

SW — SAND - well graded about 40% Gravel and Cobbles (to 6" in size), light brown

SM — SILTY SAND - fine, light brown

SP — SAND - fine, lenses of Silt, some Gravel, grey

SW — SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), light grey

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. Heavy caving from 3' to 17' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.

PLATE A - 1.43

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 44

Coordinates
N-4,138,185
E-4,218,965

DATE DRILLED: November 25, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 6:45 am; Finish: 8:50 am
ELEVATION 307

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
305		15		8.0	111	8	
				1.6	123	9 for 10"	
	5	5		1.6	114	5	
300		5		0.1	119	8	
	10	20		14.3	107	2	
295							
		20		41.6	79	1	
	15						
290							
	20	100		31.7	86	3	

SM — 4" Tar and Gravel
ARTIFICIAL FILL (af) (to 2')
SM — SILTY SAND - fine to medium, about 20% Gravel and Cobbles, pieces of wood, brown
SW — ALLUVIUM (Qal)
SILTY SAND - fine, about 10% Gravel, brown
SAND - well graded, about 40% Gravel, some Cobbles (to 8" in size), light brown
Strong sulfur odor
Layer of fine Sand
PUENTE FORMATION (Tpss)
SILTSTONE - well bedded, fractured, grey and brown

NOTE: Water seepage (perched water) encountered at a depth of 10'. 2" of water at the bottom of boring 10 minutes after completion of drilling. Sloughing from 10' to 12' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.44

JOB L92045.AE4 DATE 12/3/92 F.T. AR DR. lk O.E. MS CHKD

BORING 45

Coordinates
N-4,138,620
E-4,219,470

DATE DRILLED: December 3, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 12:25 pm; Finish: 2:00 pm
ELEVATION 313

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
		5		11.1	114	7		SM CL
310		10		4.9	103	3		SP
	5	10		2.5	120	8		
305		5		2.3	114	3		SW
	10	10		5.8	115	3		
300								
	15			3.1	116	12		

ARTIFICIAL FILL (af) (to 3')
SILTY SAND and SANDY CLAY - about 10% Gravel and Cobbles (to 6" in size), pieces of brick and wood, mottled brown and grey

ALLUVIUM (Qal)
SAND - fine to medium, about 20% Gravel and Cobbles (to 9" in size), light grey
SAND - well graded, about 20% Gravel and Cobbles

Lenses of Sandy Silt

A Boulder (12" in size)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE:

Water not encountered. Caving from 3' to 9' and from 11' to 13' (to 5' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.45

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD JK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 46

Coordinates
N-4,138,845
E-4,219,280

DATE DRILLED: January 29, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:10 am; Finish: 1:30 pm
ELEVATION 355

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
		35		8.9	102	2		SM ML	ARTIFICIAL FILL (af) (to 12') SILTY SAND and SANDY SILT - fine to medium, pieces of brick and concrete, brown to dark brown
		30		16.1	109	1			Light brown
350	5	45		18.2	98	< 1			Some shell fragments
		35		26.2	96	< 1			
345	10	5		22.3	99	< 1		ML	CLAYEY SILT - pieces of nail, some shell fragments, dark brown
		10		19.5	106	2		CL	COLLUVIUM SILTY CLAY - some Sand, few Gravel, brown
340	15	10		19.1	109	3			(LL = 33; PI = 14)
				23.7	99	3			Lenses of Sandy Clay, light brown
335	20								PUENTE FORMATION (Tpss) SILTSTONE - moderately well bedded, fractured, Sandstone interbeds, light brownish grey Bedding: N84E, 34SE
330	25	25		33.8	87	3			Bedding: E-W, 42S
									Bedding: N71W, 45SW
325	30	10		22.2	105	15			Bedding: N76W, 47SW
									SANDSTONE - fine grained, poorly bedded to massive, few Siltstone interbeds, light brown Bedding: N86W, 44SW Cemented below 34' Bedding: N82E, 53SW
320	35			14.3	107	15			(BORING TERMINATED AT A DEPTH OF 37' DUE TO DIFFICULT DRILLING THROUGH CEMENTED SANDSTONE)
315	40								

NOTE: Water not encountered. No caving.
* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight : 0' to 25' = 1,680 lbs. Below 25' = 840 lbs.; Stroke = 12"

LOG OF BORING

LAW / CRANDALL, INC.

PLATE A - 1.46

BORING 47

Coordinates
N-4,138,920
E-4,219,490

DATE DRILLED: December 21, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 3:10 pm

ELEVATION 314

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
310	5			13.0	105	11	
				—	—	5	
		5		5.1	115	11	
305	10	50		9.4	118	50	
			100 for 5"				
300	15	5		18.2	110	35	
295	20	5	40 60 for 3"				
290	25	10		19.4	106	75 for 9"	
285	30		50 50 for 4"				
280	35	5		12.6	104	50 for 10"	
275	40						

SM — ARTIFICIAL FILL (af) (to 5')
SILTY SAND - fine, some Gravel, greyish brown

SP — ALULUVIUM (Qal)
SAND - fine, light brown

PUENTE FORMATION (Tpss)
INTERBEDDED SILTSTONE AND SANDSTONE - fine-grained, thinly bedded, weathered, light brown and rust brown

Well cemented bed, hard

Well bedded

SILTSTONE - Sandstone interbeds, fine-grained, well bedded, light grey and grey

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 2/24/93 F.T. GMC DR. nh O.E. JB CHKD

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.47a

BORING 47 (Continued)

DATE DRILLED: December 21, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 3:10 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		60	40 60 for 4"				
270	45			18.8	115	80 for 8"	■
265	50	15	100 for 6"				
260	55			16.0	112	75 for 10"	■
255	60	5	30 40 40 for 5"				
250	65	5		16.5	112	85	■
245	70	5	40 60 for 4"				
240	75	5		16.7	107	80 for 8"	■
235	80						

INTERBEDDED SILTSTONE and SANDSTONE-
Clayey, thinly bedded, grey

SILTSTONE - few Sandstone interbeds,
fine-grained, well bedded, grey

(CONTINUED ON FOLLOWING PLATE)

JOB L92045.AE4 DATE 2/24/93 F.T. GMC DR. nh O.E. JB CHKD JB BK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.47b

BORING 47 (Continued)

DATE DRILLED: December 21, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 3:10 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		40	60 60 for 4"				
230	85			18.0	110	75 for 8"	
225	90		50 for 1"				
220	95			16.7	111	75 for 7"	
215	100			17.5	112	75 for 6"	
210	105						

Well cemented bed, very hard from 86' to 92'

NOTE:

Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2" - diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 10' and 90'. Backfilled with Sand to within 10' of ground surface. A bentonite plug was place between depth of 5' and 8' and was grouted with cement above 5'. Top is capped. Water level measured at a depth of 23-1/2' on 12/30/92 and at 23' on 1/27/93.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 24"

JOB L92045.AE4 DATE 2/24/93 F.T. EMC DR. nh O.E. CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

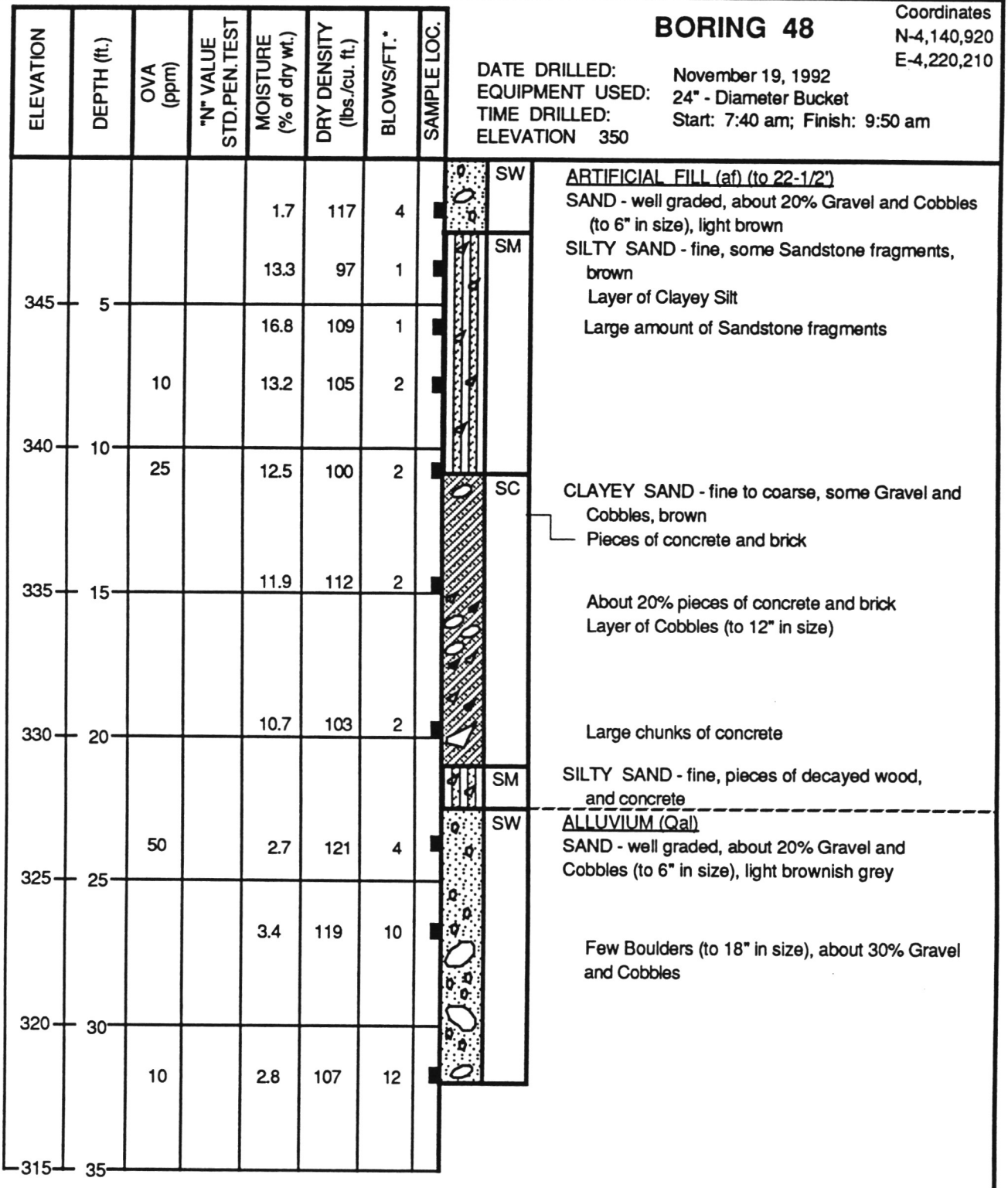
LAW/CRANDALL, INC.

PLATE A - 1.47c

BORING 48

Coordinates
N-4,140,920
E-4,220,210

DATE DRILLED: November 19, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:40 am; Finish: 9:50 am
ELEVATION 350



NOTE: Water not encountered. Raveling from 23' to 31' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.
Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.48

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 49

Coordinates
N-4,141,470
E-4,220,675

DATE DRILLED: December 15 & 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 11:00 am (12/15)
Start: 7:00 am; Finish: 11:00 am (12/16)

ELEVATION 354

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
350	0			6.3	119	12		SM	ARTIFICIAL FILL (af) (to 18') SILTY SAND - fine to medium, some coarse, about 10% Gravel, light brown
				11.7	121	9			
	5			6.2	122	14			Fine to coarse Sand, about 25% Gravel
				8.4	111	15			
345		5		8.6	116	35			
	10								
		5	24						Pieces of glass
340									
	15			8.7	130	75 for 10"			Some pieces of decayed wood
335		10	52					SM	ALLUVIUM (Qal) SILTY SAND - fine to medium, light brown
	20							SP	SAND - fine to medium, about 25% Gravel, light greyish brown
		10		7.7	110	75 for 10"			
330								SW	SAND - well graded, about 35% Gravel, light brown
	25		25						
			55						
			20 for 1"						
325				3.8	121	75 for 10"			
	30								
			78						
320									
				11.3	129	75			
	35					for 8"			
315									
	40		85					SP SM	SAND and SILTY SAND - fine to medium, some coarse, about 5% Gravel, light brown

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.49a

BORING 49 (Continued)

DATE DRILLED: December 15 & 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 11:00 am (12/15)
Start: 7:00 am; Finish: 11:00 am (12/16)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
310	45	5		7.0	120	75 for 10"			
		5		6.2	122	75 for 11"		SW	OLDER ALLUVIUM (Qalo) SAND - well graded, about 25% Gravel, light brown
305	50			12.6	121	75 for 10"			Layers of fine Sand
300	55	35	35 75 for 5"						Greyish blue
295	60	5		12.7	114	50			Light grey
290	65	10	100						Thin layer of Silt
285	70	5		10.7	119	50			
280	75	35	35 50 25 for 2"						Lenses of Silt
275	80							ML	SANDY SILT - light brown
								SP	SAND - fine to medium, light brownish grey

(CONTINUED ON FOLLOWING PLATE)

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.49b

BORING 49 (Continued)

DATE DRILLED: December 15 & 16, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 11:00 am (12/15)
Start: 7:00 am; Finish: 11:00 am (12/16)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
270	85	5		16.8	107	75	
		55	100				
265	90						
		5		10.1	123	60	
260	95						
		5	75				
255	100						
		5		8.6	119	75 for 6"	
250	105						

SW — SAND - well graded, some Gravel, light brownish grey

Layer of Silty Sand
Layer of Sandy Silt

Layer of Sandy Silt

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 20' and 100'. Backfilled with Sand to within 12' of ground surface. Bentonite plug placed between depths of 8' and 12' and was grouted with cement above 8'. Water level measured in the well at a depth of 60' on 12/30/92.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 24"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD BK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.49c

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS/MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 50

Coordinates
N-4,141,975
E-4,221,505

DATE DRILLED: January 27, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 9:35 am
ELEVATION 345

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				5.5	112	2	
				1.7	109	5	
340	5	10		2.1	107	4	
335	10			2.8	112	5	
330	15	20		3.7	115	10	

SM ML — 2-1/2" Asphaltic Paving

ARTIFICIAL FILL (af) (to 2')

SILTY SAND and SANDY SILT - fine to medium, pieces of concrete and brick, brown

SP — ALLUVIUM (Qal)

SAND - fine to coarse, about 20% Gravel and Cobbles (to 10" in size), lenses of Silty Sand, light brown

Few Boulders (to 14" in size)

NOTE: Water not encountered. Raveling from 2' to 14' (to 4' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.50

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD 12/3/92

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 51

DATE DRILLED: November 19, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIMED DRILLED: Start: 10:00 am; Finish: 11:10 am
ELEVATION 355

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
		15		5.1	124	7		SM
		25		5.6	107	4		SM
350	5	35		14.5	105	2		SP
		75		6.6	104	5		SW
345	10	25		3.0	117	6		
340	15			3.2	117	12		

ARTIFICIAL FILL (af) (to 2-1/2')
SILTY SAND - fine, about 10% Gravel and Cobbles, brown and grey

ALLUVIUM (Qal)
SILTY SAND - fine, few Gravel, greyish brown

SAND - fine, about 10% Gravel and Cobbles (to 8" in size), light greyish brown

SAND - well graded, about 10% Gravel and Cobbles (to 8" in size), light brown

NOTE: Water not encountered. Caving and raveling from 9' to 14' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.51

BORING 52

DATE DRILLED: November 19, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 11:35 am; Finish: 3:15 pm
ELEVATION 362

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
								SM	ARTIFICIAL FILL (af) (to 1') SILTY SAND - fine, few Gravel, brown
360				2.1	123	4		SW	ALLUVIUM (Qal) SAND - well graded, about 30% Gravel and Cobbles (to 8" in size), few pieces of wood, light brownish grey
	5			2.2	114	6		SW GW	SAND and GRAVEL - well graded, about 30% Cobbles (to 8" in size), light brownish grey
355				1.6	116	5			Cobbles (to 12" in size)
	10			2.2	124	10			24" Boulder Some Boulders (to 18" in size)
350								SP	SAND - fine to medium, about 10% Gravel and Cobbles, light brown
	15	10		3.4	125	11			

NOTE: Water not encountered. Caving and raveling from 0' to 12' (to 6' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD BJC 1/3

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.52

BORING 53

DATE DRILLED: December 28 & 30, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 3:45 pm (12/28)
Start: 6:30 am; Finish: 1:30 pm (12/30)
ELEVATION 367

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
365	0			5.8	125	18	■
	5			5.0	131	40	■
360				5.2	129	45	■
	10	10	38				
355							
	15	5		4.1	120	40	■
350							
	20	5	50 50 for 4"				
345							
	25			9.7	115	100 for 8"	■
340							
	30		40 60 for 4"				
335							
	35			7.6	123	55	■
330							
	40						

SW GW — ARTIFICIAL FILL (af) (to 2')
SAND and GRAVEL - well graded, some Cobbles, light brown

SW GW — ALLUVIUM (Qal)
SAND and GRAVEL - well graded, large amount of Cobbles, light greyish brown

Some Boulders (to 18" in size)

(CONTINUED ON FOLLOWING PLATE)

JOB L92045.AE4 DATE 1/14/93 F.T. GMC DR. lk O.E. CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.53a

BORING 53 (Continued)

DATE DRILLED: December 28 & 30, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 3:45 pm (12/28)
Start: 6:30 am; Finish: 1:30 pm (12/30)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
325	45	20	45 60 for 4"					ML	OLDER ALLUVIUM (Qalo) CLAYEY SILT - some sand, light greyish brown
320				11.6	127	75 for 10"			
	50								
315		5	21					SM	SILTY SAND - fine, light greyish brown
310	55			16.7	115	35			Thin layers of Clayey Silt and Sand
	60							ML	CLAYEY SILT - some Sand, light greyish brown
305		35	35					SP	SAND - fine, thin layers of Silty Sand, light greyish brown
	65								
300		5		16.6	116	50		SW	SAND - well graded, about 10% Gravel, light greyish brown
	70								
295		350	100						Layer of Silty Sand
	75								
290				—	—	—			Some Cobbles (to 10" in size)
	80								

(CONTINUED ON FOLLOWING PLATE)

JOB L92045.AE4 DATE 1/14/93 F.T. GMC DR. lk O.E. CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.53b

BORING 53 (Continued)

DATE DRILLED: December 28 & 30, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 3:45 pm (12/28)
Start: 6:30 am; Finish: 1:30 pm (12/30)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
285				15.7	113	50 for 8"	
	85		28				
		190	60 20 for 2"				
280							
	90						
		110		15.5	114	60 for 11"	
275							
	95						
		120	100 for 4"				
270							
	100						
				17.7	112	100 for 4"	
265							
	105						

CL — SANDY CLAY - light bluish grey

SP — SAND - fine to coarse, some Gravel, light bluish grey

Thin layers of Sandy Silt and Silty Sand

PUENTE FORMATION (Tpss)
SILTSTONE - well bedded, dark grey

Sandstone interbed

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 98'. Pipe perforated between depths of 18' and 98'. Backfilled with Sand to within 13' of ground surface. Bentonite plug placed between depths of 10' and 13' and was grouted with cement above 10'. Water level measured in the well at a depth of 38' on 1/8/93.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/14/93 F.T. GMC DR. lk O.E. JB CHKD AK

LOG OF BORING

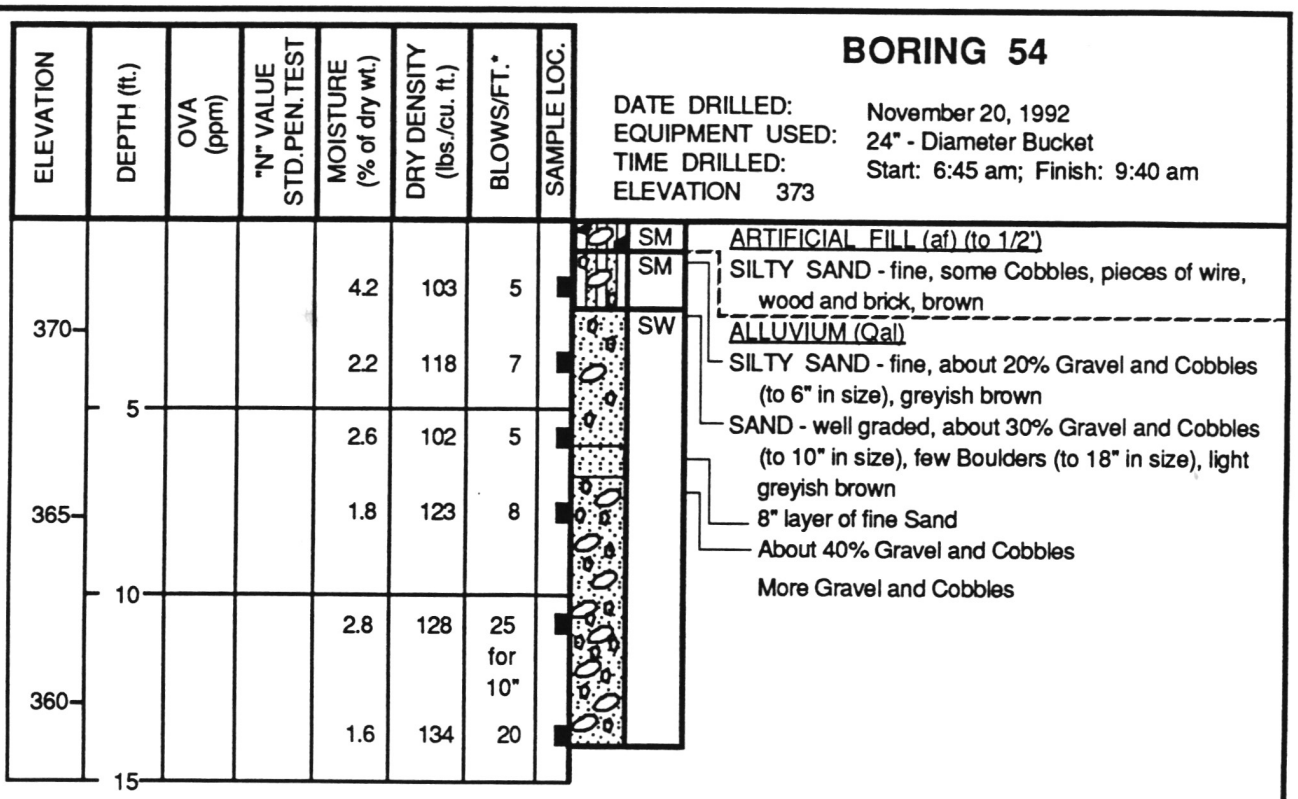
LAW/CRANDALL, INC.

PLATE A - 1.53c

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD

BORING 54

DATE DRILLED: November 20, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 6:45 am; Finish: 9:40 am
ELEVATION 373



NOTE: Water not encountered. Caving and raveling from 0' to 13' (to 6' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

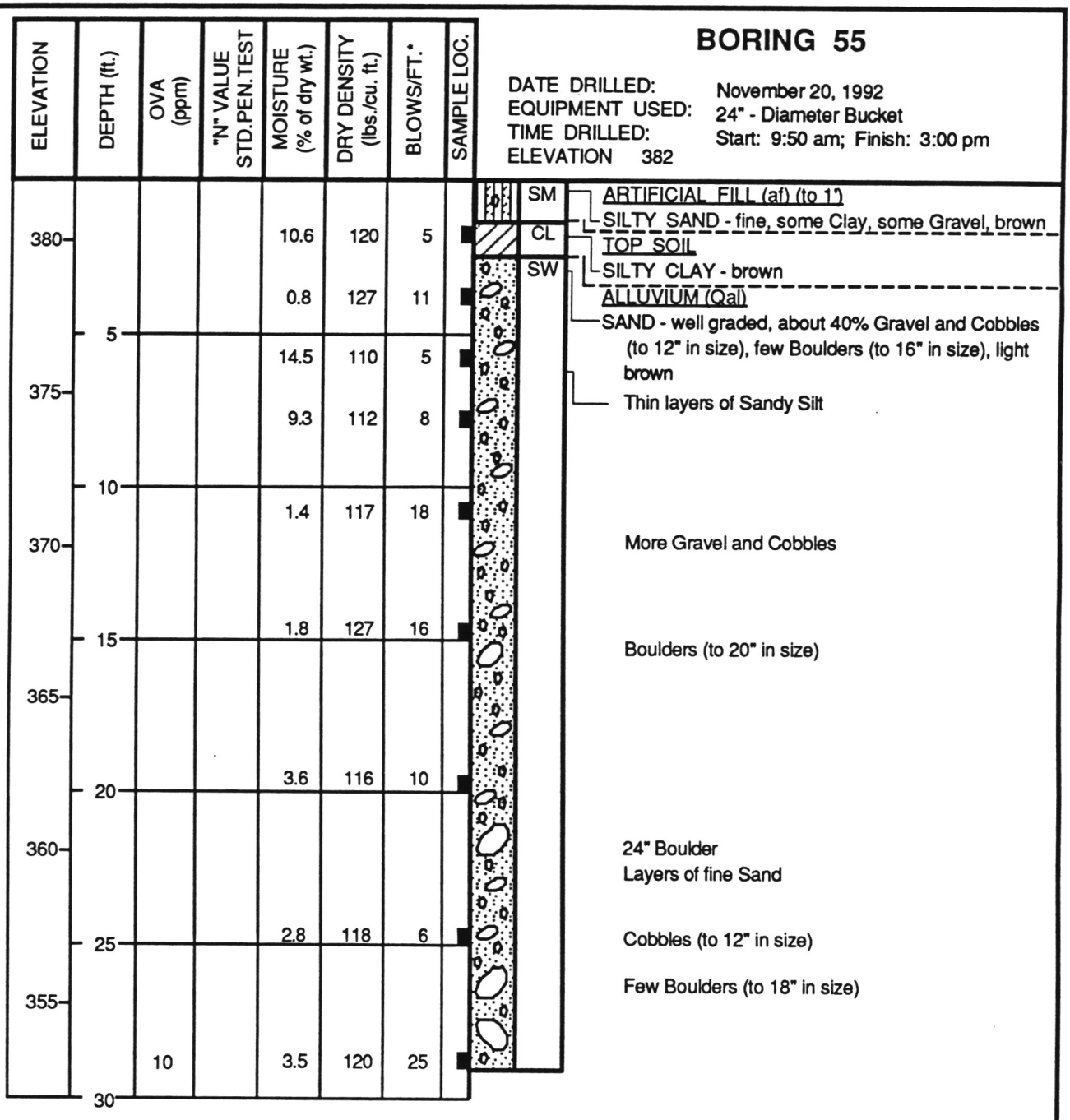
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.54

BORING 55

DATE DRILLED: November 20, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 9:50 am; Finish: 3:00 pm
ELEVATION 382



NOTE: Water not encountered. Heavy caving from 3' to 7' and from 12' to 28' (to 6' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,600 lbs.; Below 25' = 800 lbs.
Stroke = 12"

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD JK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

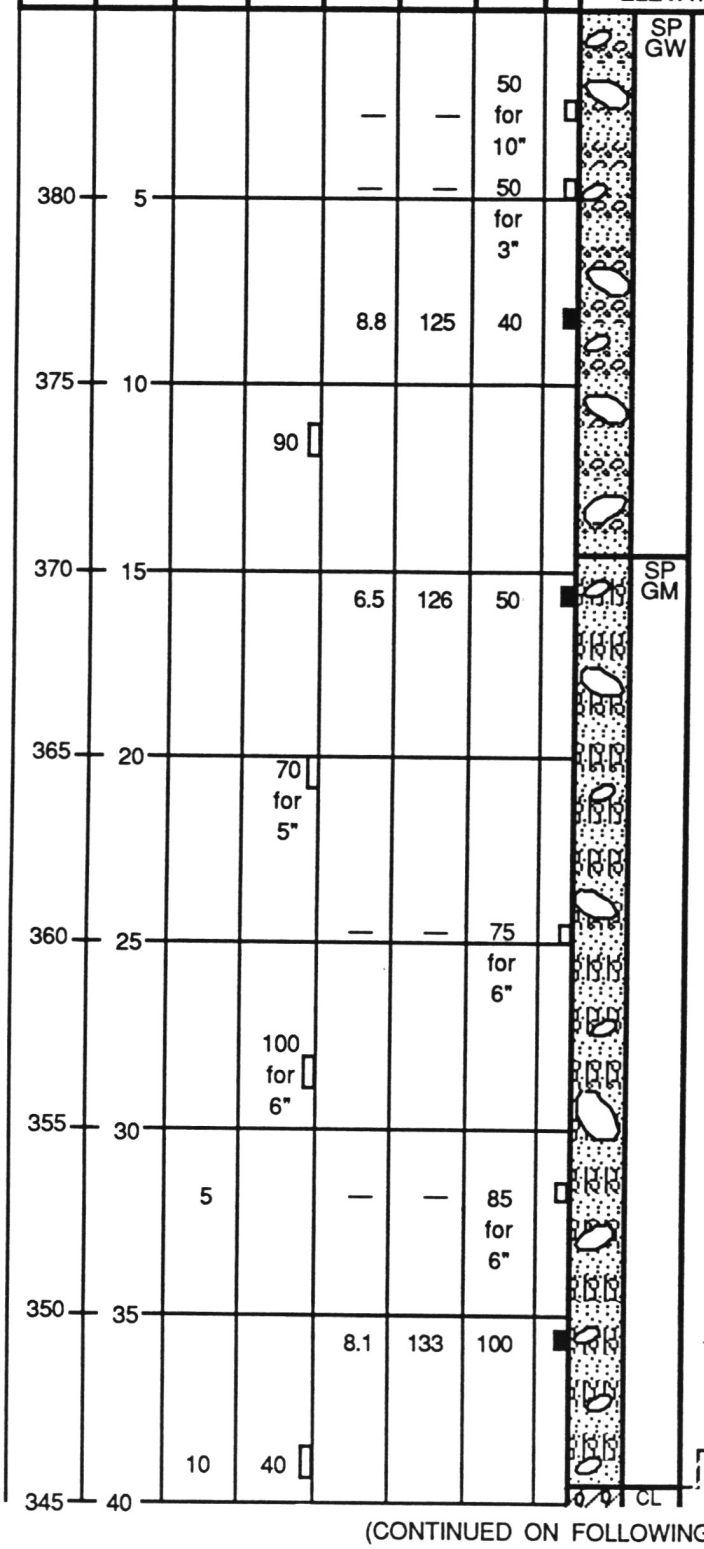
LAW/CRANDALL, INC.

PLATE A - 1.55

BORING 56

DATE DRILLED: December 22 & 23, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 3:30 pm (12/22)
Start: 6:00 am; Finish: 3:45 pm (12/23)

ELEVATION 385



ALLUVIUM (Qal)
SAND and GRAVEL - well graded, some Cobbles and Boulders, light brownish grey

Some Boulders

SAND and SILTY GRAVEL - fine to coarse, some Cobbles and Boulders, light brownish grey

16" Boulder

12" Boulder

Few Cobbles (to 12" in size)

Layer of fine Sand

OLDER ALLUVIUM (Qalo)
SANDY CLAY - some Silt, few Gravel, light brown

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/19/93 F.T. GMC DR. lk O.E. MS CHKD BK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.56a

BORING 56 (Continued)

DATE DRILLED: December 22 & 23, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 3:30 pm (12/22)
Start: 6:00 am; Finish: 3:45 pm (12/23)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				—	—	40	
		10		18.7	112	28	
340	45						
		45	14				
		85		17.5	114	60 for 10"	
335	50						
		500 +	50				
330	55		50 for 3"				
		10		28.6	94	55 for 11"	
325	60						
		120	100 for 6"				
320	65						
		5		18.4	105	75 for 7"	
315	70						
		50	100 for 5"				
310	75						
		5		16.3	110	80 for 6"	
305	80						

PUENTE FORMATION (Tpss)

INTERBEDDED SANDSTONE and SILTSTONE - fine grained, well bedded, light brown and yellowish brown

NOTE:
Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 75'. Pipe perforated between depths of 15' and 75'. Backfilled with Sand to within 11' of ground surface. A bentonite plug was placed between depth of 9' and 11' and was grouted with cement above 9'. Top is capped. Water level measured at a depth of 35-1/2' on 12-30-92.

SILTSTONE - well bedded, locally well cemented, light brown

SANDSTONE - fine grained, well bedded, light grey

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 24"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 11/10/92 F.T. TC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.56b

BORING 57

DATE DRILLED: December 4, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:30 am; Finish: 12:00 pm
ELEVATION 405

JOB L92045.AE4 DATE 1/5/93 F.T. GMC DR. lk O.E. MS CHKD 1/13/93

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				9.1	99	5	■	ML	ARTIFICIAL FILL (af) (to 3') SANDY SILT - some Clay, light greyish brown
400	5	10		10.9	93	5	■	ML	TOPSOIL CLAYEY SILT - some fine Sand, few roots, light brown Few Gravel
				11.9	99	8	■		
395	10		31					CL	SILTY CLAY - few Gravel, brown
390	15	10		28.1	89	15	■	SW	ALLUVIUM (Qal) SAND - well graded, about 40% Gravel and Cobbles, light brown
			45						PUENTE FORMATION (Tpss) SILTSTONE - moderately well bedded, fractured, light brownish grey
385	20	15		31.5	91	30	■		Less fractured, well bedded, light grey
380	25	5		24.5	98	55	■		Light brown
375	30	10		26.6	102	30	■		
370	35	15		13.4	113	100 for 9"	■		SANDSTONE - fine grained, poorly bedded to massive, light brown
						100 for 9"			Siltstone interbeds
365	40	5		30.8	94		■		

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.57a

BORING 57 (Continued)

DATE DRILLED: December 4, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:30 am; Finish: 12:00 pm

JOB L92045.AE4 DATE 1/5/93 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
360	45			14.3	115	100 for 11"		Siltstone interbeds
355	50			16.2	114	80 for 11"		
350	55	5		15.6	116	90 for 11"		
345	60	10		15.6	114	100 for 10"		Siltstone interbeds Light grey
340	65			15.0	117	100 for 10"		
335	70	10		16.4	113	80		SILTSTONE - moderately well bedded, light bluish grey
330	75	25		16.3	112	100 for 10"		Sandstone interbeds, light grey

NOTE: Drilling mud used in drilling process. Mud removed after completion of drilling. Water level not established.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.57b

BORING 58

DATE DRILLED: January 14, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:15 am; Finish: 5:45 pm
ELEVATION 418

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									3" Asphaltic Paving - 11" Concrete
415				13.9	108	< 1		ML	ARTIFICIAL FILL (af) (to 4') SANDY SILT - fine to medium, some Gravel, pieces of brick and wood, brown
		25		14.7	110	1			
	5							ML	TOPSOIL SANDY SILT - brown
				13.4	113	2			
410				5.7	120	12		SM	ALLUVIUM (Qal) SILTY SAND - fine to coarse, about 15% Gravel and Cobbles (to 9" in size), light brown
	10			4.1	106	8		SP SM	SAND and SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 9" in size), light brown
405									
	15								
		10		24.7	96	5			PUENTE FORMATION (Tpss) SILTSTONE - moderately well bedded, fractured, light brownish grey
400									
	20	50		22.1	104	10			
									Less fractured
395									
	25	10		12.7	116	20			
390									Light brown
	30	35		17.9	110	26			

NOTE: Water not encountered. Raveling from 7' to 14-1/2' (to 3-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.58

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 59

DATE DRILLED: November 25, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 9:10 am
ELEVATION 421

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
420				5.7	115	3	
	5			—	—	—	
415				2.9	126	11	
		20		7.4	102	11	
	10	20		7.8	101	25	
410						for 8"	
	15	40		24.7	104	9	
405							
	20	20		20.9	103	45	
400						for 8"	
	25	5		41.0	84	17	
395							
	30	5		22.6	102	25	

SM / ML — ARTIFICIAL FILL (af) (to 1/2')
SILTY SAND - fine, light brown

ALLUVIUM (Qal)

SW — SANDY SILT - few Gravel and Cobbles (to 12" in size), a 14" Boulder, light brown

SAND - well graded, about 30% Gravel and Cobbles, light brown
Brown

PUENTE FORMATION (Tpss)

INTERBEDDED SANDSTONE and SILTSTONE - fine grained, well bedded, light brown and grey

Bedding: N40E, 11SE

Bedding: N72E, 12SE

Bedding: N63E, 14SE

Bedding: N54E, 14SE

Bedding: N52E, 20SE

Bedding: N52E, 13SE

Bedding: N84W, 16SW

Bedding: N47E, 13SE

NOTE: Slight water seepage encountered at a depth of 25'. Raveling from 3' to 8' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 24' = 1,600 lbs.; Below 24' = 800 lbs.
Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.59

BORING 60

DATE DRILLED: November 25, 1992
EQUIPMENT USED: 24" - Diameter Bucket
18" - Diameter Bucket
TIME DRILLED: Start: 11:40 am; Finish: 4:28 pm
ELEVATION 470

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				9.5	91	3	
		30		9.6	94	3	
465	5			12.5	106	9	
		25		21.1	88	12 for 10"	
460	10			6.5	106	35 for 8"	
455	15	65		8.2	122	25 for 7"	
450	20	250		10.4	120	25	

ML — ARTIFICIAL FILL (af) (to 3-1/2')
SANDY SILT - some Sandstone fragments, light brown

ML — TOPSOIL
SANDY SILT - some Clay, porous, massive, brown

PUENTE FORMATION (Tpsh)
SANDSTONE - fine grained, few Siltstone interbeds, massive to poorly bedded, light brown
Bedding: N62E, 32SE

Diatomaceous Siltstone interbeds

Bedding: N72W, 52SW

(BORING TERMINATED DUE TO DIFFICULT DRILLING THROUGH BEDROCK)

NOTE: Water not encountered. Raveling from 2-1/2' to 5' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/14/93 F.T. AR DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.60

JOB L92045.AE4 DATE 1/19/93 F.T. AR DR. lk O.E. MS CHKD

BORING 61

Coordinates
N-4,149,345
E-4,225,960

DATE DRILLED: November 30, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 12:33 pm
ELEVATION 485

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				24.8	93	1	
		25		20.2	82	1	
480	5	35		19.6	99	2	
		15		15.4	109	2	
		35		10.1	98	1	
475	10						
		15		27.4	92	9	
470	15						
		250		12.3	120	19	
465	20						
		225		18.4	109	12	
460	25						
		80		21.5	104	25	
455	30						
				14.9	102	40 for 9"	
450	35						

ML — ARTIFICIAL FILL (af) (to 1/2')

ML — SANDY SILT - light brown

TOPSOIL

CLAYEY SILT - some Sand, porous, massive, dark brown

Less Clay, brown

(LL = 38; PI = 12)

ML — SANDY SILT - some Clay, brown

SP — OLDER ALLUVIUM (Qalo)

SAND - fine to medium, poorly cemented, about 50% Gravel and Cobbles (to 8" in size), brown

Contact: N30W, 31SW

PUENTE FORMATION (Tpsh)

INTERBEDDED SILTSTONE and SANDSTONE - fine to medium grained, well bedded, light brown and grey

Bedding: N72E, 28SE

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.61

JOB L92045.AE4 DATE 12/3/92 F.T. AR DR. lk O.E. MS CHKD

BORING 62

Coordinates
N-4,150,150
E-4,225,925

DATE DRILLED: November 23, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 8:00 am; Finish: 9:00 am
ELEVATION 495

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
				6.7	99	2		SM ML
				15.1	90	2		
490	5			17.5	82	1		
		10		19.1	84	1		
485	10			16.5	81	2		
		10		19.5	93	4		CL
480	15							
		30		20.4	88	5		
475	20							
		30		26.6	91	7		
470	25							
		30		25.6	91	19		
465	30							

ARTIFICIAL FILL (af) (to 14')
SILTY SAND and SANDY SILT - pieces of wood, glass, and asphaltic paving, some Gravel, light greyish brown

Some rootlets

Some Cobbles (to 7" in size)

Pieces of brick

TOPSOIL
SANDY CLAY - some Silt, light greyish brown

PUENTE FORMATION (Tpsh)
SILTSTONE - some Sandstone interbeds, fine grained, massive to poorly bedded, brown and grey

Light brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. Raveling from 7' to 9'.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 26' = 1,680 lbs.; Below 26' = 800 lbs.
Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.62

JOB L92045.AE4 DATE 12/3/92 F.T. AR DR. lk O.E. MS CHKD

BORING 63

Coordinates
N-4,150,940
E-4,226,400

DATE DRILLED: November 23, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:05 am; Finish: 11:15 am
ELEVATION 508

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
505	0			4.9	107	6	
				14.7	115	7 for 8"	
	5			4.6	116	12	
500				—	—	12	
	10	10		6.0	138	19	
495							
	15	20		3.9	124	15	



ML — ARTIFICIAL FILL (af) (to 1')
ML — SANDY SILT - pieces of glass, brown
TOPSOIL
SANDY SILT - brown
CL — SILTY CLAY - brown
SM — OLDER ALLUVIUM (Qalo)
SILTY SAND - fine to medium, about 20% Gravel and Cobbles (to 6" in size), brown

Fine to coarse Sand, light brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.63

BORING 64

Coordinates
N-4,151,755
E-4,227,690

DATE DRILLED: January 12, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 8:30 am; Finish: 11:00 am
ELEVATION 524

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				7.6	100	4	
				4.0	118	7	
520	5			4.0	119	9	
		5		3.3	127	13	
515	10						
				3.3	112	20	
510	15						
				5.4	123	40	
505	20						



SM 4" Asphaltic Paving

ARTIFICIAL FILL (af) (to 2-1/2')

SM SILTY SAND - fine to medium, about 10% Gravel, and Cobbles (to 6" in size), brown

OLDER ALLUVIUM (Qalo)

SP SILTY SAND - fine to coarse, some roots, light brown

SM SAND and SILTY SAND - fine to coarse, about 30% Gravel and Cobbles (to 8" in size), light brown

NOTE: Water not encountered. Raveling from 3' to 19' (to 3-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,039 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.64

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD

BORING 65

Coordinates
N-4,152,265
E-4,228,565

DATE DRILLED: January 14, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:15 am; Finish: 10:15 am
ELEVATION 535

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
				8.0	102	4		SM ML ML — 3" Asphaltic Paving; ARTIFICIAL FILL (af) (to1-1/2'); SILTY SAND and SANDY SILT - brown
		5		3.9	123	9		SW — OLDER ALLUVIUM (Qalo); SANDY SILT - few Gravel, brown
530	5	5		2.4	99	8		SAND - well graded, about 20% Gravel and Cobbles (to 8" in size), light brown
525	10			1.6	120	14		Few boulders (to 17" in size)
520	15	15		1.5	108	4		SP — SAND - fine to medium, some coarse, about 10% Gravel and Cobbles (to 6" in size), light brown
						16 for 10"		SW — SAND - well graded, about 15% Gravel and Cobbles (to 7" in size), light brown
515	20			2.7	125			

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. Raveling from 4' to 20' (to 3-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.65

BORING 66

Coordinates
N-4,152,715
E-4,229,300

DATE DRILLED: November 24, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:30 am; Finish: 9:40 am
ELEVATION 545

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
								SM/ML ARTIFICIAL FILL (af) (to1')
		10		0.6	93	3		ML SILTY SAND and SANDY SILT - fine, brown
								OLDER ALLUVIUM (Qalo)
				2.9	115	7		SP/SM SANDY SILT - brown
540	5							SAND and SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 8" in size), brown
		10		2.2	120	11		
				6.1	120	14		About 30% Gravel and Cobbles
535	10	25		2.8	121	11		SW SAND - well graded, about 20% Gravel and Cobbles (to 8" in size), light brown
								Lenses of Silty Sand
530	15			3.4	107	15		
								About 35% Gravel and Cobbles (to 8" in size)
525	20	10		6.1	102	14		Lenses of Silt
520	25			7.1	113	19		Greyish brown
								About 15% Gravel and Cobbles
515	30	15		4.3	113	33		

NOTE: Slight water seepage encountered at a depth of 24'. Slight raveling throughout boring (to 10" in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.
Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. k O.E. MS CHKD JK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.66

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. k O.E. MS CHKD 12/3 RK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 67

Coordinates
N-4,152,975
E-4,230,330

DATE DRILLED: November 23, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 12:08 pm; Finish: 1:30 pm
ELEVATION 553

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
550	0			2.4	107	1		SM ML — ARTIFICIAL FILL (af) (to 4') SILTY SAND and SANDY SILT - pieces of asphaltic paving, wood, and glass, some Gravel and Cobbles, brown
				10.3	114	2		
	5			10.5	120	4		ML — TOPSOIL SANDY SILT - some Gravel and Cobbles, brown
545		20		6.2	108	7		SM — OLDER ALLUVIUM (Qalo) SILTY SAND - fine to medium, brown
	10	25		3.9	120	9		About 15% Gravel and Cobbles (to 9" in size)
540								
	15			5.4	124	15		Layer of Silt
535								
	20			9.7	121	11		

NOTE: Water not encountered. Raveling throughout boring (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

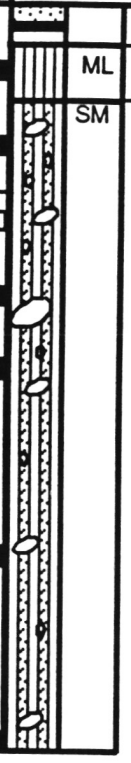
LAW/CRANDALL, INC.

PLATE A - 1.67

BORING 68

Coordinates
N-4,153,095
E-4,230,805

DATE DRILLED: November 24, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:10 am; Finish: 2:15 pm
ELEVATION 555



ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				10.8	113	4	■	ML	6" Sand and Gravel - 3" of Asphaltic Paving - 4" Fill Soils
									OLDER ALLUVIUM (Qalo)
		20		5.4	117	11	■	SM	SANDY SILT - brown
550	5								SILTY SAND - fine to medium, about 20% Gravel and Cobbles (to 12" in size), brown
				—	—	14	□		
		20		3.5	123	21	■		18" Boulder
545	10			5.9	115	23	■		Lenses of Sandy Silt
									Less Gravel and Cobbles
540	15	5		3.9	118	21	■		
									Few Cobbles (to 10" in size)
535	20			4.2	129	30	■		

NOTE: Water not encountered. Slight raveling throughout boring (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 12/3/92 F.T. GMC DR. lk O.E. MS MS CHKD DJC JB GR

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

BORING 69

Coordinates
N-4,152,800
E-4,232,050

DATE DRILLED: February 8, 9 & 10, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 8:45 am (2/8)
Start: 7:00 am; Finish: 2:25 pm (2/9)
ELEVATION 510 Start: 6:40 am; Finish: 12:20 pm (2/10)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				11.3	89	4	■	SM	ARTIFICIAL FILL (af) (to 3') SILTY SAND - fine, few Gravel, grey
				23.4	86	15	■	SM	ALLUVIUM (Qal) SILTY SAND - fine, few Gravel, grey
505	5			—	—	14	□	SW	SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), light greyish brown
				—	—	27	□		
				15.9	116	20	■		
500	10			9.4	116	25	■		About 30% Gravel and Cobbles Thin layer of Clayey Silt
495	15		100 for 5"						TOPANGA FORMATION (Ttss) SILTSTONE - some Sandstone interbeds, dark grey
				9.8	96	75 for 6"	■		Well cemented beds
490	20			24.4	99	100 for 5"	■		Well cemented beds below 20', very hard
485	25			—	—	100 for 1"	□		
480	30			—	—	100 for 2"	□		
475	35			22.5	107	100 for 3"	■		Some oil stains
470	40								

(CONTINUED ON FOLLOWING PLATE)

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.69a

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 69 (Continued)

DATE DRILLED: February 8, 9 & 10, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 8:45 am (2/8)
Start: 7:00 am; Finish: 2:25 pm (2/9)
Start: 6:40 am; Finish: 12:20 pm (2/10)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				—	—	100 for 2"	
465	45		100 for 1"				
460	50			—	—	100 for 2"	
455	55			10.6	116	100 for 5"	
450	60	15	100 for 5"				
445	65	5		13.2	117	100 for 3"	
440	70	30	100 for 5"				
435	75	10		11.0	122	100 for 7"	
430	80						

Dark grey to black

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.69b

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 69 (Continued)

DATE DRILLED: February 8, 9 & 10, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 8:45 am (2/8)
Start: 7:00 am; Finish: 2:25 pm (2/9)
Start: 6:40 am; Finish: 12:20 pm (2/10)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		30		13.4	111	100 for 7"	
425	85		100 for 4"				
420	90	100		11.2	115	100 for 7"	
415	95	10	100 for 3"				
410	100			11.6	117	100 for 3"	
405	105						

SANDSTONE - fine grained, bedded, grey

NOTE:

Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 100'. Pipe perforated between depths of 5' and 100'. Backfilled with Sand to within 5' of ground surface. Bentonite plug placed between depths of 1' and 5' and was grouted with cement above 1'. Water level measured in the well at 7-1/2' on 2/15/93.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.69c

BORING 70

Coordinates
N-4,152,600
E-4,232,530

DATE DRILLED: December 24, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm
ELEVATION 515

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				12.1	114	10	
510	5			10.2	113	25	
				4.5	131	40	
505	10		47				
500	15	5		13.0	119	50 for 6"	
				12.5	118	100 for 8"	
495	20						
490	25	20	50 for 4"				
485	30	25		13.9	117	100 for 8"	
480	35	10	60 for 2"				
475	40	60		13.7	116	100 for 8"	

CL ML — 3" Asphaltic Paving
ARTIFICIAL FILL (af) (to 3-1/2')
CLAY and SILT - few Sandstone fragments, mottled brown

ML — COLLUVIUM
SANDY SILT - some Clay, light brown

GM SP — ALLUVIUM (Qal)
SILTY GRAVEL and SAND - fine to coarse, about 40% Gravel and Cobbles, light greyish brown

TOPANGA FORMATION (Ttss)
SILTSTONE - some Sandstone interbeds, dark grey

Well cemented bed

Dissemenated fine organics

Well cemented beds

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/19/93 F.T. GMC DR. lk O.E. MS CHKD JB 2/1/93

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.70a

JOB L92045.AE4 DATE 1/19/93 F.T. GMC DR. lk O.E. MS CHKD

BORING 70 (Continued)

DATE DRILLED: December 24, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
470	45	50	60 / 45 for 4"				
465	50	90		19.5	110	100 for 5"	
460	55	50	100 for 6"				
455	60	60		11.8	119	100 for 6"	
450	65	60		15.3	112	100 for 6"	
445	70						
440	75	25		11.3	119	100 for 6"	
435	80						

Well cemented beds (44' to 48')

Well cemented beds (53' to 55-1/2')

Highly cemented bed

NOTE: Drilling mud used in drilling process. To obtain future water level measurements and sampling, installed 2"- diameter PVC pipe to a depth of 73'. Pipe perforated between depths of 13' and 73'. Backfilled with Sand to within 5' of ground surface. A bentonite plug was placed between depths of 2' and 5' and was grouted with cement above 2'. Top is capped. Water level measured at a depth of 13-1/2' on 12/30/92.

* Numbers of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 24"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.70b

JOB L92045.AE4 DATE 1/19/93 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 71

Coordinates
N-4,152,535
E-4,232,875

DATE DRILLED: December 2, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:30 am; Finish: 2:45 pm
ELEVATION 567

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
565	0	5		15.9	106	3		ARTIFICIAL FILL (af) (to 6-1/2') SILTSTONE and SHALE FRAGMENTS - brown
		5		14.4	103	1		
560	5			16.0	99	<1	CL	SILTY CLAY - brown
		20		9.9	102	<1		LANDSLIDE DEBRIS (Qls) SANDSTONE FRAGMENTS - Clayey Silt matrix, incoherent bedding, light brown
555	10	20		8.3	107	1		Shear: N68W, 29NE
	15	15		21.6	102	4		SILTSTONE - clayey, well bedded, fractured, caliche in filled fractures, brown
550								
	20	25		13.5	119	10		SANDSTONE - fine grained, discontinuous bedding, fractured, dissemenated, organic and rootlets (to 1/32"), light brown Bedding: N71E, 26SE SILTSTONE - fractured and jointed, caliche in filling of fractures, brown to dark brown Joint: N51W, 3SW Bedding: N48E, 24SE Bedding: N74E, 22SE Bedding: N18E, 31SE
545								
	25	35		16.7	114	15		Gypsum seams
540								
	30	50		22.3	103	18		Bedding: N48E, 17 SE
535								Dark greyish brown
	35	140		12.2	124	30 for 8"		
530						30 for 8"		INTERBEDDED SANDSTONE and SILTSTONE - fine grained, well bedded, dark grey and brown
	40	100		15.2	109			

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.71a

JOB L92045.AE4 DATE 1/19/93 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 71 (Continued)

DATE DRILLED: December 2, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:30 am; Finish: 2:45 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
525							
	45	10		14.0	116	30 for 10"	
520							
	50						
515							
	55						

Shear: N68W, 22NE

TOPANGA FORMATION (Ttss)

INTERBEDDED SILTSTONE and SANDSTONE - well bedded

Bedding: N15E, 21SE

Light brown and grey

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 26' = 1,600 lbs. Below 26' = 800 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.71b

BORING 72

Coordinates
N-4,152,395
E-4,233,310

DATE DRILLED: January 4, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 11:00 am; Finish: 4:15 pm
ELEVATION 563

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. k O.E. MS CHKD BK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
560	0	5		6.8	110	2	
		60		18.3	98	2	
	5	30		13.2	98	2	
555		75		10.4	94	2	
	10	40		12.1	96	2	
550							
	15	85		15.5	95	1	
545							
	20	55		9.9	103	3	
540							
	25	70		22.0	97	4	
535							
	30	60		22.9	96	10	
530							
	35	35		22.8	98	12	
525							
	40	40		17.6	111	8	

SM ML — ARTIFICIAL FILL (af) (to 13')
SILTY SAND and SANDY SILT - fine to medium, pieces of asphaltic paving, wood, and glass, 15" Boulder, few Gravel, light brown

Some roots, pieces of wood
Some Siltstone fragments

Contact: N32E, 47NW

SM — COLLUVIUM
SILTY SAND - fine, some rootlets, dark brown

Contact: N20E, 28NW

LANDSLIDE DEBRIS (Qls)
SANDSTONE FRAGMENTS - Silty Sand matrix, jumbled, incoherent structure, yellowish brown and dark brown

INTERBEDDED SANDSTONE and SILTSTONE - fine grained, discontinuous bedding, Siltstone highly sheared, yellowish brown and grey

SILTSTONE - highly sheared, discontinuous bedding, brown to grey
Shear Zone (3' thick): N18E, 17°NW

SILTSTONE and SANDSTONE - Clayey, fine grained, incoherent structure, discontinuous bedding, fine disseminated organics, dark brown and light grey

(CONTINUED ON FOLLOWING PLATE)

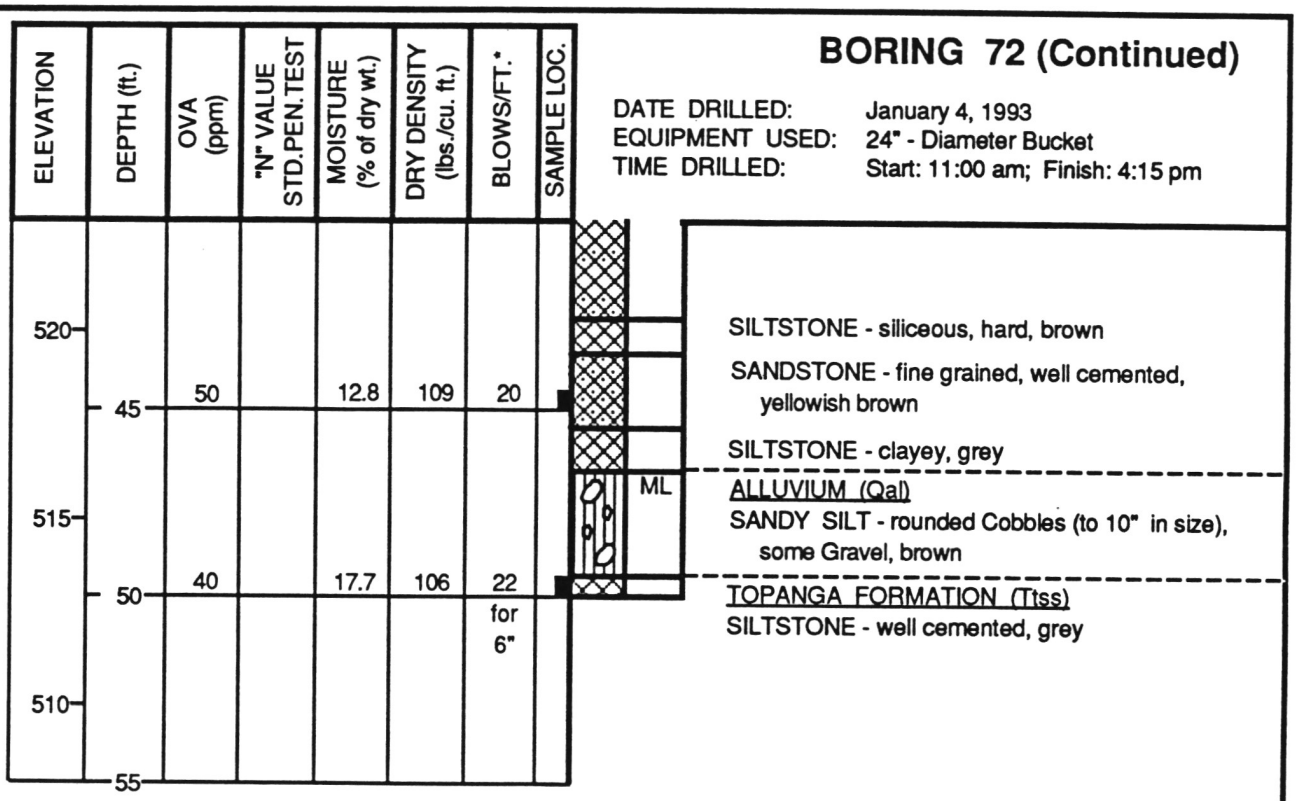
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.72a

BORING 72 (Continued)

DATE DRILLED: January 4, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 11:00 am; Finish: 4:15 pm



ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
520							
	45	50		12.8	109	20	
515							
	50	40		17.7	106	22 for 6"	
510							
	55						

SILTSTONE - siliceous, hard, brown

SANDSTONE - fine grained, well cemented, yellowish brown

SILTSTONE - clayey, grey

ML

ALLUVIUM (Qal)

SANDY SILT - rounded Cobbles (to 10" in size), some Gravel, brown

TOPANGA FORMATION (Ttss)

SILTSTONE - well cemented, grey

NOTE: Water seepage encountered at depths of 28-1/2', 37', and 48-1/2'. Slight caving and sloughing at seepage depths.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 24' = 1,600 lbs.; 24' to 40' = 800 lbs.; Below 40' = 1,600 lbs.
Stroke = 12"

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.72b

BORING 73

DATE DRILLED: December 28, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 4:00 pm
ELEVATION 573

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
570	0	330		13.8	112	< 1	
		335		25.3	88	2	
	5	305		28.9	88	< 1	
565		370		17.9	90	1	
	10	450		19.4	86	< 1	
560							
	15	500+		6.6	112	1	
555							
	20	460		26.3	91	2	
550							
	25	120		21.4	98	2	
545							
	30	150		19.6	99	6	
540							
	35	15		12.8	121	20	
535							
	40						

ML
CL

ARTIFICIAL FILL (af) (to 12-1/2')
SANDY SILT and SANDY CLAY - some Siltstone fragments, pieces of brick and plastic, brown and grey

Some roots

SILTSTONE FRAGMENTS - brown

Contact: N75E, 2NW

LANDSLIDE DEBRIS (Qls)
SANDSTONE - massive, caliche infilling in fractures (up to 1" wide), fractures randomly oriented

Joint: N48E, 57NW

SILTSTONE - Clayey, highly sheared, dark brown
Bedding: N35W, 24SW

Highly fractured, sheared, discontinuous bedding

OLDER LANDSLIDE DEBRIS (Qlso)
INTERBEDDED SILTSTONE and SANDSTONE - clayey, fine grained, highly sheared, discontinuous bedding, light grey and dark brown

NOTE:
Water seepage encountered at depths of 26' and 28'. Slight caving at 23' (to 4' in diameter).

*Numbers of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 3,200 lbs.
Below 25' = 1,600 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.73

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD BJK

BORING 74

DATE DRILLED: December 18 & 22, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm (12/18)
Start: 1:30 pm; Finish: 4:10 pm (12/22)
ELEVATION 630

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
		10		27.7	97	6		ML SM — ARTIFICIAL FILL (af) (to 2') SANDY SILT and SILTY SAND - fine to medium, some Siltstone fragments, brown
		10		7.7	120	20		LANDSLIDE DEBRIS (Qls) SANDSTONE - fine grained, massive, yellowish brown
625	5	45		7.6	117	8		Many roots SILTSTONE - Clayey, bedded Bedding: N40W, 22SW Joint: N10W, 40SW
620	10	140		10.5	109	6		SANDSTONE - fine grained, massive, light brown
615	15	70		10.3	112	10		Bedding: N80W, 17SW (Siltstone interbed)
610	20	200		19.0	109	8		Bedding: N40W, 24SW (Siltstone interbed, polished bedding surface)
605	25	225		10.7	114	8		Zone of incoherent Sandstone and Siltstone, jumbled appearance Trend of zone: N10W, 22SW INTERBEDDED SANDSTONE and SILTSTONE - well bedded, discontinuous structure, light grey and light brown
600	30	70		14.7	107	14		Bedding discontinuous, randomly oriented Clay pods, incoherent structure
595	35	40		9.6	118	25		Well cemented bed Zone of highly sheared and fractured Siltstone (8" thick): N32W, 48NE
590	40	30		9.1	114	50 for 10"		OLDER LANDSLIDE DEBRIS (Qlso) SANDSTONE - fine grained, siliceous, massive, yellowish brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.74a

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 74 (Continued)

DATE DRILLED: December 18 & 22, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm (12/18)
Start: 1:30 pm; Finish: 4:10 pm (12/22)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
585	45	40		21.7	103	20	
580	50	50		18.9	97	16	
575	55	15		12.1	116	35	
570	60	20		12.2	120	35	
565	65	5		13.9	115	20	
560	70	10		13.2	118	50 for 10"	
555	75	20		16.2	112	18	
550	80						

Bedding: N43W, 28SW
SILTSTONE - Clayey, well bedded, fractured caliche in filling, dark brown to black

Bedding: N38W, 27SW
Randomly oriented shears

Bedding: N62W, 18SW
SANDSTONE - fine to medium grained, siliceous, fractured, randomly oriented, Clay seams, grey

Sheared Clay seam (4" to 8" thick, continuous assend hole): N78E, 13NW

Siltstone bed, sheared, discontinuous: N75E, 12NW

Shear: N5W, 32SW

Randomly oriented shears

Well cemented beds, brown

Grey

SILTSTONE - some fine Sand, well bedded, moderately fractured, grey and dark grey

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.74b

BORING 74 (Continued)

DATE DRILLED: December 18 & 22, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm (12/18)
Start: 1:30 pm; Finish: 4:10 pm (12/22)

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		35		16.4	113	20	
545	85	15		14.0	117	50 for 9"	
540	90			9.6	126	45 for 9"	
535	95						

Interbeds of siliceous Siltstone and Clayey Siltstone, highly fractured, well bedded, light grey and dark grey

NOTE:

Water seepage encountered at a depth of 58'. Caving and sloughing from 60' to 64' due to water seepage.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight: 0' to 25' = 1,680 lbs. 25' to 50' = 840 lbs.; 50' to 75' = 1,300 lbs.; Below 75' = 1,800 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.74c

JOB L92045.AE4 DATE 2/15/93 F.T. GMC DR. lk O.E. MS CHKD BJK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 75

Coordinates
N-4,152,955
E-4,235,510

DATE DRILLED: February 5, 1993
EQUIPMENT USED: 2' X 5'- Hand Auger
TIME DRILLED: Start: 7:00 am; Finish: 10:00 am
ELEVATION 602

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
600	0			12.8	107	30	SM ML
				—	—	30 for 4"	SM GP
	5			—	—	30 for 6"	
595							
	10						
590							
	15						

ARTIFICIAL FILL (af) (to 2-1/2')
SILTY SAND and SANDY SILT - fine to medium, about 20% Gravel and Cobbles (to 6" in size), brown

OLDER ALLUVIUM (Qalo)
SILTY SAND and SANDY GRAVEL - fine to coarse, some Cobbles, dark brown
Few Boulders (to 24" in size)

(BORING TERMINATED AT A DEPTH OF 6' DUE TO DIFFICULT DRILLING IN COBBLES AND BOULDERS)

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 50 lbs.; Stroke = 16"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.75

JOB L92045.AE4 DATE 1/19/93 F.T. AR DR. lk O.E. MS CHKD BK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 76

Coordinates
N-4,153,135
E-4,235,950

DATE DRILLED: January 5, 1993
EQUIPMENT USED: 18" - Diameter Bucket
TIME DRILLED: Start: 7:45 am; Finish: 2:30 pm
ELEVATION 610

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
		10		7.1	102	4		SM ML	ARTIFICIAL FILL (af) (to 8') SILTY SAND and SANDY SILT - fine to medium, about 10% Gravel and Cobbles (to 2" in size), pieces of brick, plastic and glass, dark brown
		15		7.7	116	2			
605	5			5.7	115	9			About 20% Gravel and Cobbles (to 11" in size) Few Boulders (to 23" in size)
		15		5.2	118	15		SP	OLDER ALLUVIUM (Qalo) SAND - fine to medium, some coarse, about 20% Gravel and Cobbles (to 10" in size), light brown
600	10								
						30 for 9"		SW	SAND - well graded, some Gravel, Cobbles, and Boulders, light brown
		5		1.6	124				
595	15								

NOTE: Water not encountered. Raveling from 3-1/2' to 9' (to 5' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: = 785 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.76

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 77

DATE DRILLED: January 8 and 11, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:30 am; Finish: 12:30 pm (1/8)
Start: 7:10 am; Finish: 10:30 am (1/11)

ELEVATION 635

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
				21.3	100	5		ML
				16.3	109	6		CL
630	5			20.5	112	9		
								SM
625	10			7.6	114	19		
						for 9"		SP SM
620	15	5		7.8	119	24		
615	20			8.2	119	30		
						for 10"		
610	25			7.6	128	32		
605	30			7.3	129	40		

ARTIFICIAL FILL (af) (to 3')
SANDY SILT - some Clay, few Gravel, pieces of glass

OLDER ALLUVIUM (Qalo)
SILTY CLAY - brown
(LL = 38; PI = 17)

SILTY SAND - fine to coarse, about 15% Gravel and Cobbles (to 8" in size), greyish brown

SAND and SILTY SAND - fine to coarse, about 25% Gravel and Cobbles (to 8" in size), light brown

(BORING TERMINATED ON 1-8-93 AT A DEPTH OF 11' DUE TO DIFFICULTY WITH MINI BUCKET. THE BORING WAS FINISHED USING SHORT BOOM BUCKET ON 1-11-93)

NOTE: Water seepage encountered at a depth of 21-1/2'. Slight raveling from 7' to 11' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 10' = 785 lbs.; 10' to 19' = 745 lbs.; 19' to 27' = 416 lbs.
Below 27' = 656 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.77

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. k O.E. MS CHKD DJC

BORING 78

DATE DRILLED: December 3, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:00 am; Finish: 11:30 am
ELEVATION 650

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				13.3	100	3	
		10		16.2	117	7	
645	5						
		5		17.6	112	4	
		10		17.7	106	4	
				17.2	113	4	
640	10						
635	15	15		19.8	103	5	
630	20	10		5.6	114	18	

ML SM — ARTIFICIAL FILL (af) (to 1-1/2')
SANDY SILT and SILTY SAND - fine to medium, few Gravel and Cobbles, brown

ML — OLDER ALLUVIUM (Qalo)
SANDY SILT - brown

CL — SILTY CLAY - some Sand, brown
(LL = 38; PI = 17)

SM — SILTY SAND - fine to medium, some Gravel and Cobbles, brown

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: = 1,680 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.78

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. k O.E. MS CHKD

BORING 79

Coordinates
N-4,153,845
E-4,239,635

DATE DRILLED: January 11, 1993
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 12:25 pm; Finish: 1:45 pm
ELEVATION 664

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		5		9.2	102	1	
660				13.9	115	3	
	5			12.7	112	3	
655				15.0	115	9	
	10						
650		15		6.7	105	16	
	15						
645		5		10.3	102	30	
	20						

SM ML 4" Asphaltic Paving
ARTIFICIAL FILL (af) (to 3')
SILTY SAND and SANDY SILT - fine to medium, brown

ML OLDER ALLUVIUM (Qalo)
SANDY SILT - brown
Lenses of Silty Sand

Some Gravel

SM SILTY SAND - fine to medium, some Gravel, light brown

Thin layer of Sandy Silt

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 10' = 1,039 lbs.; 10' to 19' = 745 lbs.; Below 19' = 416 lbs.
Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.79

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD BK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 80

Coordinates
N-4,154,815
E-4,240,470

DATE DRILLED: January 11, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:45 am; Finish: 12:25 pm
ELEVATION 682

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
680	0			13.3	112	1		SM ML	ARTIFICIAL FILL (af) (to 3') SILTY SAND and SANDY SILT - about 15% Gravel and Cobbles (to 8" in size), brown
				14.6	113	< 1		ML	OLDER ALLUVIUM (Qalo) SANDY SILT - brown
	5			14.9	113	< 1			Thin layers of Silty Sand
675		10		12.7	118	1			Some Gravel and Cobbles
		5		14.8	109	1			
	10								
670								SM	SILTY SAND - fine to medium, light brown
		5		14.1	119	11			
	15								
665								SP	SAND - fine to medium, light brown
		5		4.3	122	40			
	20							SW	SAND - well graded, about 15% Gravel and Cobbles, light brown
660									
								SP	SAND - fine to medium, some Gravel, light brown
	25	10		4.1	99	12			

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 10' = 1,039 lbs.; 10' to 19' = 745 lbs.
Below 19' = 416 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.80

BORING 81

DATE DRILLED: December 4, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 7:30 am; Finish: 9:00 am
ELEVATION 690

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
								ML SM	6" Asphaltic Paving ARTIFICIAL FILL (af) (to 5') SANDY SILT and SILTY SAND - fine to medium, brown
		240		10.5	117	4			
		80		11.7	92	6			
685	5	110		10.0	121	5		SM	OLDER ALLUVIUM (Qalo) SILTY SAND - fine to medium, some Gravel, grey
		200		8.6	118	6			Fine to coarse
680	10	25		8.2	110	6		SP	SAND - fine to medium, some coarse, few Gravel, light greyish brown
								SW	SAND - well graded, about 15% Gravel and Cobbles, light greyish brown
675	15	40		7.8	124	10			
								ML	SANDY SILT - light brown
670	20	30		10.1	120	8		SM	SILTY SAND - fine to medium, light brown

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,600 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. k O.E. MS CHKD BK 1/3

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.81

BORING 82

DATE DRILLED: January 8, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 12:30 pm
ELEVATION 697

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
695								GP	ARTIFICIAL FILL (af) (to 9-1/2') GRAVEL - some Sand
	5			12.9	105	7		ML	SANDY SILT - light brown
690				12.4	120	10			
	10			11.9	119	5		SM	OLDER ALLUVIUM (Qalo) SILTY SAND - fine to medium, some Gravel, light brown
685		5		12.0	123	11			
	15							SW	SAND - well graded, about 20% Gravel and Cobbles, light brownish grey
680		15		5.5	119	25			
	20			6.8	120	35			
675				11.5	116	30			
	25	5		6.4	130	50 for 10"			
670									
	30			19.3	108	11		ML	SANDY SILT - light brown
665									Layer of well graded Sand and Gravel
	35								Some Clay
660		10		11.7	122	40			
	40							SW	SAND - well graded, about 10% Gravel, light brown

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. GMC DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.82a

JOB L92045.AE4 DATE 1/20/93 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 82 (Continued)

DATE DRILLED: January 8, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 12:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
655		25		7.2	122	50 for 9"	
	45			6.2	134	70 for 10"	
650							
	50	5		13.9	115	35	
645							
	55	10		8.5	129	60 for 10"	
640							
	60	15		4.5	120	60 for 11"	
635							
	65						

ML SANDY SILT - few Gravel, light brown

SM SILTY SAND - fine to medium, some Gravel, light brown

NOTE: Drilling mud used in drilling process. Mud removed at completion of drilling. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.82b

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

BORING 83

Coordinates
N-4,156,825
E-4,242,290

DATE DRILLED: December 4, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:00 am; Finish: 12:15 pm
ELEVATION 733

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
730	0			10.6	111	3	
		10		7.8	100	3	
	5	20		8.2	118	8	
725		20		12.0	102	6	
	10	15		9.6	115	12	
720							
	15	40		11.0	113	9	
715							
	20	35		11.7	115	10	
710							
	25	50		14.2	113	6	
705							
	30	40		9.1	113	50 for 10"	

ML — ARTIFICIAL FILL (af) (to 6')
SANDY SILT - pieces of asphaltic paving, some Siltstone and Sandstone fragments, few rootlets, brown

SM — TERRACE DEPOSITS (Qt)
SILTY SAND - fine, about 10% Gravel, light brown

TOPANGA FORMATION (Ttss)
INTERBEDDED SANDSTONE and SILTSTONE - fine grained, well bedded, tan and grey

SILTSTONE - few Sandstone interbeds, very fine grained, well bedded, brown and grey

Interbedded Siltstone and Sandstone - fine grained, well bedded, brown and grey

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. No caving.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 26' = 1,680 lbs.; Below 26' = 800 lbs.
Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.83

BORING 84

Coordinates
N-4,157,500
E-4,242,195

DATE DRILLED: December 3, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:30 am; Finish: 9:40 am
ELEVATION 740

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		5		4.9	106	4	
		15		6.0	111	7	
735	5			13.8	111	7	
		15		5.2	103	5	
		10		19.3	102	7	
730	10						
		5		5.0	124	15	
725	15						
		20		6.9	111	16	
720	20						
		35		4.2	114	12	
715	25						
		15		3.3	122	30 for 8"	
710	30						

SM

ARTIFICIAL FILL (af) (to 2')
SILTY SAND - fine to medium, about 20% Gravel and Cobbles, pieces of brick and concrete, light brown

SM

TERRACE DEPOSITS (Qt)
SILTY SAND - fine, brown

TOPANGA FORMATION (Ttss)
SANDSTONE - fine to coarse grained, conglomerate interbeds, Pebbles and Cobbles (up to 8"), poorly bedded, light greyish brown

Sandstone interbeds, fine grained, thinly bedded

NOTE: Water not encountered. Slight raveling from 11' to 30'.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 26' = 1,680 lbs.; Below 26' = 800 lbs.
Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.84

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 85

Coordinates
N-4,158,175
E-4,242,605

DATE DRILLED: November 30, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 1:30 pm; Finish: 3:35 pm
ELEVATION 747

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
745				15.2	109	9	
				13.8	110	3	
	5			9.1	117	7	
740				3.0	105	9	
				3.6	133	15	
	10						
735							
				7.2	126	25	
	15						
730						25 for 7"	
	20			6.1	118		

ML
SM

ARTIFICIAL FILL (af) (to 1')
SANDY SILT - 3" asphaltic paving, brown

TERRACE DEPOSITS (Qt)
Silty Sand - fine to medium, some iron staining, grey

About 25% Gravel, few Cobbles (to 12" in size), yellowish brown

TOPANGA FORMATION (Ttcg)
SANDSTONE - fine to medium grained, poorly bedded, light brownish yellow

NOTE: Water not encountered. Slight raveling from 9-1/2' to 12' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.85

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD BJK QB

BORING 86

DATE DRILLED: December 1, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 8:40 am; Finish: 10:50 am
ELEVATION 764

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
		10		9.6	105	6		ML SM	ARTIFICIAL FILL (af) (to 2') SANDY SILT and SILTY SAND - fine, few Gravel, brown
				9.8	129	9		SC	OLDER ALLUVIUM (Qalo) CLAYEY SAND - fine to medium, dark brownish grey
760	5			11.0	121	10		SM	SILTY SAND - fine to meidum, about 20% Gravel and Cobbles (to 9" in size), light brownish grey
		10		5.9	121	10			
755		15		5.3	103	5		SP	SAND - fine to medium, light brown
	10								Layer of Sandy Silt
750		30		6.2	107	7			Layer of Silty Sand
	15							SW	SAND - well graded, some Silt, about 25% Gravel and Cobbles (to 8" in size), light brown
745		45		3.7	120	14			
	20								
740		15		4.6	126	14			
	25								Layer of Silt
								SP	SAND - fine to medium, light brown
735		60		16.6	109	16		SM	SILTY SAND - fine to medium, light brownish grey
	30								

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

NOTE: Water not encountered. No caving.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 26' = 1,680 lbs.; Below 26' = 840 lbs.
Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.86

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD GB BJK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 87

DATE DRILLED: December 1, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:55 am; Finish: 2:10 pm
ELEVATION 769

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
		30		10.1	103	3		ML SM / SM
765		15		7.9	99	1		
	5	5		19.4	105	2		CL
		10		17.0	106	7		
760		5		4.9	109	25		SM
	10							
755		35		7.0	117	8		SW
	15							
750		60		4.4	109	8		
	20							
745		40		4.9	117	8		
	25							
740		125		5.6	122	25		
	30							

ARTIFICIAL FILL (af) (to1')
SANDY SILT and SILTY SAND - fine to medium, pieces of brick, few roots, brown

OLDER ALLUVIUM (Qalo)
SILTY SAND - fine to medium, some Gravel and Cobbles, brown

SILTY CLAY - some Sand, grey

(LL = 39; PI = 20)
Light grey

SILTY SAND - fine to medium, about 15% Gravel and Cobbles (to 6" in size), light grey

SAND - well graded, some Gravel, light brown

About 25% Gravel and Cobbles

Lenses of fine Sand

Light grey

Less Cobbles

NOTE: Water not encountered. No caving.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.
Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.87

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. k O.E. MS CHKD DK 1/3

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 88

Coordinates
N-4,162,900
E-4,243,025

DATE DRILLED: December 2, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 12:45 pm; Finish:1:55 pm
ELEVATION 803

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				10.6	116	5		SM ML	ARTIFICIAL FILL (af) (to 2-1/2') SILTY SAND and SANDY SILT - dark brown
800				13.4	123	5		SC	OLDER ALLUVIUM (Qalo) CLAYEY SAND - fine to medium, about 10% Gravel and Cobbles (to 8" in size), brown
	5			4.6	122	5		SW	SAND - well graded, few Gravel and Cobbles, some Silt, brown
795				4.6	116	5			
	10	35		8.7	126	12			About 15% Gravel and Cobbles (to 11" in size)
790									Lenses of Silty Sand and Sandy Silt
	15			7.2	125	5			Light brown

NOTE: Water not encountered. Slight raveling from 6' to 9' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.88

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 89

Coordinates
N-4,164,005
E-4,242,990

DATE DRILLED: December 2, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 10:30 am; Finish:12:40 pm
ELEVATION 822

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
820	0			5.3	100	4		SM	ARTIFICIAL FILL (af) (to 1-1/2") SILTY SAND - fine to medium, pieces of concrete, brown
				2.4	106	3		SM	OLDER ALLUVIUM (Qalo) SILTY SAND - fine to medium, about 20% Gravel and Cobbles (to 9" in size), light greyish brown
	5			3.0	111	5		SW	SAND - well graded, few Gravel and Cobbles, some Silt, light brown
815				0.8	113	3			
	10			12.0	108	2			
810									
	15			8.3	104	5			Layer of Silty Sand
805									
	20	5		10.4	110	5			
800									
	25	10		5.1	116	16			
795								SP	SAND - fine to medium, few Gravel, brown
	30	5		9.7	95	8			Fine Sand

NOTE: Water not encountered. Slight raveling from 3' to 7' (to 5' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 24' = 1,680 lbs.; Below 24' = 840 lbs.
Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.89

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD 2/3/93

BORING 90

Coordinates
N-4,164,650
E-4,243,010

DATE DRILLED: December 2, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 6:45 am; Finish: 10:30 am
ELEVATION 830

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		5		10.7	103	1	
				6.5	113	2	
825	5	10		9.4	118	2	
				12.0	104	1	
820	10	5		11.4	117	3	
815	15	5		7.8	113	4	
810	20	5		10.7	94	12	
805	25			6.7	117	6	
800	30	10		6.1	125	22	
795	35	5		5.5	109	14	
790	40	15		4.2	122	17	

ML SM

ARTIFICIAL FILL (af) (to 2')
SANDY SILT and SILTY SAND - fine to medium, some Gravel and Cobbles, brown

SW

OLDER ALLUVIUM (Qalo)
SAND - well graded, about 20% Gravel and Cobbles (to 12" in size), light brown

Thin layers of Silty Sand and fine Sand, less Gravel and Cobbles

Lenses of Sandy Silt

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

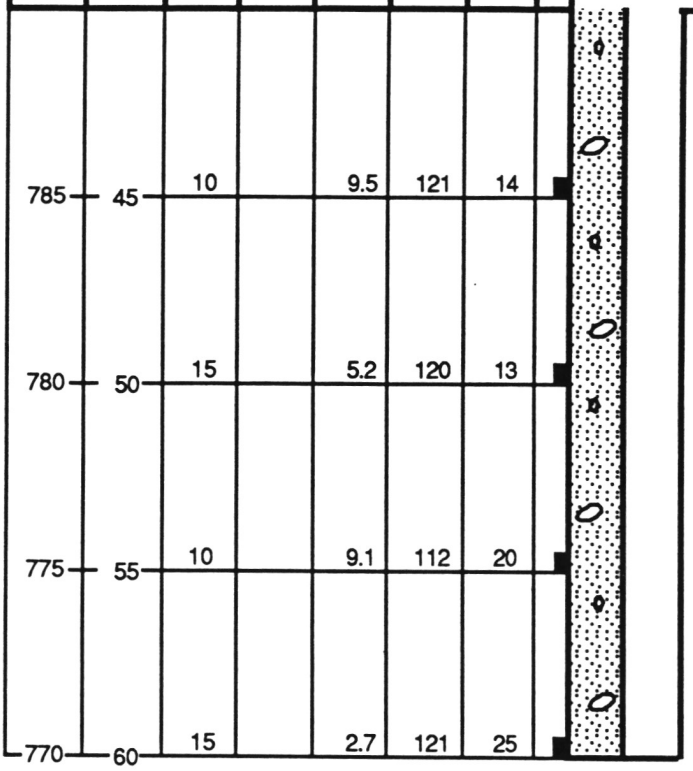
LAW/CRANDALL, INC.

PLATE A - 1.90a

BORING 90 (Continued)

DATE DRILLED: December 2, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 6:45 am; Finish: 10:30 am

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
785	45	10		9.5	121	14	
780	50	15		5.2	120	13	
775	55	10		9.1	112	20	
770	60	15		2.7	121	25	



Layer of Silty Sand and fine Sand

NOTE: Water not encountered. Raveling from 2-1/2' to 5-1/2' (to 2-1/2' in diameter).

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.
Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD DK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.90b

BORING 91

DATE DRILLED: February 12, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 12:10 pm
ELEVATION 844

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				8.8	111	12		SM	3-1/2" Asphaltic Paving ARTIFICIAL FILL (af) (to 6-1/2') SILTY SAND - fine to coarse, brown
840				11.6	121	14			
	5			13.9	117	14			
				5.7	132	18		SW	OLDER ALLUVIUM (Qalo) SAND - well graded, about 20% Gravel, light brown
835									
	10			23.2	90	7		ML	SANDY SILT - light brown
830									
	15			15.3	103	12		SM	SILTY SAND - fine to medium, brown
825									
	20			12.2	110	20		SP SM	SAND and SILTY SAND - fine, light brown About 30% Gravel
820									
	25			5.1	116	60 for 10"		SP	SAND - fine to coarse, about 10% Gravel, light brown
815									
	30			6.9	127	100 for 5"		SW	SAND - well graded, brown
810								ML	SANDY SILT - brown
	35			7.0	125	100 for 10"		SW	SAND - well graded, about 20% Gravel, light brown
805									
	40								

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.91a

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 91 (Continued)

DATE DRILLED: February 12, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 12:10 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				6.4	94	75	■		Less Gravel
800	45			4.4	119	100 for 11"	■		Thin layer of fine Sand
795	50			4.2	105	50	■	SM	SILTY SAND - fine, light brown
790	55	5		12.4	109	60	■		
785	60			9.9	119	55	■		
780	65								

NOTE: Drilling mud used in drilling process. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 400 lbs; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.91b

BORING 92

DATE DRILLED: January 11, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 12:00 pm
ELEVATION 846

JOB L92045.AE4 DATE 1/20/93 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
845				13.4	103	4		SM	3" Concrete ARTIFICIAL FILL (af) (to 3-1/2') SILTY SAND - fine to medium, dark brown
	5			12.0	102	4		SM	OLDER ALLUVIUM (Qalo) SILTY SAND - fine to medium, few Gravel, brown
840				12.2	114	12			About 20% Gravel
	10		9						Less Gravel
835				15.8	109	16			
	15	10	20						
830		5		7.9	120	33		SW	SAND - well graded, about 10% Gravel, light brown
825	20								
	25	5	65						
820		25		9.5	125	100 for 10"			Some Cobbles
	30	10	100						Layer of fine to coarse Silty Sand
815				5.2	122	75 for 8"			
	35								Layer of Silty Sand
810		15	65 35 for 2"						
	40								

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.92a

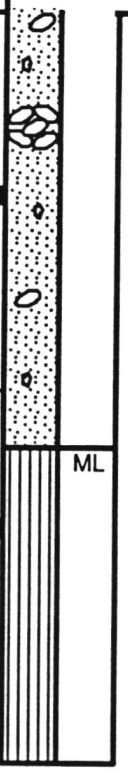
JOB L92045.AE4 DATE 1/20/93 F.T. GMC DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 92 (Continued)

DATE DRILLED: January 11, 1993
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 12:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
805							
	45	5		5.3	132	60 for 8"	
800							
	50	5	55 45 for 3"				
795		10		9.9	111	40	
	55						
790							
	60			16.1	118	45	



Layer of Cobbles

Thin layers of Silty Sand

ML

SANDY SILT - light brown

NOTE: Drilling mud used in drilling process. Mud removed at completion of drilling. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.92b

BORING 93

DATE DRILLED: January 20, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 4:30 pm
ELEVATION 877

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									5" Asphaltic Paving - 4-1/2" Base Course
875		5		7.6	96	3	■	SM	TERRACE DEPOSITS (Qt) SILTY SAND - fine to medium, some coarse, about 15% Gravel and Cobbles (to 7" in size), dark brown
		15		8.3	109	2	■	SW	SAND - well graded, about 20% Gravel and Cobbles (to 12" in size), light brown
	5			11.0	113	2	■		Thin layers of Silty Sand
870									
	10	20		13.8	104	3	■		
865									About 15% Gravel and Cobbles
	15	15		12.0	105	3	■	ML	SANDY SILT - light brown
860									
	20	5		12.5	110	5	■		Layer of Silty Sand
855								SW	SAND - well graded, thin layers of Silty Sand, about 20% Gravel and Cobbles (to 10" in size), light brown
	25			5.0	107	6	■		
850									About 15% Gravel and Cobbles
	30			5.4	118	16	■		
845									
	35			6.2	107	14	■		Thin layers of fine to medium Sand
840									
	40			5.2	109	17	■		

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD SF

LOG OF BORING

LAW/CRANDALL, INC.

BORING 93 (Continued)

DATE DRILLED: January 20, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 4:30 pm

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD BJK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
835	45			5.6	108	14	
830							
	50			2.8	115	17	
825							
	55			6.6	114	18	
820							
	60			2.9	116	9	
815							
	65			3.6	119	24	
810							
	70			4.1	107	14	
805							
	75			3.4	108	14	
800							
	80			25.4	99	5	

Layer of Silty Sand

NOTE:
Water not encountered. Raveling from 3' to 79' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Between 25' and 50' = 840 lbs.; Between 50' and 75' = 1,640 lbs. Below 75' = 1,740 lbs.; Stroke = 12"

20" Boulder

SM SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 8" in size), light brown

ML SANDY SILT - brown

SP SAND - fine to medium, light greyish brown

ML SANDY SILT - brown

SP SAND - fine to coarse, light brown

ML SANDY SILT - brown

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.93b

BORING 94

DATE DRILLED: December 8, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:35 am; Finish: 10:18 am
ELEVATION 840

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									4" Asphaltic Paving - 8" Base Course
		5		8.8	111	6		SM	TERRACE DEPOSITS (Qt) SILTY SAND - fine to medium, brown
		5		3.3	113	12		SW	SAND - well graded, about 15% Gravel and Cobbles, light brown
835	5	5		3.4	118	8			
		10		3.9	110	6			
		5		3.8	121	8			
830	10								Layer of Silty Sand
				0.7	117	14			About 25% Gravel and Cobbles (to 12" in size)
825	15					for 10"			
				4.1	128	21			
820	20								
						15 for 10"			
		15		5.7	115				
815	25								A Boulder
		15		16.5	104	18		SM	SILTY SAND - fine, light brown
810	30								

NOTE: Water not encountered. Raveling from 3' to 29' (to 2-1/2' in diameter).

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.
Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.94

BORING 95

DATE DRILLED: December 8, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 10:20 am; Finish: 11:40 am
ELEVATION 829

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									5" Asphaltic Paving - 3" Base Course
				9.9	115	4		SM	ARTIFICIAL FILL (af) (to 3') SILTY SAND - fine to medium, brown
825				4.1	106	6 for 8"		SP	TERRACE DEPOSITS (Qt) SAND - fine to coarse, about 10% Gravel and Cobbles, light greyish brown
	5			3.5	120	10			
				3.0	109	7			
820		5		14.6	106	8			
	10							SM	SILTY SAND - fine, brown Layer of fine Sand
815									
	15	5		8.1	102	8			

NOTE: Water not encountered. No caving.

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.95

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 96

DATE DRILLED: December 8, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 11:40 am; Finish: 12:40 pm
ELEVATION 825

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				5.7	102	5		SP	3-1/2" Asphaltic Paving - 3" Base Course TERRACE DEPOSITS (Qt) SAND - fine to medium, light brown
				11.5	102	5		SM	SILTY SAND - fine, light brown
820	5	5		9.6	101	7			Fine to medium
		5		14.9	102	5			Some coarse Sand
815	10	5		9.4	115	7			
								SW	SAND - well graded, about 10% Gravel and Cobbles, light brown
810	15			3.2	120	14			

NOTE: Water not encountered. No caving.

*Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 1,680 lbs. Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.96

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

BORING 97

DATE DRILLED: December 8, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 1:33 pm; Finish: 2:30 pm
ELEVATION 823

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
820	0			12.0	113	6	SM ML
		5		5.2	100	4	SP
	5			12.1	97	5	SM
815		5		3.3	126	12	SW
	10	5		4.4	115	25	
810							
	15	10		4.5	118	12	

4" Asphaltic Paving - 3-1/2" Base Course

ARTIFICIAL FILL (af) (to 2')

SILTY SAND and SANDY SILT - fine to medium, brown

TERRACE DEPOSITS (Qt)

SAND - fine to medium, light brown

SILTY SAND - fine, light brown

SAND - well graded, about 15% Gravel and Cobbles, light brown

Lenses of fine Sand

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

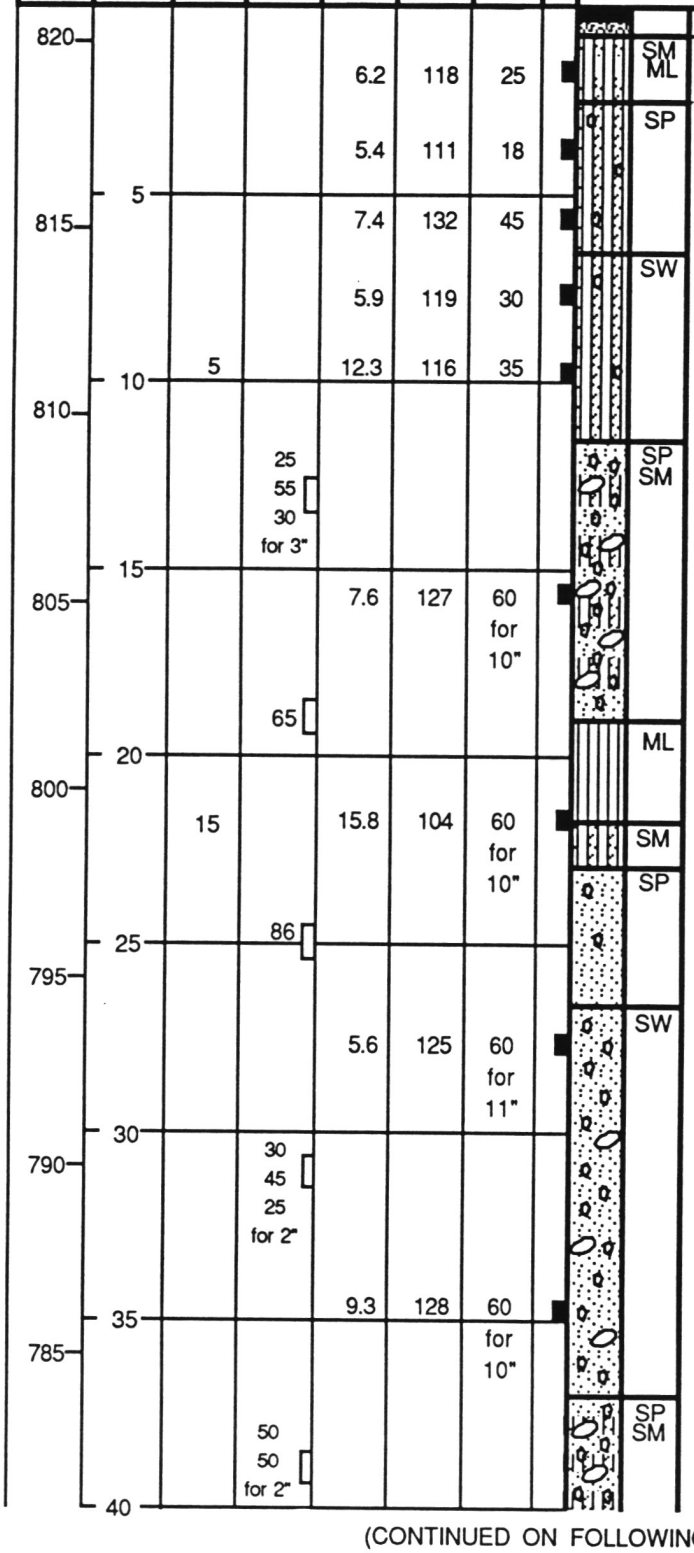
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.97

BORING 98

DATE DRILLED: December 10, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm
ELEVATION 821



4" Asphaltic Paving - 3" Base Course

ARTIFICIAL FILL (af) (to 2-1/2')

SILTY SAND and SANDY SILT - fine to medium, brown

TERRACE DEPOSITS (Qt)

SAND - fine to medium, some coarse, some Gravel, light brown

SAND - well graded, about 10% Gravel, light brown

SAND and SILTY SAND - fine to coarse, about 40% Gravel and Cobbles, light brown

SANDY SILT - brown

SILTY SAND - fine to medium, light brown

SAND - fine to medium, about 10% Gravel, light brown

SAND - well graded, about 25% Gravel, light brown

Few Cobbles

SAND and SILTY SAND - fine to coarse, about 25% Gravel and Cobbles, light brown

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.98a

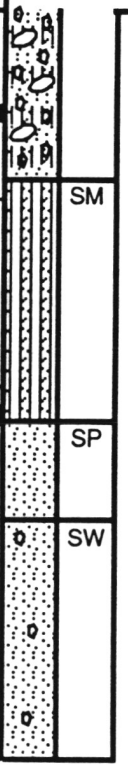
JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 98 (Continued)

DATE DRILLED: December 10, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 7:00 am; Finish: 1:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
780				5.5	119	65 for 10"	
	45						
775			54				
	50	15		16.5	105	50 for 10"	
770							
	55		100				
765						75 for 10"	
	60	5		5.9	120		



More Cobbles

SM SILTY SAND - fine, brown

SP SAND - fine to medium, light brown

SW SAND - well graded, about 10% Gravel, light brown

NOTE: Drilling mud used in drilling process. Mud removed to a depth of 57' after completion of drilling. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 24"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.98b

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 99

DATE DRILLED: December 9, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 7:18 am; Finish: 8:49 am
ELEVATION 822

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
820				5.5	129	6	
		10		4.5	103	5	
	5						
		5		14.4	98	5	
815		5		15.5	97	5	
		5		10.6	116	9	
	10						
810							
		5		8.9	108	8	
	15						

3" Asphaltic Paving - 3" Base Course

SM — ARTIFICIAL FILL (af) (to 2-1/2')
SILTY SAND - fine to medium, some Gravel and Cobbles, brown

SM — TERRACE DEPOSITS (Qt)
SILTY SAND - fine to meddium, some Gravel, brown

Fine to coarse Sand

SP — SAND - fine to medium, about 20% Gravel and Cobbles (to 6" in size), light brown

NOTE: Water not encountered. Raveling from 12' to 14' (to 2' in diameter).

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.99

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. lk O.E. MS CHKD JK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 100

DATE DRILLED: December 9, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 8:50 am; Finish: 10:15 am
ELEVATION 826

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
825		65		11.1	117	12	
		10		6.3	110	8	
	5						
820		15		20.0	104	2	
		20		12.5	109	4	
		15		5.4	112	5	
	10						
815							
		30		8.9	115	6	
	15						

SM ML — 4" Asphaltic Paving - 3" Base Course
ARTIFICIAL FILL (af) (to 9-1/2')
SILTY SAND and SANDY SILT - fine to medium, about 20% Gravel and Cobbles (to 6" in size), pieces of metal, asphaltic paving, and wood, light brown and dark brown

SW — TERRACE DEPOSITS (Qt)
SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), light brown

Layer of fine Sand

NOTE: Water not encountered. Slight raveling from 4' to 6' (to 1-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.100

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 101

DATE DRILLED: December 9, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 10:20 am; Finish: 11:35 am
ELEVATION 834

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		35		8.3	126	8	
830		80		10.8	111	2	
	5	40		12.8	108	3	
		35		12.3	108	4	
825		55		7.1	109	3	
	10						
820		10		6.5	119	6	
	15						

4" Asphaltic Paving - 5" Base Course

SM ML — ARTIFICIAL FILL (af) (to 7-1/2')
SILTY SAND and SANDY SILT - fine to medium, about 10% Gravel and Cobbles, pieces of metal pipe and brick, brown

Light brown

SM — TERRACE DEPOSITS (Qt)
SILTY SAND - fine to coarse, about 10% Gravel and Cobbles (to 8" in size), light brown

SW — SAND - well graded, about 20% Gravel and Cobbles, light brown

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.101

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. lk O.E. MS CHKD 03 2K

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 102

DATE DRILLED: January 15, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 8:30 am; Finish: 9:30 am
ELEVATION 818

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
				15.0	105	1		SM	ARTIFICIAL FILL (af) (to 3') SILTY SAND - fine, some Gravel and Cobbles, pieces of charcoal and glass, dark brown
815		15		14.0	105	< 1		ML	TOPSOIL SANDY SILT - some rootlets, dark brown
	5	10		12.4	117	< 1		ML	TERRACE DEPOSITS (Qt) SANDY SILT - about 10% Gravel, light brown
810									
	10	15		12.4	115	4			Lenses of Silty Sand
805									
	15	30		11.2	112	4		SM	SILTY SAND - fine, light brown

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.102

JOB L92045.AE4 DATE 1/5/93 F.T. SEJ DR. k O.E. MS CHKD DJC

BORING 103

DATE DRILLED: December 9, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 12:20 pm; Finish: 1:38 pm
ELEVATION 843

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				5.8	123	7	
840		15		6.4	117	7	
	5	15		11.0	118	6	
835		30		8.9	124	7	
	10	30		8.8	121	8	
830							
	15	10		10.2	124	4	

4" Asphaltic Paving - 4" Base Course

SM

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to coarse, about 20% Gravel and Cobbles, pieces of decayed wood, brown

Pieces of brick

Lenses of Sandy Silt

Some Cobbles (to 9" in size)

More pieces of brick

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.103

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD

BORING 104

DATE DRILLED: December 9, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 1:38 pm; Finish: 2:45 pm
ELEVATION 844

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		35		7.7	122	10	
840		50		7.5	116	5	
	5						
		35		6.8	120	4	
		15		4.9	121	7	
835		40		5.0	124	7	
	10						
830		35		9.2	114	6	
	15						



4-1/2" Asphaltic Paving - 4" Base Course

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 6" in size), pieces of brick, asphaltic paving, and wood, brown and dark brown

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.104

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD BK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 105

DATE DRILLED: December 10, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 6:50 am; Finish: 8:22 am
ELEVATION 844

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		45		8.2	117	8	
840		100		6.3	118	6	
	5						
		35		11.7	125	4	
		75		8.4	121	5	
835		40		8.5	121	6	
	10						
830							
	15	80		7.3	119	5	

SM

4" Asphaltic Paving - 4" Base Course

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to coarse, about 15% Gravel and Cobbles, mottled brown

Dark brown

Pieces of brick, some odor

Lenses of Sandy Silt and Clayey Silt

Pieces of glass, some odor

More pieces of brick

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.105

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD DK 1/13

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 106

DATE DRILLED: December 10, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 8:22 am; Finish: 9:40 am
ELEVATION 842

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
840		40		6.7	129	14	
		110		6.8	122	7	
	5	100		9.9	116	3	
835		45		5.8	126	7	
		30		9.3	112	3	
	10						
830							
	15	40		8.1	125	5	



SM

5" Asphaltic Paving - 4" Base Course

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 6" in size), few pieces of brick , brown

More Cobbles (to 10" in size)

More pieces of brick

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.106

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD DK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 107

DATE DRILLED: December 10, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 9:40 am; Finish: 11:10 am
ELEVATION 840

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		25		7.9	126	12	
		15		10.8	113	3	
835	5	20		8.5	118	4	
		10		11.5	117	6	
830	10	35		5.8	124	6	
825	15	20		10.4	119	6	

4" Asphaltic Paving - 4" Base Course

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to coarse, about 15% Gravel and Cobbles (to 5" in size), light brown to brown — SM

Dark brown

Pieces of wood

Large piece of concrete

NOTE: Water not encountered. Raveling from 7' to 11' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.107

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 108

DATE DRILLED: December 10, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 12:20 pm; Finish: 2:15 pm
ELEVATION 837

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
835		10		5.9	119	6	
		5		7.9	113	6	
	5	5		3.7	127	7	
830		20		11.1	115	7	
	10	5		7.5	120	9	
825							
	15	5		9.5	121	10	



5" Asphaltic Paving - 4" Base Course

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 6" in size), brown

(ENCOUNTERED LARGE PIECES OF CONCRETE MOVED BORING 1-1/2' TO THE EAST)

About 30% Gravel

NOTE: Water not encountered. Slight raveling from 3' to 4' (to 2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.108

BORING 109

DATE DRILLED: December 11, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 6:45 am; Finish: 10:00 am
ELEVATION 833

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. k O.E. MS CHKD DK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
830	0			8.0	113	4	SM
				10.6	118	6	
	5			11.6	118	5	
825				10.2	112	2	
				19.9	115	3	
	10						
820							
	15	15		7.6	109	7	
815							
	20			9.7	115	6	
810							
	25			9.0	119	4	ML
805							
	30			11.7	91	2	SM
800							SP
	35			2.9	111	6	
795							
	40			7.8	118	14	SM

5-1/2" Asphaltic Paving - 5" Base Course

ARTIFICIAL FILL (af) (to 30')

SILTY SAND - fine to coarse, about 20% Gravel and Cobbles (to 6" in size), brown

Pieces of concrete, brick, and wire, few Cobbles (to 8" in size)

More pieces of concrete

Dark brown

NOTE:
Water not encountered. Raveling from 8' to 8-1/2' and from 35' to 39' (to 3' in diameter).

*Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.
Below 25' = 840 lbs.; Stroke = 12"

Large chunks of concrete

14" Boulder

SANDY SILT - few pieces of brick, some odor, grey

Strong odor, dark brown, about 10% Gravel

Some roots

TERRACE DEPOSITS (Qt)

SILTY SAND - fine to medium, about 10% Gravel, brown

SAND - fine to coarse, about 20% Gravel and Cobbles (to 5" in size), light brown

About 30% Gravel

SILTY SAND - fine to medium, about 10% Gravel, light brown

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.109

BORING 110

DATE DRILLED: December 14, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 8:37 am
ELEVATION 824

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
								6" Asphaltic Paving - 3-1/2" Base Course
		15		7.2	117	6	SM	ARTIFICIAL FILL (af) (to 15')
820		25		7.7	118	6		SILTY SAND - fine to coarse, about10% Gravel and Cobbles (to 6" in size), pieces of asphaltic paving, brown
	5	15		9.3	117	4		
		10		9.7	111	3		Few pieces of brick
815		20		9.5	119	5		Dark brown
	10							Layer of Sandy Silt, few roots, slight odor
810		10		7.8	126	8		Large roots, strong odor
	15							

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. k O.E. MS CHKD RB BJK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.110

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. k O.E. MS CHKD BK 1/13

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 111

DATE DRILLED: December 14, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 8:37 am; Finish: 9:46 am
ELEVATION 815

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		5		9.7	125	9	
				9.2	121	5	
810	5	30		9.7	119	2	
		5		8.8	114	6	
805	10	25		8.8	117	4	
800	15	15		7.5	100	6	



4-1/2" Asphaltic Paving -5" Base Course

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to coarse, about 10% Gravel and Cobbles (to 5" in size), few pieces of asphaltic paving and roots, brown

Lenses of Sandy Silt

About 20% Gravel and Cobbles (to 10" in size)

Pieces of brick and wood, some roots

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.111

JOB L92045.AE4 DATE 1/28/93 F.T. AR DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 112

DATE DRILLED: January 15, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 8:15 am
ELEVATION 782

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
780				11.7	119	2	
		20		9.3	105	< 1	
	5						
		30		10.2	105	1	
775		15		6.8	114	1	
		15		7.9	110	1	
	10						
770							
		5		2.6	123	8	
	15						

4" Asphaltic Paving - 10" Base Course

SM / ML — ARTIFICIAL FILL (af) (to 3')
SILTY SAND and SANDY SILT - fine to medium, about 20% Gravel and Cobbles, pieces of brick, dark brown

SM — TERRACE DEPOSITS (Qt)
SILTY SAND - fine to medium, some Gravel, brown
About 15% Gravel and Cobbles

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

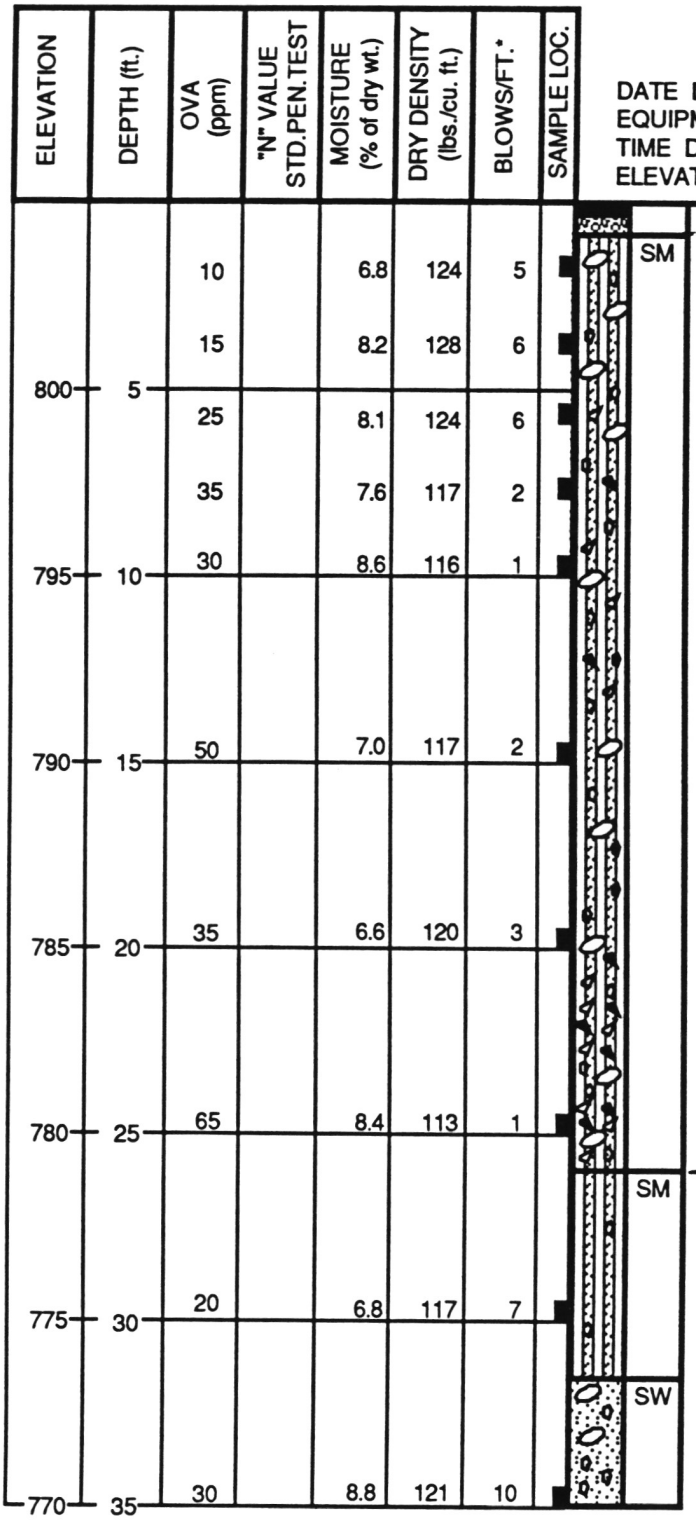
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.112

BORING 113

DATE DRILLED: December 14, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 9:46 am; Finish: 2:30 pm
ELEVATION 805



ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		10		6.8	124	5	
		15		8.2	128	6	
800	5	25		8.1	124	6	
		35		7.6	117	2	
795	10	30		8.6	116	1	
790	15	50		7.0	117	2	
785	20	35		6.6	120	3	
780	25	65		8.4	113	1	
775	30	20		6.8	117	7	
770	35	30		8.8	121	10	

4-1/2" Asphaltic Paving - 4-1/2" Base Course

SM — ARTIFICIAL FILL (af) (to 26')
SILTY SAND - fine to coarse, about 20% Gravel and Cobbles, light brown to brown

Pieces of asphaltic paving and concrete

Some Cobbles (to 6" in size)
Some roots, few pieces of wood
About 20% Gravel and Cobbles (to 8" in size)

Pieces of decayed wood and metal, some odor, grey and dark brown

Large amount of debris, odorous

SM — TERRACE DEPOSITS (Qt)
SILTY SAND - fine to medium, about 10% Gravel, brown

Some rootlets

SW — SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), brown
Layer of Silty Sand

NOTE: Water not encountered. Slight raveling from 23' to 24' and from 33' to 34' (to 1-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. k O.E. MS CHKD

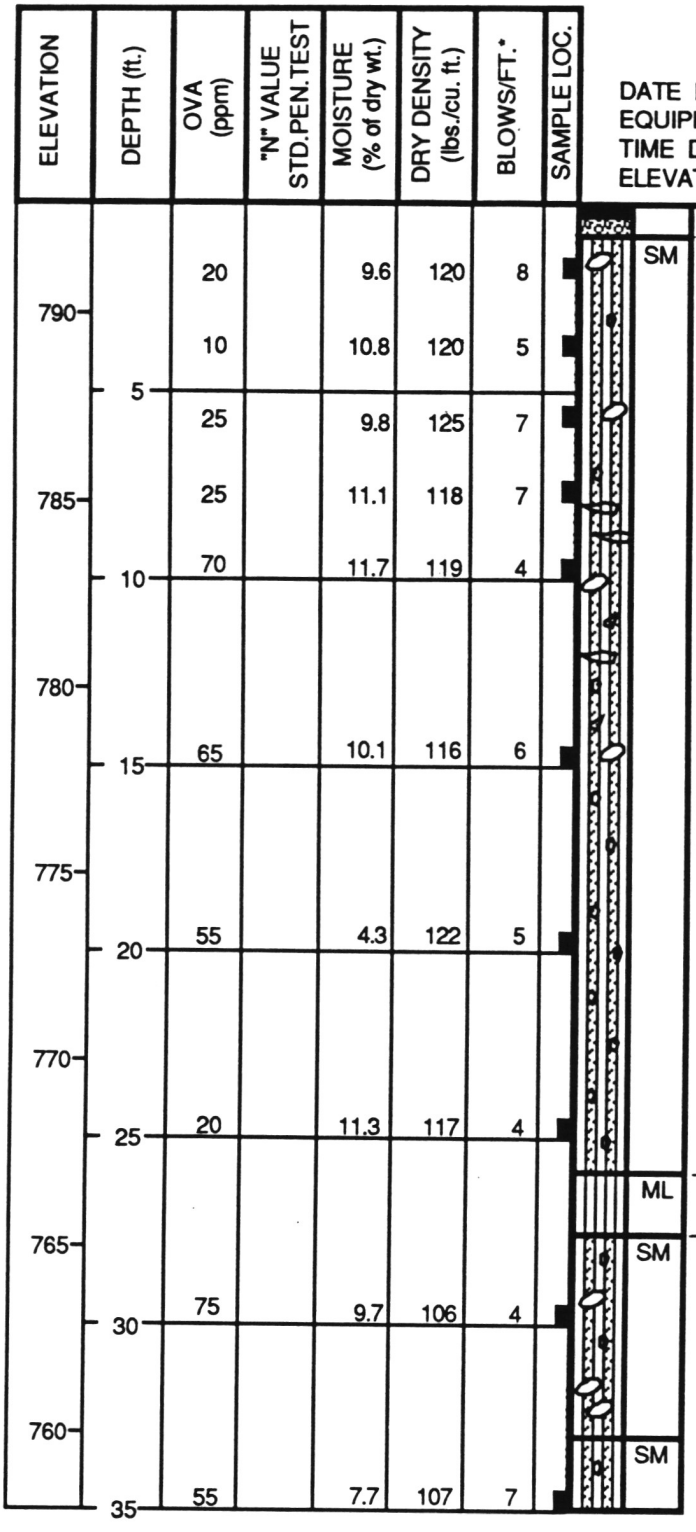
LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.113

BORING 114

DATE DRILLED: December 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 9:30 am
ELEVATION 793



ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		20		9.6	120	8	
790		10		10.8	120	5	
	5	25		9.8	125	7	
785		25		11.1	118	7	
	10	70		11.7	119	4	
780							
	15	65		10.1	116	6	
775							
	20	55		4.3	122	5	
770							
	25	20		11.3	117	4	
765							
	30	75		9.7	106	4	
760							
	35	55		7.7	107	7	

5" Asphaltic Paving - 4" Base Course

SM — ARTIFICIAL FILL (af) (to 26')
SILTY SAND - fine to medium, some coarse, about 10% Gravel and Cobbles (to 6" in size), brown

Thin layers of Sandy Silt

Some pieces of wood

Pieces of glass

Fine to coarse Sand, about 20% Gravel, dark brown

ML — TOPSOIL
SANDY SILT - dark brown

SM — TERRACE DEPOSITS (Qt)
SILTY SAND - fine to medium, about 10% Gravel and Cobbles, brown

More Cobbles

SM — SILTY SAND - fine to medium, about 10% Gravel, brown

NOTE: Water not encountered. Slight raveling from 33' to 34' (to 2-1/2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 24' = 1,680 lbs.; Below 24' = 840 lbs.; Stroke = 12"

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. k O.E. MS CHKD DK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.114

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. k O.E. MS CHKD

BORING 115

DATE DRILLED: December 15, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 9:30 am; Finish: 11:00 am
ELEVATION 775

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				12.0	118	6	
		25		9.2	124	8	
770	5	15		10.8	119	3	
		40		11.9	112	1	
		5		15.0	120	5	
765	10						
		60		8.0	131	7	
760	15						

5-1/2" Asphaltic Paving - 4" Base Course

SM

ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to medium, about 10% Gravel and Cobbles (to 6" in size), brown
Lenses of Clayey Silt

Layer of Sandy Silt, pieces of brick and concrete, some roots, some odor, dark brown

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.115

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. k O.E. MS CHKD BK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 116

Coordinates
N-4,167,470
E-4,260,630

DATE DRILLED: December 15, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 12:55 pm; Finish: 2:20 pm
ELEVATION 762

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
760		20		9.1	123	9	
		25		9.2	118	5	
	5	10		9.1	129	5	
755		15		11.4	120	6	
	10	25		10.7	116	5	
750							
	15	45		10.0	123	5	

4" Asphaltic Paving - 4" Base Course

SM ARTIFICIAL FILL (af) (to 15')

SILTY SAND - fine to medium, about 10% Gravel and Cobbles, brown

Pieces of brick, dark brown

About 15% Gravel

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.116

BORING 117

Coordinates
N-4,166,975
E-4,261,195

DATE DRILLED: December 16, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:00 am; Finish: 10:15 am
ELEVATION 750

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
				10.1	125	8	
		45		10.4	119	7	
745	5			12.4	119	4	
		30		10.8	117	4	
		50		13.0	120	3	
740	10						
		60		10.4	117	3	
735	15						
		70		12.1	117	3	
730	20						
		20		9.9	127	6	
725	25						
		35		11.6	117	10	
720	30						
		5		1.9	110	8	
715	35						
				2.1	115	10	
710	40						

5" Asphaltic Paving - 4-1/2" Base Course

SM

ARTIFICIAL FILL (af) (to 34')

FILL - SILTY SAND - fine to medium, about 10% Gravel and Cobbles, brown

Pieces of Concrete and wood, dark brown

More pieces of wood, some odor

Debris (including pieces of wood, concrete, and asphaltic paving) from 13' to 34'

SW

ALLUVIUM (Qal)

SAND - well graded, about 20% Gravel and Cobbles (to 6" in size), light brownish grey

NOTE:
Water not encountered. Caving from 35' to 39' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.
Below 25' = 840 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. k O.E. MS CHKD JSK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.117

BORING 118

Coordinates
N-4,166,910
E-4,261,685

DATE DRILLED: January 19, 1993
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:30 am; Finish: 10:45 am
ELEVATION 712

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.		
									8" Asphaltic Paving - 8" Base Course
710				2.9	112	5		SP	ARTIFICIAL FILL (af) (to 6-1/2') SAND - fine to coarse, about 10% Gravel and Cobbles, dark grey Pieces of brick Lenses of Silty Sand
				4.7	113	2			
	5			8.7	110	2			
705				3.7	115	5		SP	ALLUVIUM (Qal) SAND - fine to coarse, about 15% Gravel and Cobbles (to 8" in size), light brown
				3.5	113	6			
	10								
700									
				6.4	112	3			
	15								
695									
				11.2	120	3			
	20								
690									
				4.2	118	9			
	25								
685									
	30	10		4.6	120	30			

NOTE: Water seepage encountered at a depth of 19'. Raveling from 7' to 29' (to 3' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.; Stroke = 12"

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 2/15/93 F.T. AR DR. lk O.E. MS CHKD

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.118

BORING 119

Coordinates
N-4,166,345
E-4,262,340

DATE DRILLED: December 11, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 12:30 pm
ELEVATION 725

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
		5		10.8	123	22		SM ML — 3-1/2" Asphaltic Paving - 3" Base Course ARTIFICIAL FILL (af) (to 26-1/2') SILTY SAND and SANDY SILT - fine to medium, about 10% Gravel, light brown
		5		11.6	119	17		
720	5			12.2	120	18		
				8.5	124	30		SM — SILTY SAND - fine to coarse, about 5% Gravel, light brown
715	10			10.8	130	35		
			48					
710	15			9.9	117	30		
			52					
705	20			8.7	123	28		Layer of Sand
		15	13					Pieces of wood, some roots
700	25			4.5	117	18		SW — ALLUVIUM (Qal) SAND - well graded, about 20% Gravel, light brownish grey
								SM — SILTY SAND - fine, grey
695	30		54					
690	35			8.7	115	14		Fine to medium Sand, some coarse
		5	30					
685	40							

(CONTINUED ON FOLLOWING PLATE)

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. k O.E. MS CHKD BK

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.119a

JOB L92045.AE4 DATE 1/20/93 F.T. AR DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 119 (Continued)

DATE DRILLED: December 11, 1992
EQUIPMENT USED: 5" - Diameter Rotary Wash
TIME DRILLED: Start: 6:30 am; Finish: 12:30 pm

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
				5.3	108	37	■	SW — SAND - well graded, about 20% Gravel and Cobbles, light brownish grey
								Layer of fine Sand
680	45		75					
675	50			4.2	128	75 for 10"	■	About 30% Gravel
670	55			3.7	111	75	■	Some lenses of fine Sand
665	60			5.5	128	40	■	

NOTE: Drilling mud used in drilling process. Mud removed to a depth of 57' after completion of drilling. Water level not established.

* Number of blows required to drive Law/Crandall Sampler 12". Driving Weight = 400 lbs.; Stroke = 18"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.119b

BORING 120

Coordinates
N-4,166,240
E-4,263,365

DATE DRILLED: December 17, 1992
EQUIPMENT USED: 24" - Diameter Bucket
TIME DRILLED: Start: 7:15 am; Finish: 10:15 am
ELEVATION 709

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. k O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.
		40		7.8	121	5	SM
705		20		8.5	119	12	
	5	75		8.9	126	7	
		40		3.8	115	9	
700		85		9.7	115	5	
	10						
695		65		5.2	114	8	
	15						
690		30		17.0	99	1	
	20						
685		20		8.8	108	4	
	25						SP
680		50		3.9	109	7	SW
	30						
675		30		10.2	109	15	
	35						

6" Asphaltic Paving - 3-1/2" Base Course
ARTIFICIAL FILL (af) (to 26')
SILTY SAND - fine to medium, about 10% Gravel and Cobbles (to 6" in size), brown

Pieces of asphaltic paving

Fine to coarse Sand

Some pieces of brick

Some odor, dark grey

Large amount of debris

Light brown

Light grey

ALLUVIUM (Qal)
SAND - fine to medium, light greyish brown

SAND - well graded, about 20% Gravel and Cobbles, light greyish brown

Layer of Sandy Silt
Layer of Silty Sand

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight: 0' to 25' = 1,680 lbs.; Below 25' = 840 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.120

JOB L92045.AE4 DATE 1/20/93 F.T. SEJ DR. k O.E. MS CHKD DK

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 121

Coordinates
N-4,166,295
E-4,264,365

DATE DRILLED: December 16, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 10:15 am; Finish: 11:02 am
ELEVATION 690

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
		45		8.3	118	7		5-1/2" Asphaltic Paving - 5" Base Course
							SM	ARTIFICIAL FILL (af) (to15')
		40		10.1	121	6		SILTY SAND - fine to medium, some Gravel and Cobbles, brown
685	5							
		35		8.6	117	5		Brown and dark brown
		50		10.2	119	3		Pieces of asphaltic paving and rebar
680	10	50		8.8	101	1		
675	15	10		2.7	115	3	SW	SAND - well graded, about 20% Gravel, light grey

NOTE: Water not encountered. No caving.

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.121

JOB L92045.AE4 DATE 1/5/93 F.T. AR DR. lk O.E. MS CHKD

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

BORING 122

DATE DRILLED: December 16, 1992
EQUIPMENT USED: 16" - Diameter Bucket
TIME DRILLED: Start: 12:05 pm; Finish: 1:30 pm
ELEVATION 678

ELEVATION	DEPTH (ft.)	OVA (ppm)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FT.*	SAMPLE LOC.	
								6" Asphaltic Paving - 5-1/2" Base Course
								ARTIFICIAL FILL (af) (to 15')
		10		9.2	125	5		SM ML — SILTY SAND and SANDY SILT - fine to medium, about 10% Gravel and Cobbles, brown to dark brown
675				11.4	125	3		
	5			15.1	113	< 1		
670		25		10.1	111	3		Layer of Sand
	10	10		2.4	114	4		SP — SAND - fine to coarse, about 20% Gravel and Cobbles, light brown
665								
	15	5		2.2	120	6		

NOTE: Slight water seepage (perched water) encountered at a depth of 5'. Raveling from 7' to 14' (to 2' in diameter).

* Number of blows required to drive Law/Crandall Sampler 12".
Driving Weight = 1,680 lbs.; Stroke = 12"

LOG OF BORING

LAW/CRANDALL, INC.

PLATE A - 1.122

JOB L92045.AE4 DATE 11/4/92 DR. lk O.E. MS CHKD

LAW/CRANDALL SAMPLING:

6 ▮ Indicates depth at which undisturbed sample obtained.

5 □ Indicates depth at which sampler was driven but no recovery.

└— Number of blows required to drive Law/Crandall Sampler 12" unless noted otherwise. Blows/ft. and driving weight are indicated on boring logs.

STANDARD PENETRATION TEST:

8 □ Indicates depth at which test performed.

└— Number of blows "N" required to drive standard penetration sampler for last 12" when driven a total of 18". When sampler is driven less then 18", the number of blows for each complete 6" increment and per each partial increment is reported.
Driving weight = 140 lbs.; Stroke = 30"

DATUM:

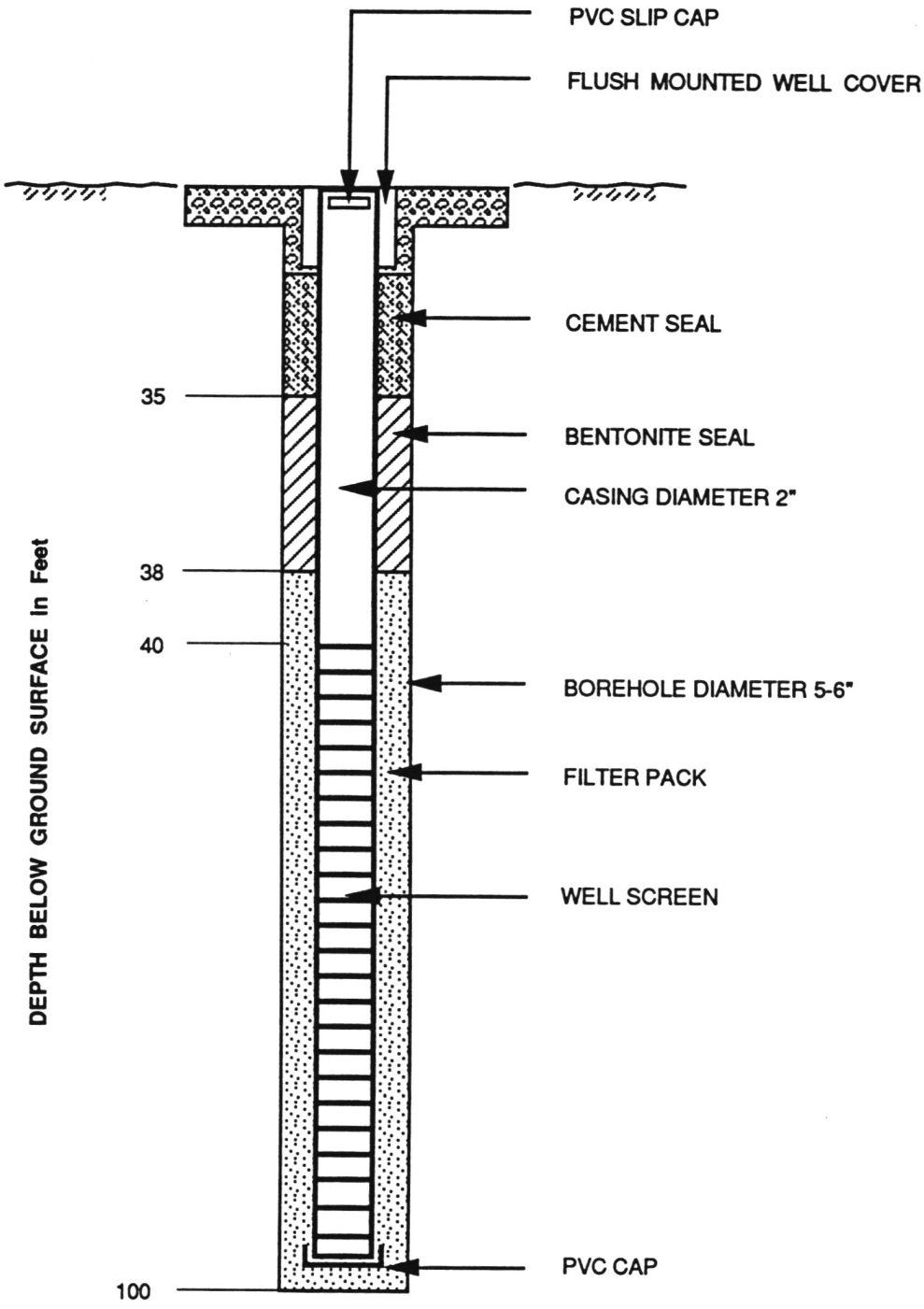
Elevations and Coordinates refer to datum of Plan and Profile Drawings provided by the Rail Construction Corporation.

CLASSIFICATION SYSTEM:

Soils classified according to the Unified Soil Classification System (Plate A-2).

KEY TO LOGS OF BORINGS

JOB L92045.AEF4 DATE 5/22/92 W.P. ph S.G. BM CHKD HAS



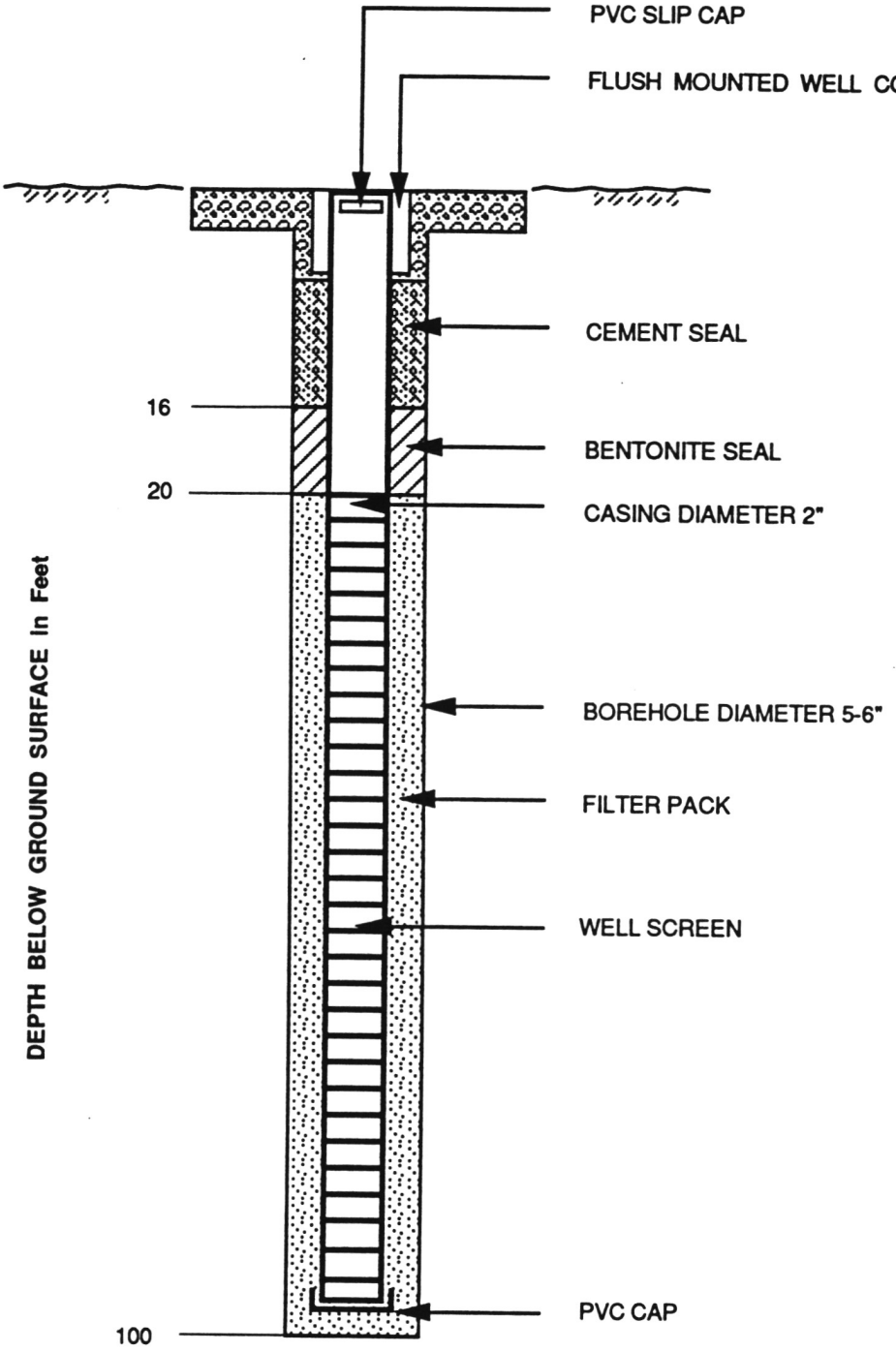
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 1

LAW/CRANDALL, INC.

PLATE A-1.124

JOB L92045.AE4 DATE 5/22/92 W.P. ph S.G. BM CHKD KAS



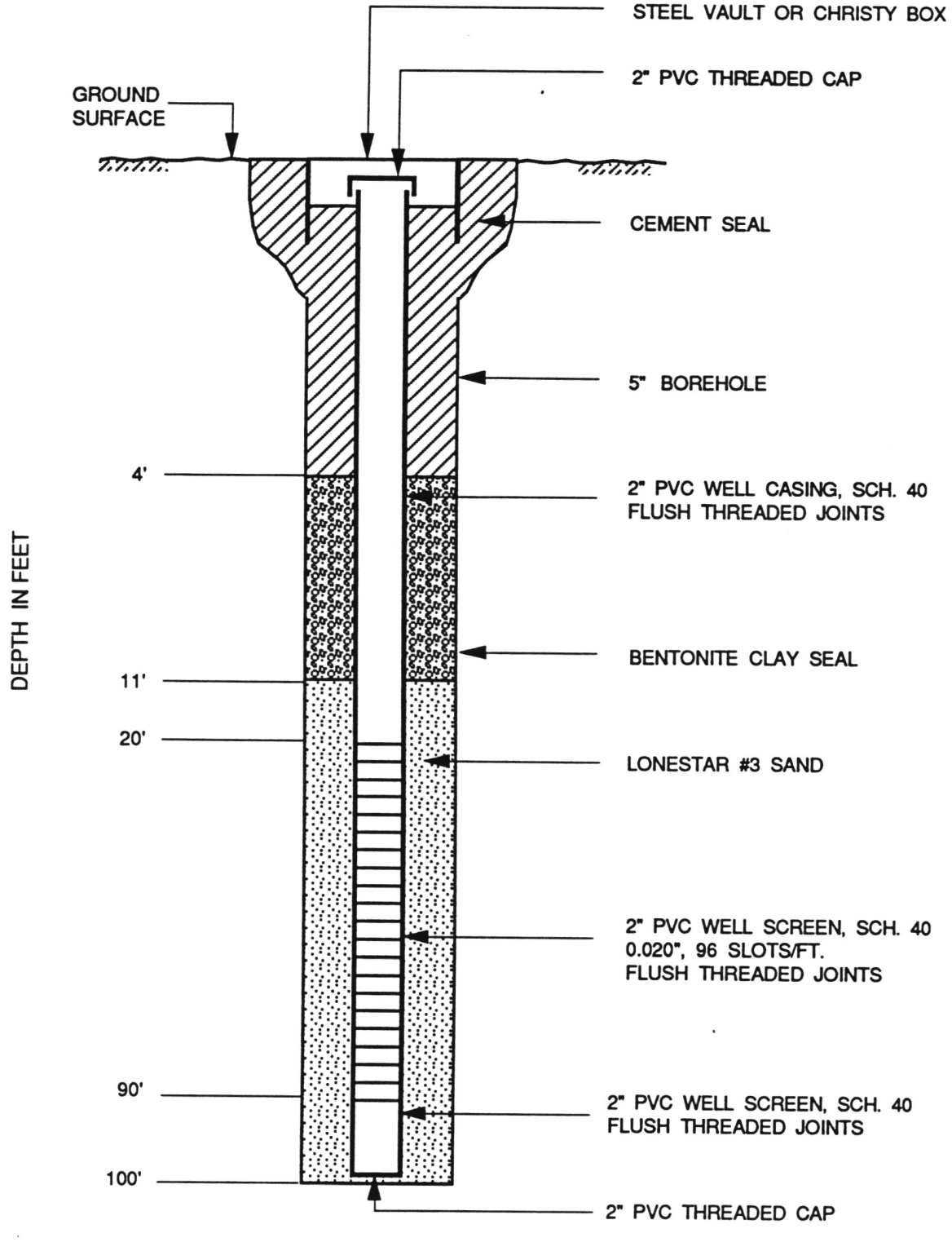
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORINGS 3 and 10

LAW/CRANDALL, INC.

PLATE A-1.125

JOB 192045.AE4 DATE 9/30/92 DR. lk S.G. HS CHKD



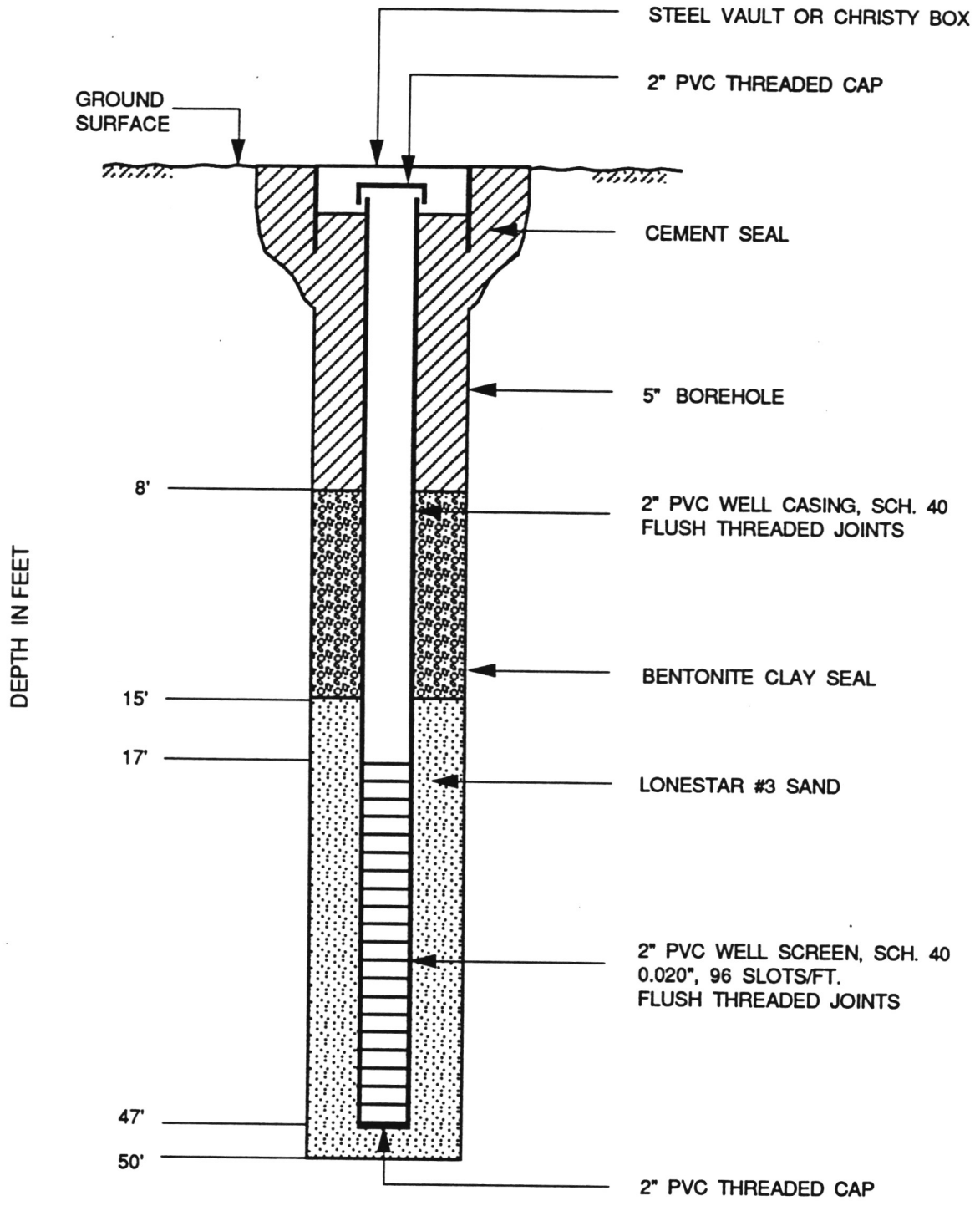
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 11

LAW/CRANDALL, INC.

PLATE A-1.126

JOB L92045.AE4 DATE 9/30/92 DR. lk S.G. HS CHKD HAS



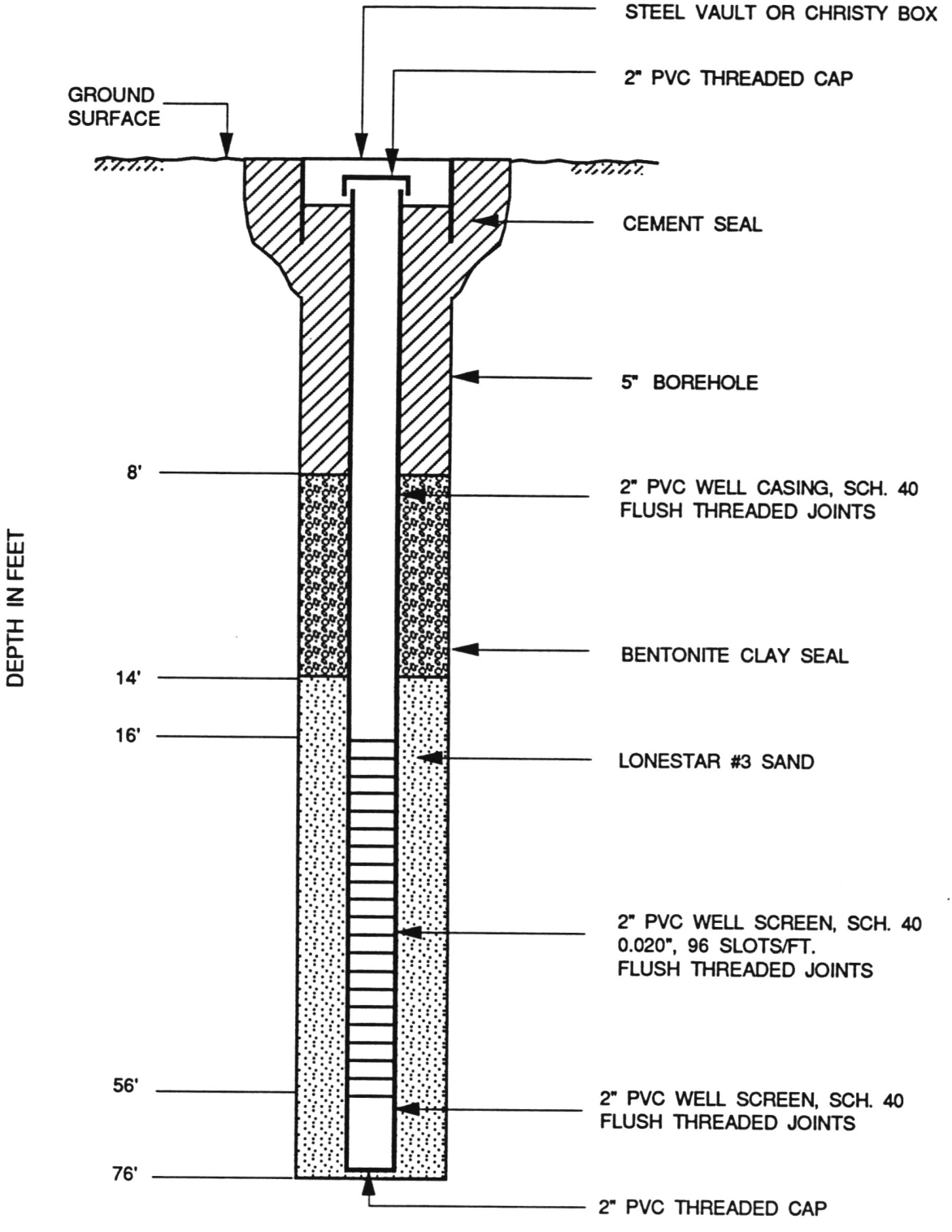
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 13

LAW/CRANDALL, INC.

PLATE A-1.127

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD MW



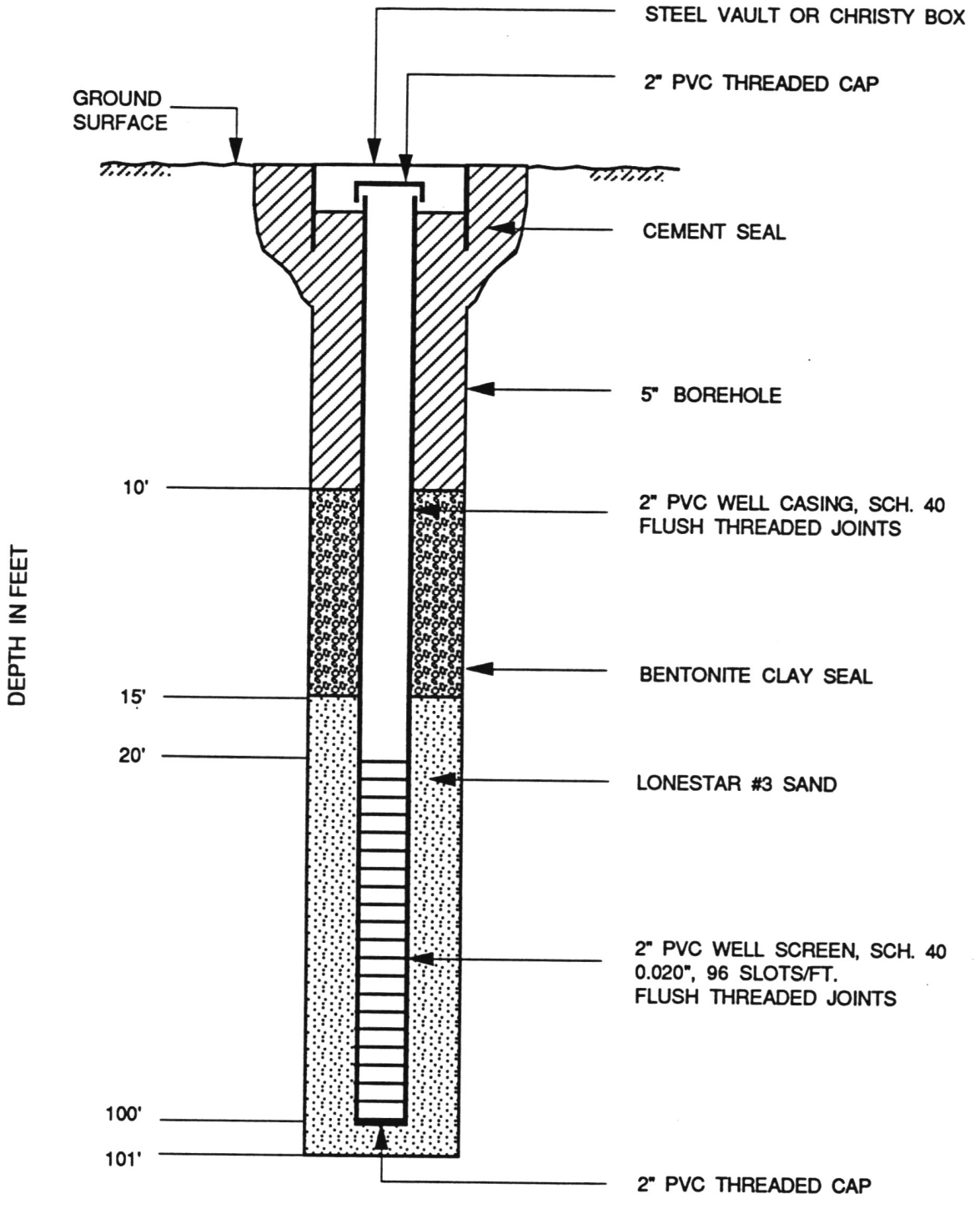
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 33

LAW/CRANDALL, INC.

PLATE A-1.128

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD HMS



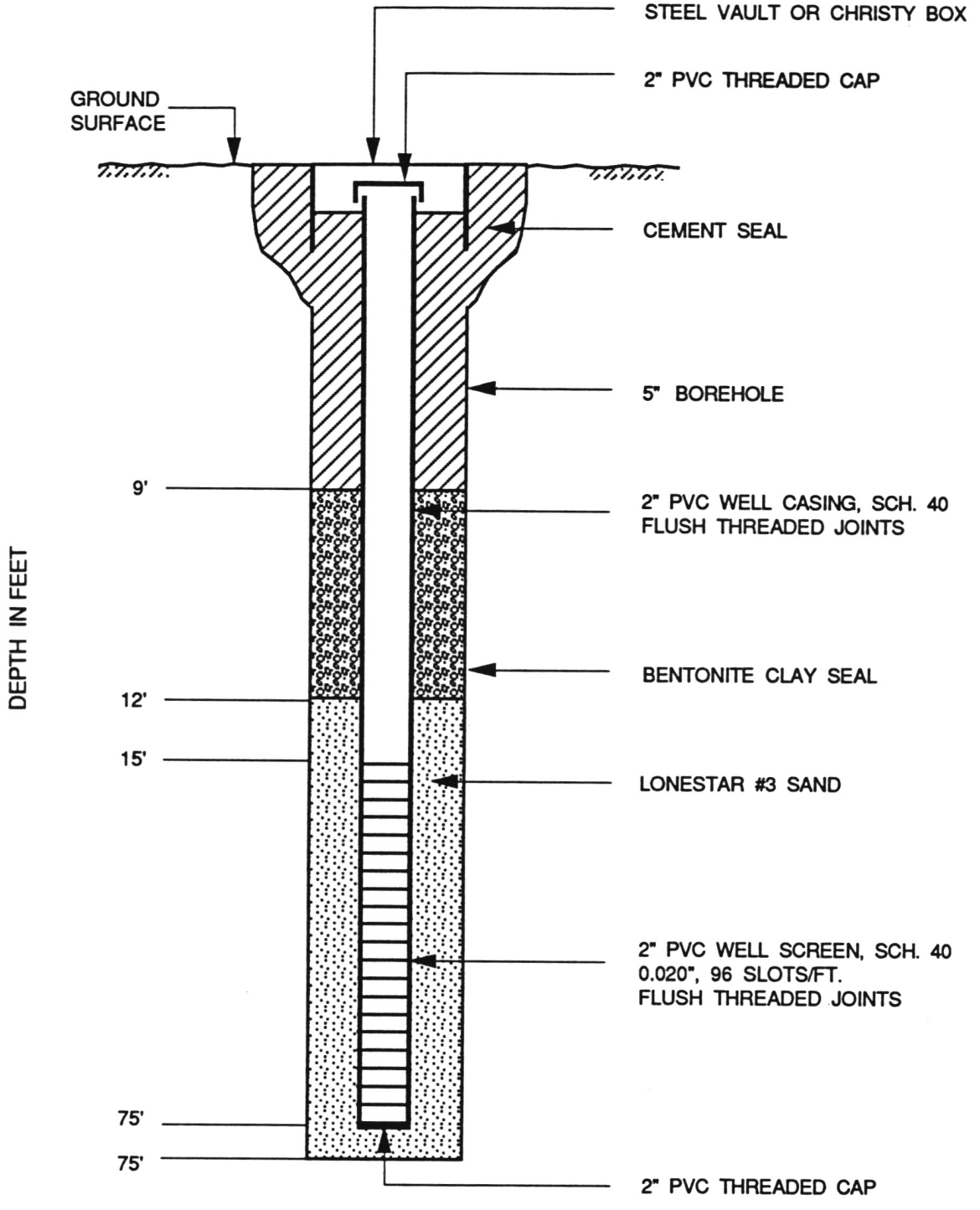
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 34

LAW/CRANDALL, INC.

PLATE A-1.129

JOB 192045.AE4 DATE 9/30/92 DR. lk S.G. HS CHKD HAS



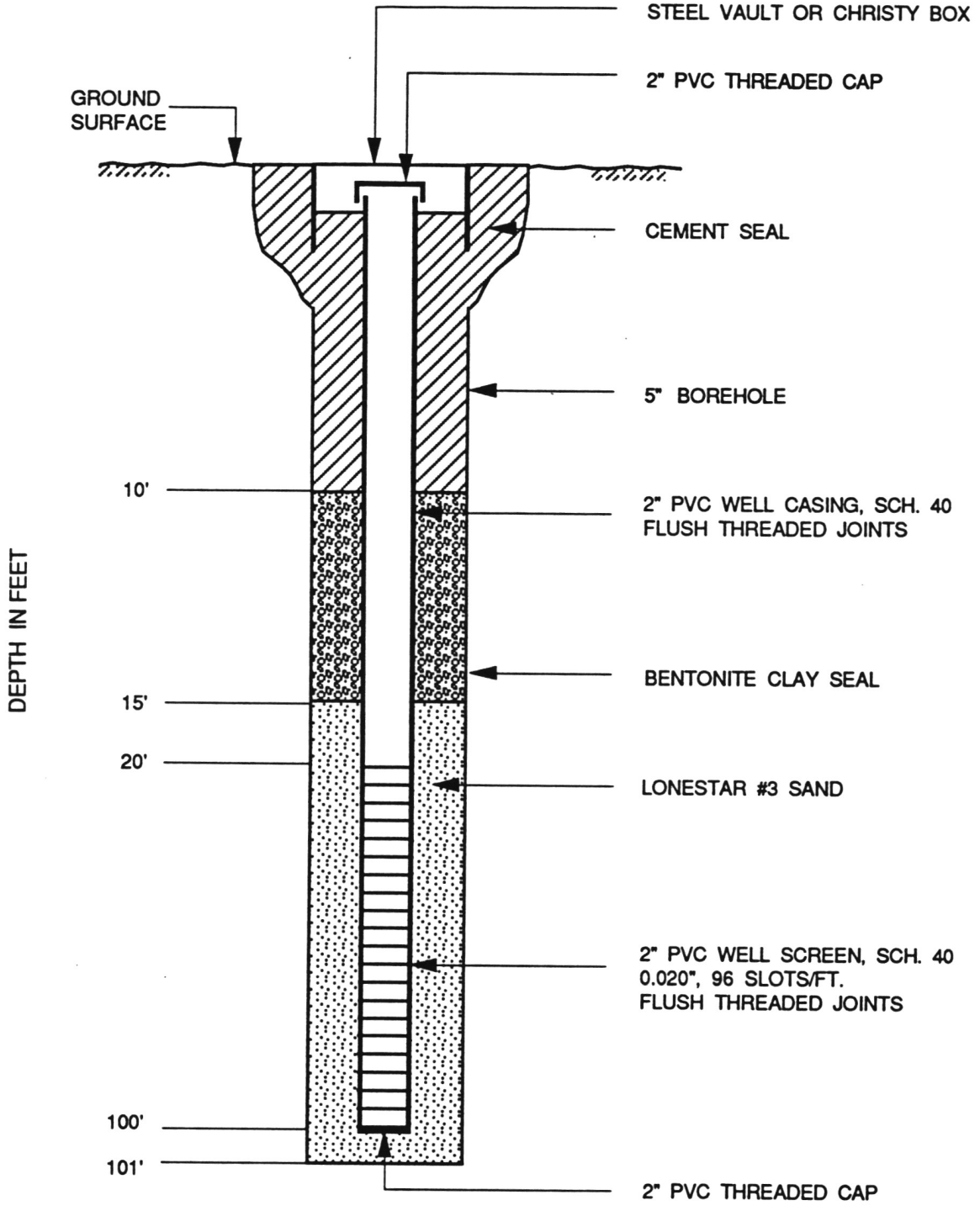
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 35

LAW/CRANDALL, INC.

PLATE A-1.130

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD HAS



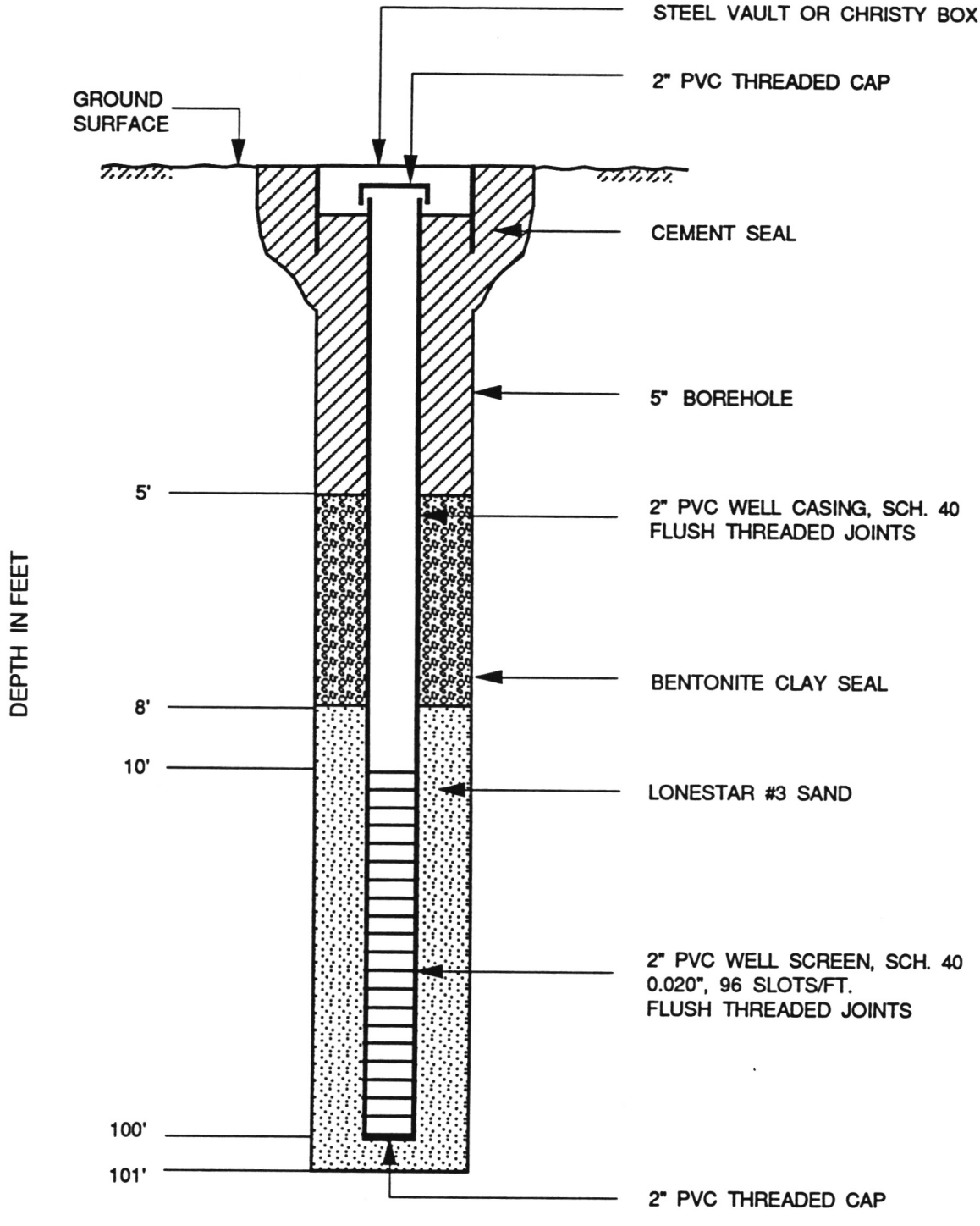
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 36

LAW/CRANDALL, INC.

PLATE A-1.131

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD HMS



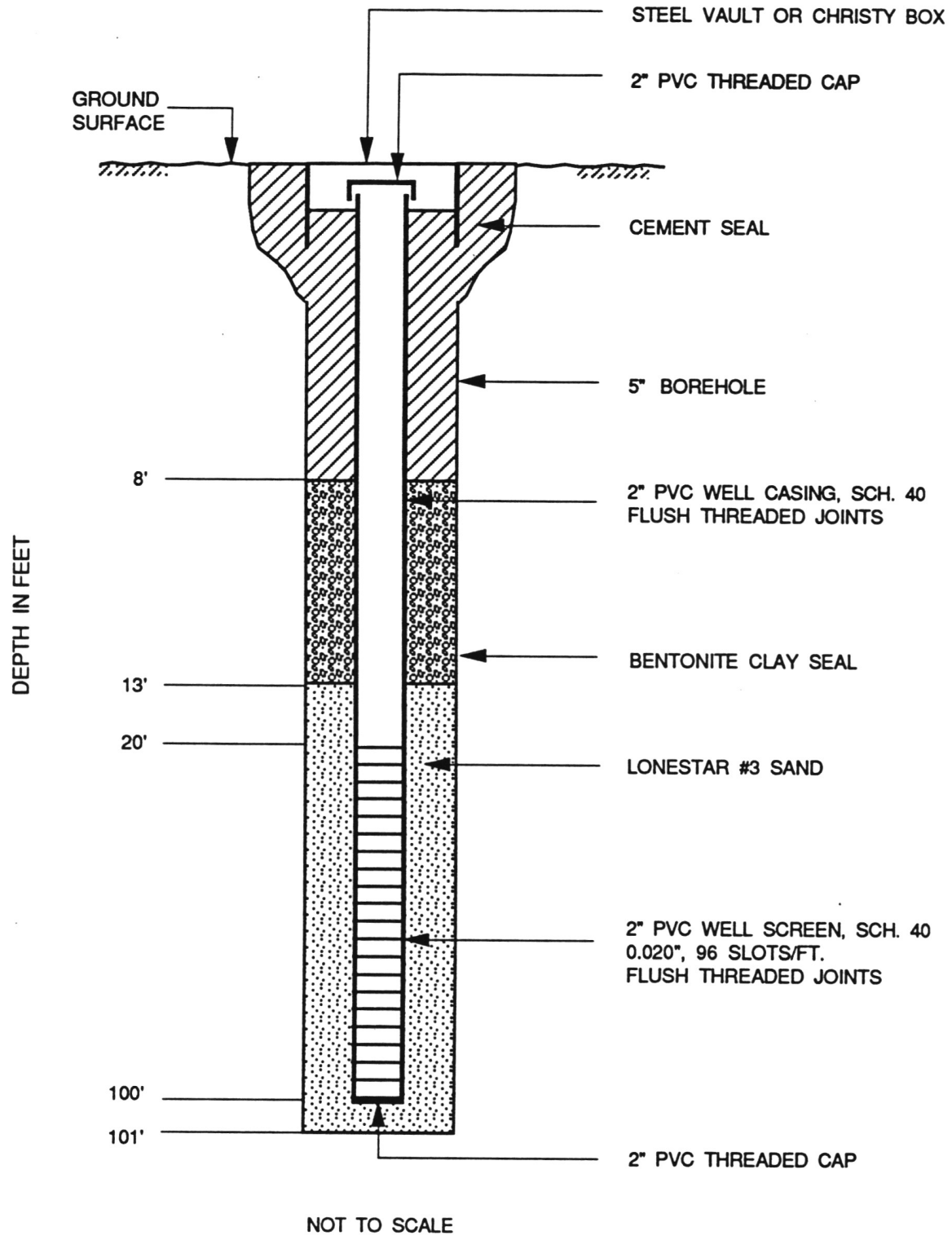
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 47

LAW/CRANDALL, INC.

PLATE A-1.132

JOB L92045.AE4 DATE 9/30/92 DR. K S.G. HS CHKD HMS



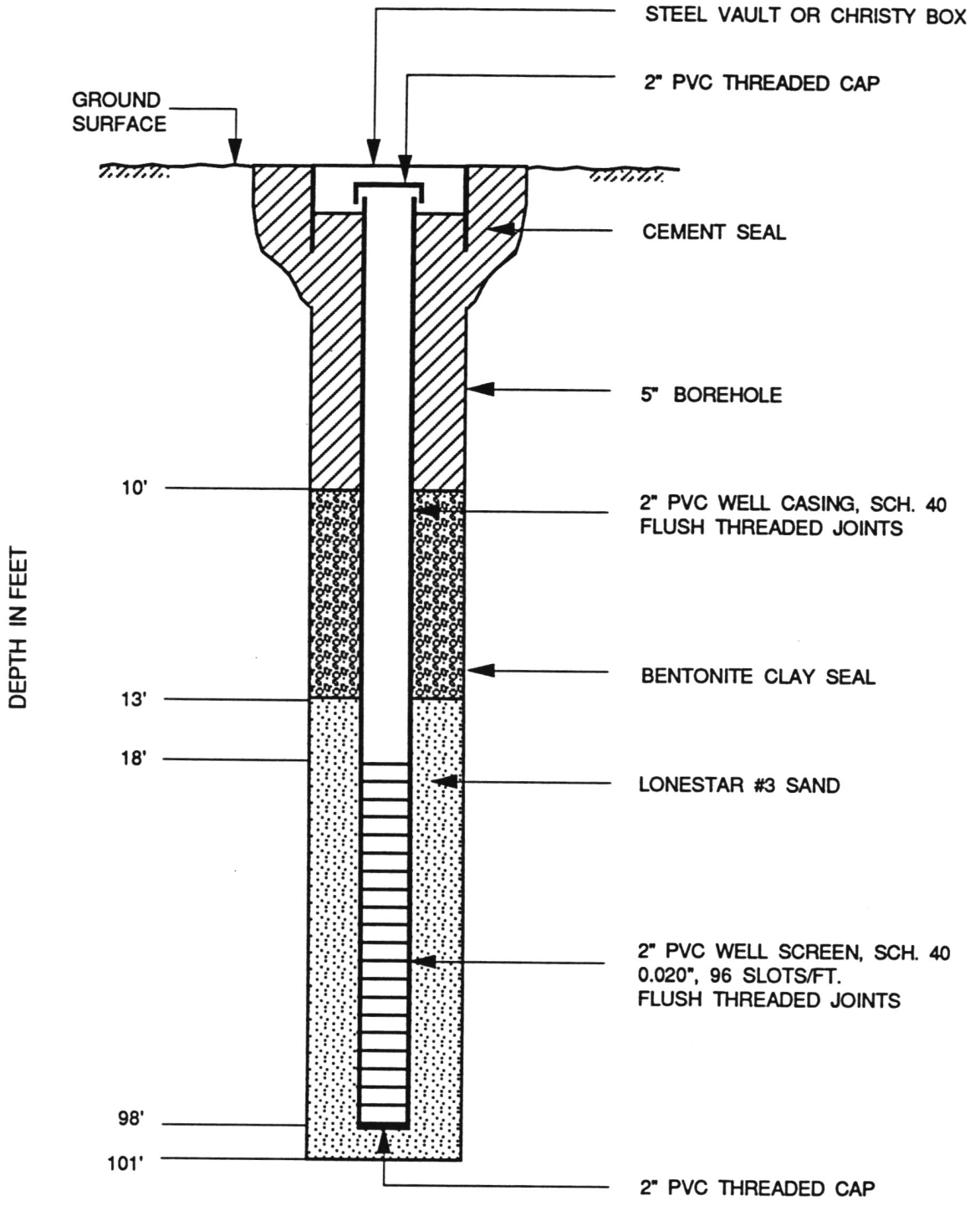
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 49

LAW/CRANDALL, INC.

PLATE A-1.133

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD HAS



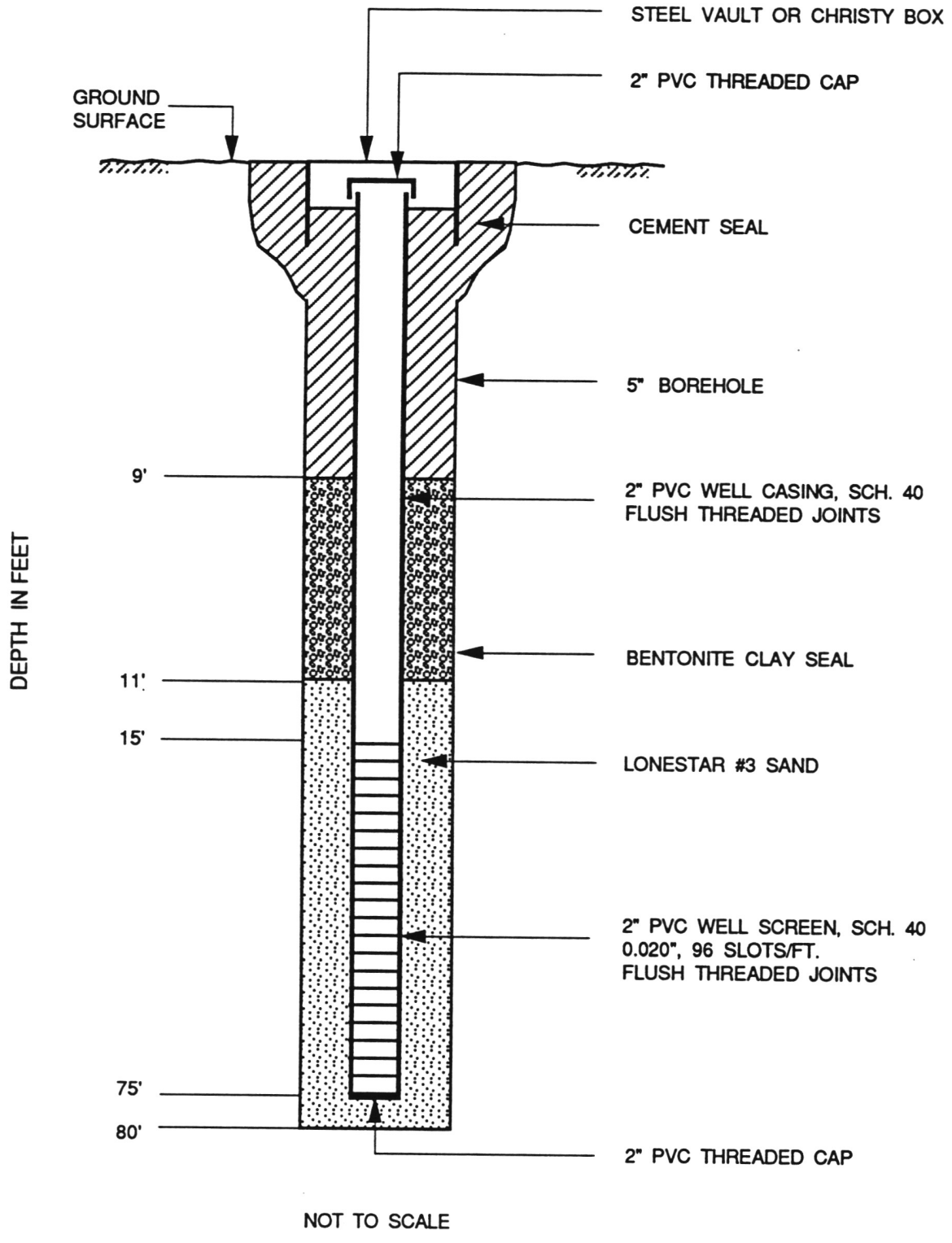
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 53

LAW/CRANDALL, INC.

PLATE A-1.134

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD HMS



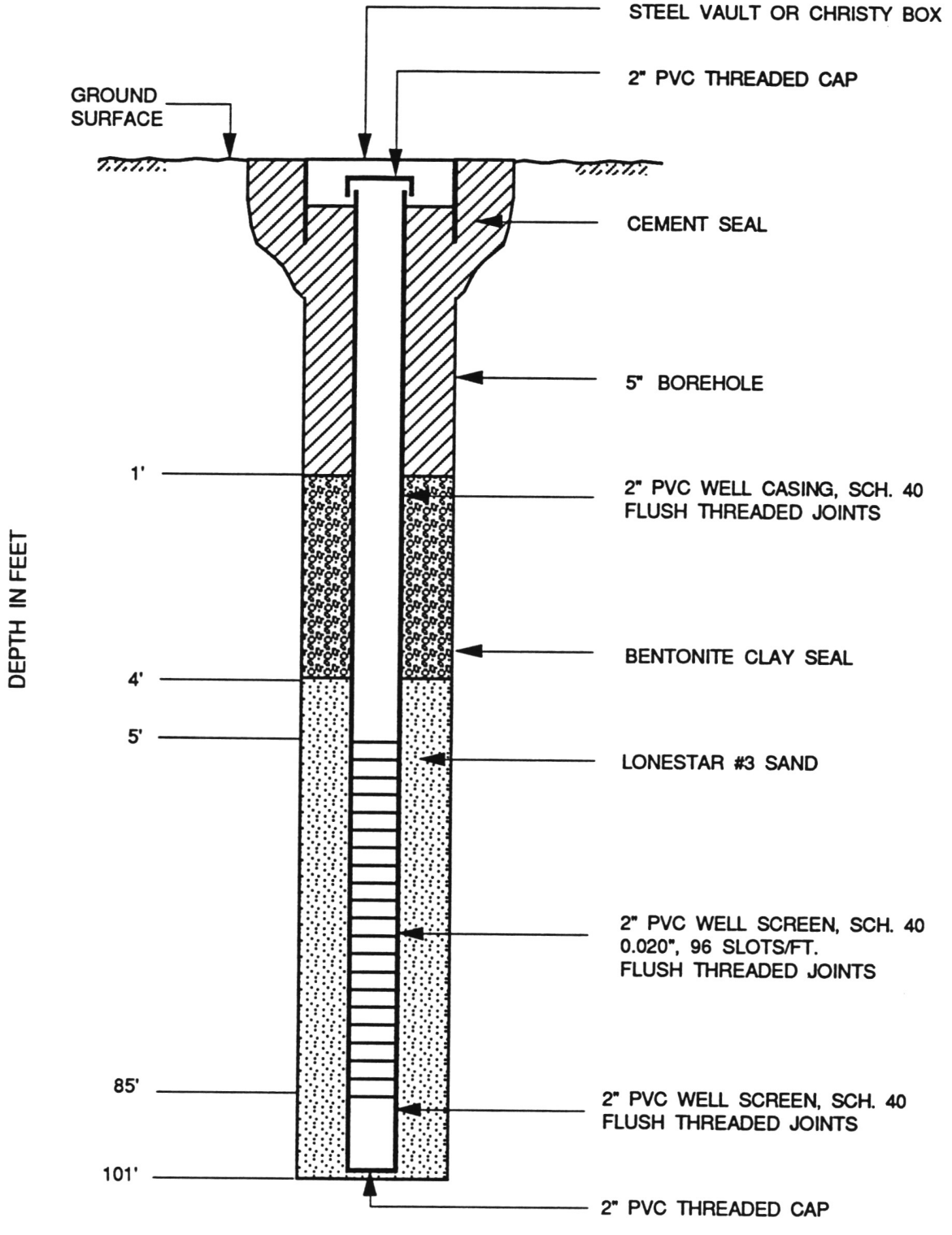
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 56

LAW/CRANDALL, INC.

PLATE A-1.135

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD HAS



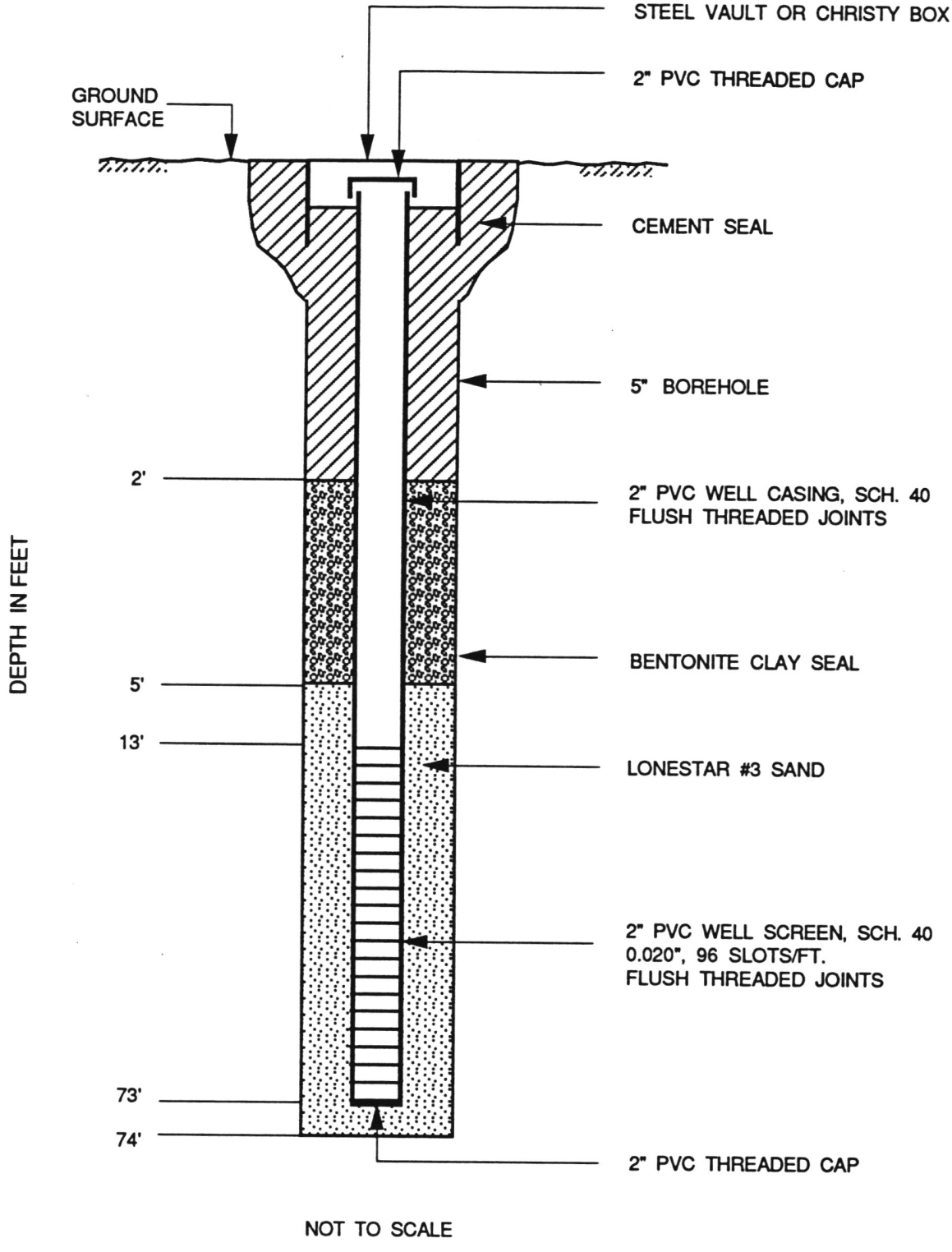
NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 69

LAW/CRANDALL, INC.

PLATE A-1.136

JOB L92045.AE4 DATE 9/30/92 DR. k S.G. HS CHKD HYS



NOT TO SCALE

MONITORING WELL CONSTRUCTION DETAILS BORING 70

LAW/CRANDALL, INC.

PLATE A-1.137

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

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	Fine	Medium	Coarse	Fine	Coarse		

No. 200 No. 40 No. 10 No. 4 3/4 in. 3 in. (12 in.)

U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

REFERENCE:
The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953. (Revised April, 1960).

LAW/CRANDALL, INC.

PLATE A-2

JOB L92045AE4 DATE 12/10/92 DR. lk O.E. MB CHKD

APPENDIX B

APPENDIX B
LABORATORY TESTING PROGRAM

GENERAL

The laboratory testing program was directed toward a quantitative determination of the physical properties of the soils and bedrock materials encountered along the proposed alignment. Each principal geologic unit was investigated to determine the significant properties of the materials. With the exception of the corrosivity testing and water chemical testing, the testing was performed within the Law/Crandall laboratory in Los Angeles, California.

The laboratory program included testing of undisturbed samples and recovered disturbed samples, as well as tests on bulk materials. The undisturbed samples in brass rings were placed in plastic bags in the field and stored in sealed cans. The recovered disturbed samples and bulk samples were stored in plastic bags.

The test procedures used for the various tests followed ASTM standards or accepted practice. The laboratory test procedures are discussed below.

MOISTURE CONTENT

Moisture contents of the undisturbed soil samples were determined in accordance with ASTM Designation D2216-90. Samples were tested shortly after they arrived at the laboratory. The use of drilling mud in the rotary wash borings increased the moisture content of some of the granular soil samples. The results of the tests are shown to the right of the boring logs in Appendix A.

DRY DENSITY

The dry density of selected undisturbed samples was obtained by carefully weighing a sample of known volume after oven drying, and dividing the dry weight by the volume of the sample. The results of the tests are shown to the right of the boring logs in Appendix A.

DIRECT SHEAR TESTS

Direct shear tests were performed on selected undisturbed samples. The testing procedure was in accordance with ASTM Designation D3080-90. The tests were performed at field and increased moisture contents and at surcharge pressures equal to the existing overburden pressures. Selected samples were tested at an increased surcharge pressure to provide more complete data. Remolded samples, compacted to 90% at optimum moisture content, were prepared for direct shear tests; these samples were tested at optimum and increased moisture contents and at different surcharge pressures. Several of the bedrock samples were soaked for 3 days and purposely cut along the shear plane prior to testing. All of the samples were tested at a constant strain of 0.05 inches per minute. The yield-point values determined from the direct shear tests are presented on Plates B-1.1 through B-1.9, Direct Shear Test Data.

TRIAXIAL SHEAR TESTS

Unconsolidated, undrained triaxial compression (UU) tests were performed on selected undisturbed samples. The testing procedure was in accordance with ASTM Designation D4767-88, with some modification of the loading sequence for a majority of the samples tested. The samples were tested, under a given confining pressure, and a cyclic sequence of loading and unloading was made on each sample prior to failure to better define the stress-strain properties of the sample. All samples were tested at field moisture content and at a strain rate of about 0.02 inch per minute. The results of the triaxial compression tests are presented on Plates B-1.10 through B-1.13, Triaxial Shear Test Data.

CONSOLIDATION TESTS

One-dimensional consolidation tests were performed on selected undisturbed samples to determine the consolidation characteristics of the soils. The tests were performed in accordance with ASTM Designation D2435-80. Vertical loads were instantaneously applied in increments, and the rate of vertical consolidation was measured for each increment. Each load was allowed to consolidate the sample for at least 12 hours before a new increment was added. Water was added to selected samples during the tests to illustrate the effect of

moisture on the compressibility; the other samples were tested at field moisture content. Remolded samples (compacted to 90% at optimum moisture content) were also tested. The results of the consolidation tests are presented on Plates B-2.1 through B-2.47, Consolidation Test Data.

COMPACTION AND CALIFORNIA BEARING RATIO TESTS

The optimum moisture content and maximum dry density of the on-site soils and bedrock materials were determined by performing compaction tests on selected bulk samples. The tests were performed in accordance with ASTM Designation D1557-78. This method of compaction uses a 1/30 cubic-foot mold, in which each of five layers of soil is compacted by 25 blows of a 10-pound hammer falling 18 inches.

After completion of the compaction tests, California Bearing Ratio tests were performed on 13 of the samples in accordance with the ASTM Designation D1883-73 method. The results of the compaction and California Bearing Ratio tests are presented on Plates B-3.1 through B-3.6, Compaction Test Data, and on Plates B-4.1 through B-4.5, Compaction and C.B.R. Test Data.

EXPANSION INDEX TESTS

The Expansion Index of the on-site soils and bedrock materials was determined on selected samples in accordance with the ASTM Designation D4829-88 method. The results of the tests are shown on Plate B-5.1 through B-5.3, Expansion Index Test Data.

PARTICLE SIZE DISTRIBUTION

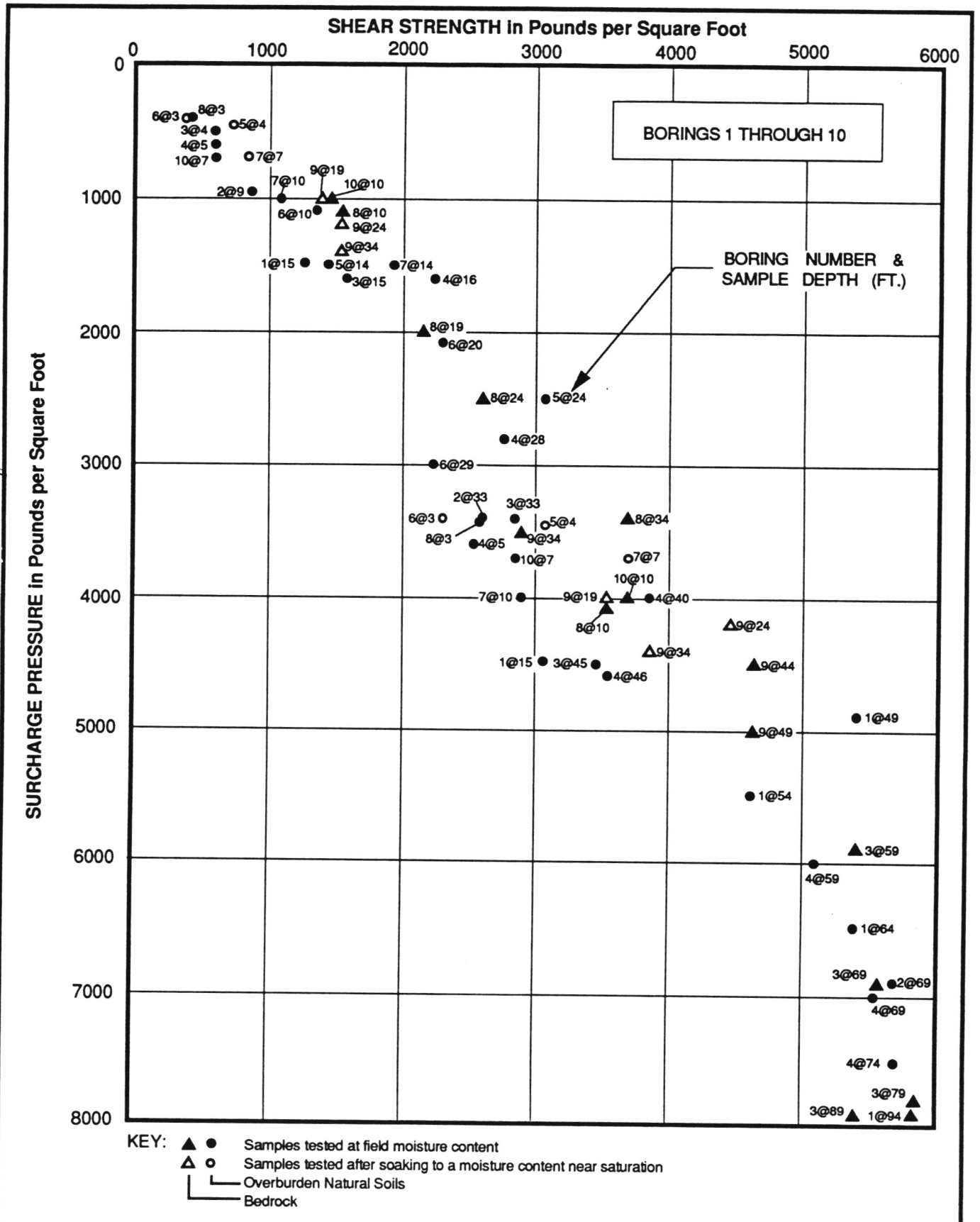
Tests were performed to determine the particle-size characteristics and assist in classification of soils. Sieve analyses were conducted in accordance with ASTM Designation D422-63 on the portions of the samples retained on the No. 200 sieve. Hydrometer tests were performed in accordance with the ASTM procedure on the portions of the samples containing the soil particles that passed the No. 200 sieve.



The results of these analyses are presented in the form of particle size distribution curves on Plates B-6.1 through B-6.11, Particle Size Distribution, and on Plate B-6.12, Percent Passing No. 200 Sieve.

ATTERBERG LIMITS TESTS

To aid in classification of the soils and to define the plasticity characteristics of the materials, Atterberg Limits tests were performed to determine the liquid limit and plastic limit of selected samples. The testing procedure was in accordance with ASTM Designation D4318-83. The results of the tests are shown on the boring logs in Appendix A.



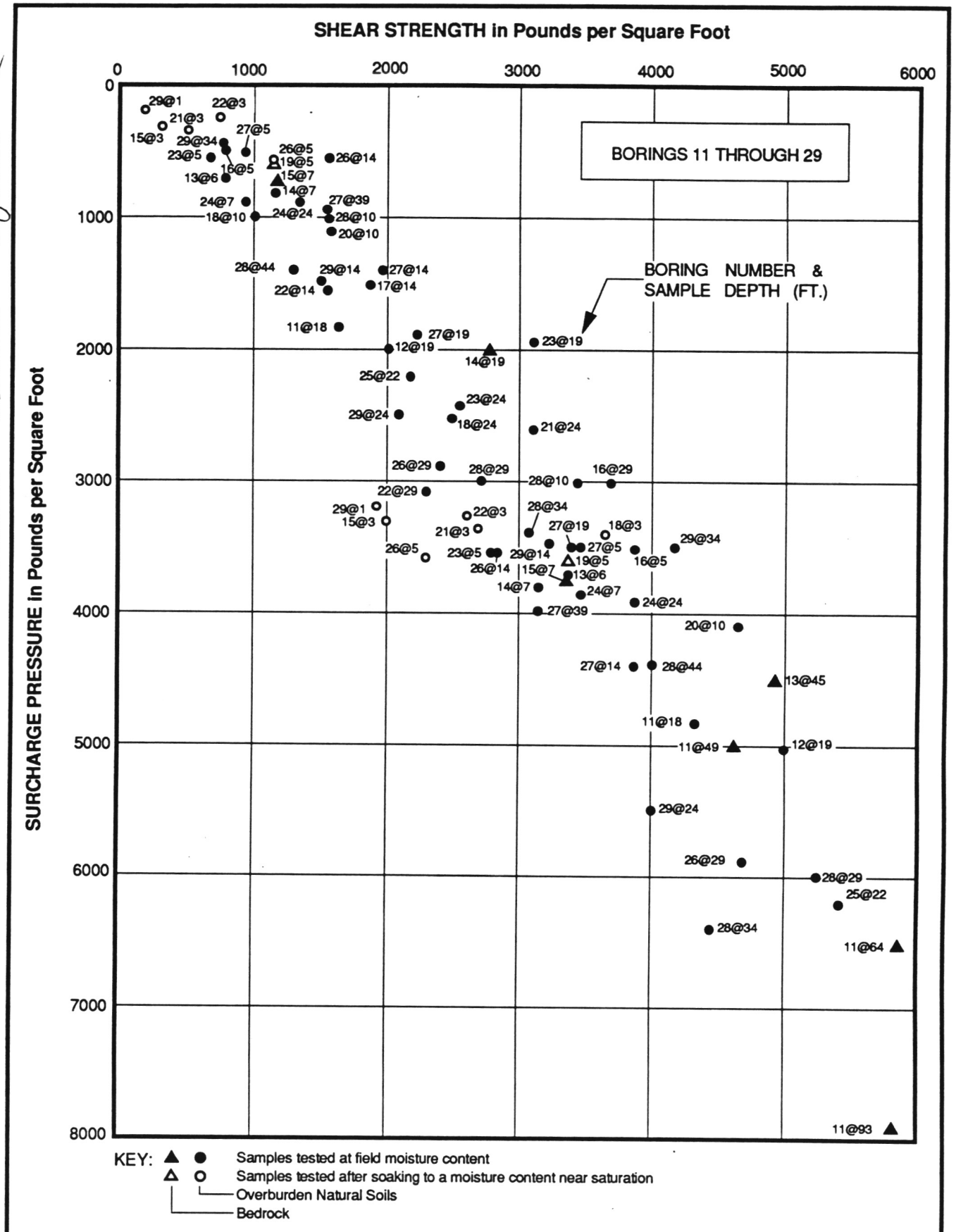
JOB L92045.AE4 DATE 12/30/92 DR nh O.E. MS CHKD. GS

DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B - 1.1

JOB L92045.AE4 DATE 12/31/92 DR nh/lk O.E. MS CHKD.

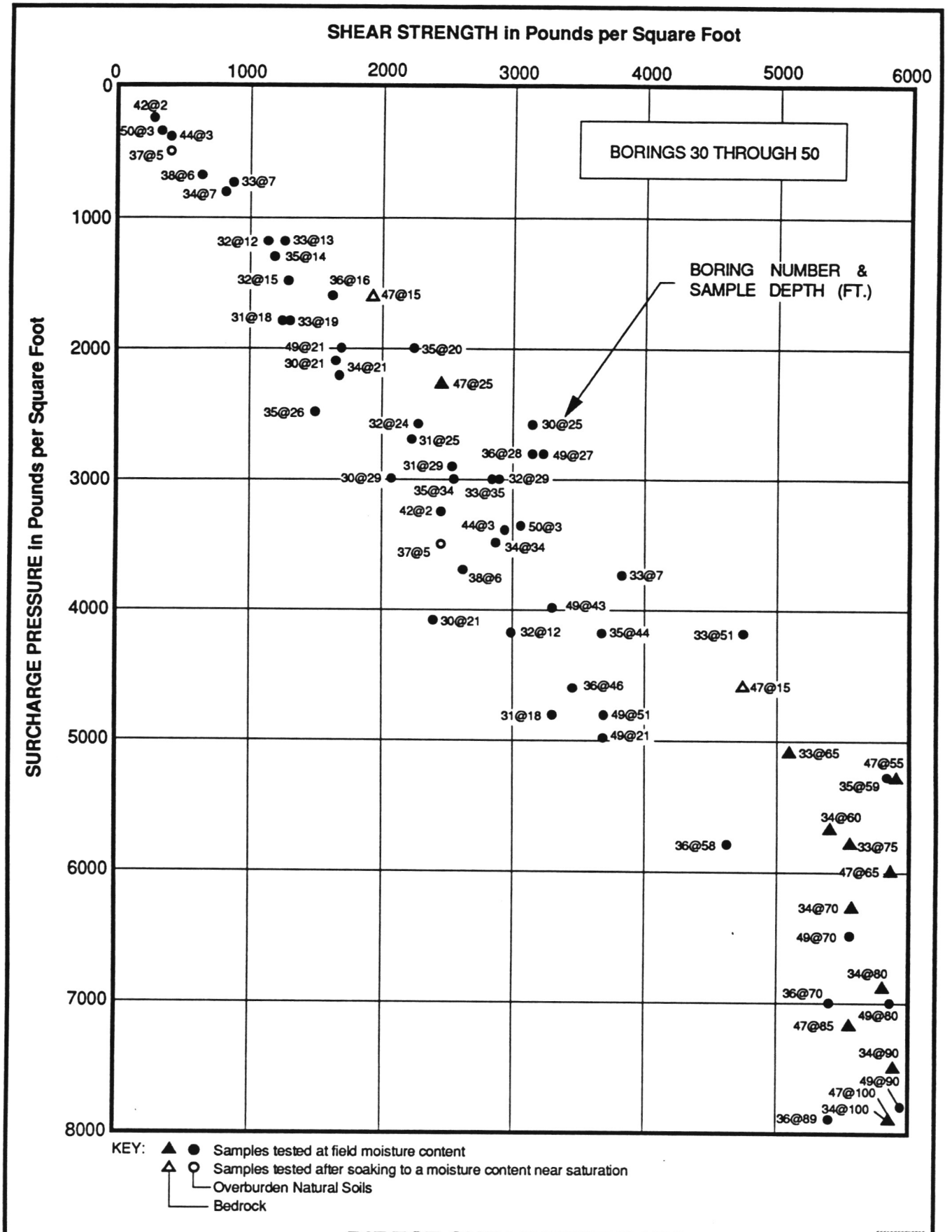


DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B - 1.2

JOB L92045.AE4 DATE 1/15/93 DR nh/lk O.E. MS CHKD.

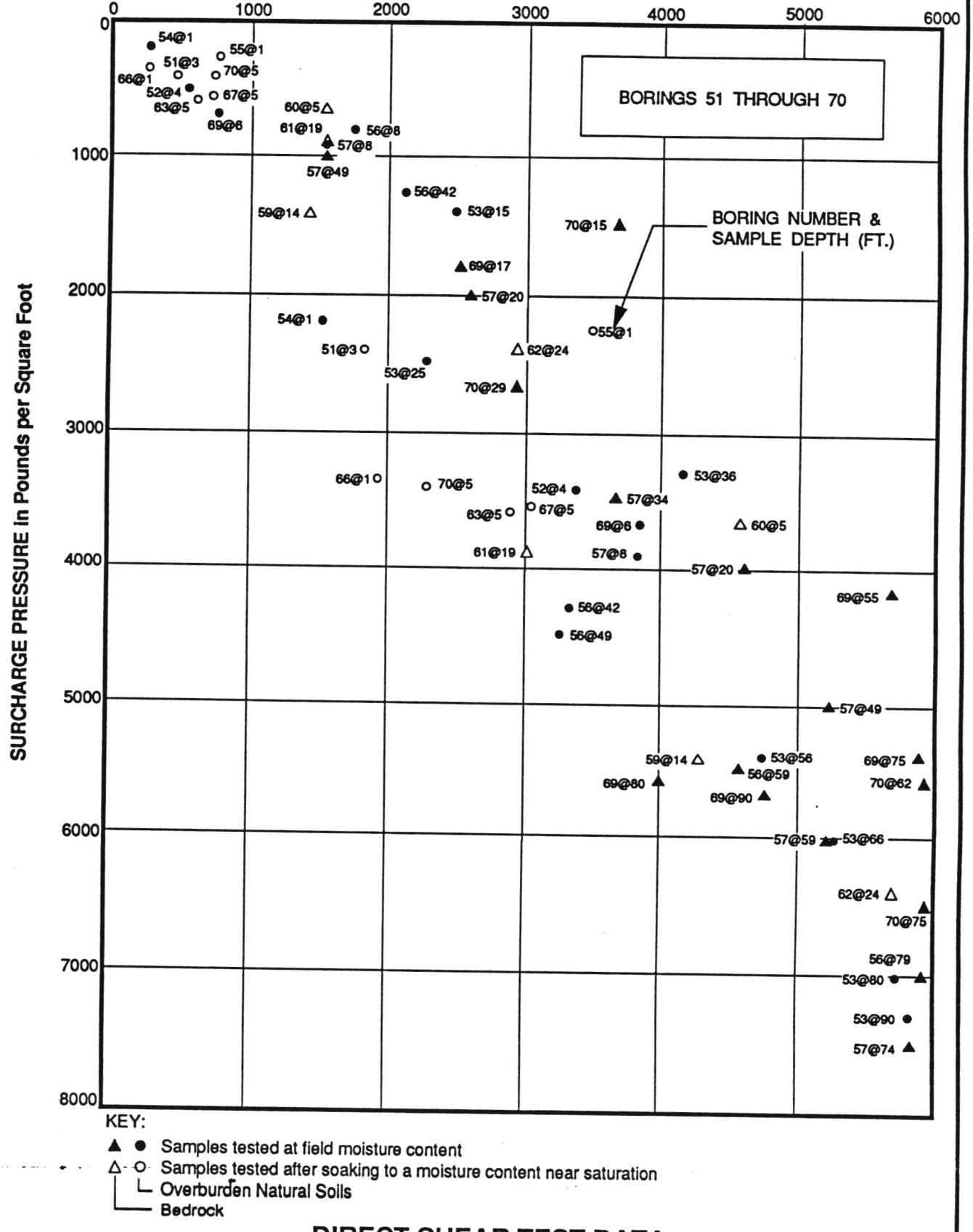


DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.3

JOB L92045.AE4 DATE 1/6/93 DR. k O.E. MS CHKD KB



KEY:

▲ ● Samples tested at field moisture content

△ ○ Samples tested after soaking to a moisture content near saturation

└ Overburden Natural Soils

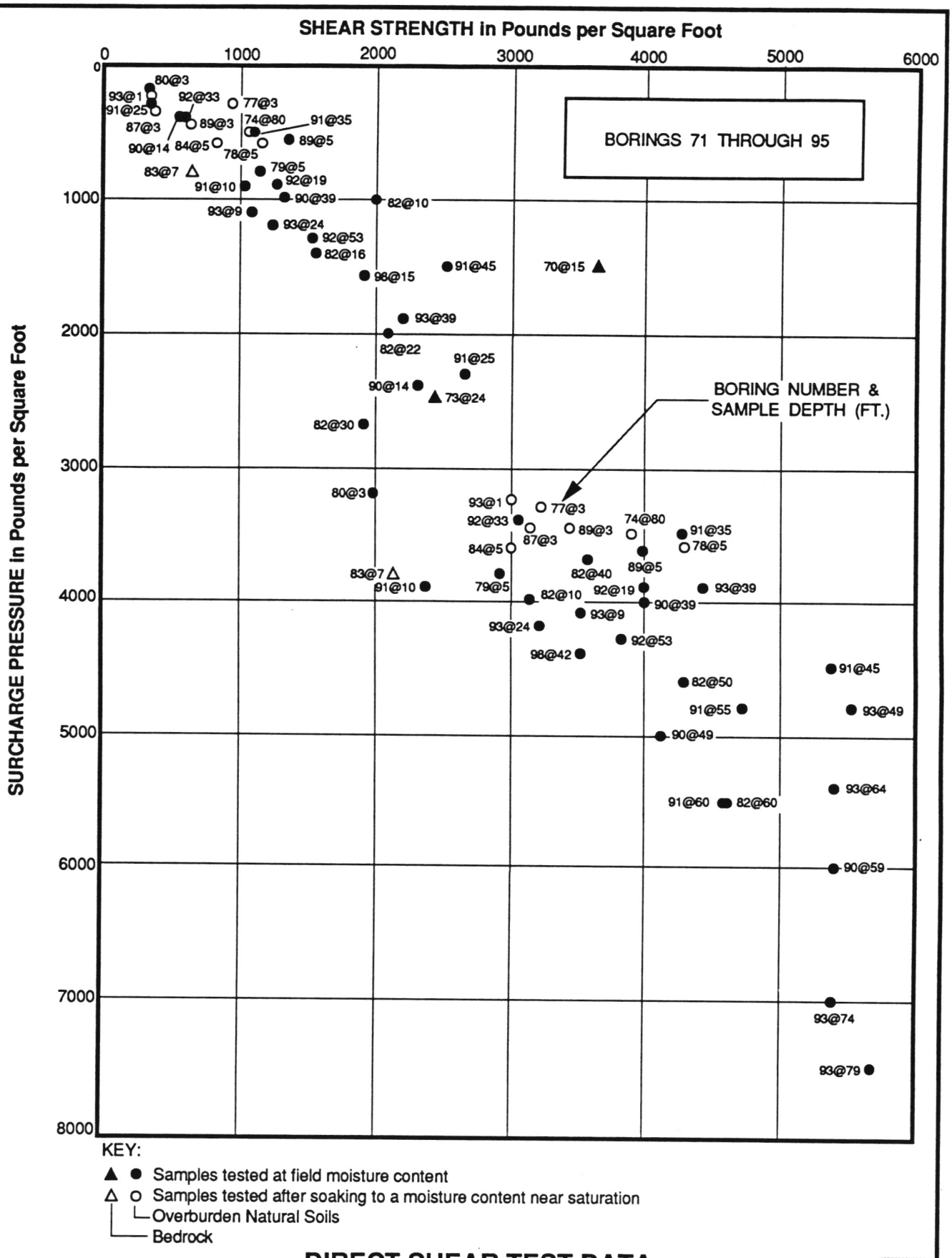
└ Bedrock

DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.4

JOB L92045.AE4 DATE 1/6/93 DR. lk O.E. MS CHKD



KEY:

▲ ● Samples tested at field moisture content

△ ○ Samples tested after soaking to a moisture content near saturation

└ Overburden Natural Soils

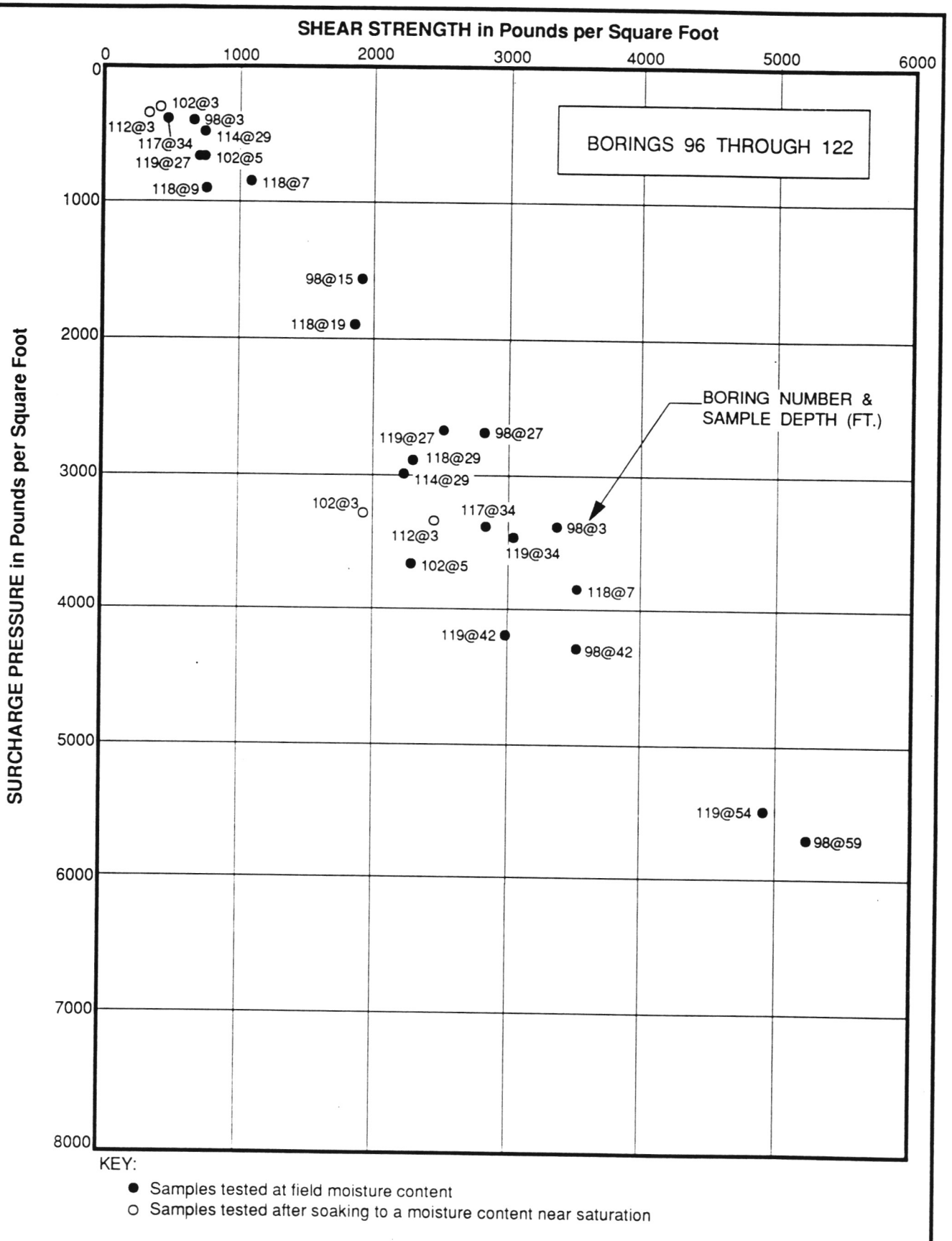
└ Bedrock

DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.5

JOB L92045.AE4 DATE 1/18/93 DR. lk O.E. MS CHKD



KEY:

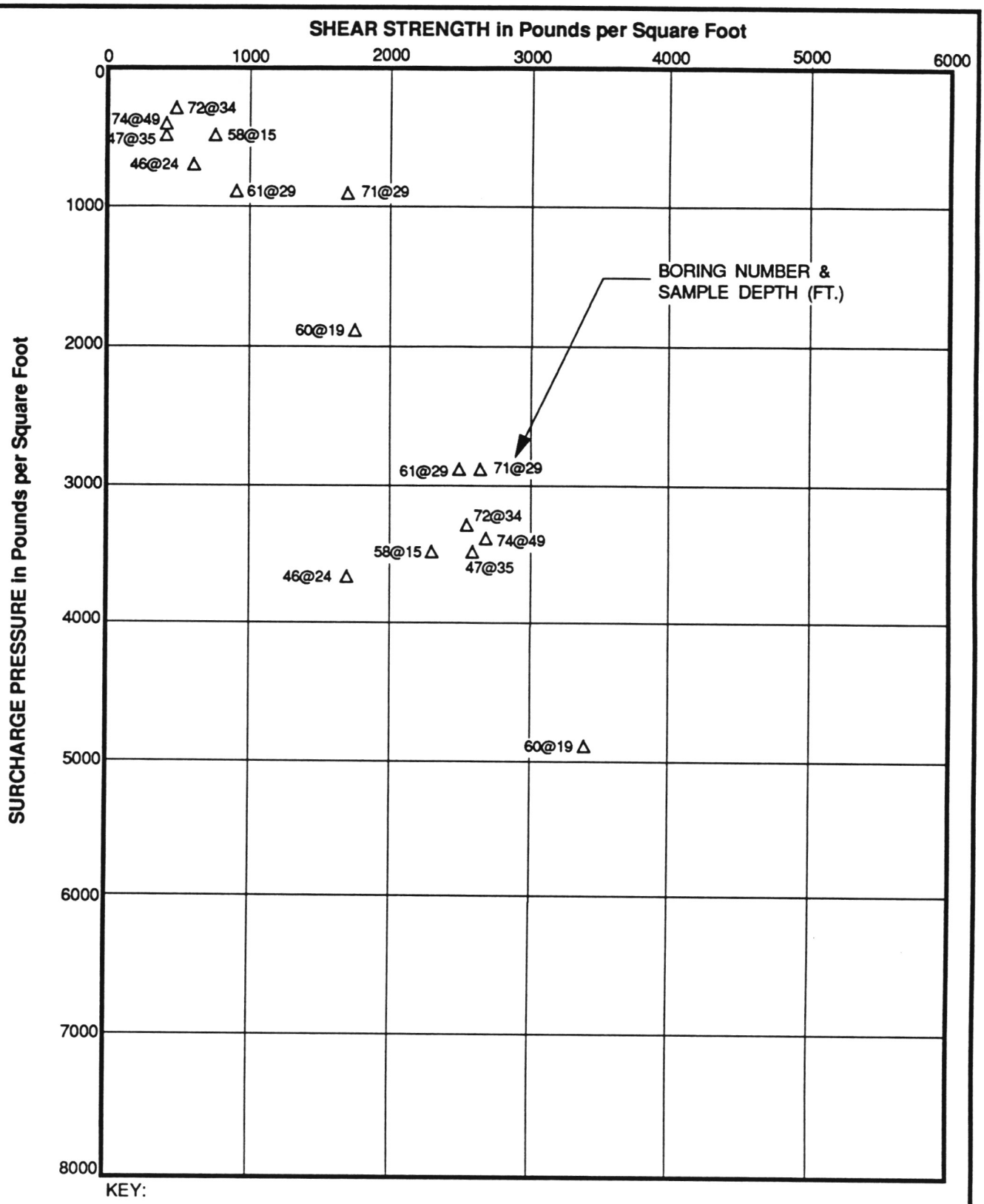
- ● Samples tested at field moisture content
- ○ Samples tested after soaking to a moisture content near saturation

DIRECT SHEAR TEST DATA

LAW / CRANDALL, INC.

PLATE B - 1.6

JOB L92045.AE4 DATE 1/18/93 DR. lk O.E. MS CHKD

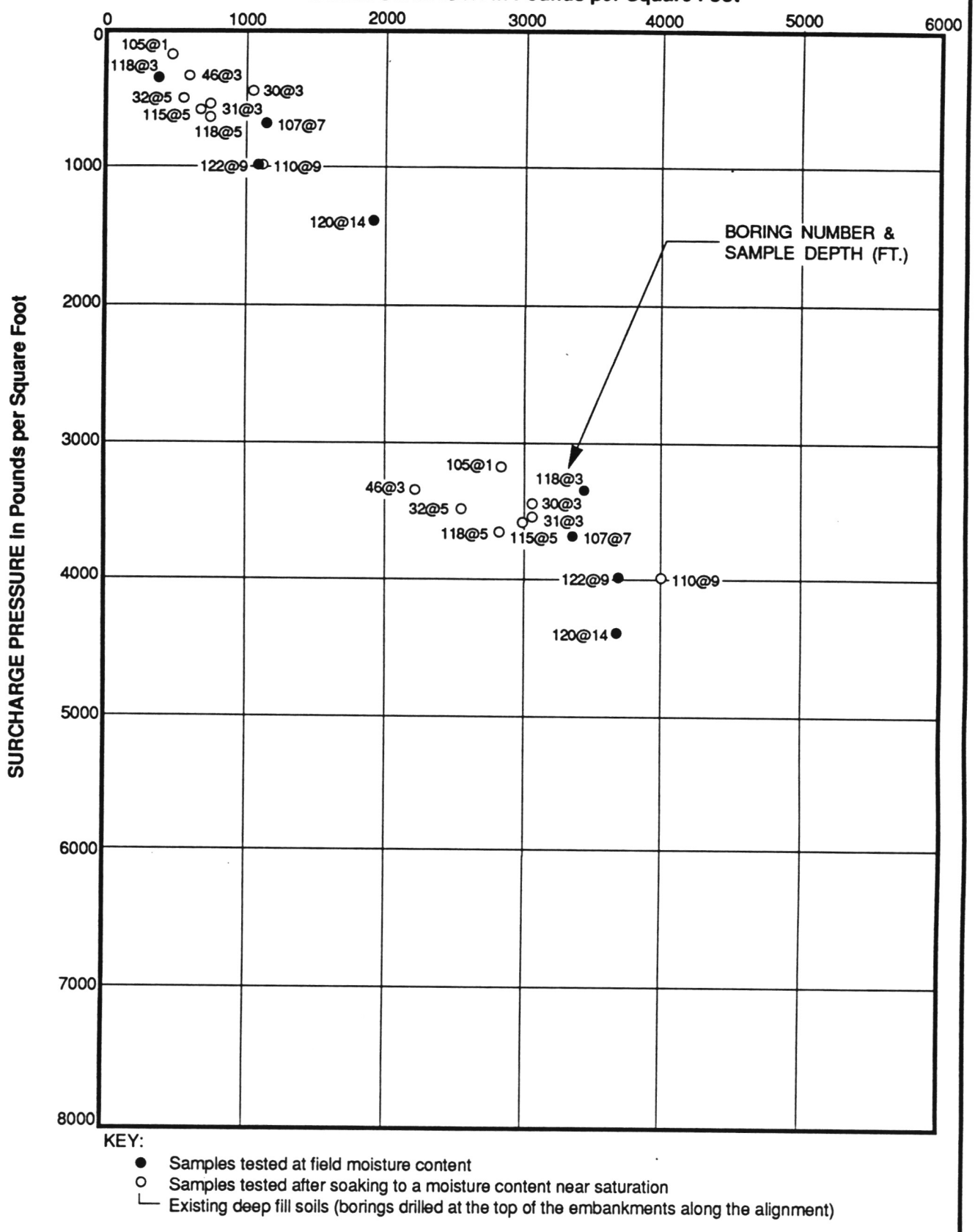


DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.7

JOB L92045.AE4 DATE 1/18/93 DR. k O.E. MS CHKD

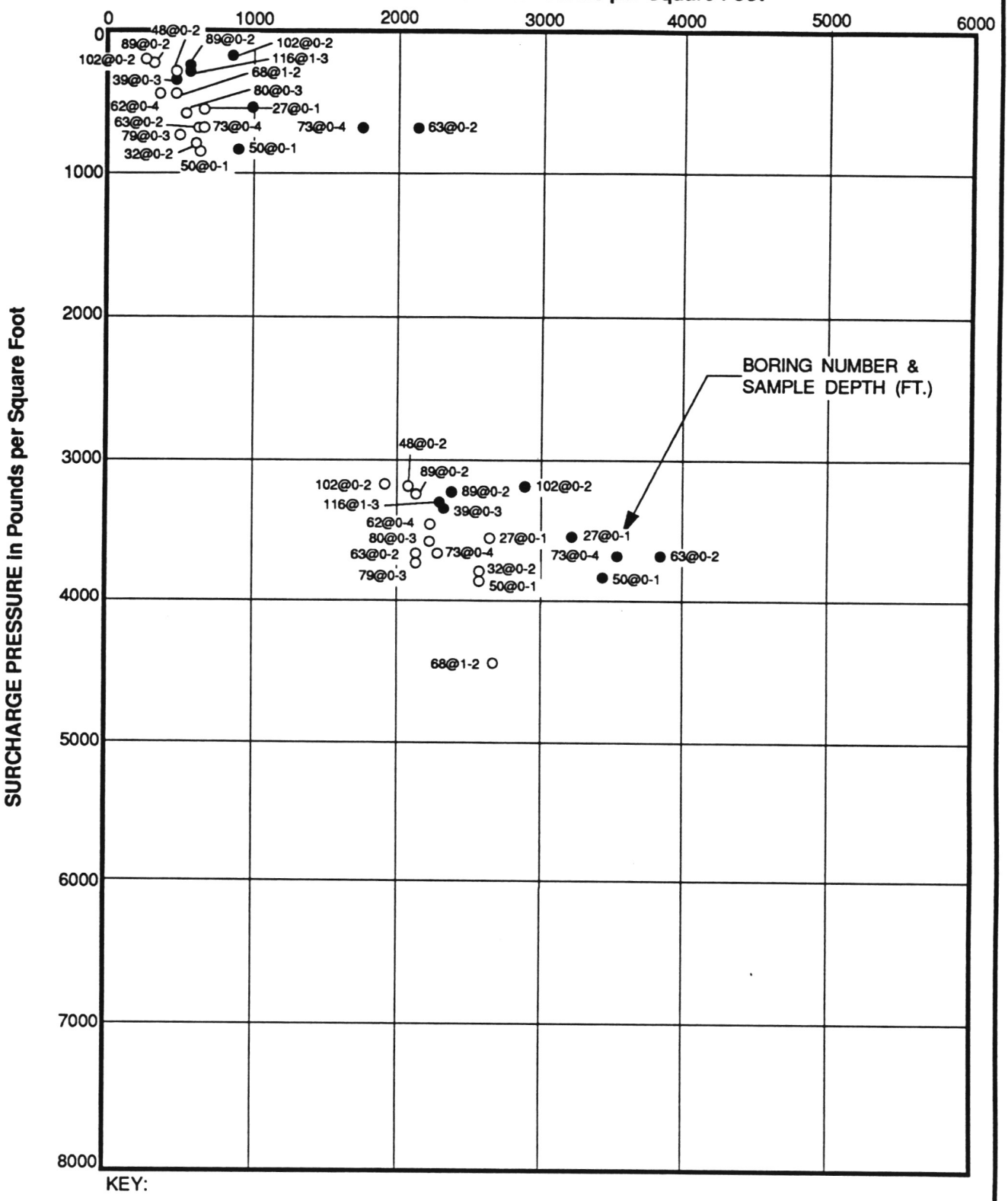


DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.8

JOB L92045.AE4 DATE 1/18/93 DR. lk O.E. MS CHKD



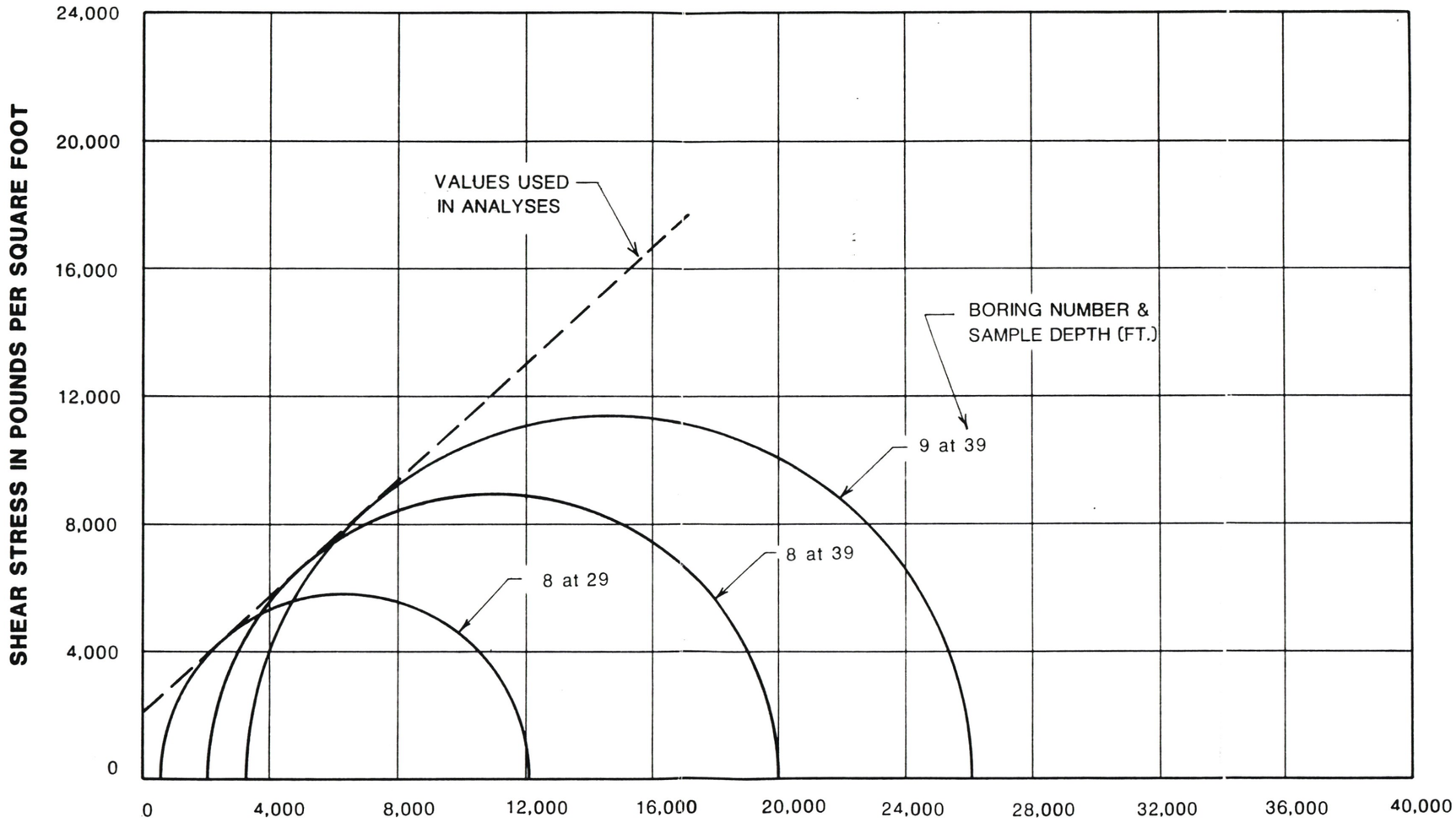
KEY:

- ● Samples tested at optimum moisture content.
- ○ Samples tested after soaking to a moisture content near saturation.
- └ Remolded samples compacted to 90%.

DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.9



NOTES:

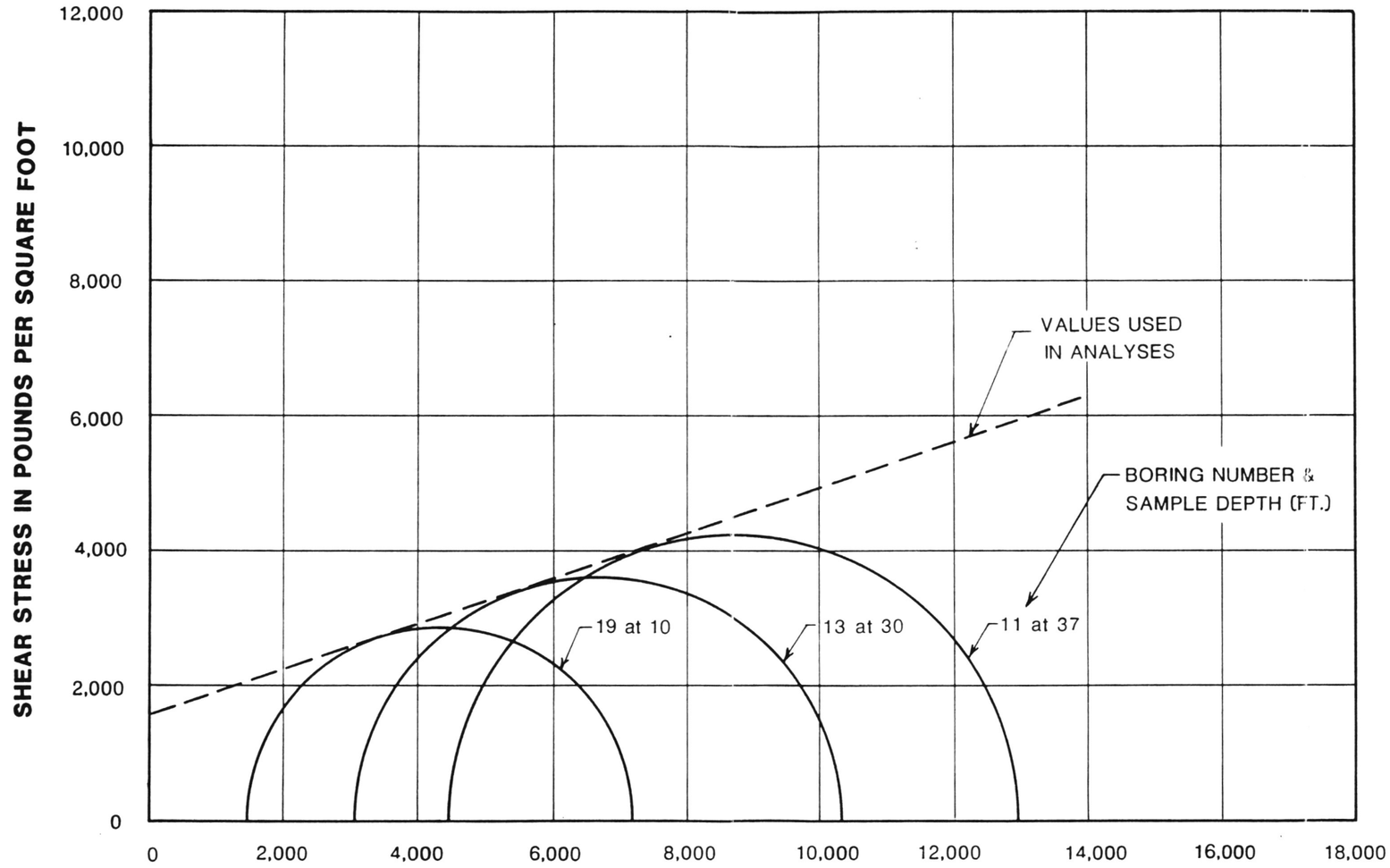
1. TESTS WERE PERFORMED ON BEDROCK.
2. SAMPLES TESTED AT FIELD MOISTURE CONTENT.

TRIAXIAL SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.10

FORM 1.. JOB 192045.AE4 DATE 2/23/93 DR. M.G. O.E. MCJ CHKD.



NOTES:

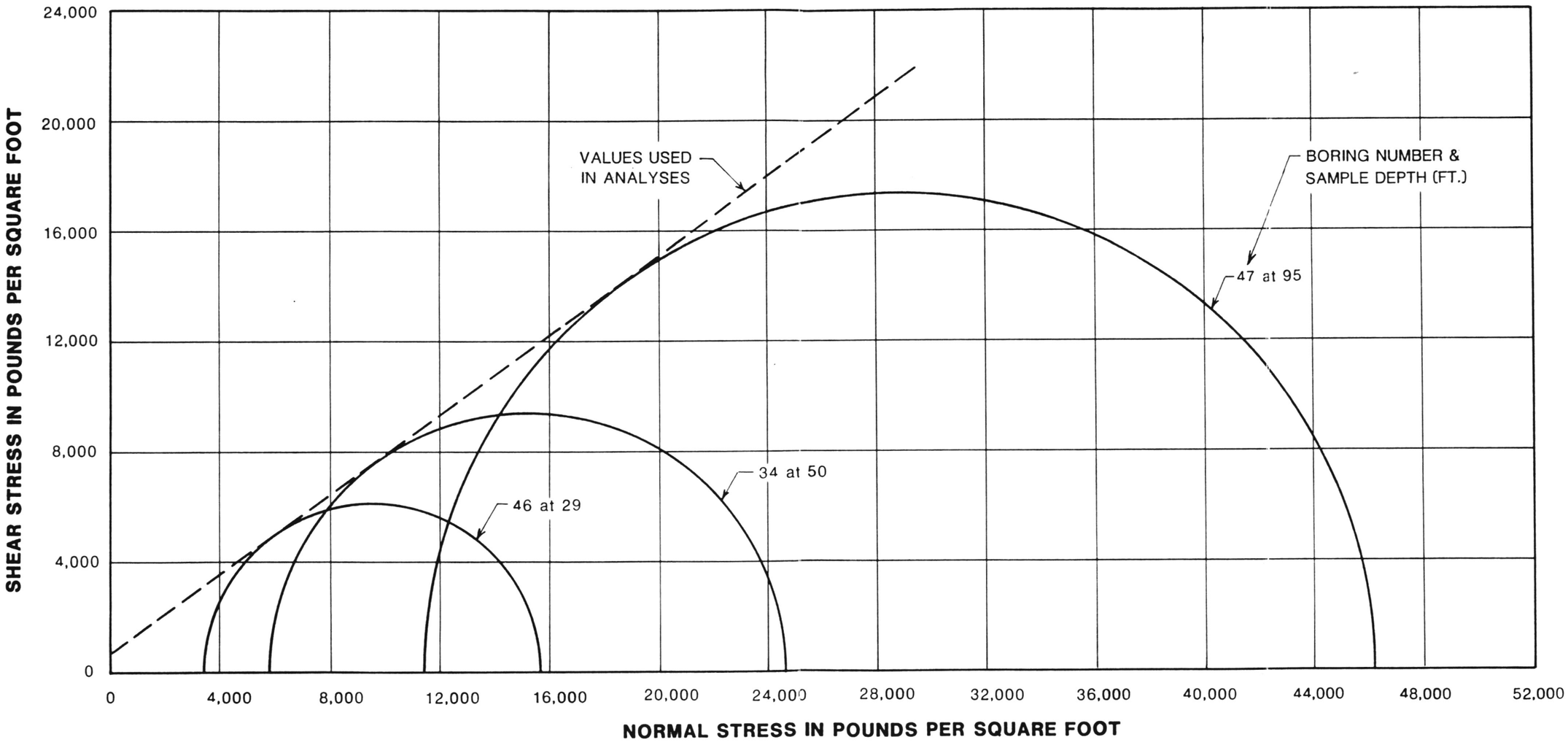
1. TESTS WERE PERFORMED ON BEDROCK.
2. SAMPLES TESTED AT FIELD MOISTURE CONTENT.

TRIAXIAL SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.11

O.E. CHKD. DR. DATE JOB FORM



NOTES:

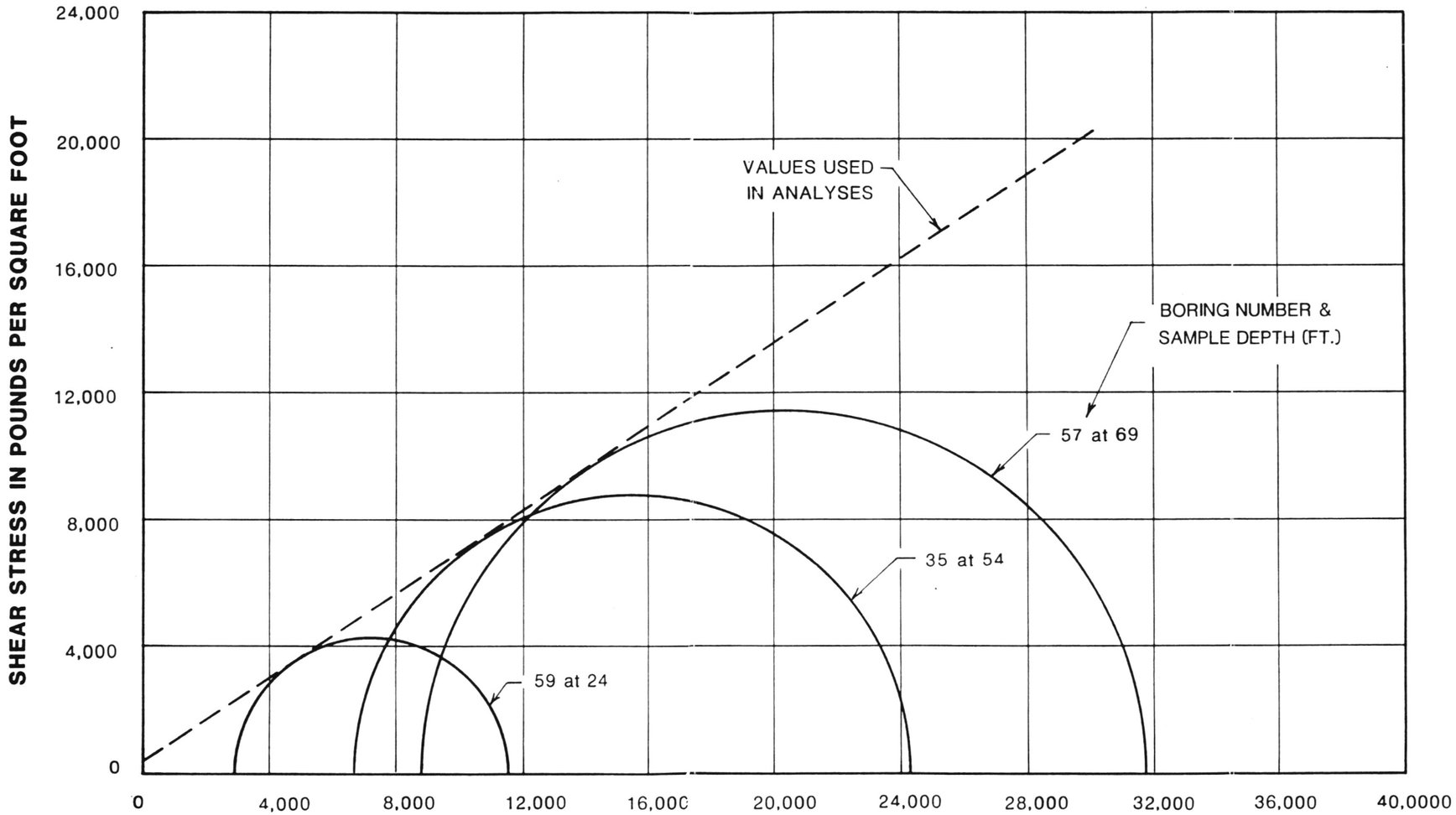
1. TESTS WERE PERFORMED ON BEDROCK.
2. SAMPLES TESTED AT FIELD MOISTURE CONTENT.

TRIAXIAL SHEAR TEST DATA

LAW/CRANDALL, INC.

PLATE B-1.12

O.E. CHKD. DR. DATE 2/23/93 JOB L92045.AE4 FORM 1.



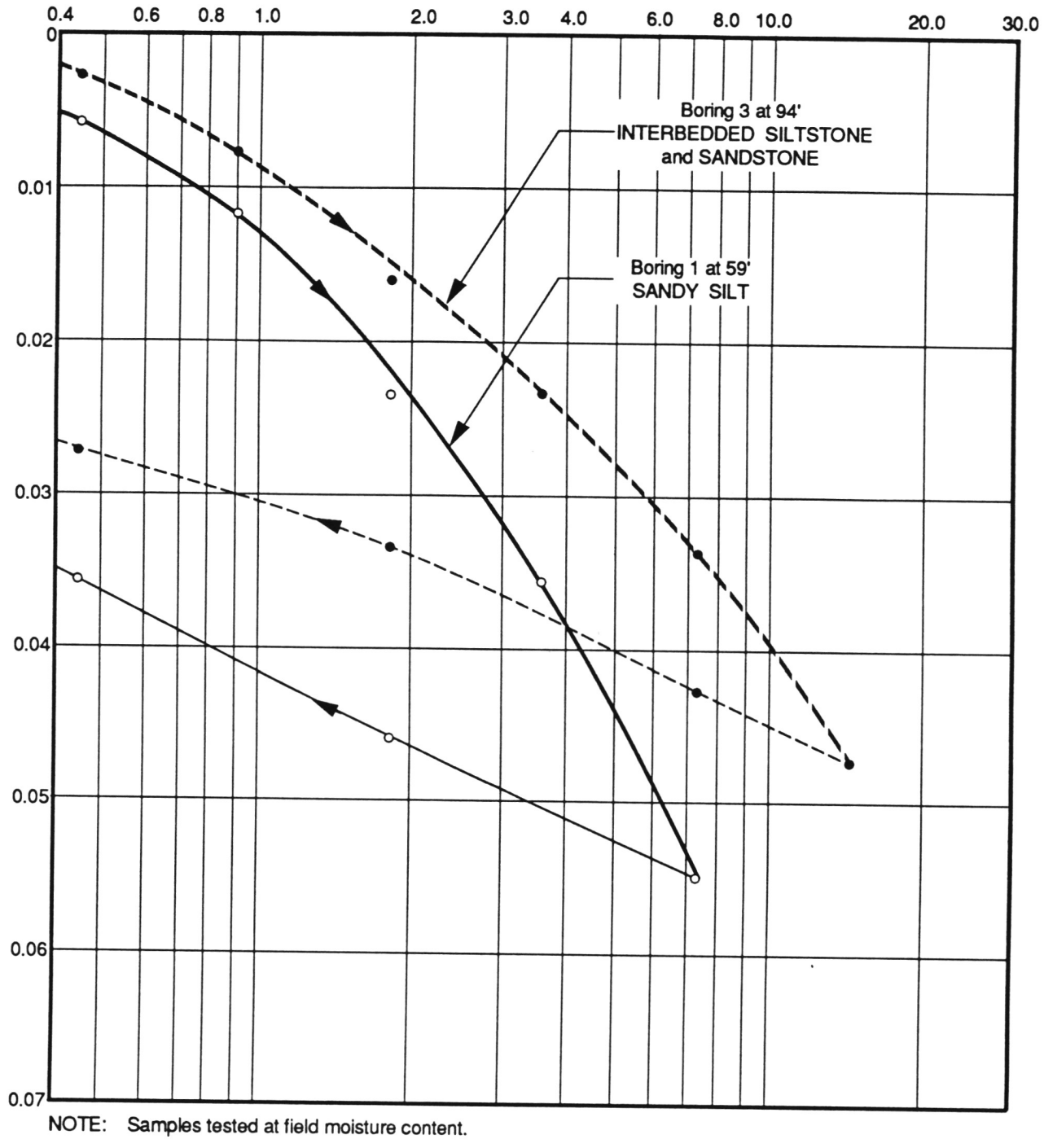
NOTES:

1. TESTS WERE PERFORMED ON BEDROCK.
2. SAMPLES TESTED AT FIELD MOISTURE CONTENT.

TRIAXIAL SHEAR TEST DATA

LAW/CRANDALL, INC.

JOB L92045.AE4 DATE 1/4/93 DR. lk O.E. MS CHKD GR



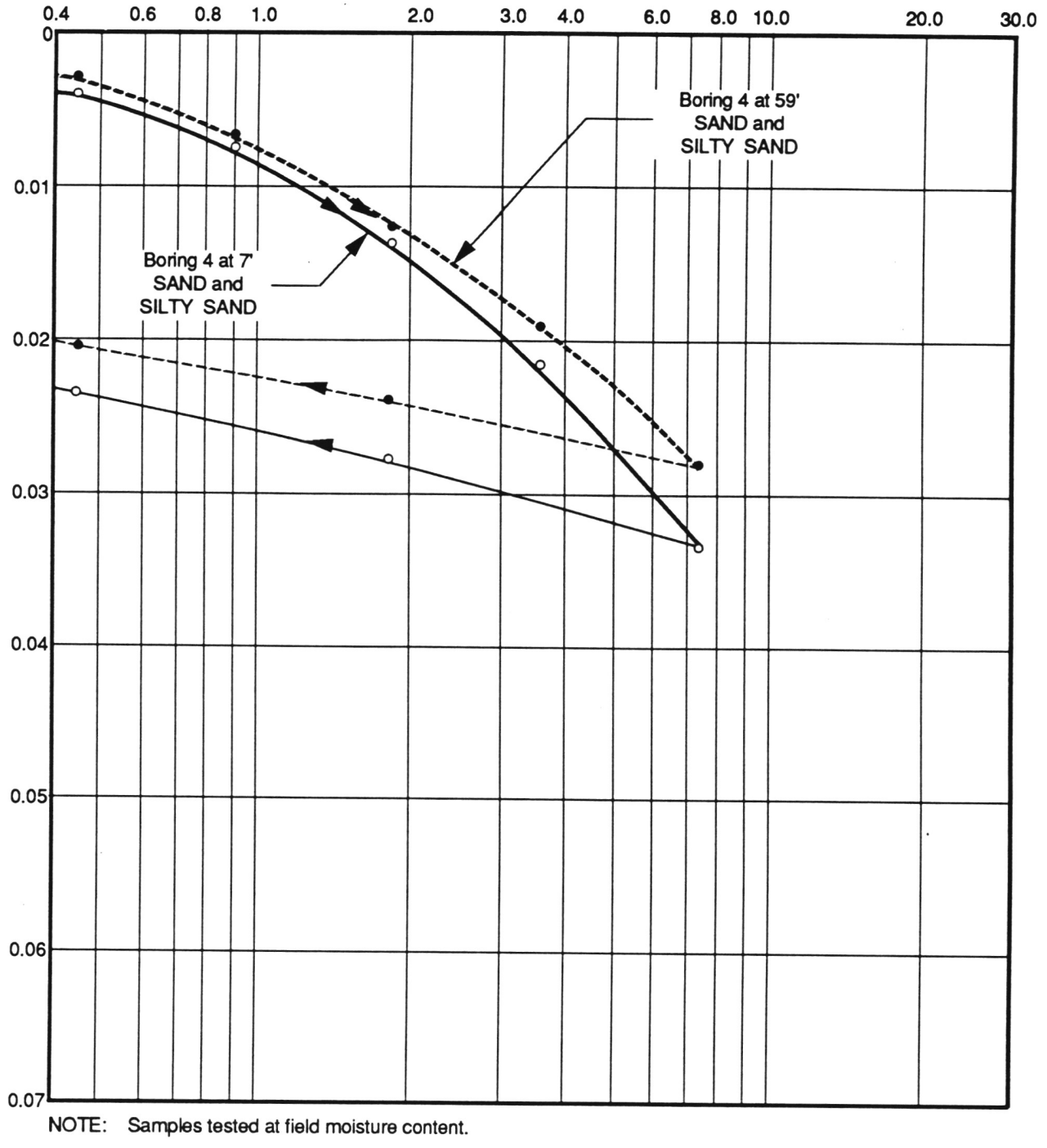
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.1

JOB L92045.AE4 DATE 1/4/93 DR. k O.E. MS CHKD 5/2



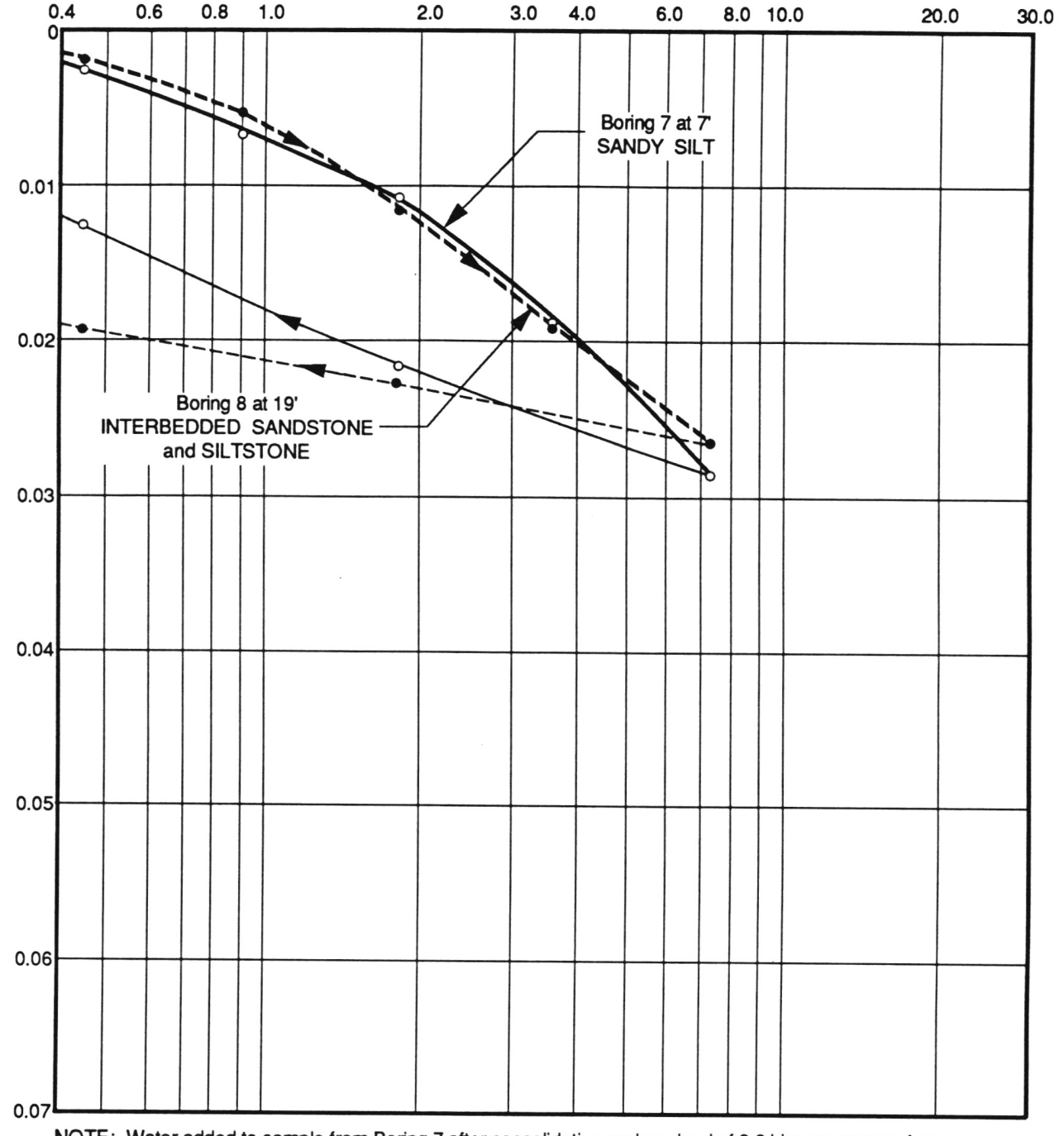
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.2

JOB L92045.AE4 DATE 1/4/93 DR. lk O.E. MS CHKD



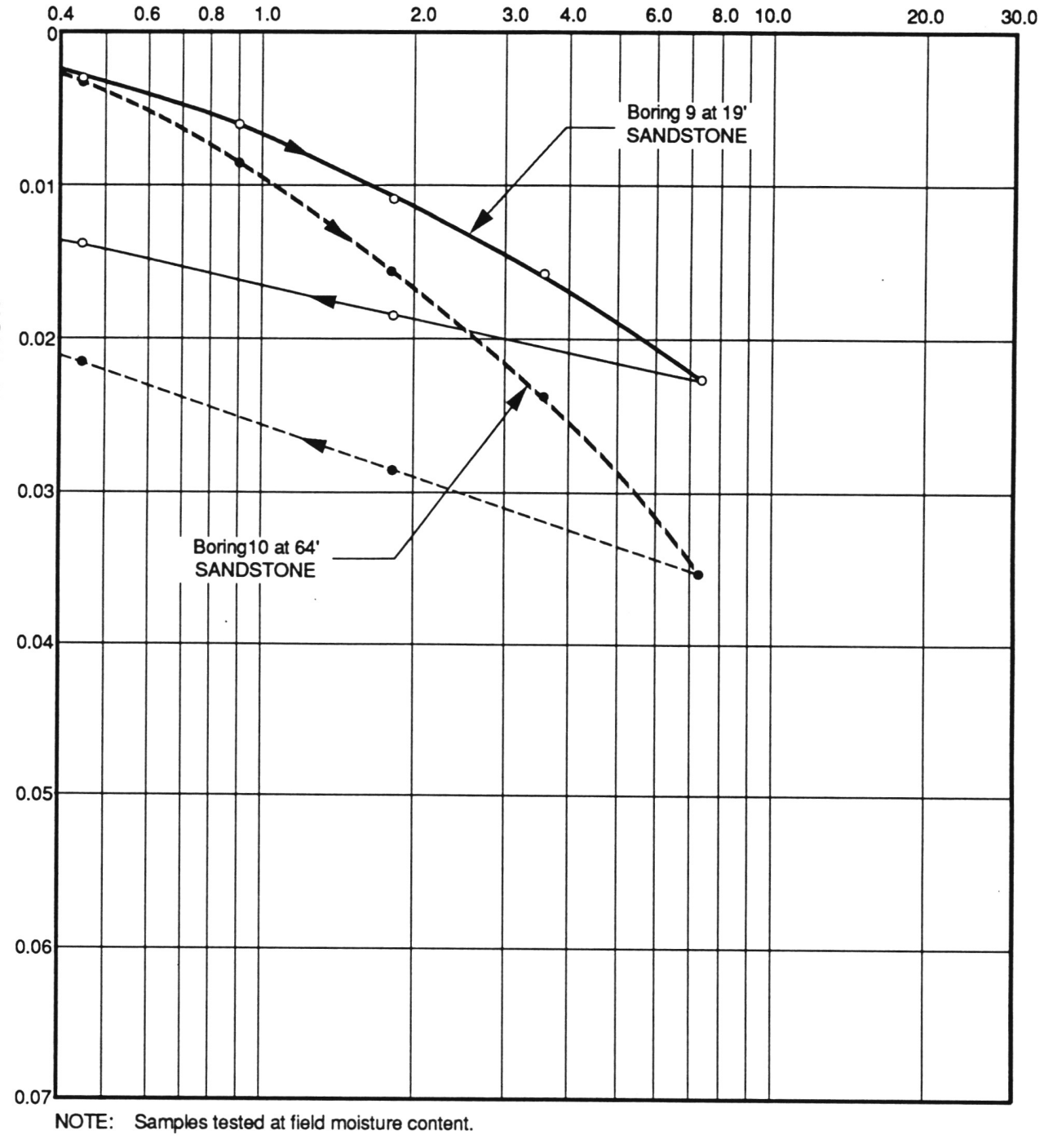
NOTE: Water added to sample from Boring 7 after consolidation under a load of 3.6 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.3

JOB L92045.AE4 DATE 1/4/93 DR. lk O.E. MS CHKD GR



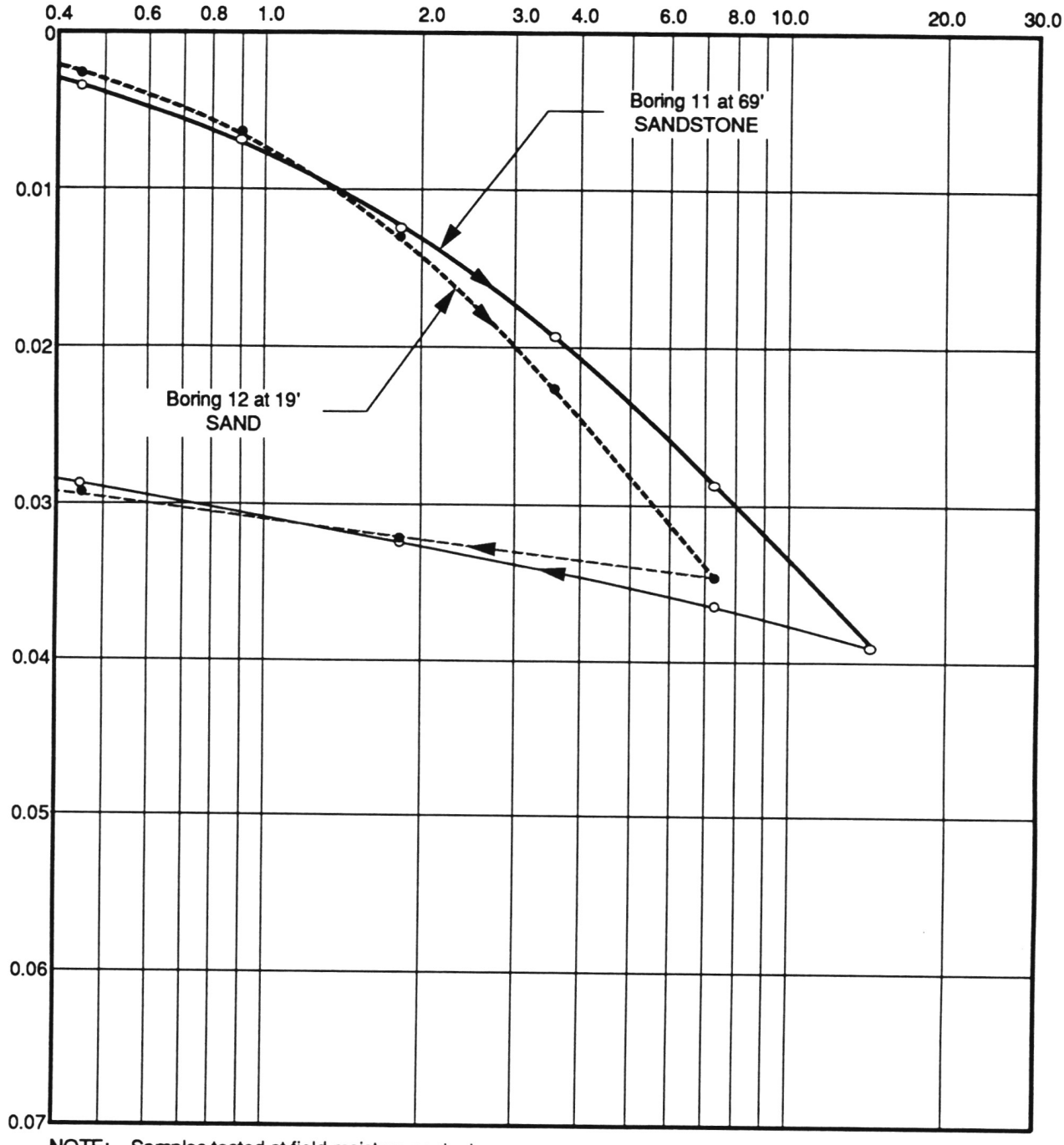
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.4

JOB L92045.AE-3 DATE 9/25/92 DR. k O.E. MS CHKD GL2

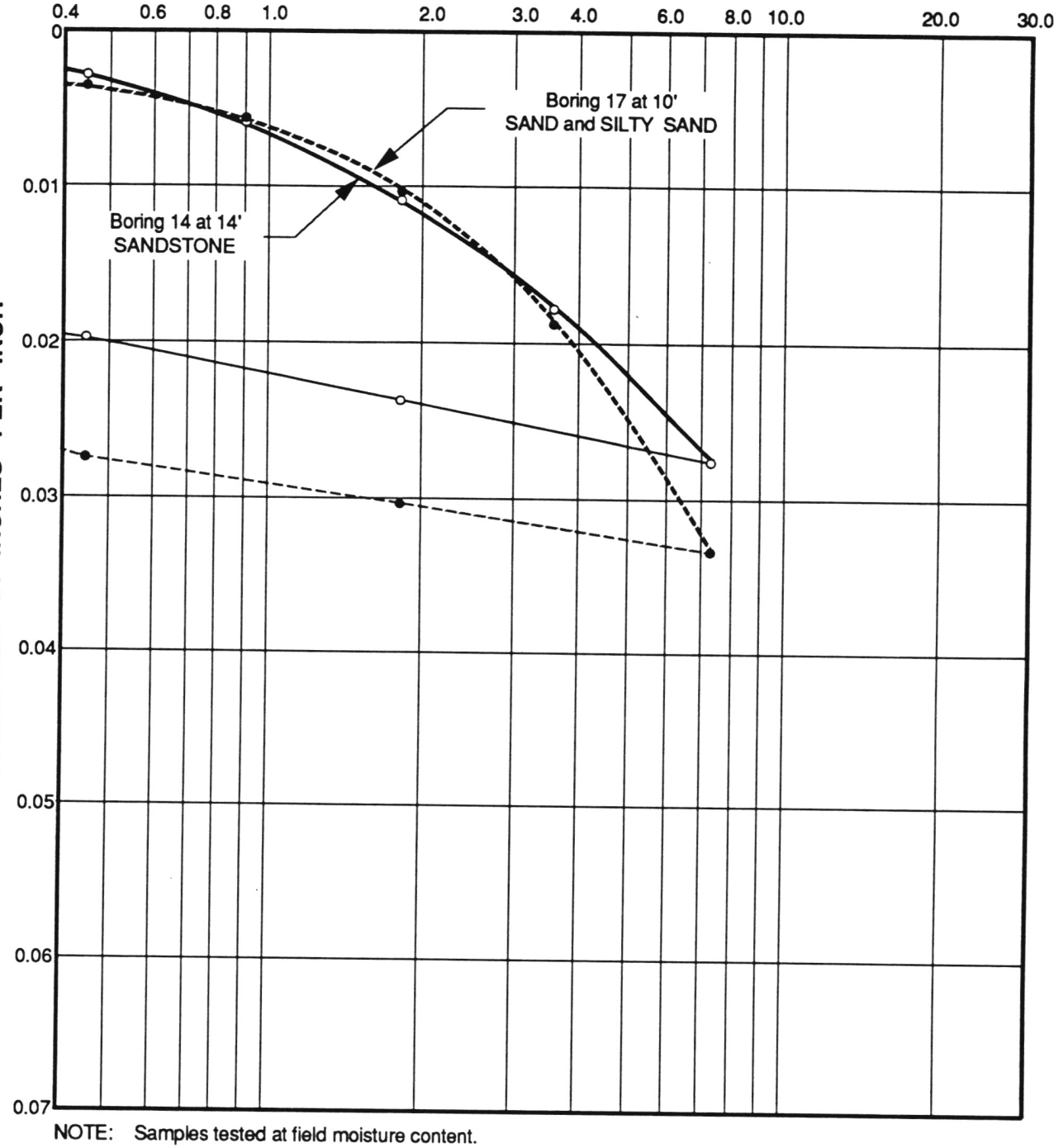


NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.5



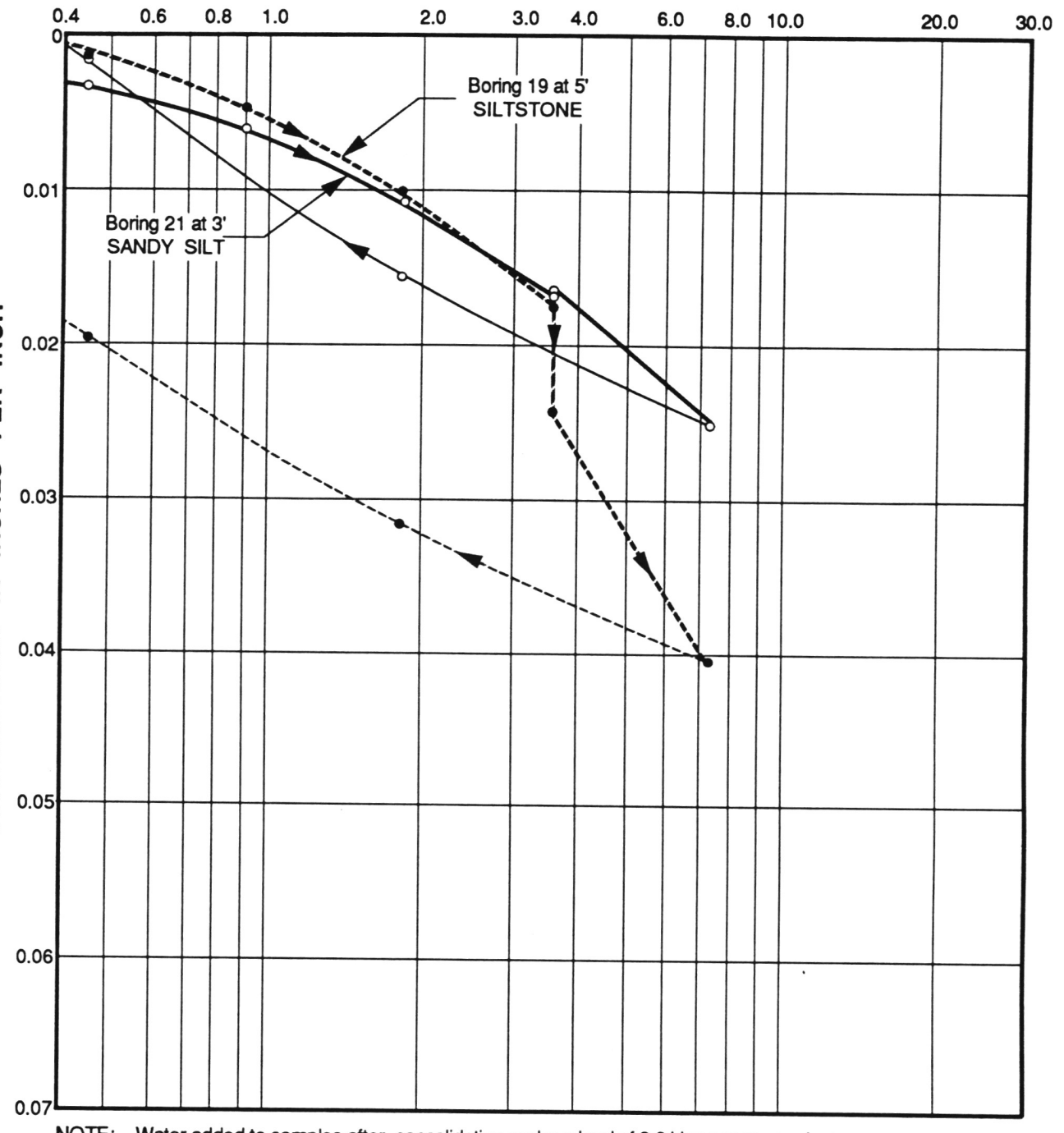
NOTE: Samples tested at field moisture content.

JOB L92045.AE-3 DATE 9/25/92 DR. lk O.E. MS CHKD

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

JOB L92045.AE-3 DATE 9/25/92 DR. lk O.E. MS CHKD



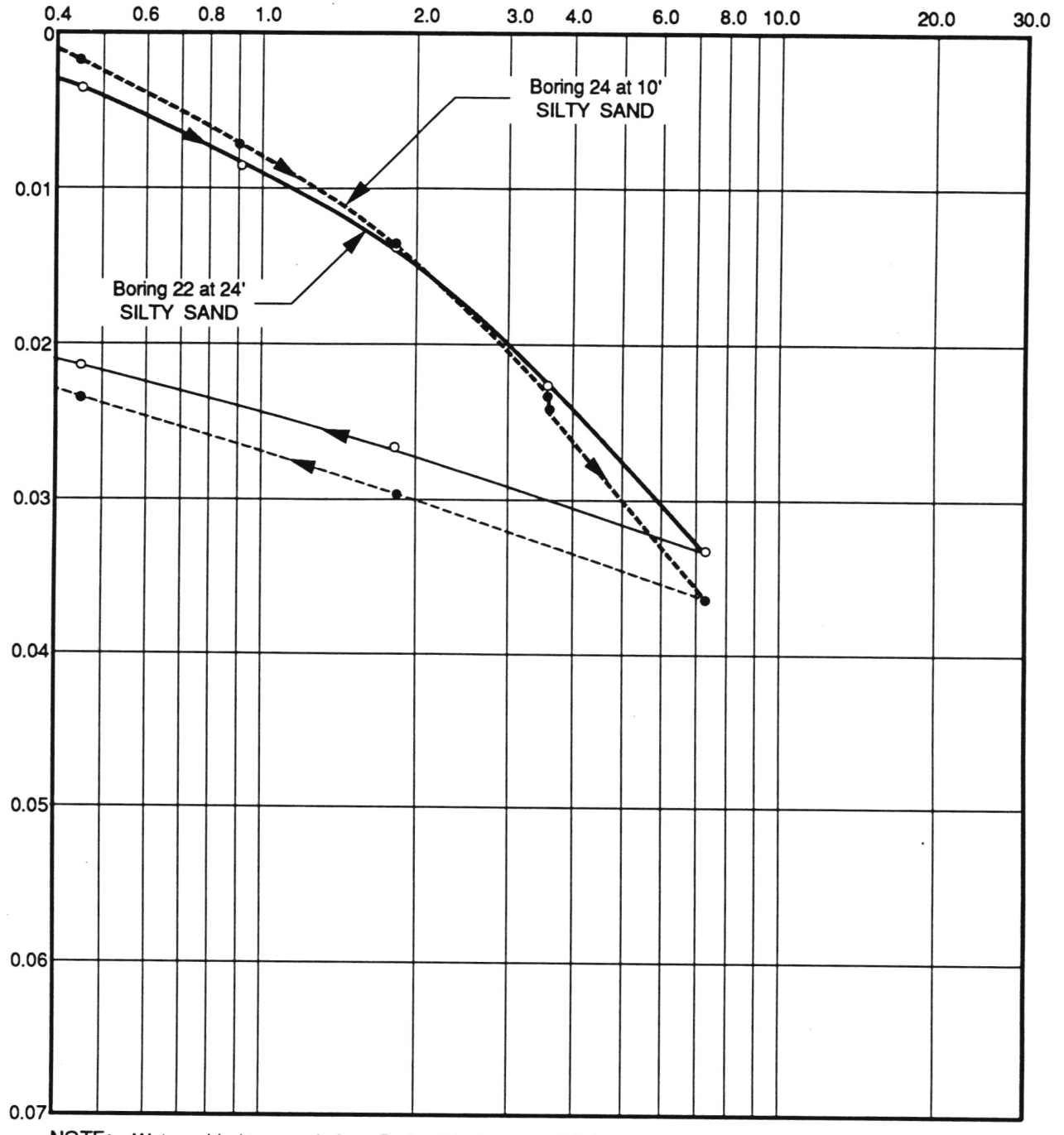
NOTE: Water added to samples after consolidation under a load of 3.6 kips per square foot.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.7

JOB L92045.AE-3 DATE 9/25/92 DR. lk O.E. MS CHKD



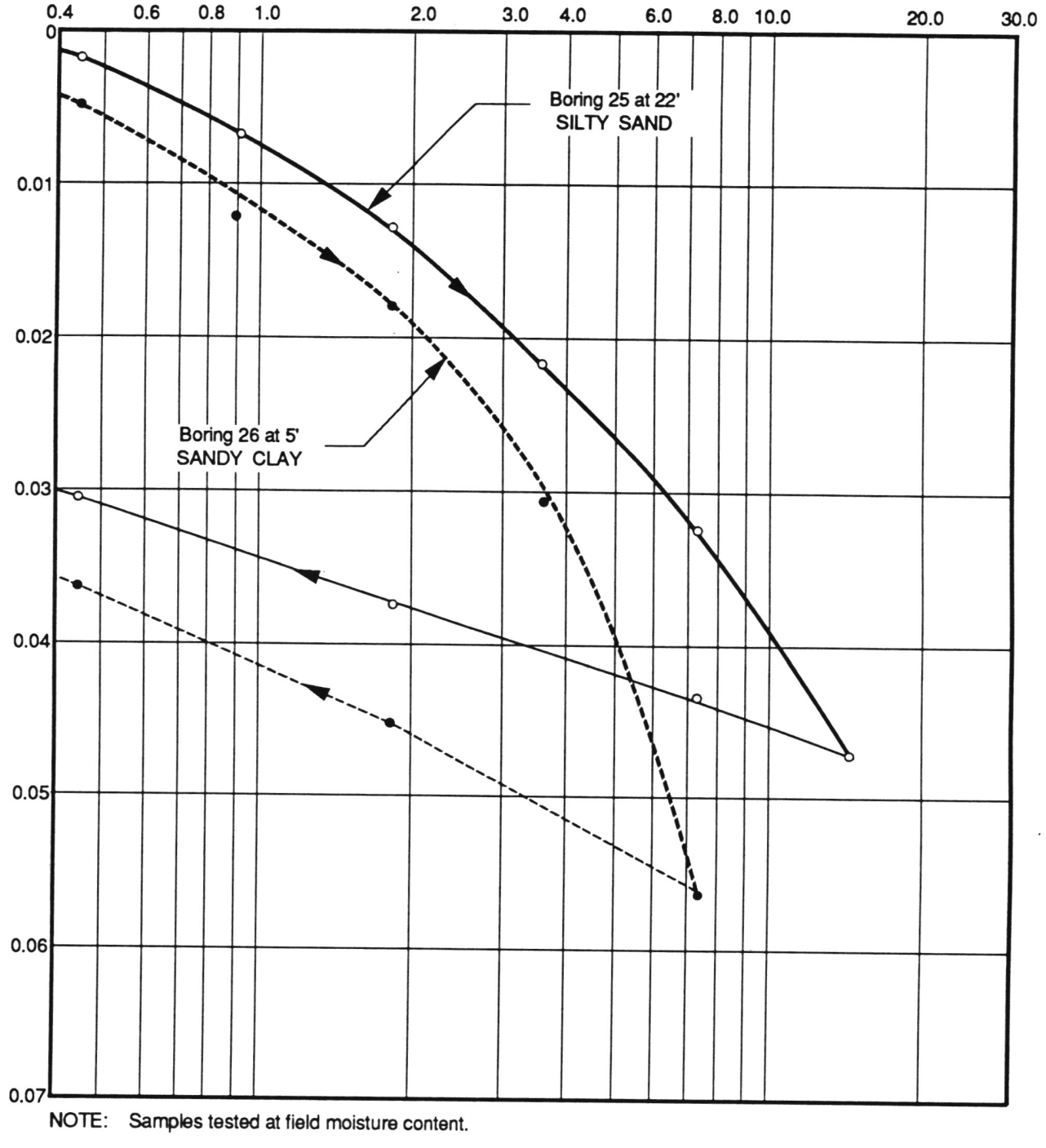
NOTE: Water added to sample from Boring 24 after consolidation under a load of 3.6 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.8

JOB L92045.AE-3 DATE 9/25/92 DR. lk O.E. MS CHKD



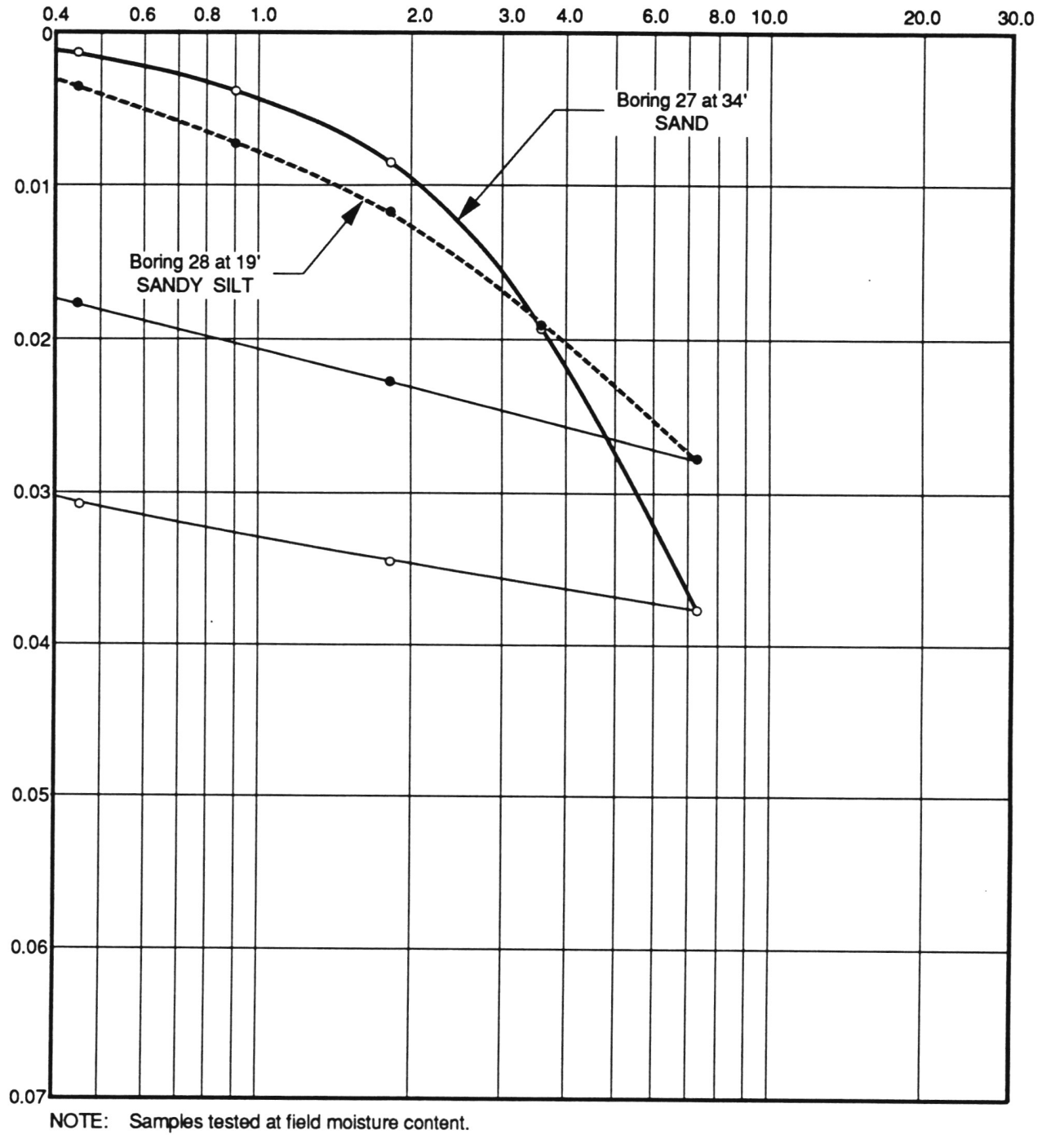
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.9

JOB L92045.AE4 DATE 1/4/93 DR. k O.E. MS CHKD BL



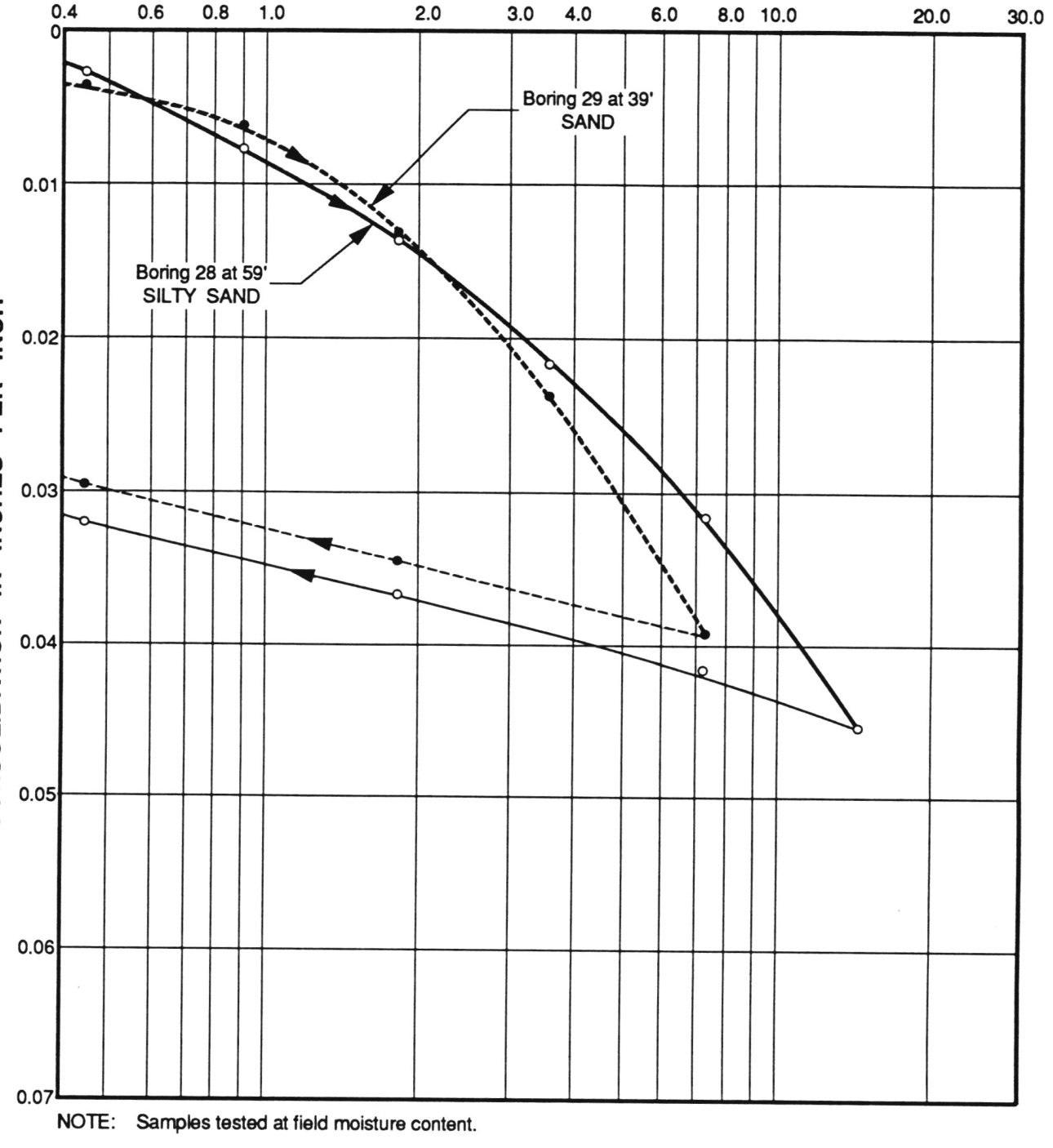
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.10

JOB L92045.AE4 DATE 1/4/93 DR. k O.E. MS CHKD SR



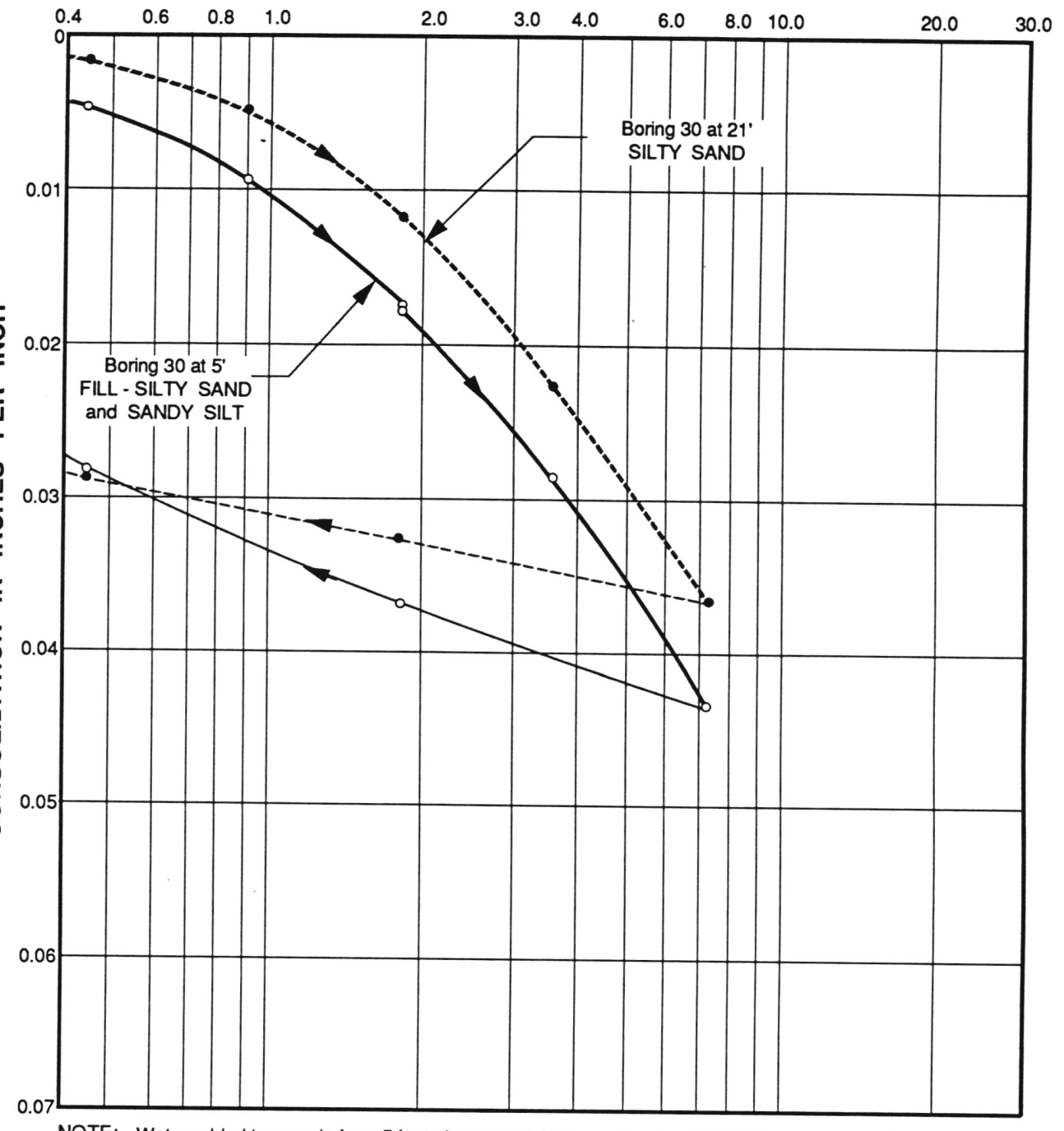
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.11

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD



NOTE: Water added to sample from 5 feet after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

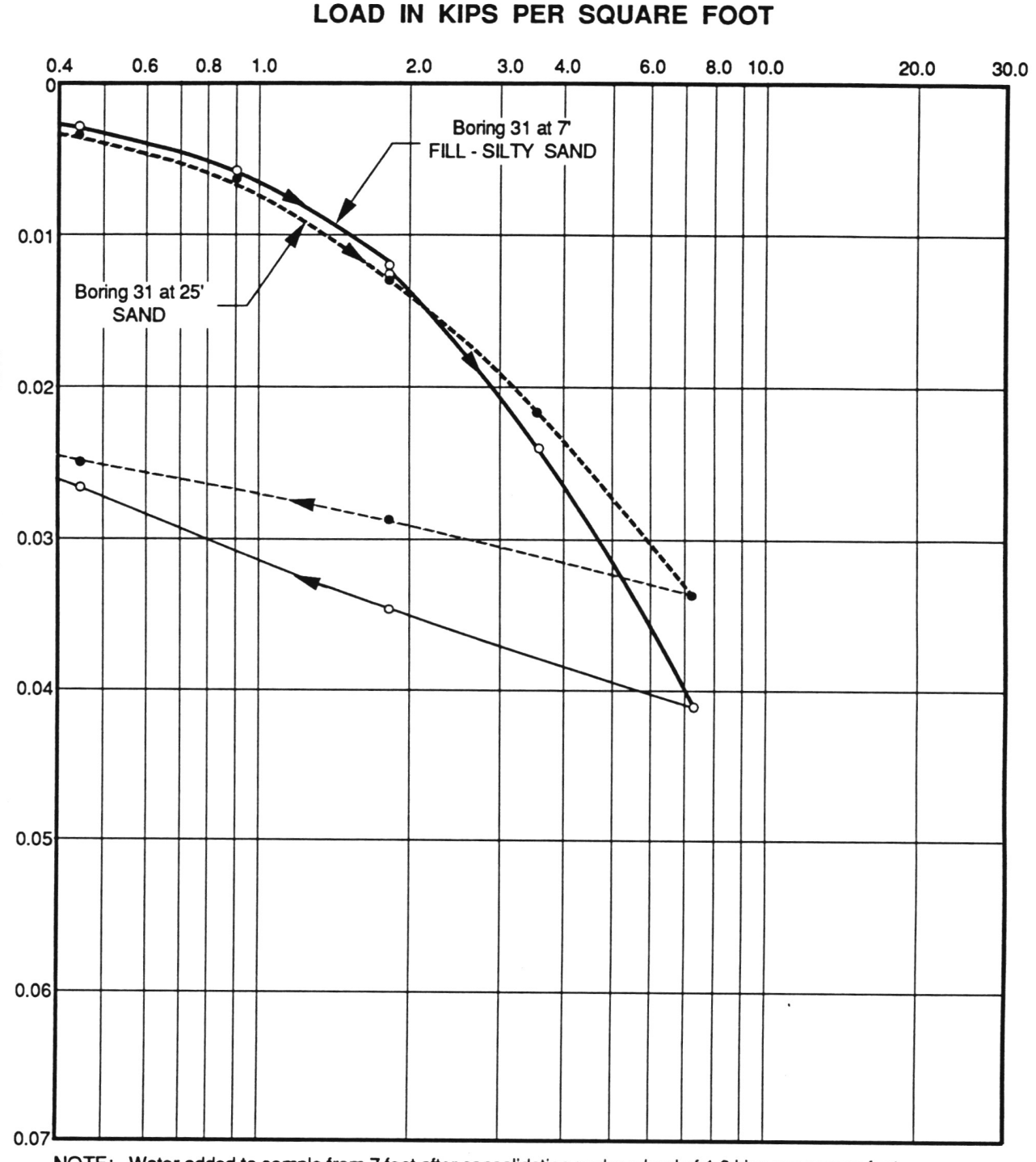
CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.12

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD

612



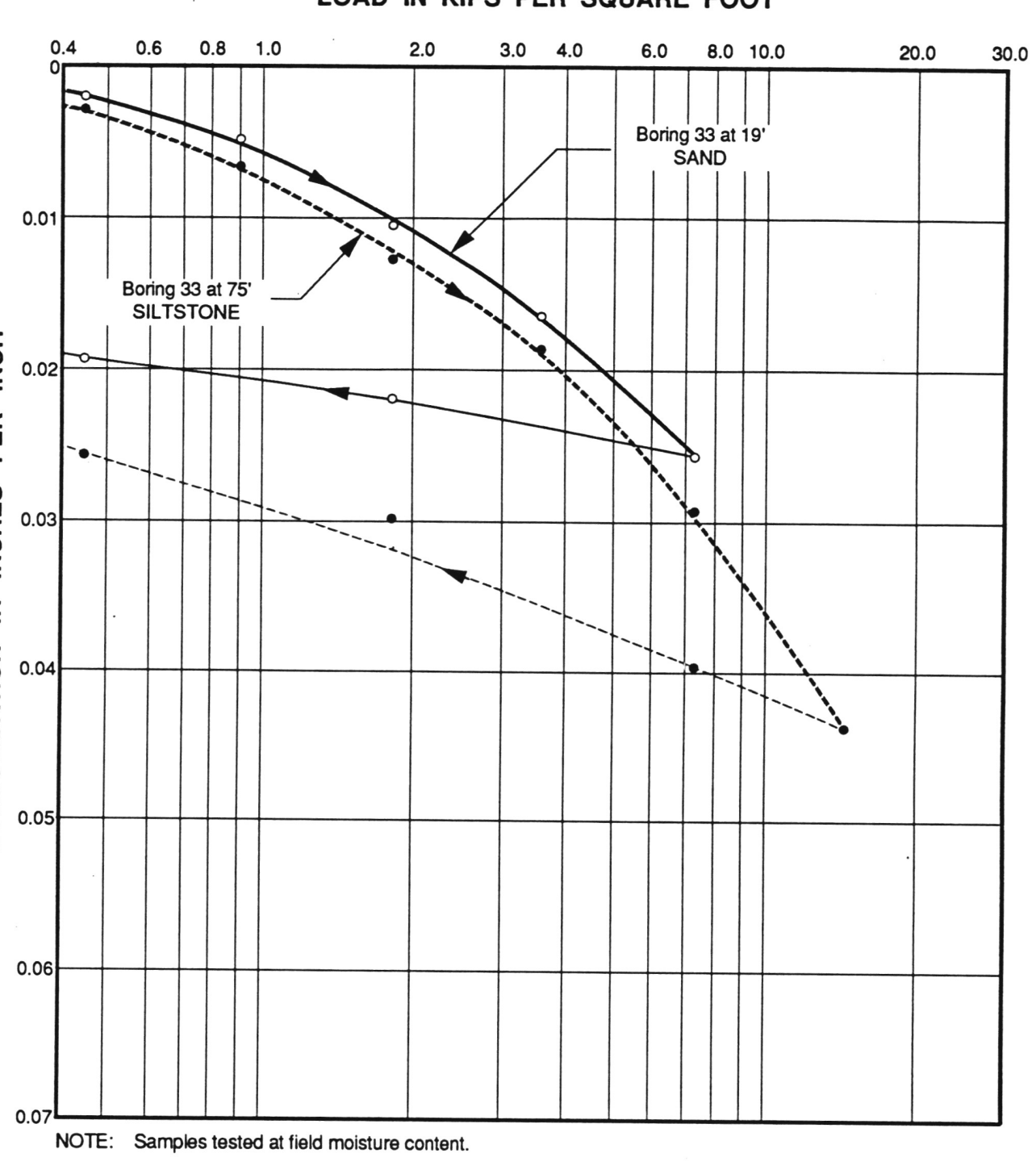
NOTE: Water added to sample from 7 feet after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.13

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



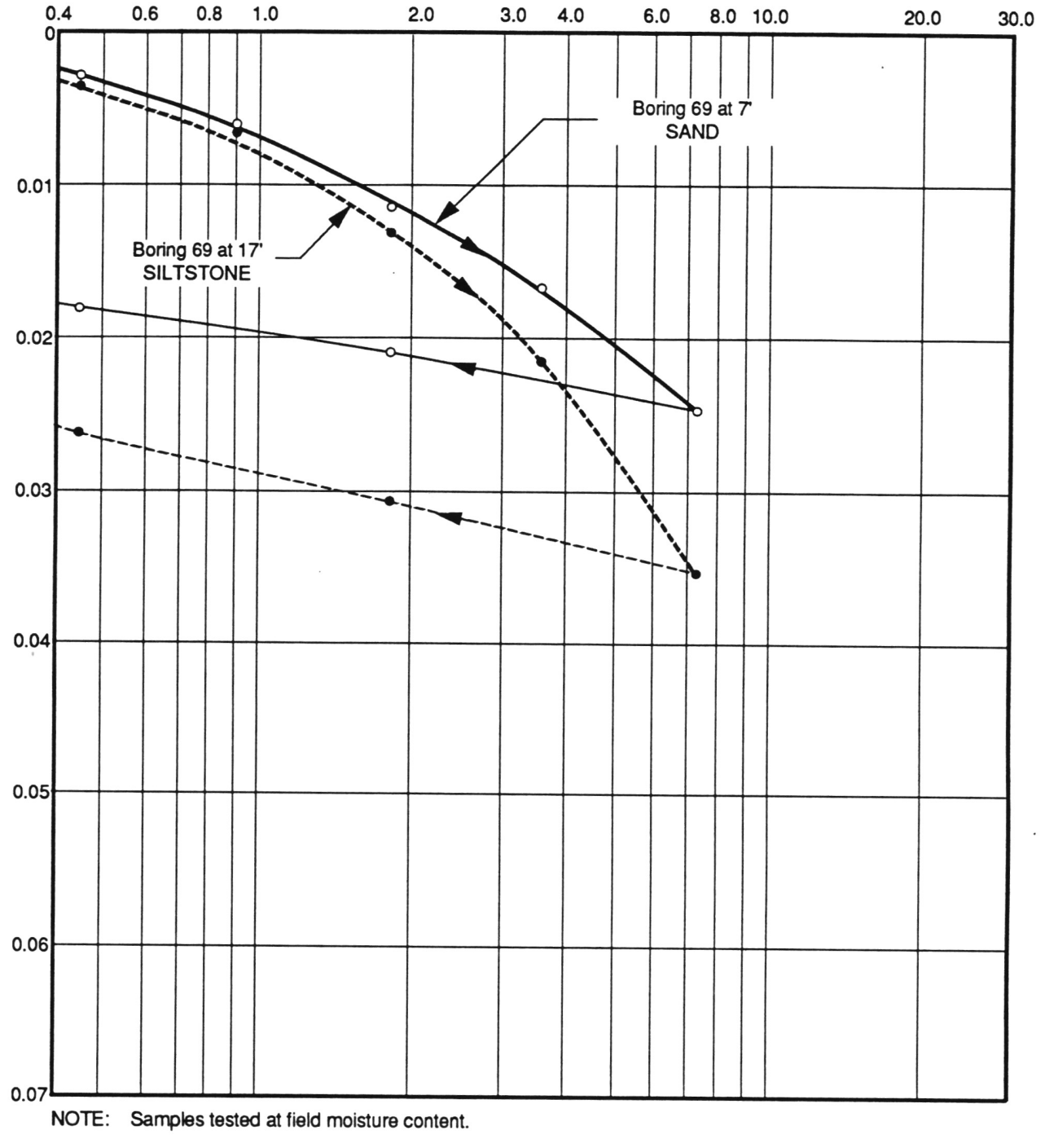
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.14

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD 5/12



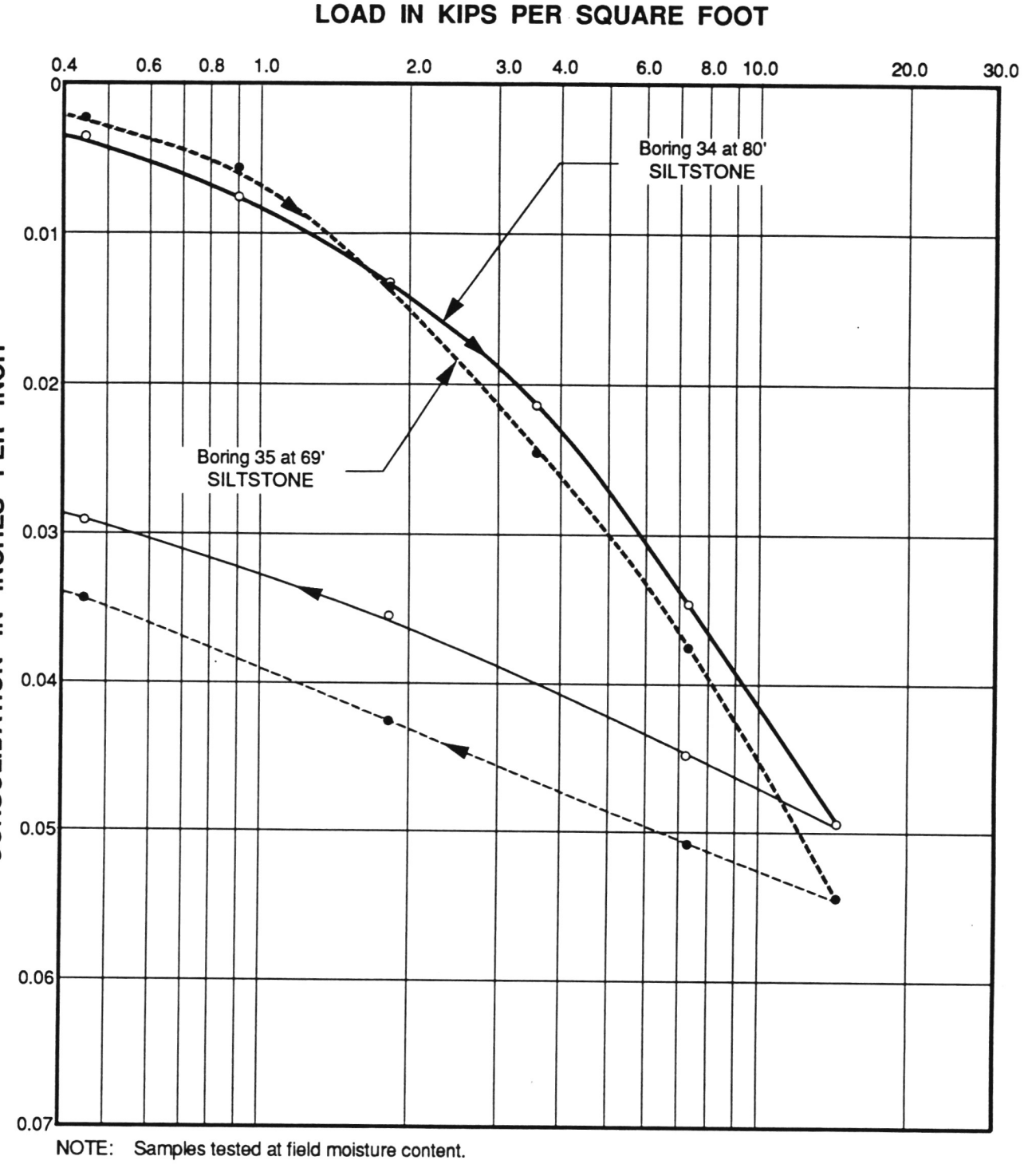
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.15

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD 5/12



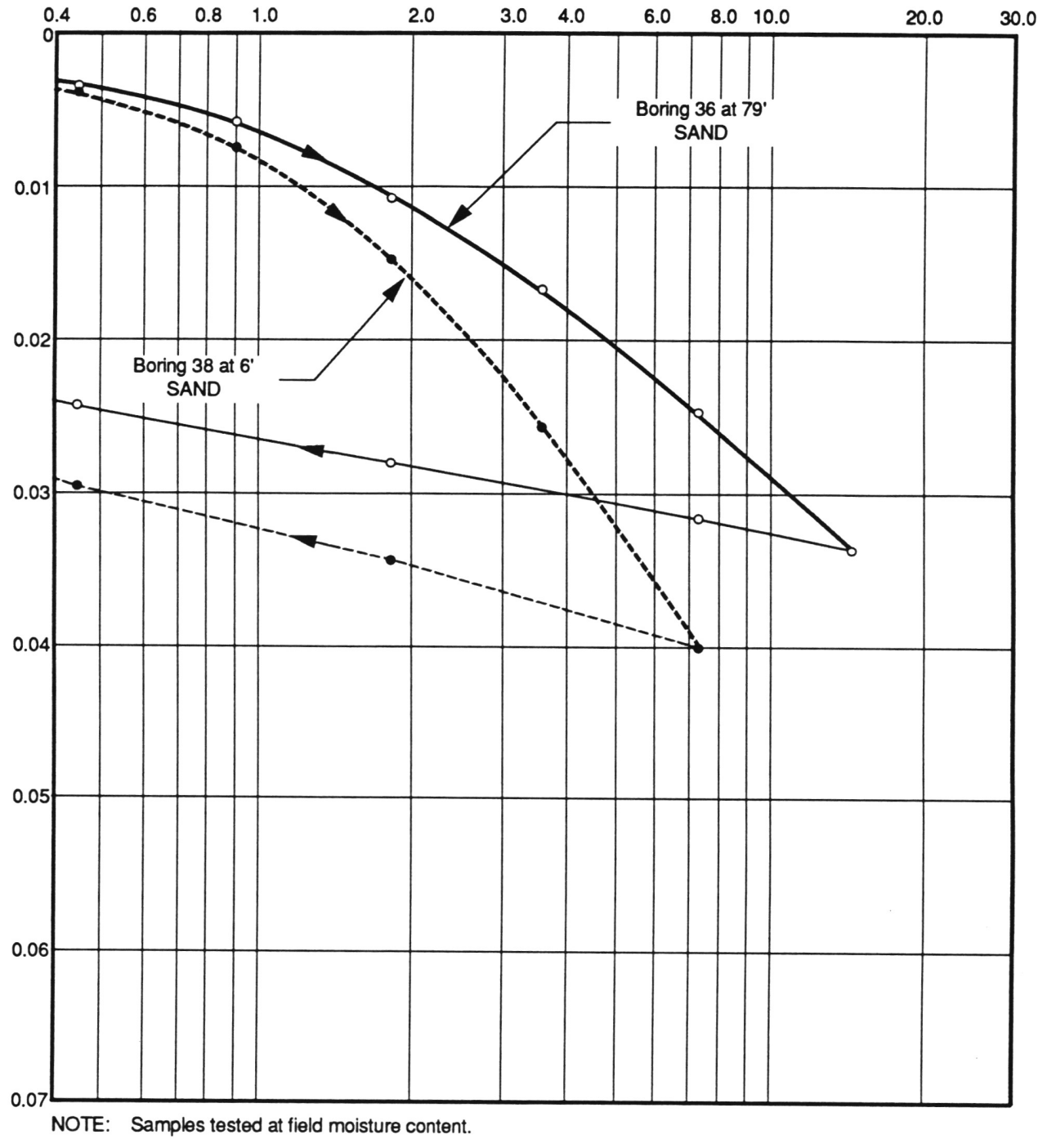
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.16

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD CJC



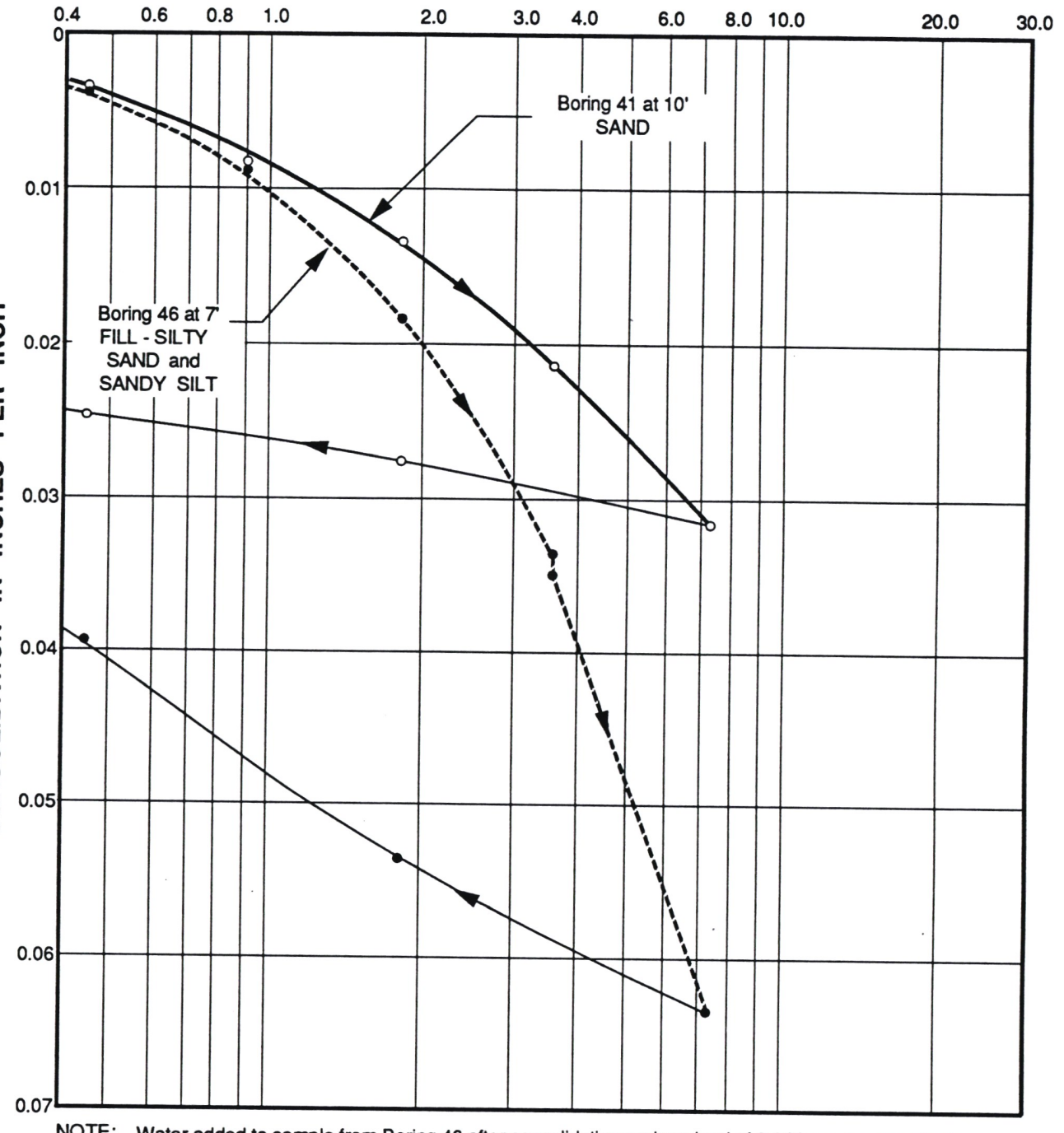
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.17

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



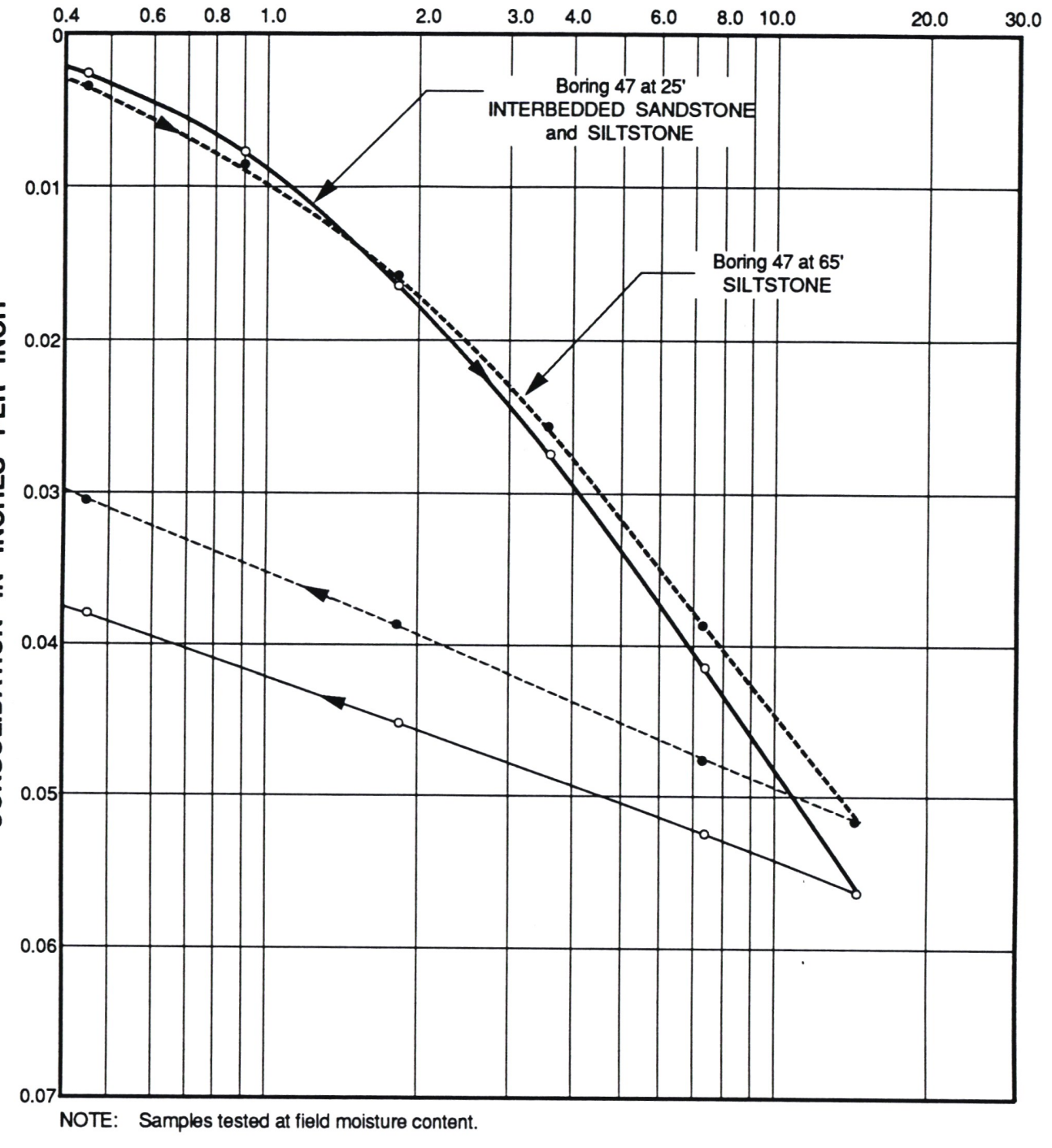
NOTE: Water added to sample from Boring 46 after consolidation under a load of 3.6 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.18

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD 5/2



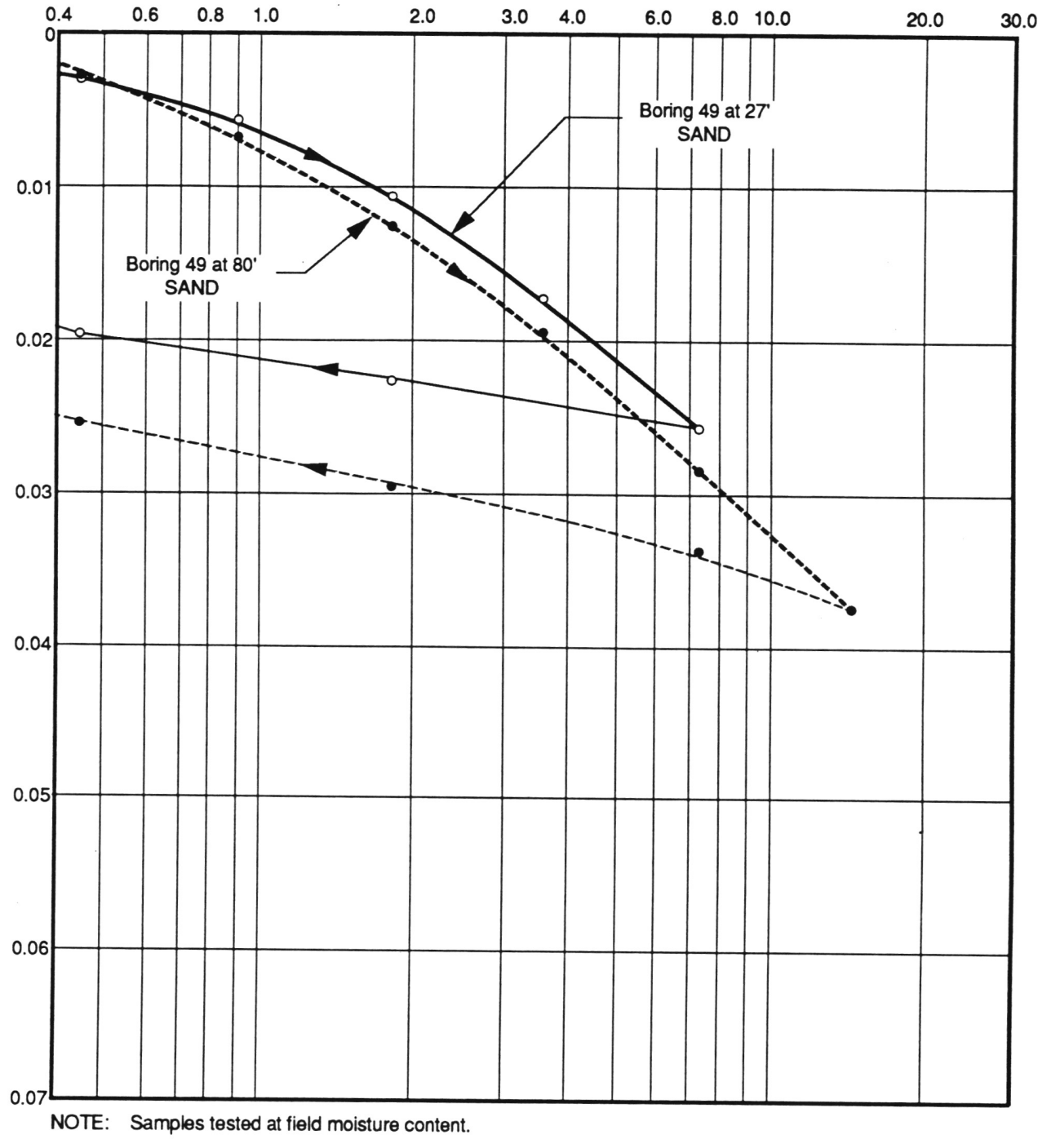
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.19

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



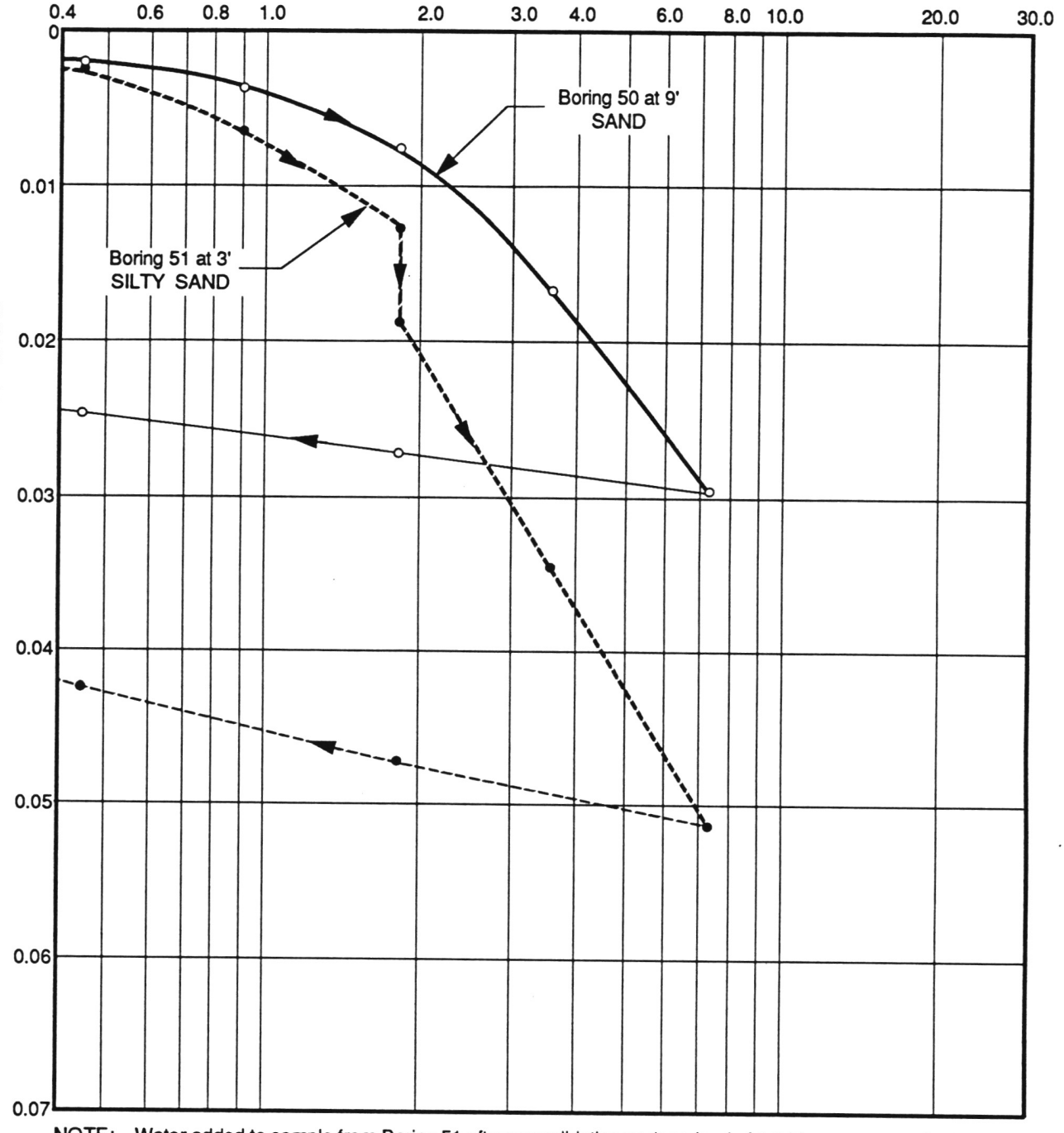
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.20

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD ER



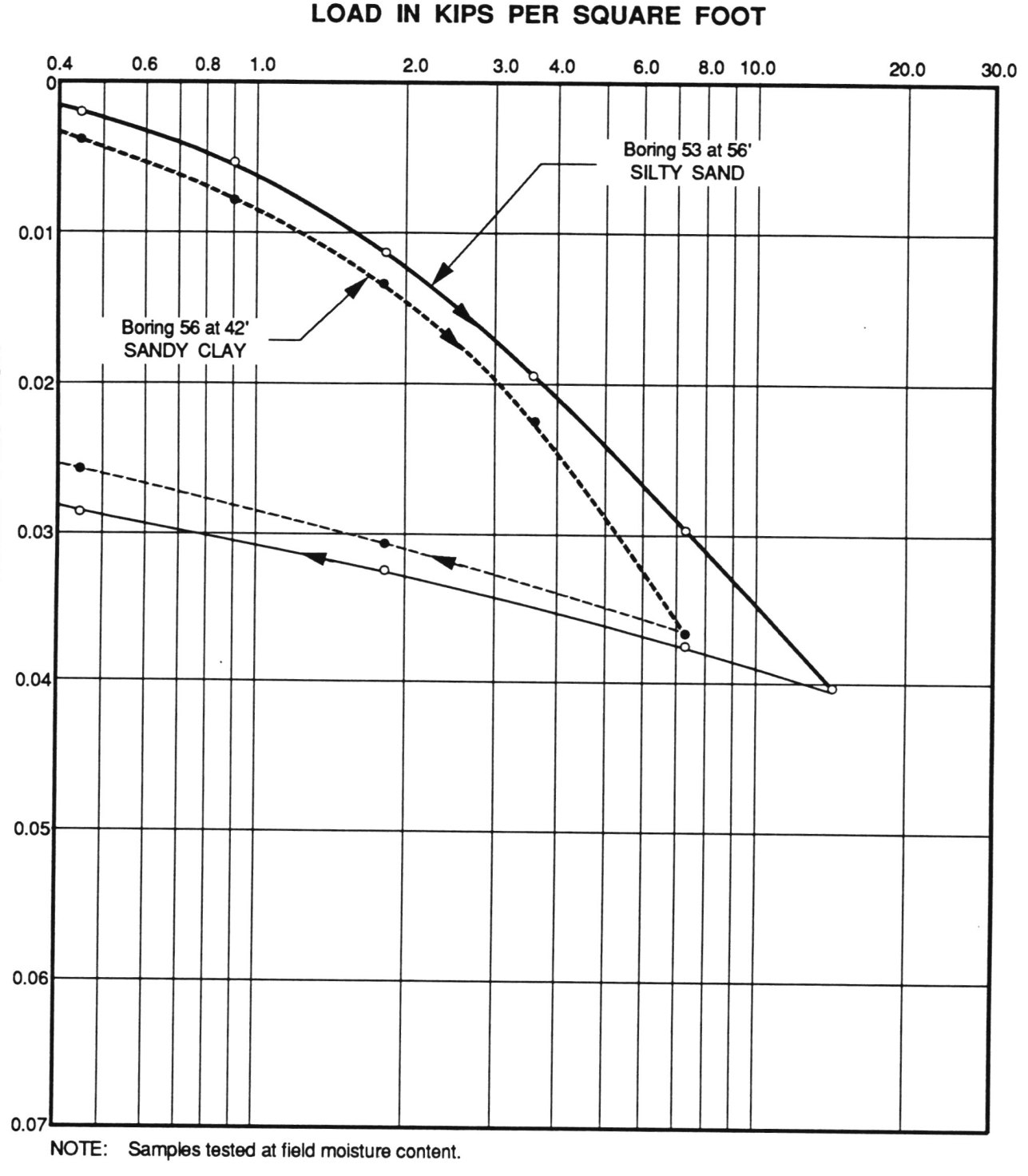
NOTE: Water added to sample from Boring 51 after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.21

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD



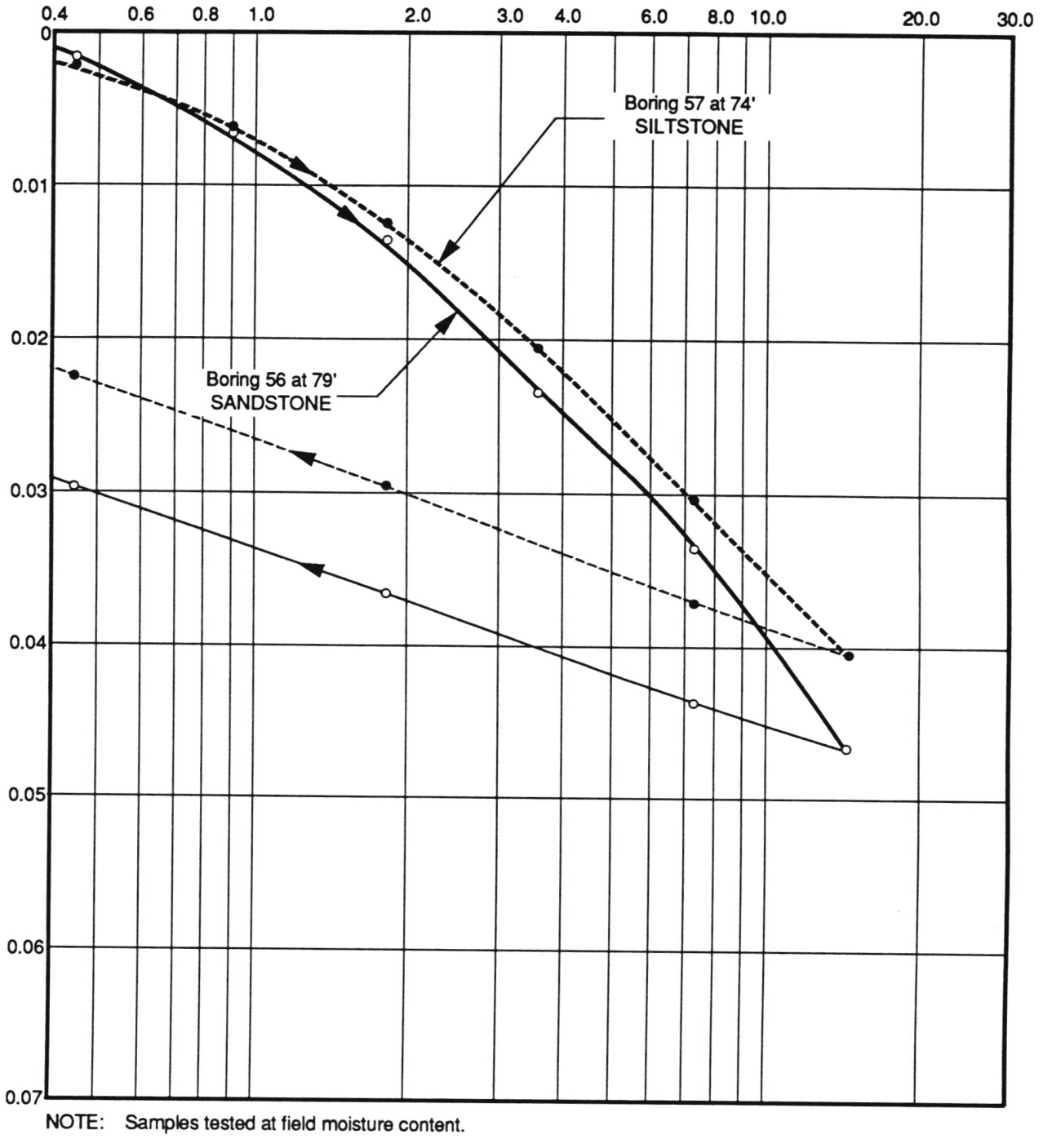
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.22

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



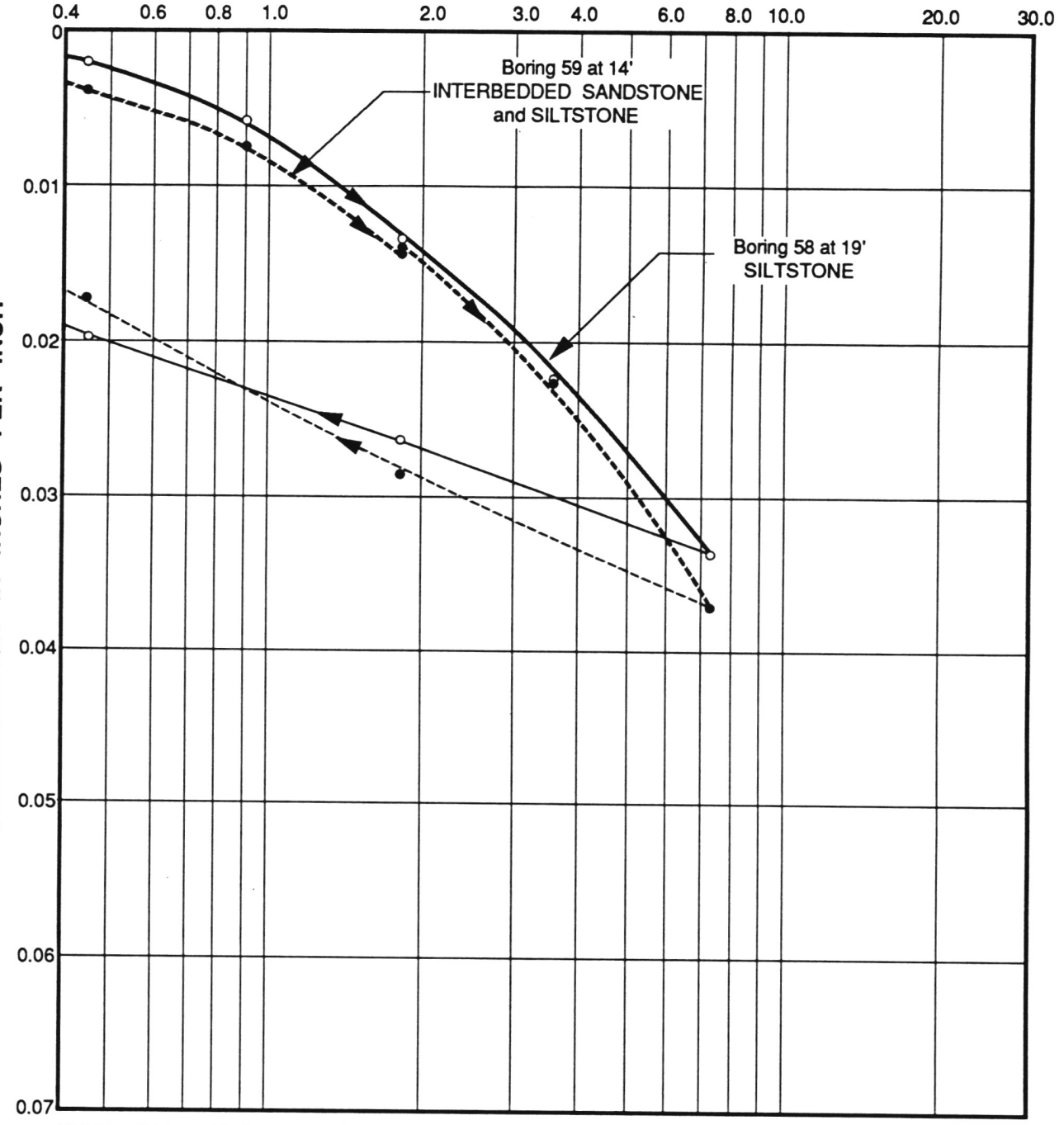
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.23

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



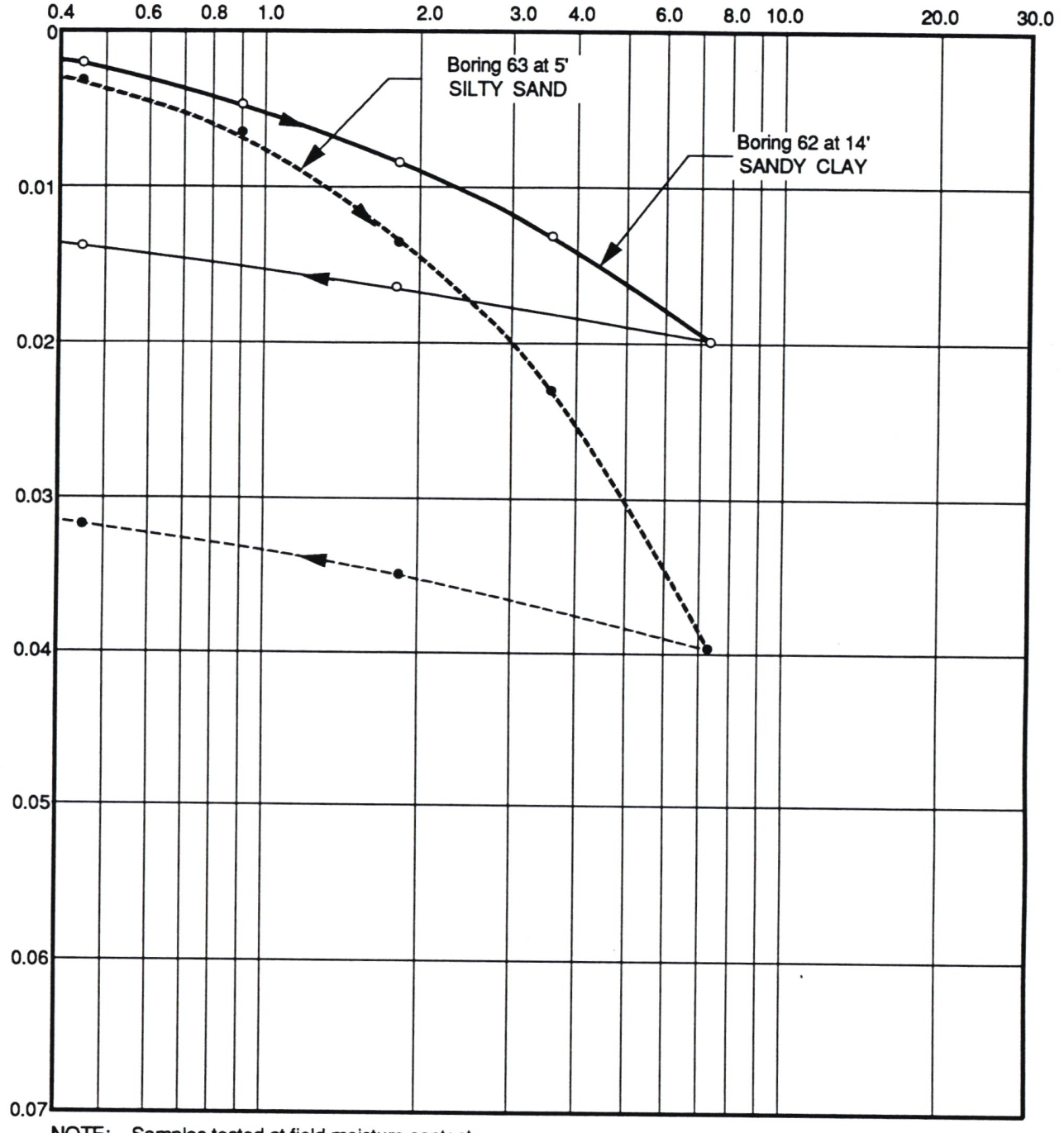
NOTE: Water added to sample from Boring 59 after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.24

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



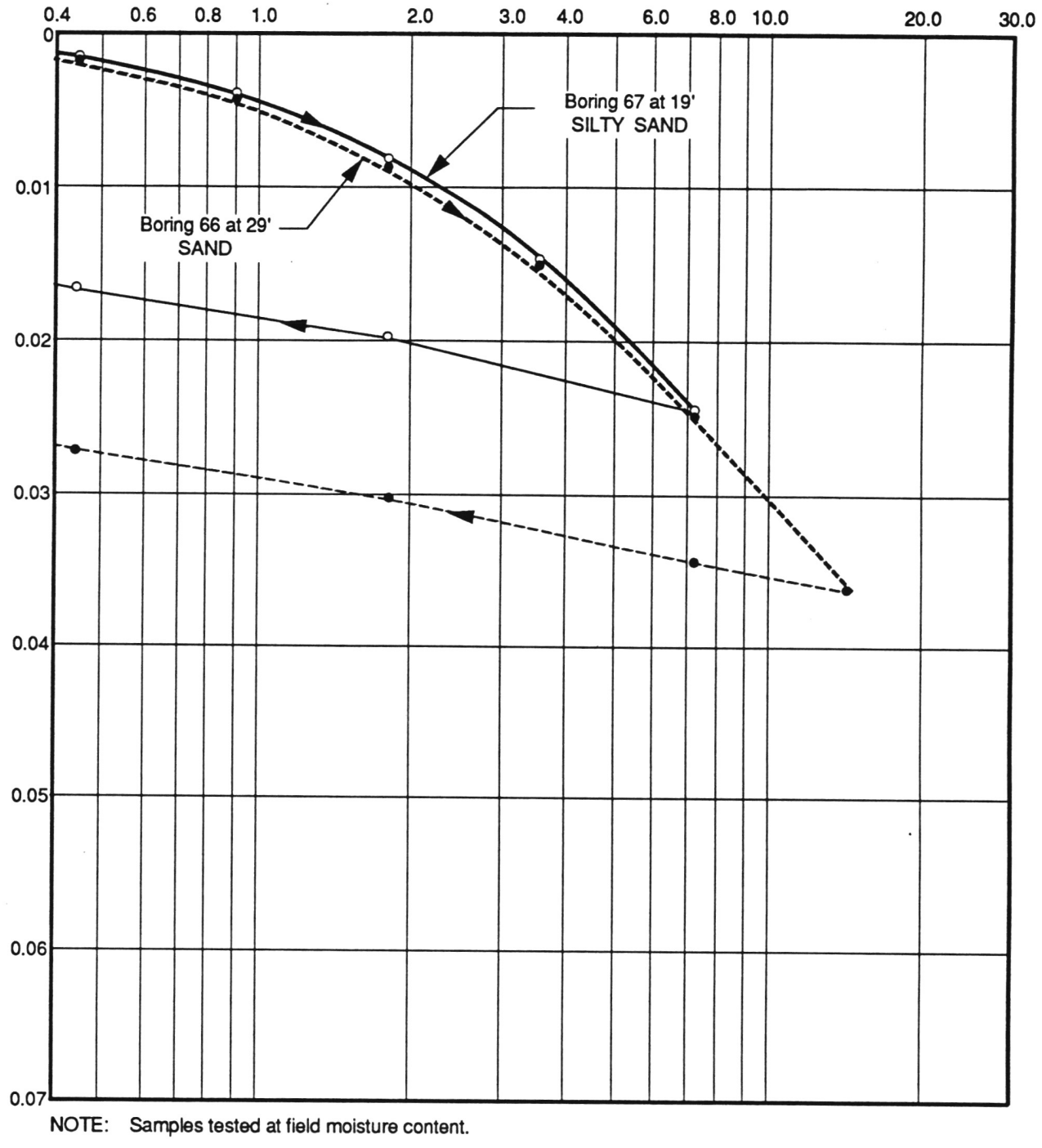
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.25

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD GR



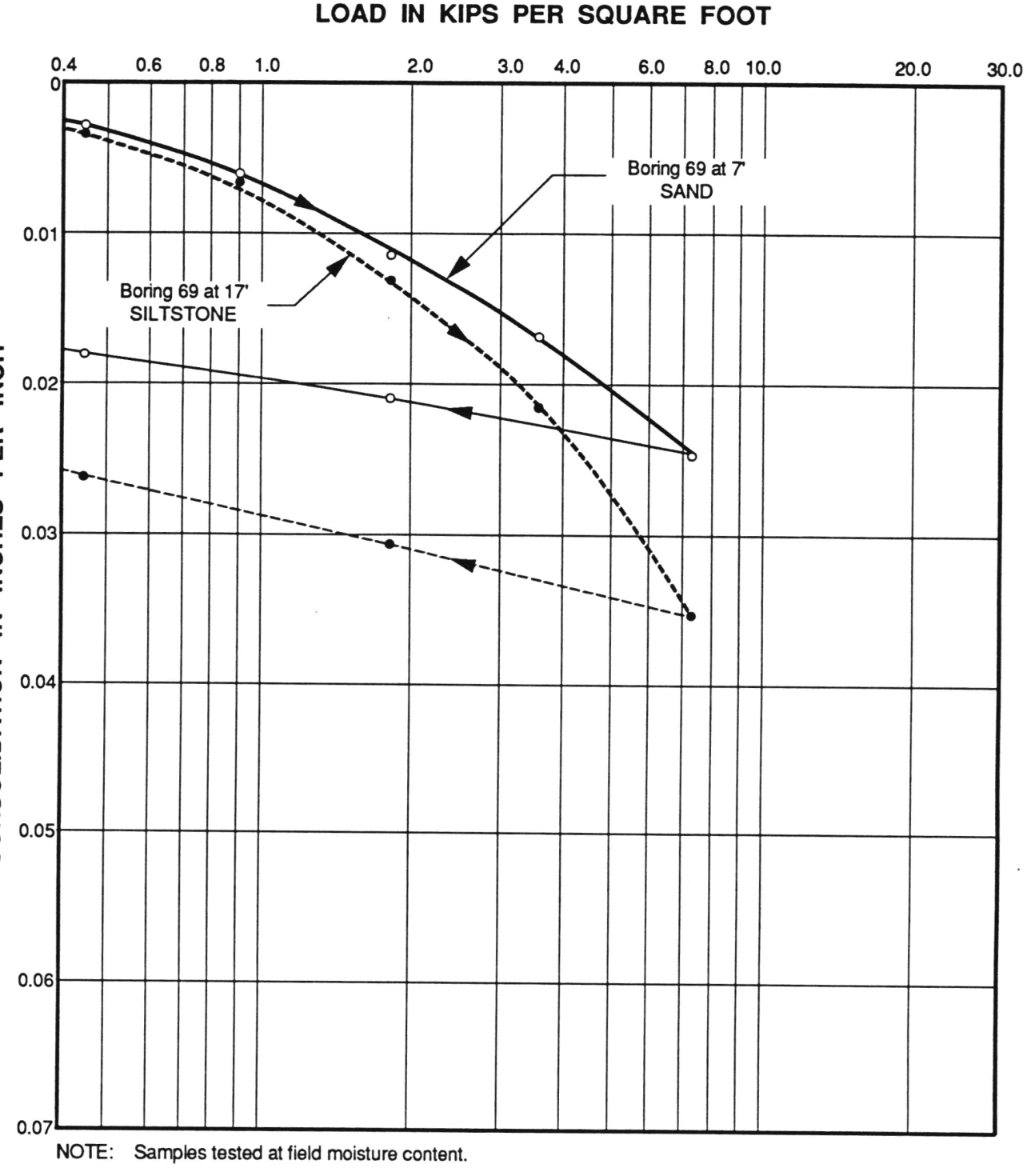
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.26

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD GR



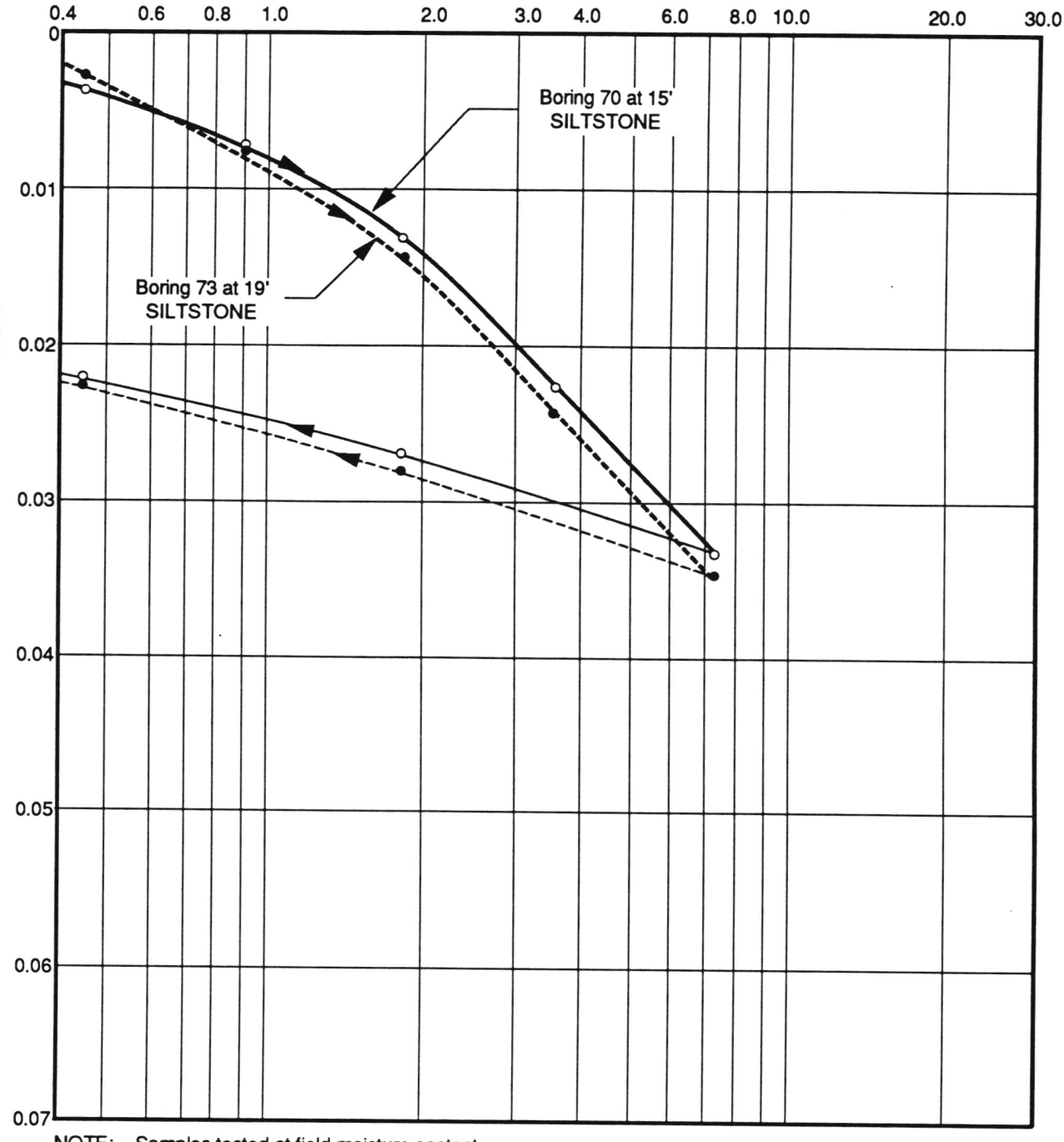
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.27

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD



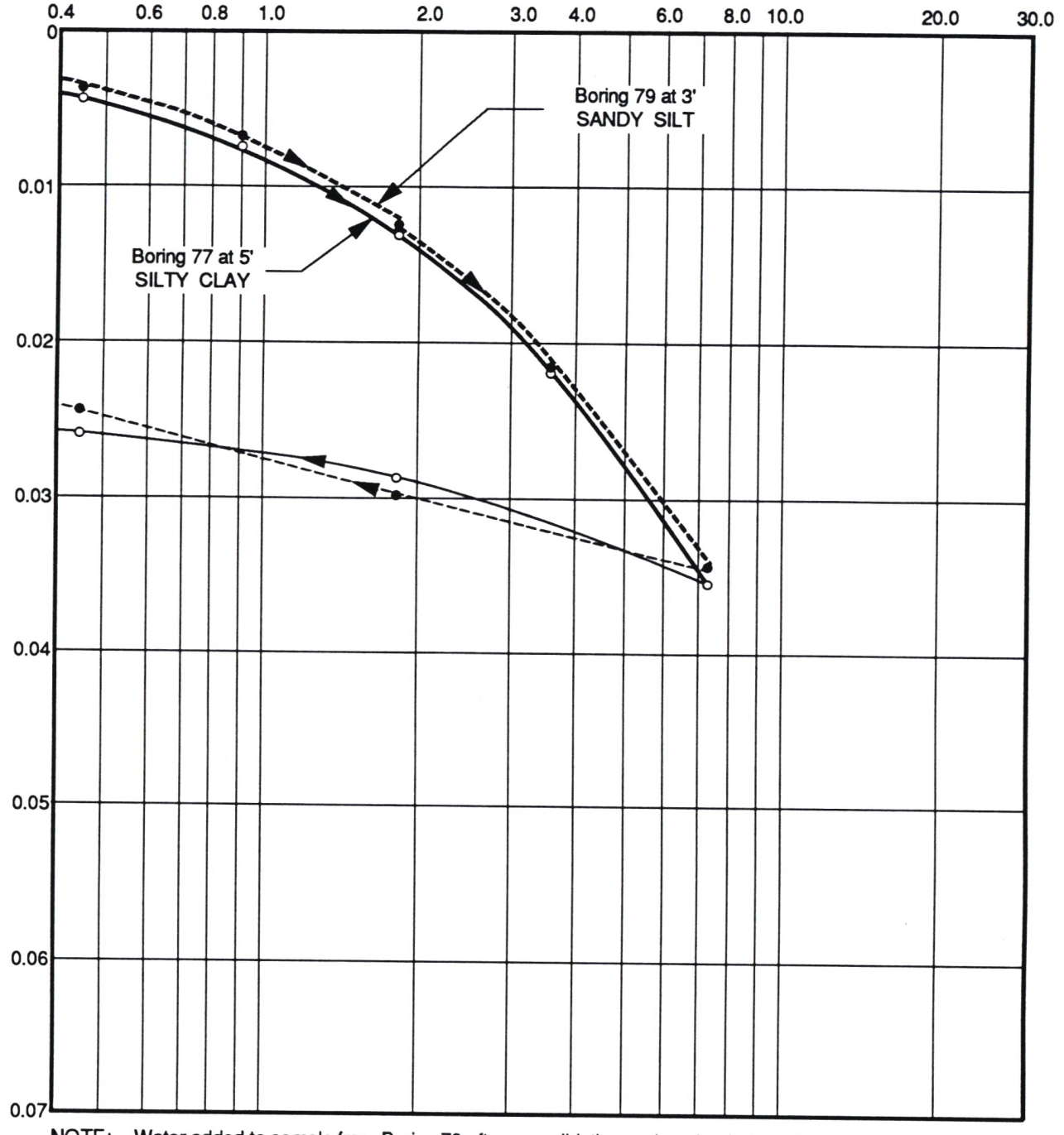
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.28

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD



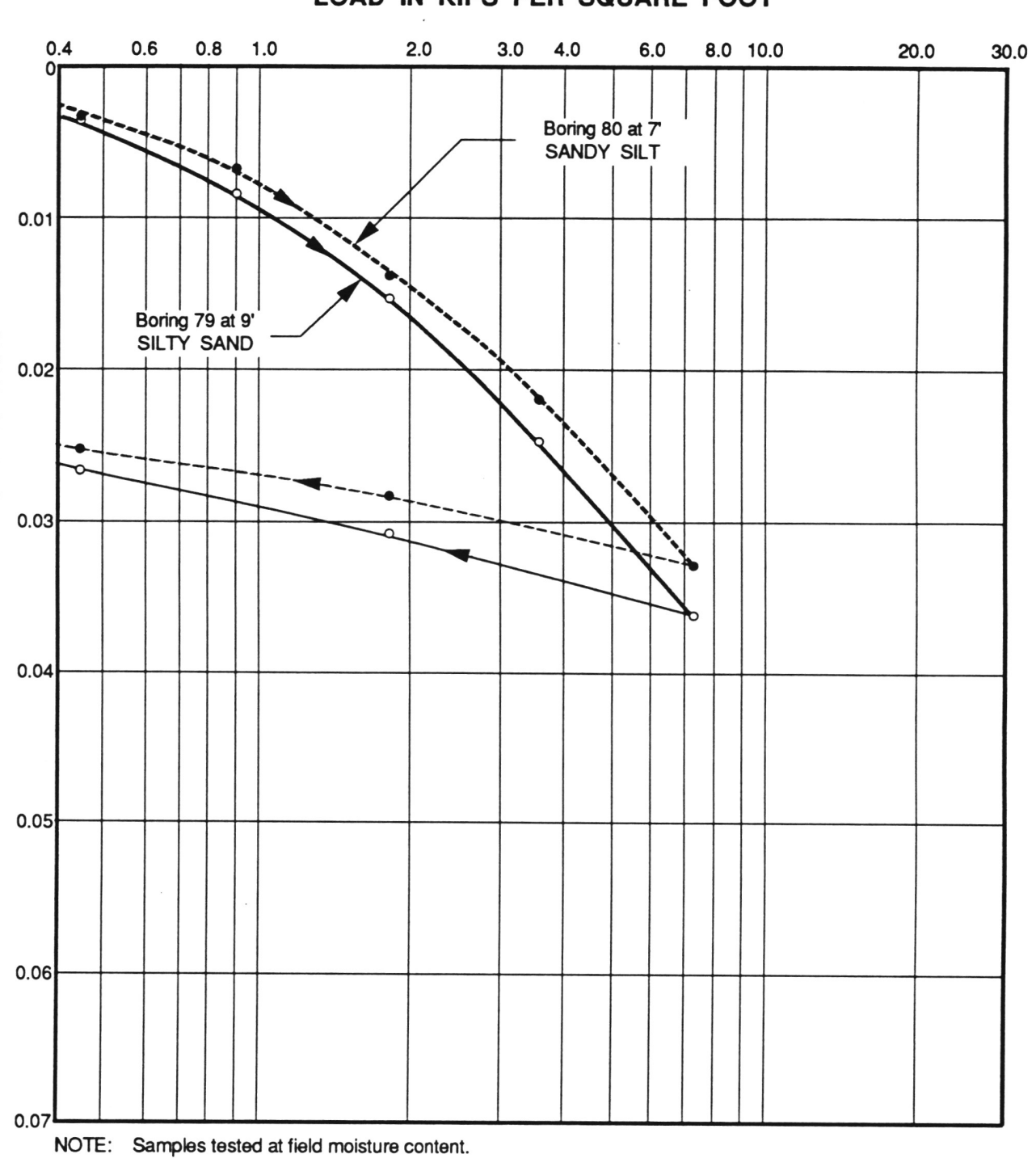
NOTE: Water added to sample from Boring 79 after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.29

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



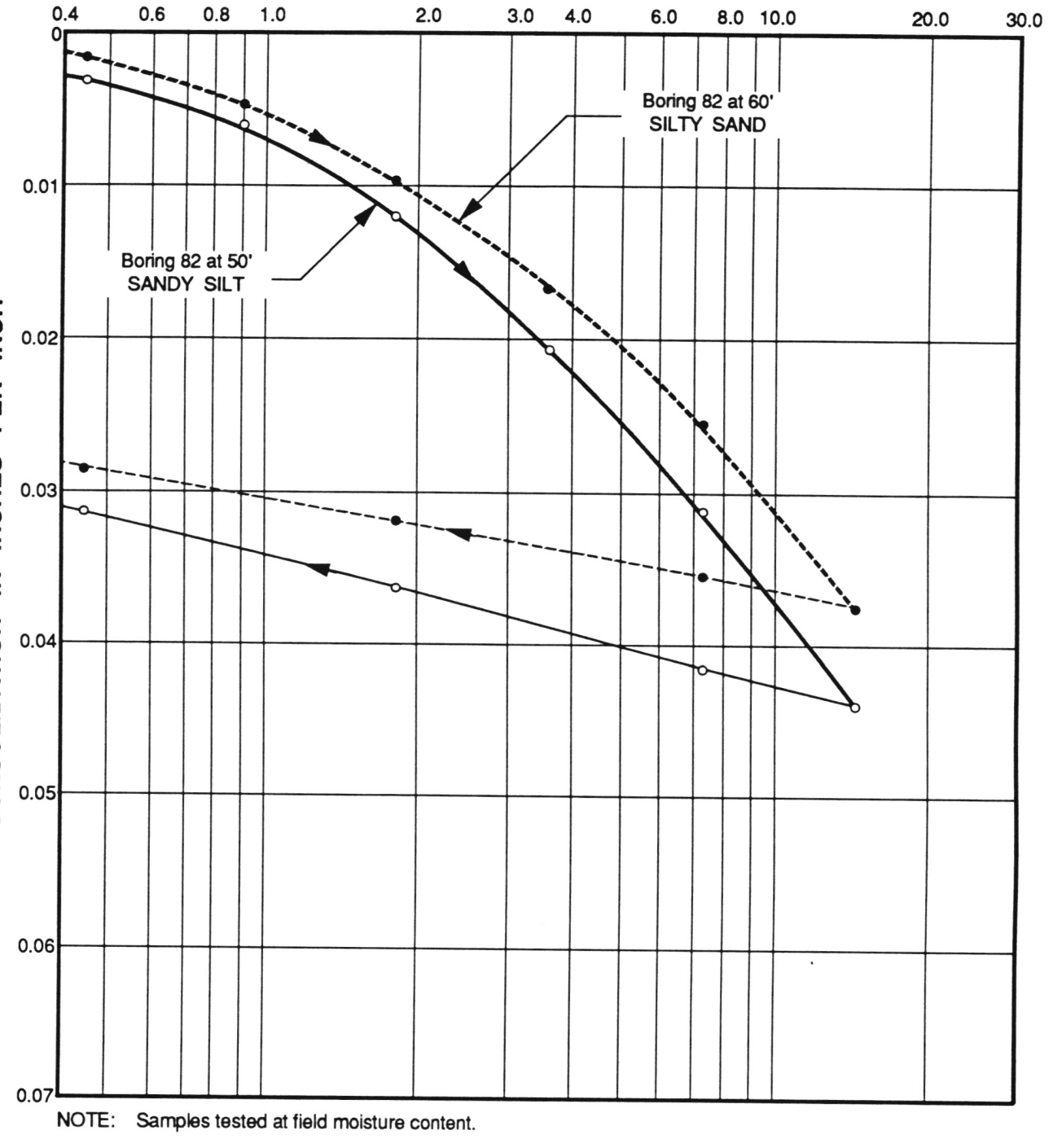
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.30

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



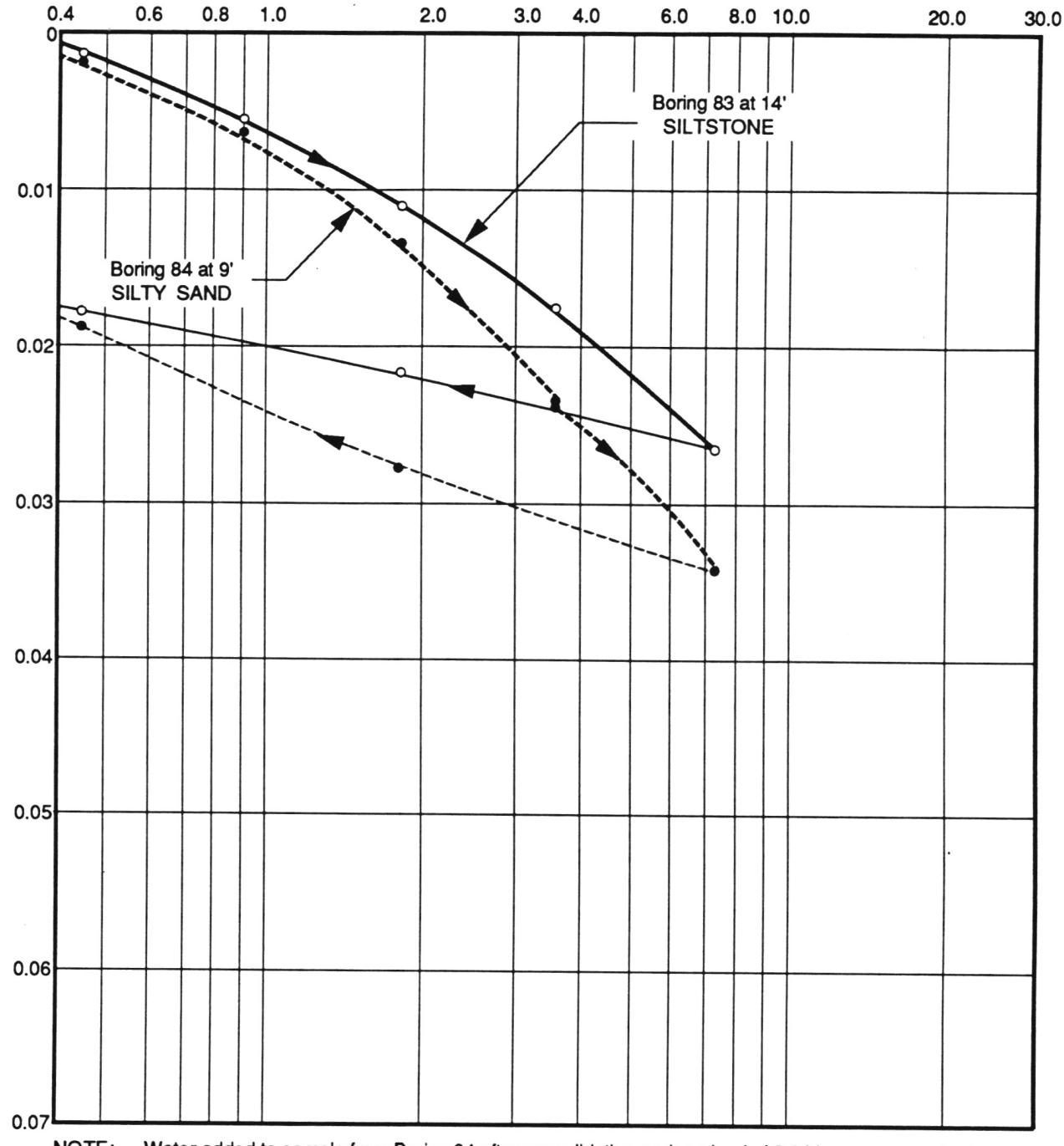
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.31

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD



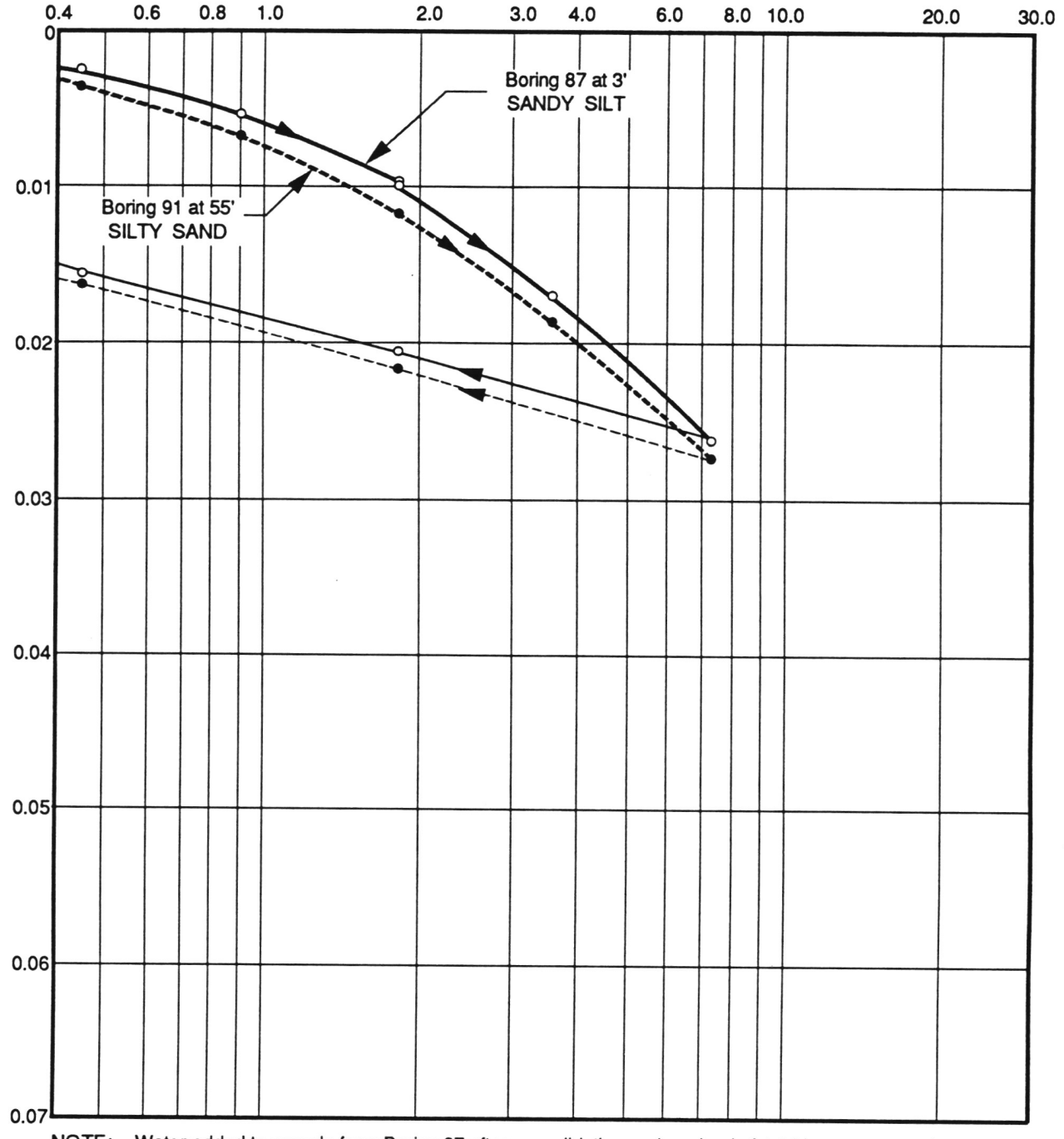
NOTE: Water added to sample from Boring 84 after consolidation under a load of 3.6 kips per square foot. The other sample tested af field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.32

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



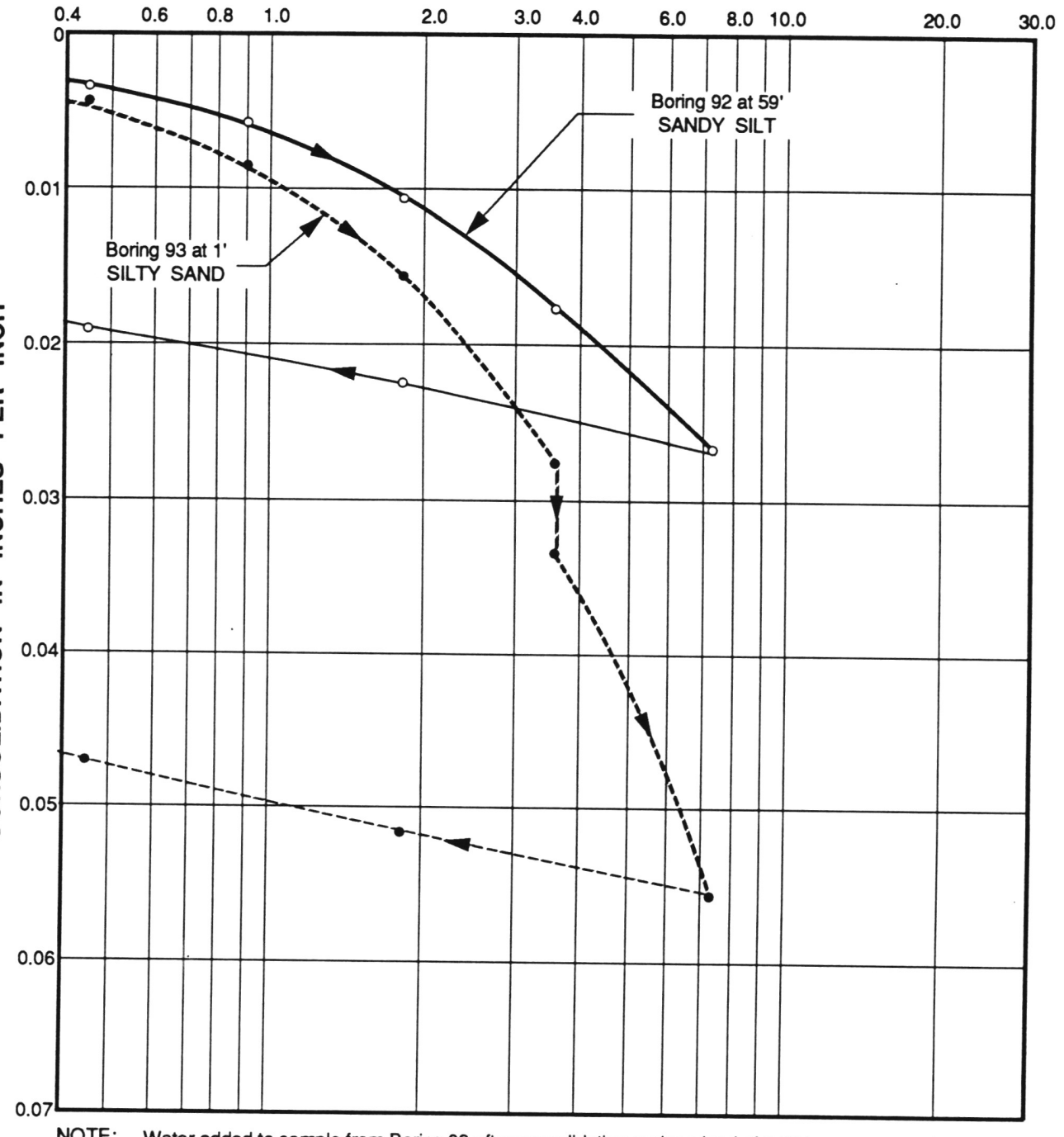
NOTE: Water added to sample from Boring 87 after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.33

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



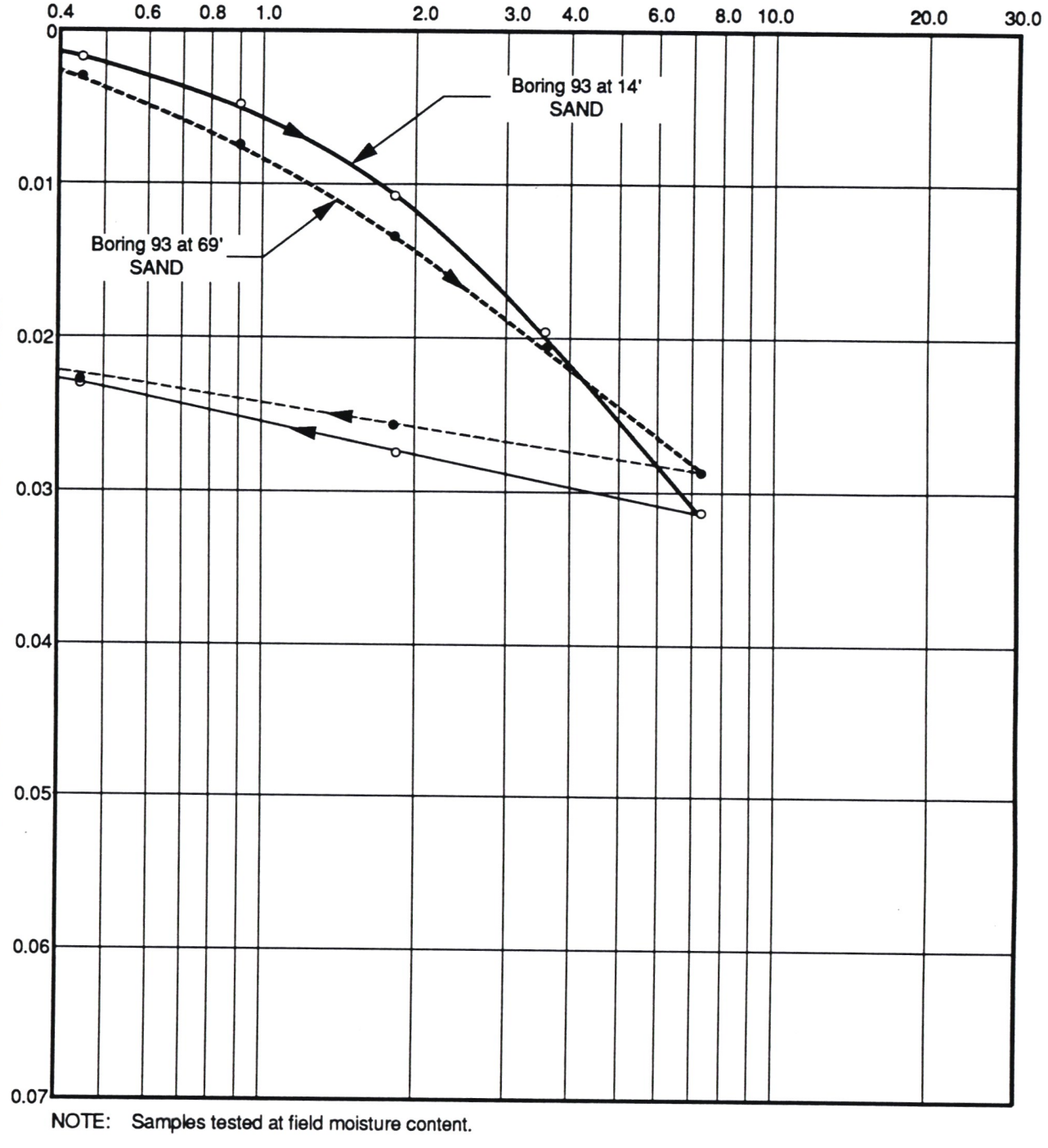
NOTE: Water added to sample from Boring 93 after consolidation under a load of 3.6 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.34

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



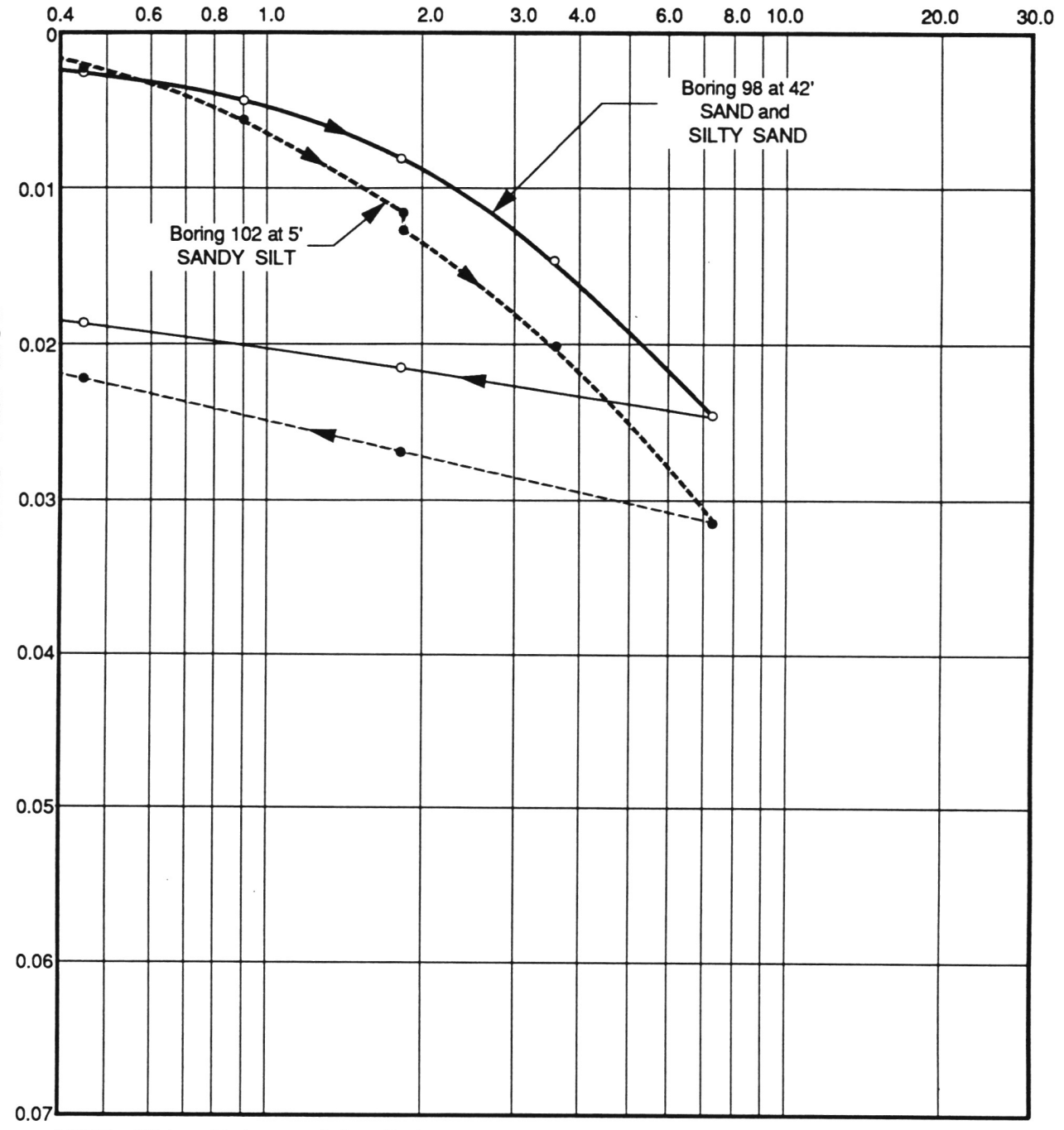
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.35

JOB L92045.AE4 DATE 1/27/93 DR. lk O.E. MS CHKD



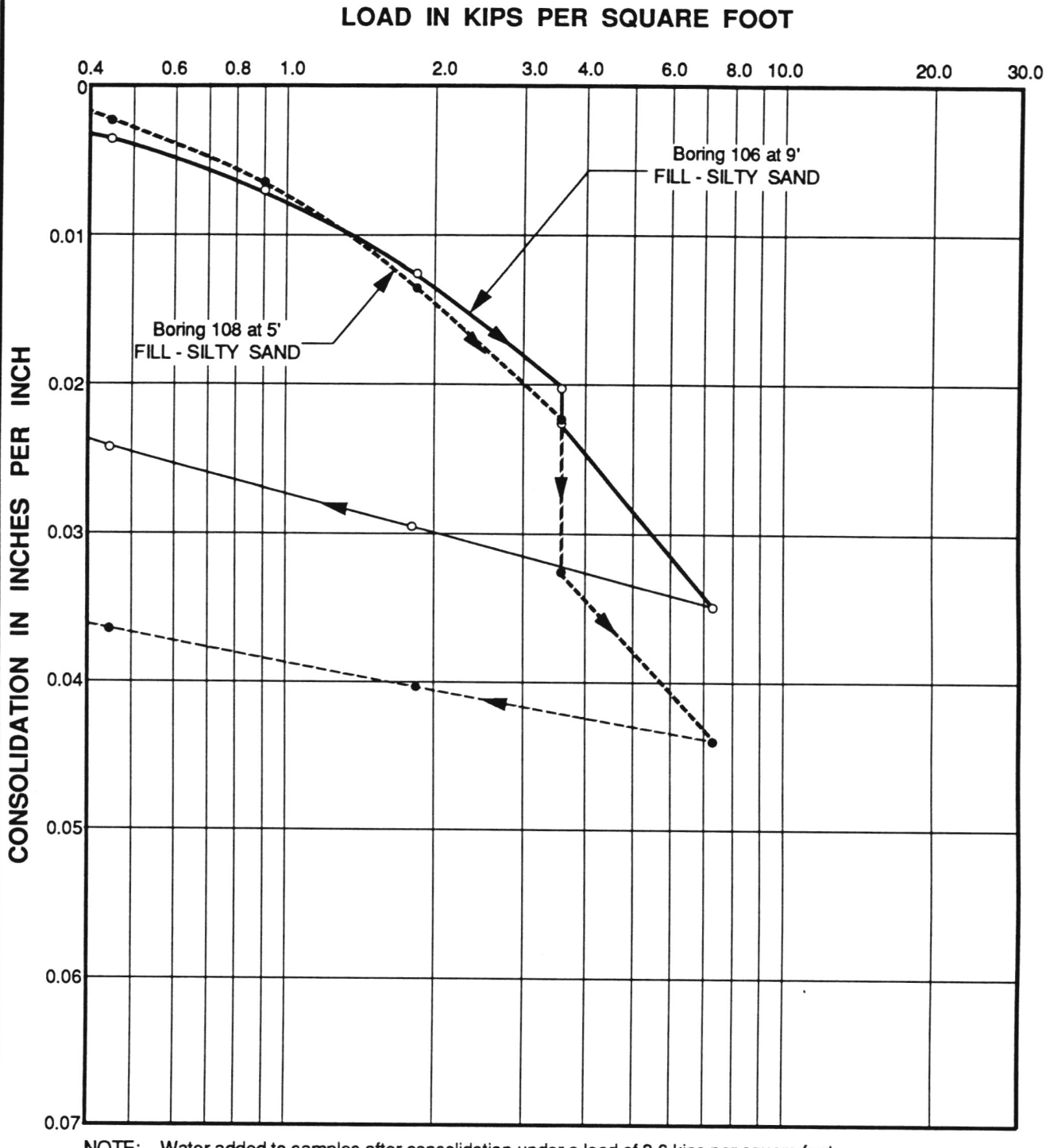
NOTE: Water added to sample from Boring 102 after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.36

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



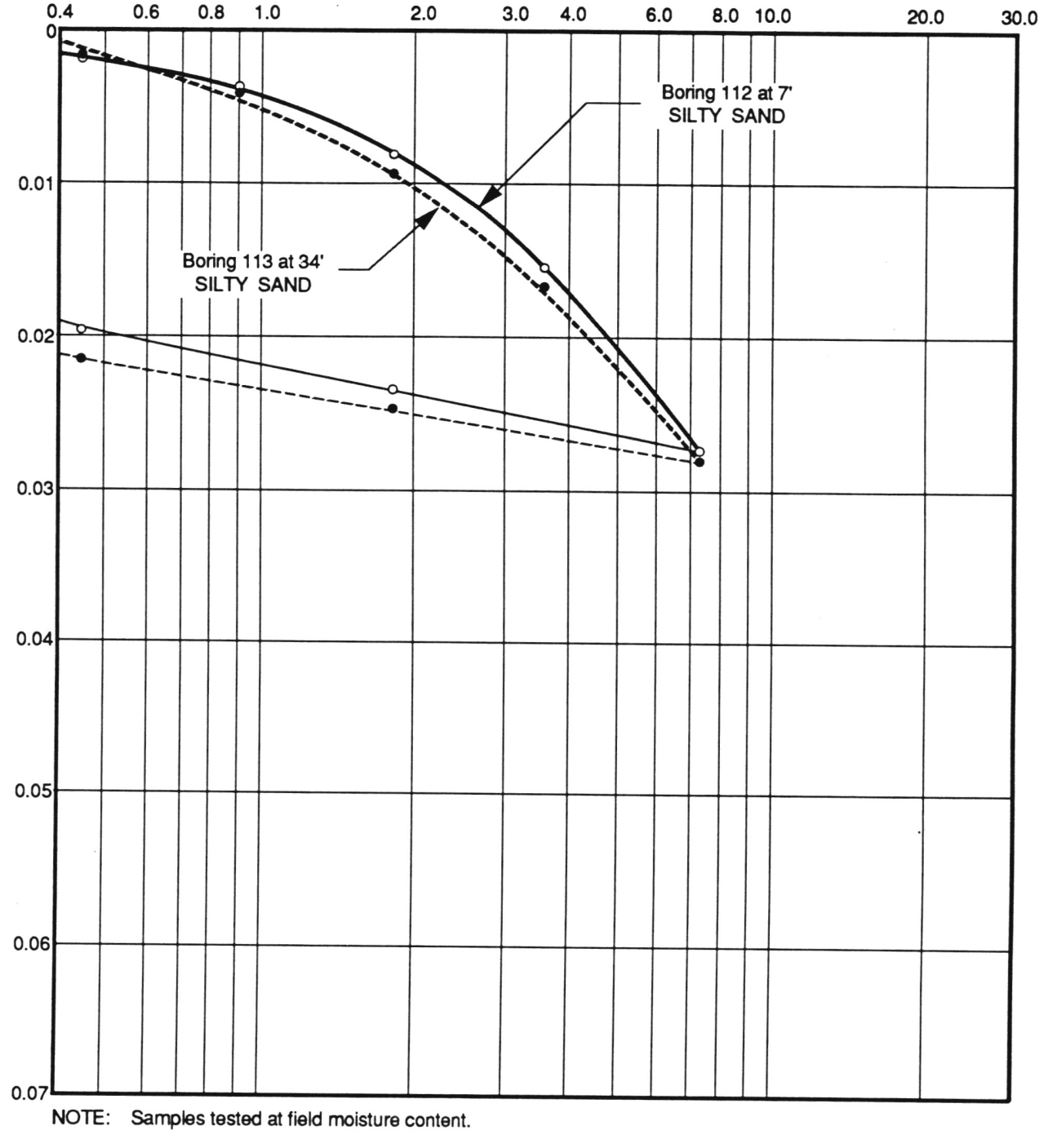
NOTE: Water added to samples after consolidation under a load of 3.6 kips per square foot.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.37

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



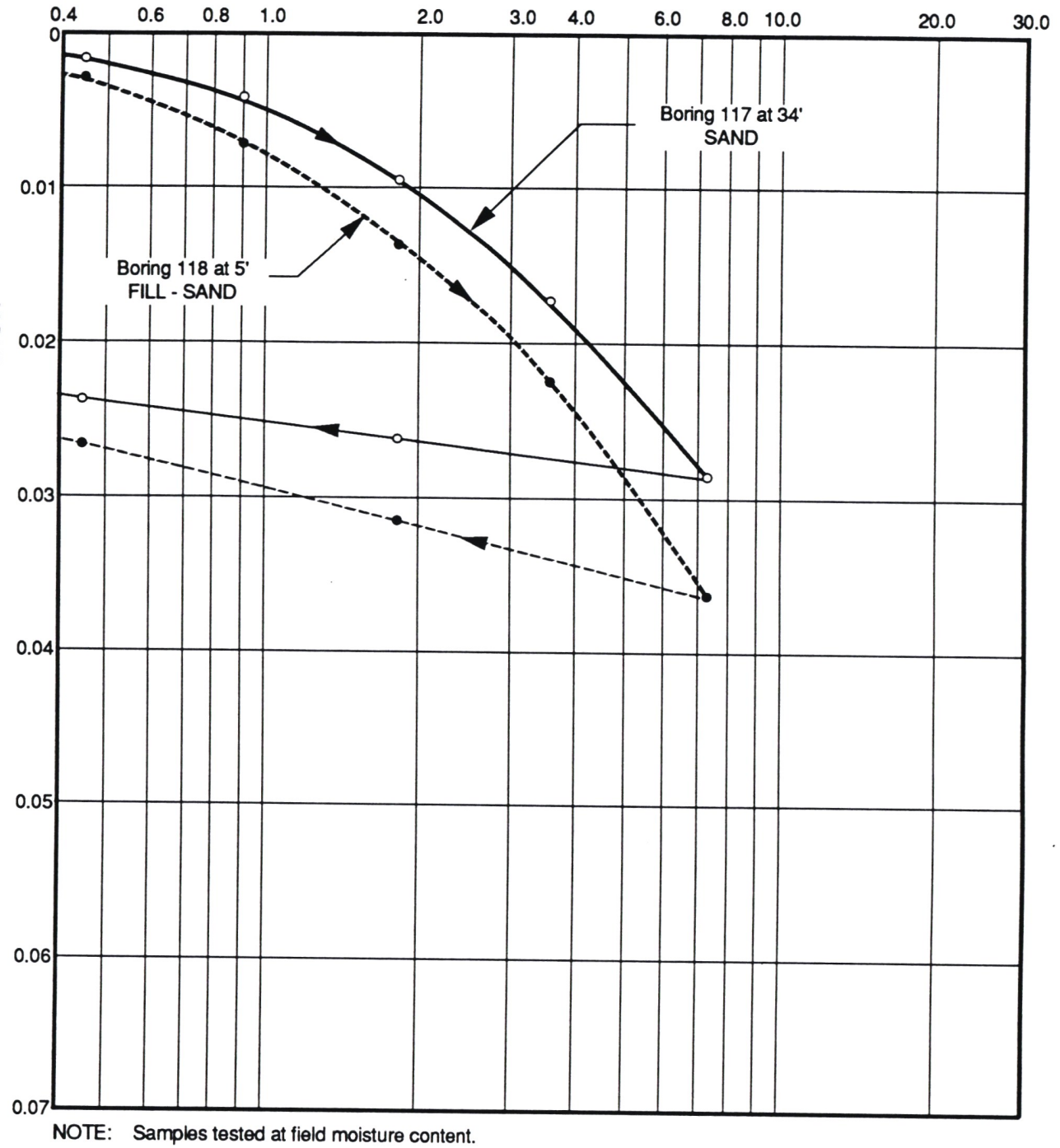
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.38

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



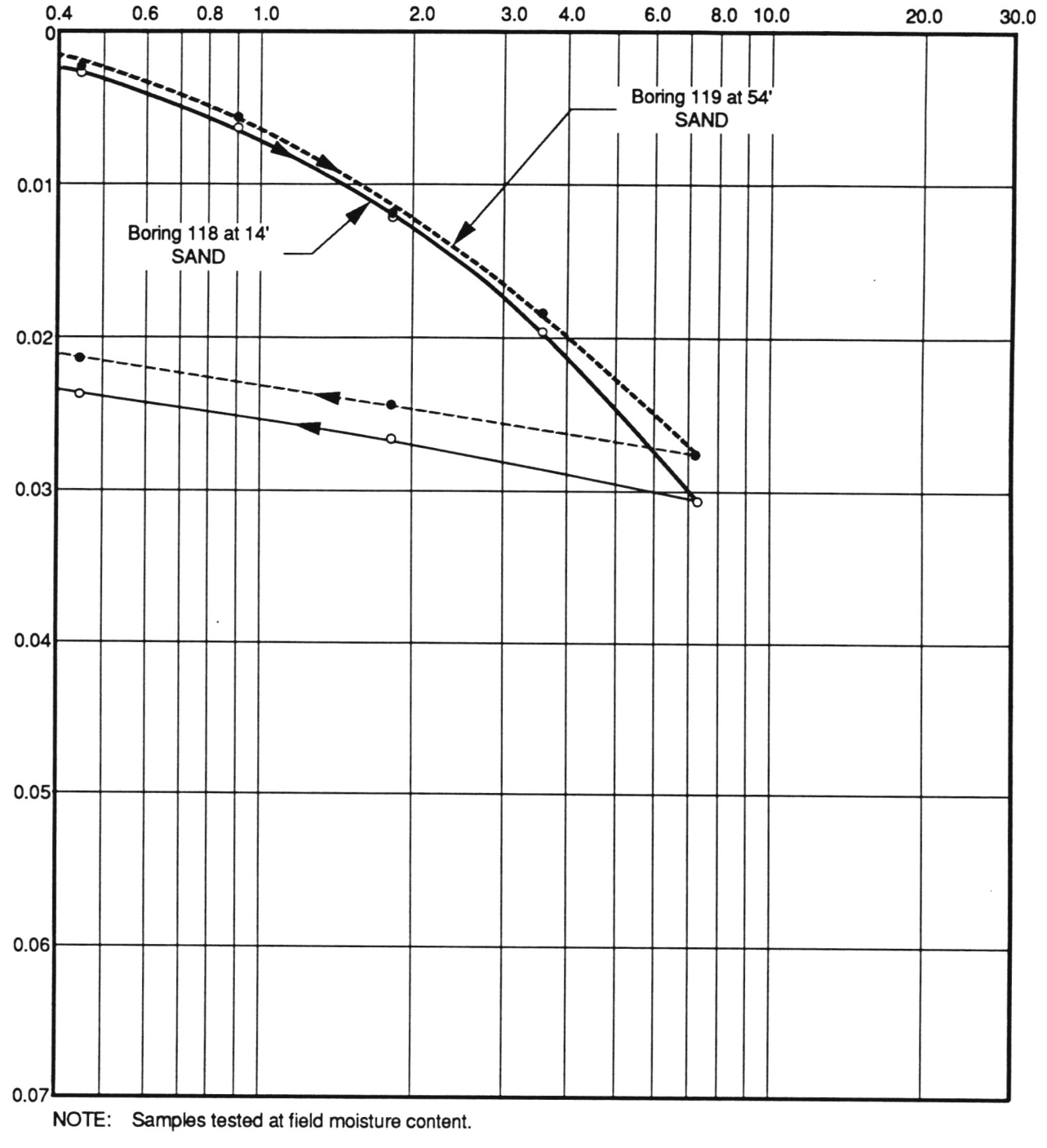
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.39

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



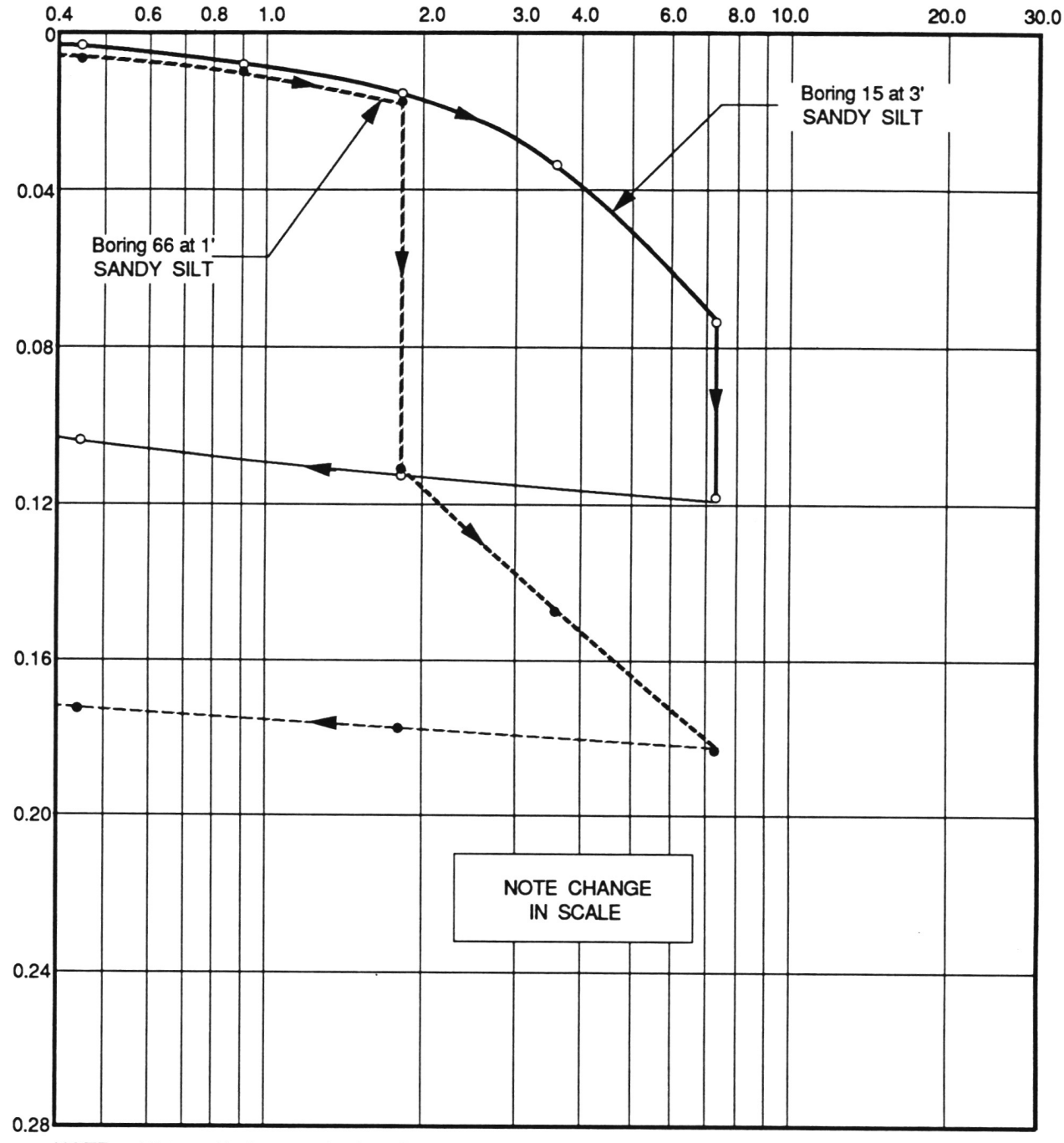
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.40

JOB L92045.AE4 DATE 1/27/93 DR. k O.E. MS CHKD



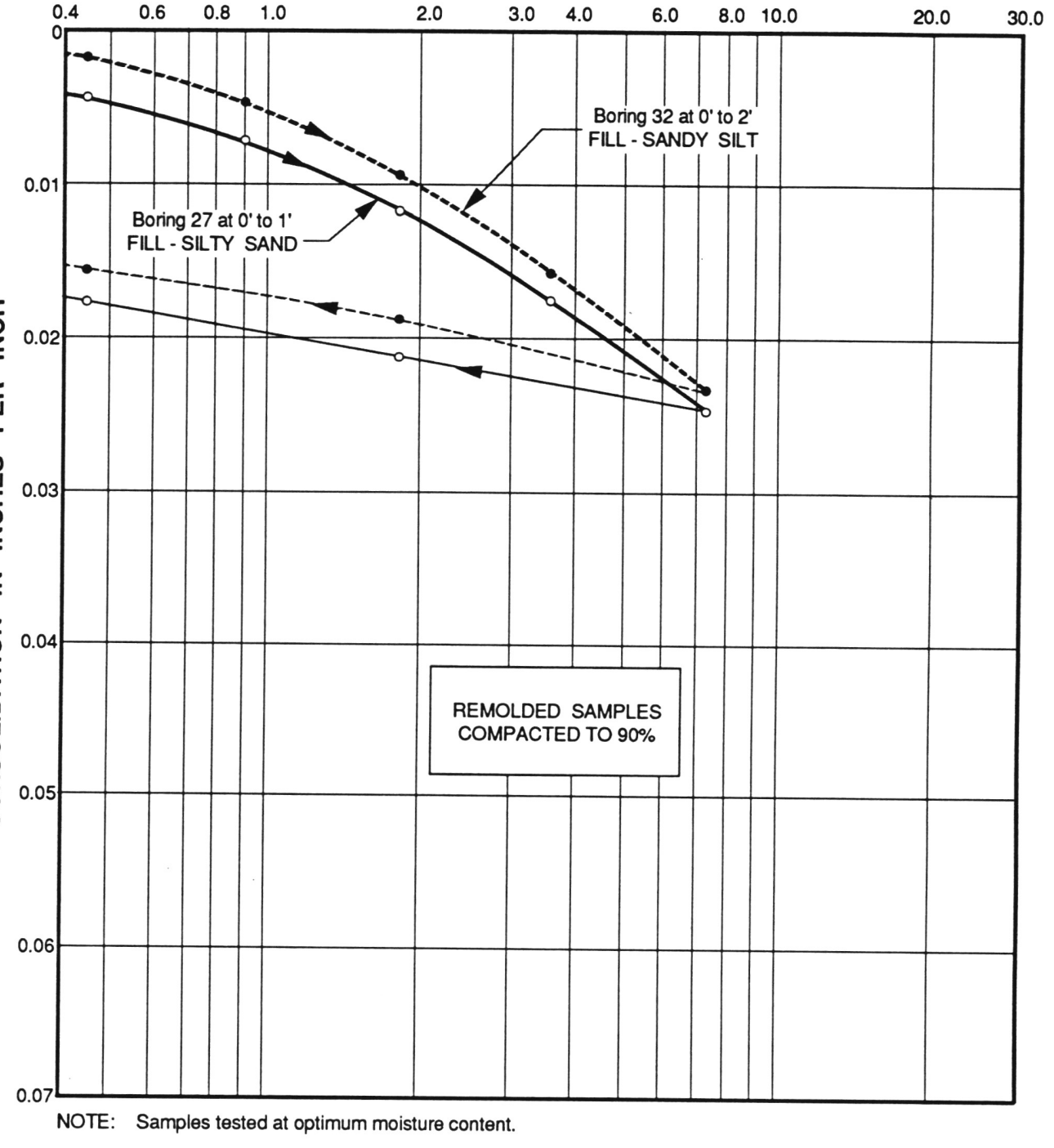
NOTE: Water added to samples from Boring15 and Boring 66 after consolidation under loads of 7.2 and 1.8 kips per square foot, respectively.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.41

JOB L92045.AE4 DATE 2/2/93 DR. lk O.E. MS CHKD



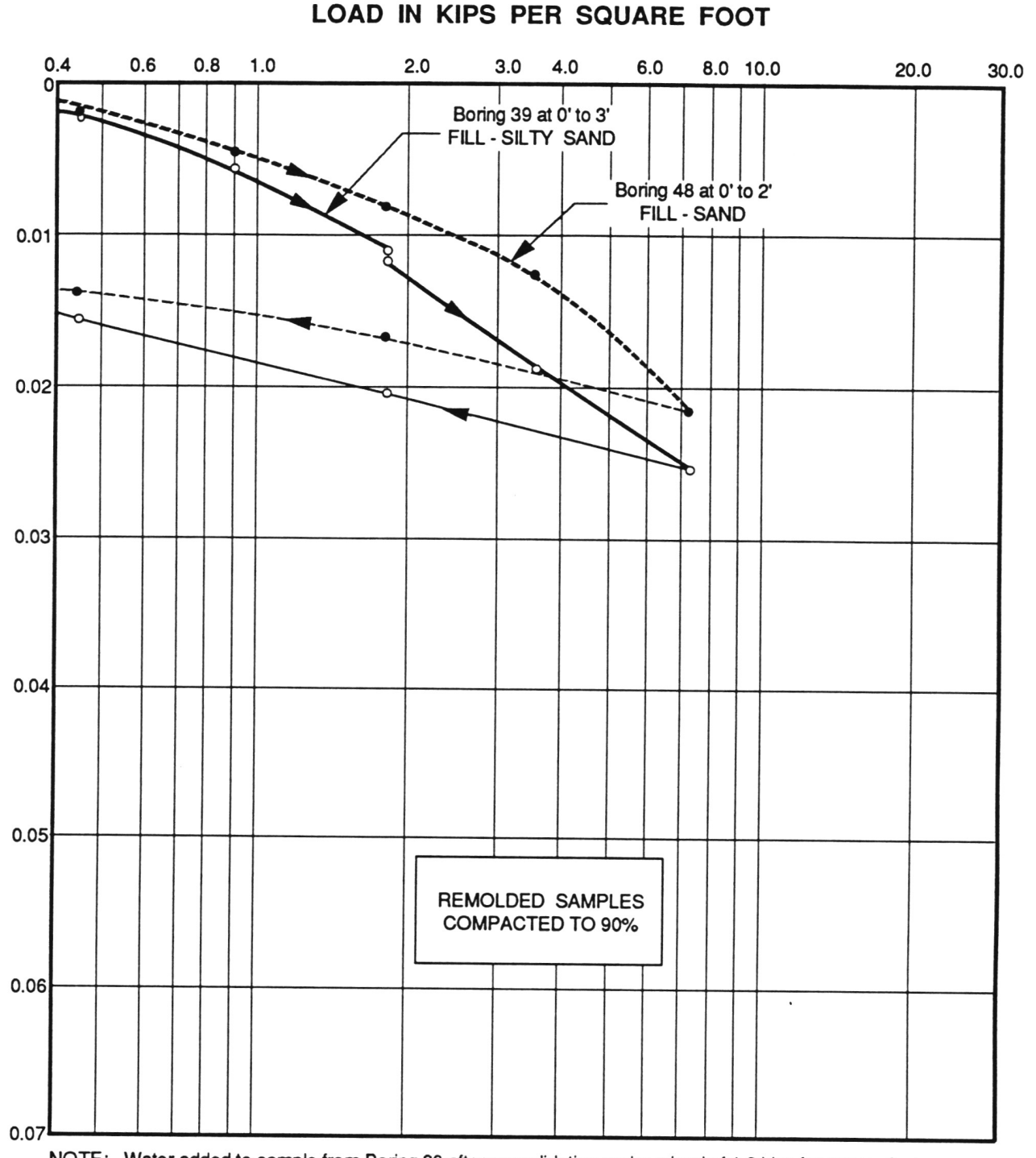
NOTE: Samples tested at optimum moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.42

JOB L92045.AE4 DATE 2/2/93 DR. lk O.E. MS CHKD GR



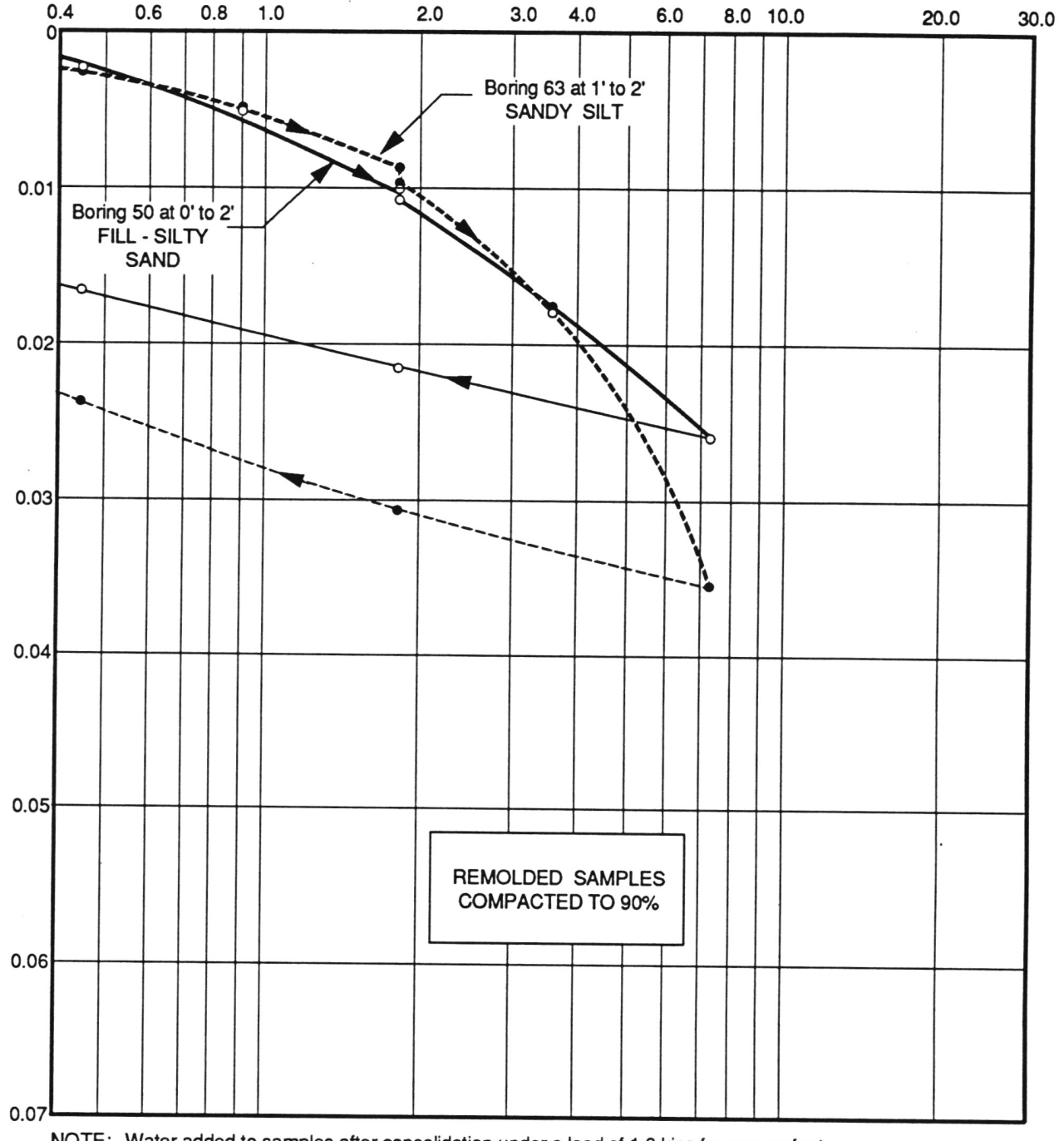
NOTE: Water added to sample from Boring 39 after consolidation under a load of 1.8 kips for square foot. The other sample tested at optimum moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.43

JOB L92045.AE4 DATE 2/2/93 DR. lk O.E. MS CHKD



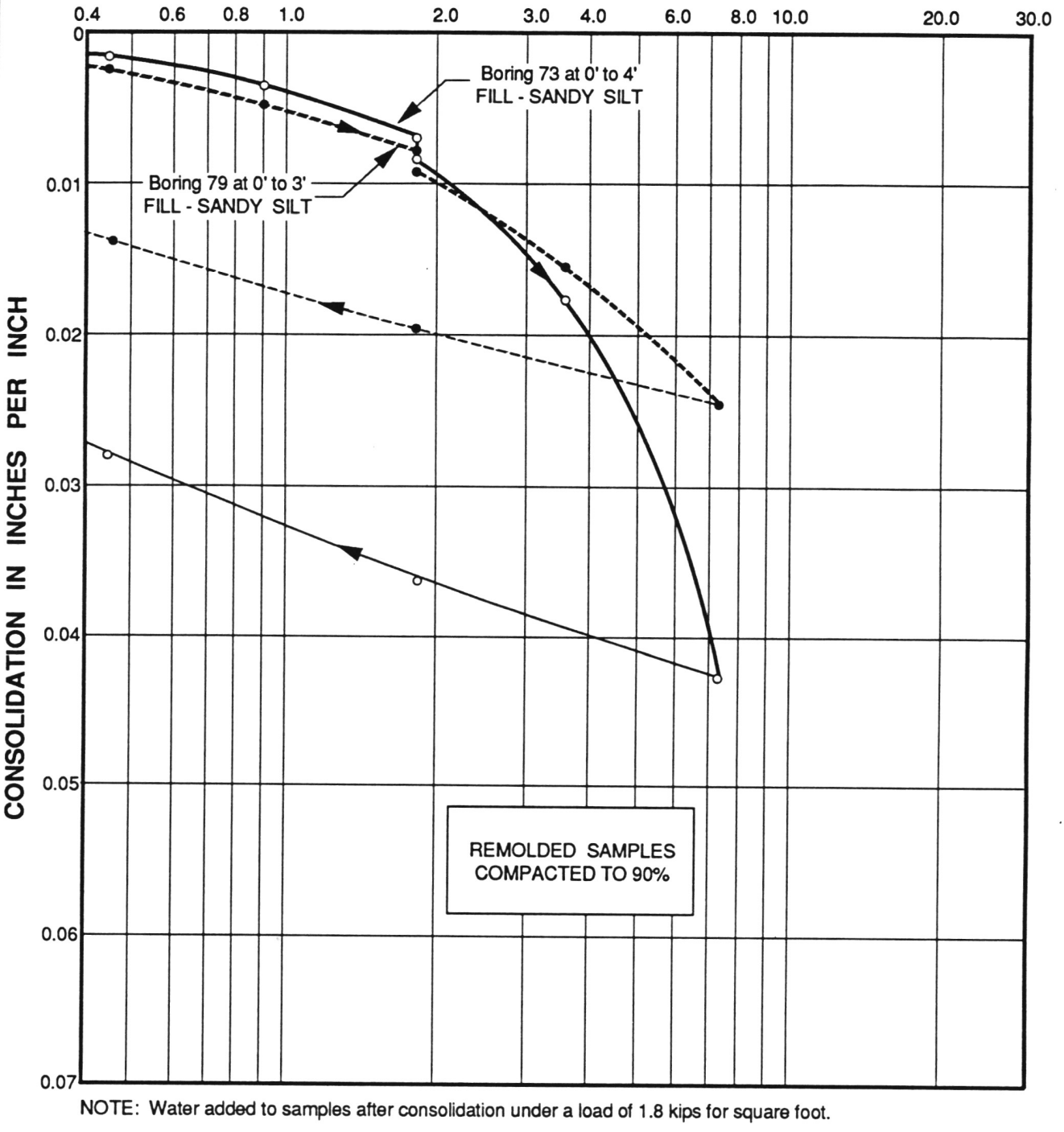
NOTE: Water added to samples after consolidation under a load of 1.8 kips for square foot.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.44

JOB L92045.AE4 DATE 2/2/93 DR. k O.E. MS CHKD



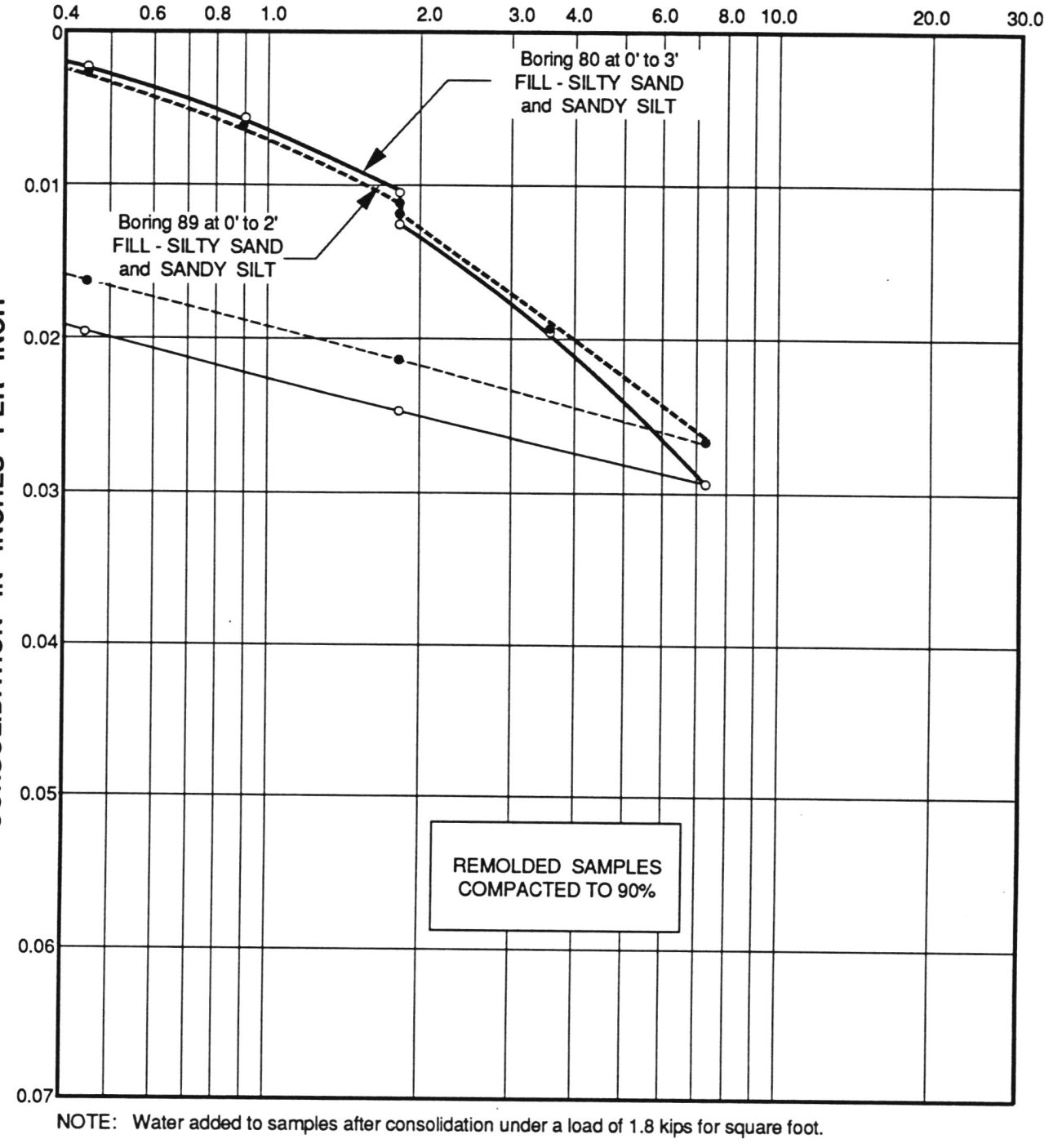
NOTE: Water added to samples after consolidation under a load of 1.8 kips for square foot.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.45

JOB L92045.AE4 DATE 2/2/93 DR. k O.E. MS CHKD SB



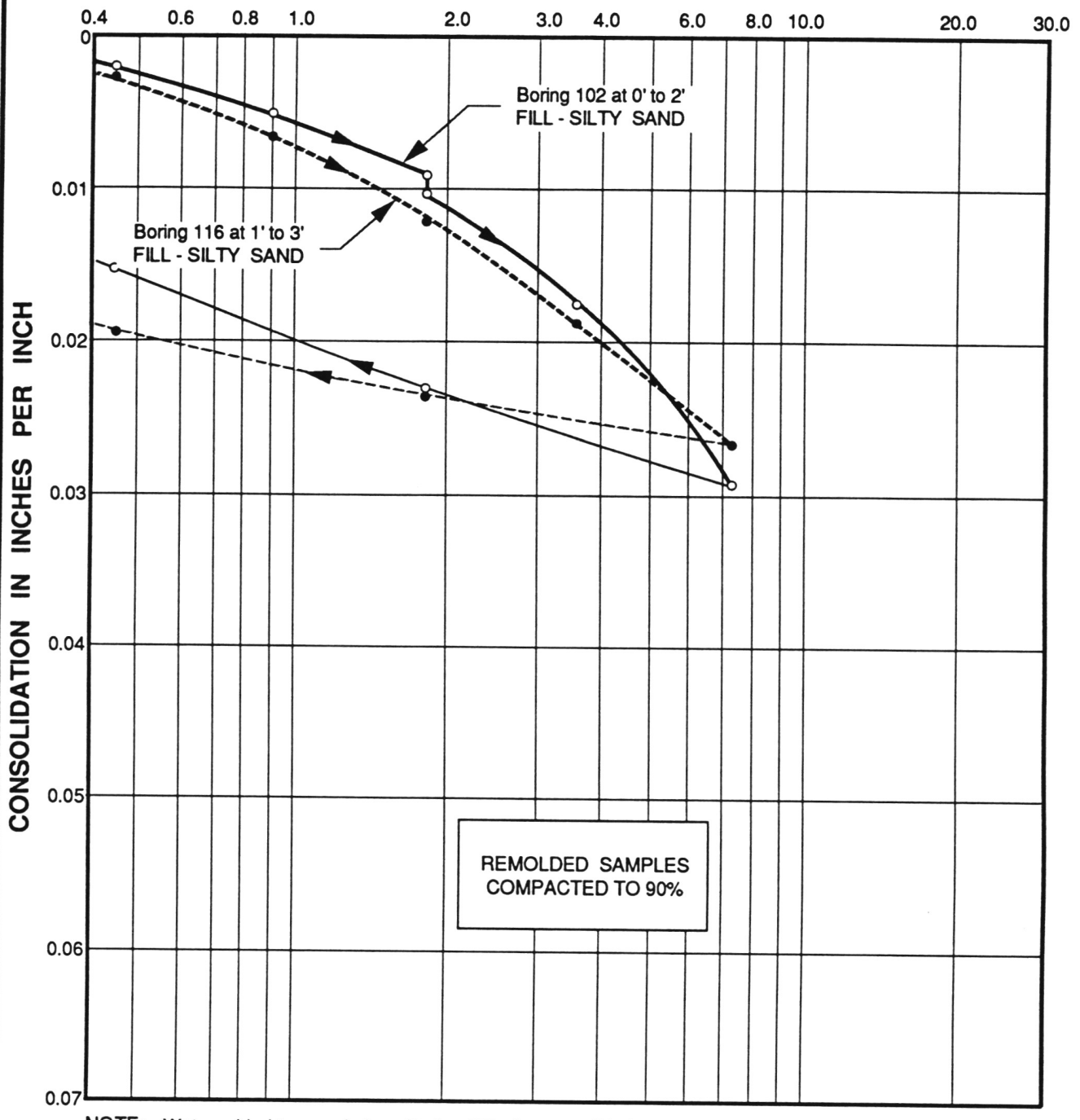
NOTE: Water added to samples after consolidation under a load of 1.8 kips for square foot.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B-2.46

JOB L92045.AE4 DATE 2/2/93 DR. lk O.E. MS CHKD



NOTE: Water added to sample from Boring 102 after consolidation under a load of 1.8 kips for square foot. The other sample tested at optimum moisture content.

CONSOLIDATION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 2.47

JOB L92045.AE4 DATE 1/4/93 DR. lk O.E. MS CHKD SR

BORING NUMBER AND SAMPLE DEPTH :	7 at 1' to 5'	9 at 0' to 5'	14 at 0' to 3'
SOIL TYPE :	FILL - SILTY SAND and SANDY SILT	FILL - SILTY SAND and SANDY SILT	SANDY SILT
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	133	132	132
OPTIMUM MOISTURE CONTENT : (% of dry wt.)	9	8	9

TEST METHOD : ASTM Designation D1557 - 78

COMPACTION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 3.1

JOB L92045.AE4 DATE 1/4/93 W.P. nh O.E. MS CHKD SR

BORING NUMBER AND SAMPLE DEPTH :	16 at 1' to 2'	20 at 0' to 3'	26 at 4' to 5'
SOIL TYPE :	SANDY SILT	FILL - SILTY SAND and SANDY SILT	SANDY CLAY
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	130	122	127
OPTIMUM MOISTURE CONTENT : (% of dry)	9	12	11

TEST METHOD: ASTM Designation D1557 - 78

COMPACTION TEST DATA

JOB L92045.AE4 DATE 1/4/93 W.P. nh O.E. MS CHKD SR

BORING NUMBER AND SAMPLE DEPTH :	27 at 0' to 1'	48 at 0' to 2'	62 at 0' to 4'
SOIL TYPE :	SILTY SAND	FILL - SAND	FILL - SILTY SAND and SANDY SILT
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	132	107	129
OPTIMUM MOISTURE CONTENT : (% of dry)	8	18	9

TEST METHOD: ASTM Designation D1557 - 78

COMPACTION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 3.3

JOB L92045.AE4 DATE 2/4/93 DR. lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH :	68 at 1' to 2'	73 at 0' to 4'	74 at 3' to 6'
SOIL TYPE :	SANDY SILT	FILL - SANDY SILT and SANDY CLAY	SANDSTONE
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	131	122	120
OPTIMUM MOISTURE CONTENT : (% of dry wt.)	10	12	13

TEST METHOD : ASTM Designation D1557 - 78

COMPACTION TEST DATA

LAW / CRANDALL, INC.

PLATE B - 3.4

JOB L92045.AE4 DATE 2/4/93 DR. lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH :	80 at 0' to 3'	100 at 5' to 7'	103 at 1' to 3'
SOIL TYPE :	FILL - SILTY SAND and SANDY SILT	FILL - SILTY SAND and SANDY SILT	FILL - SILTY SAND
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	128	122	132
OPTIMUM MOISTURE CONTENT : (% of dry wt.)	9	13	9

TEST METHOD : ASTM Designation D1557 - 78

COMPACTION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 3.5

JOB L92045.AE4 DATE 2/4/93 DR. lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH :	113 at 5' to 7'	116 at 1' to 3'	120 at 10' to 13'
SOIL TYPE :	FILL - SILTY SAND	FILL - SILTY SAND	FILL - SILTY SAND
MAXIMUM DRY DENSITY : (lbs./cu. ft.)	131	131	128
OPTIMUM MOISTURE CONTENT : (% of dry wt.)	8	9	9

TEST METHOD : ASTM Designation D1557 - 78

COMPACTION TEST DATA

LAW/CRANDALL, INC.

PLATE B - 3.6

JOB L92045.AE4 DATE 2/4/93 DR. lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH:	31 at 0' to 4'	32 at 0' to 2'	39 at 1' to 3'
SOIL TYPE :	FILL - SILTY SAND and SANDY SILT	FILL - SILTY SAND	FILL - SILTY SAND
MAXIMUM DRY DENSITY * : (lbs./cu. ft.)	122	130	130
OPTIMUM MOISTURE CONTENT * : (% of dry wt.)	11	9	8
EXPANSION (%) : (From optimum to saturated moisture content)	1.3	0.1	0
C. B. R. ** (% of standard)			
AT 90% COMPACTION :	17	24	38
AT 95% COMPACTION :	36	55	84

* TEST METHOD : ASTM Designation D1557 - 78

** TEST METHOD : ASTM Designation D1883 - 73

COMPACTION AND C. B. R. TEST DATA

LAW/CRANDALL, INC.

PLATE B - 4.1

JOB L92045.AE4 DATE 2/4/93 DR. lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH:	44 at 0' to 2'	50 at 1' to 2'	55 at 1' to 2'
SOIL TYPE :	FILL - SILTY SAND	FILL - SILTY SAND and SANDY SILT	SILTY CLAY
MAXIMUM DRY DENSITY * : (lbs./cu. ft.)	131	128	127
OPTIMUM MOISTURE CONTENT * : (% of dry wt.)	9	9	11
EXPANSION (%) : (From optimum to saturated moisture content)	0	0.1	1.1
C. B. R. ** (% of standard)			
AT 90% COMPACTION :	28	14	7
AT 95% COMPACTION :	81	46	16

* TEST METHOD : ASTM Designation D1557 - 78

** TEST METHOD : ASTM Designation D1883 - 73

COMPACTION AND C. B. R. TEST DATA

LAW / CRANDALL, INC.

PLATE B - 4.2

JOB L92045.AE4 DATE 2/4/93 DR. lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH:	63 at 0' to 2'	79 at 0' to 3'	87 at 1' to 4'
SOIL TYPE :	SANDY SILT	FILL - SILTY SAND and SANDY SILT	SILTY SAND
MAXIMUM DRY DENSITY * : (lbs./cu. ft.)	130	129	124
OPTIMUM MOISTURE CONTENT * : (% of dry wt.)	10	10	11
EXPANSION (%) : (From optimum to saturated moisture content)	0.8	0.3	0.1
C. B. R. ** (% of standard)			
AT 90% COMPACTION :	17	23	23
AT 95% COMPACTION :	32	69	52

* TEST METHOD : ASTM Designation D1557 - 78

** TEST METHOD : ASTM Designation D1883 - 73

COMPACTION AND C. B. R. TEST DATA

LAW / CRANDALL, INC.

PLATE B - 4.3

JOB L92045.AE4 DATE 2/4/93 DR. k O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH:	89 at 0' to 2'	102 at 0' to 2'	106 at 1' to 3'
SOIL TYPE :	FILL - SILTY SAND	FILL - SILTY SAND and SANDY SILT	FILL - SILTY SAND
MAXIMUM DRY DENSITY * : (lbs./cu. ft.)	123	127	134
OPTIMUM MOISTURE CONTENT * : (% of dry wt.)	11	10	8
EXPANSION (%) : (From optimum to saturated moisture content)	0.1	0.9	0.2
C. B. R. ** (% of standard)			
AT 90% COMPACTION :	26	15	22
AT 95% COMPACTION :	66	31	47

* TEST METHOD : ASTM Designation D1557 - 78

** TEST METHOD : ASTM Designation D1883 - 73

COMPACTION AND C. B. R. TEST DATA

LAW/CRANDALL, INC.

PLATE B - 4.4

JOB L92045.AE4 DATE 2/4/93 DR. lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH:	112 at 1' to 3'
SOIL TYPE :	FILL - SILTY SAND and SANDY SILT
MAXIMUM DRY DENSITY * : (lbs./cu. ft.)	129
OPTIMUM MOISTURE CONTENT * : (% of dry wt.)	9
EXPANSION (%) : (From optimum to saturated moisture content)	0.5
C. B. R. ** (% of standard)	
AT 90% COMPACTION :	10
AT 95% COMPACTION :	47

* TEST METHOD : ASTM Designation D1557 - 78

** TEST METHOD : ASTM Designation D1883 - 73

COMPACTION AND C. B. R. TEST DATA

LAW / CRANDALL, INC.

PLATE B - 4.5

JOB L92045.AE4 DATE 1/4/93 W.P. nh O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH :	21 at 5' to 7'	26 at 4' to 5'	32 at 0' to 2'
SOIL TYPE :	SANDY CLAY	SANDY CLAY	FILL - SANDY SILT and SILTSTONE FRAGMENTS
CONFINING PRESSURE : (lbs./sq. ft.)	144	144	144
INITIAL MOISTURE CONTENT : (% of dry wt.)	12.0	9.0	8.9
FINAL MOISTURE CONTENT : (% of dry wt.)	27.1	13.6	12.8
DRY DENSITY : (lbs./cu. ft.)	103	113	118
EXPANSION INDEX :	36	3	1

TEST METHOD : Uniform Building Code Standard No. 29 - 2, Expansion Index Test

EXPANSION INDEX TEST DATA

LAW/CRANDALL, INC.

PLATE B - 5.1

JOB L92045.AE4 DATE 1/4/93 W.P. nh O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH:	55 at 1' to 2'	61 at 1' to 5'	78 at 4' to 6'
SOIL TYPE:	SILTY CLAY	CLAYEY SILT	SILTY CLAY
CONFINING PRESSURE: (lbs./sq. ft.)	144	144	144
INITIAL MOISTURE CONTENT: (% of dry wt.)	9.5	14.8	13.1
FINAL MOISTURE CONTENT: (% of dry wt.)	19.4	27.8	28.5
DRY DENSITY: (lbs./cu. ft.)	110	90	99
EXPANSION INDEX:	25	63	54

TEST METHOD: Uniform Building Code Standard No. 29-2, Expansion Index Test

EXPANSION INDEX TEST DATA

LAW/CRANDALL, INC.

PLATE B-5.2

JOB L92045.AE4 DATE 1/4/93 W.P. nh O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH :	87 at 5' to 8'
SOIL TYPE :	SILTY CLAY
CONFINING PRESSURE : (lbs./sq. ft.)	144
INITIAL MOISTURE CONTENT : (% of dry wt.)	18.3
FINAL MOISTURE CONTENT : (% of dry wt.)	32.7
DRY DENSITY : (lbs./cu. ft.)	97
EXPANSION INDEX :	40

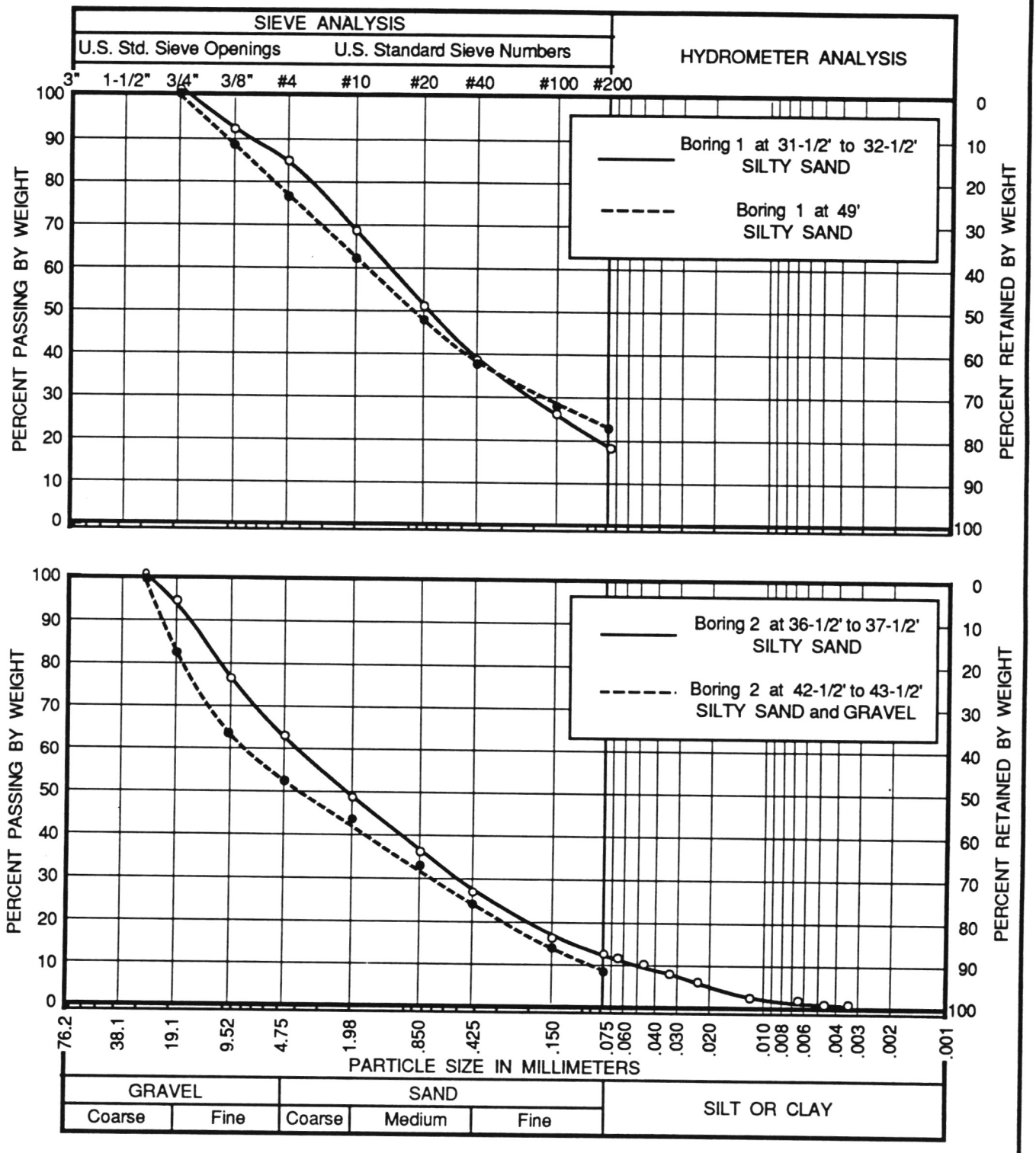
TEST METHOD : Uniform Building Code Standard No. 29 - 2, Expansion Index Test

EXPANSION INDEX TEST DATA

LAW/CRANDALL, INC.

PLATE B - 5.3

JOB L92045.AE4 DATE 1/4/93 D.R. lk O.E. MS CHKD

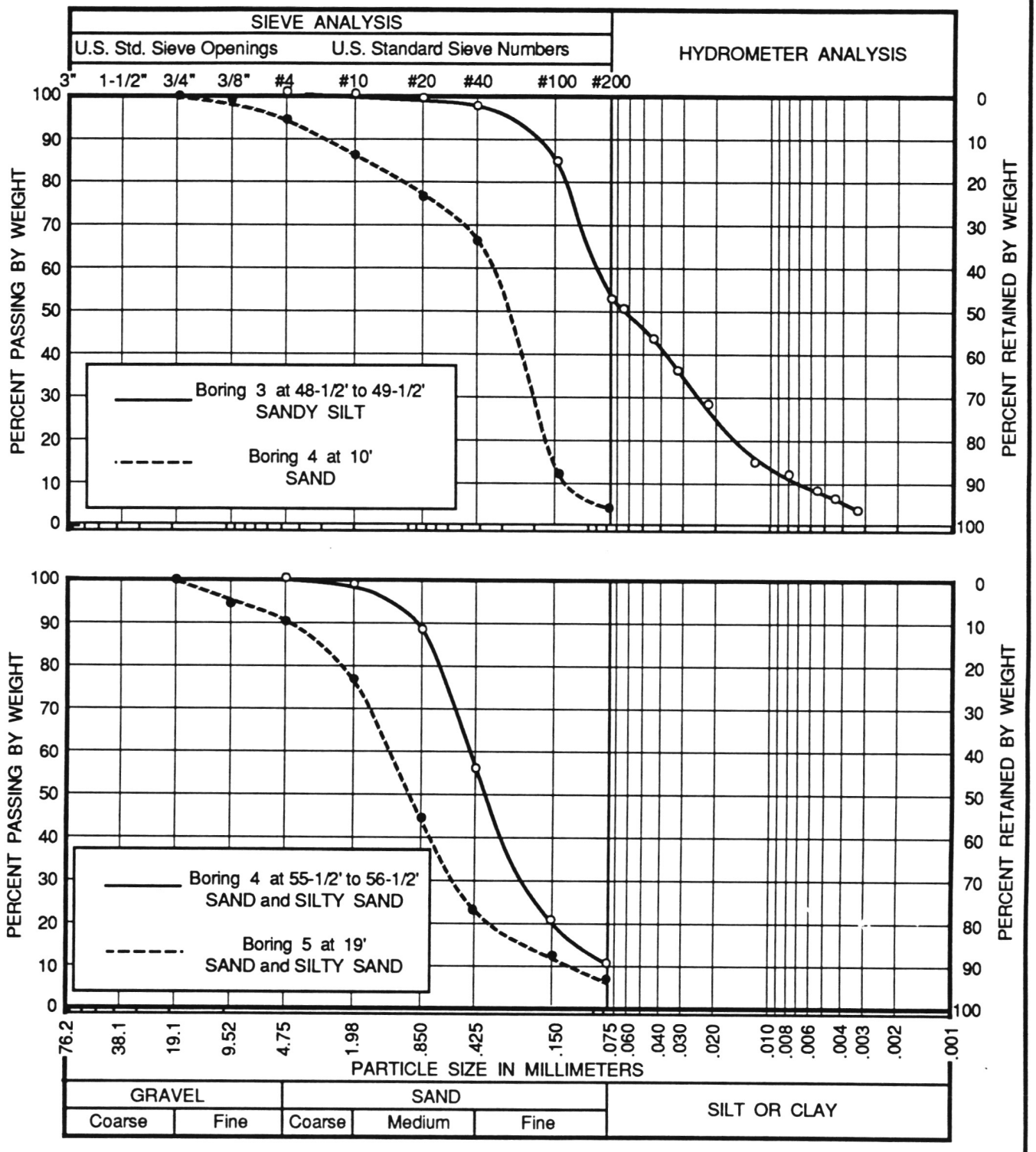


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.1

JOB L92045.AE4 DATE 1/4/93 D.R. K O.E. MS CHKD

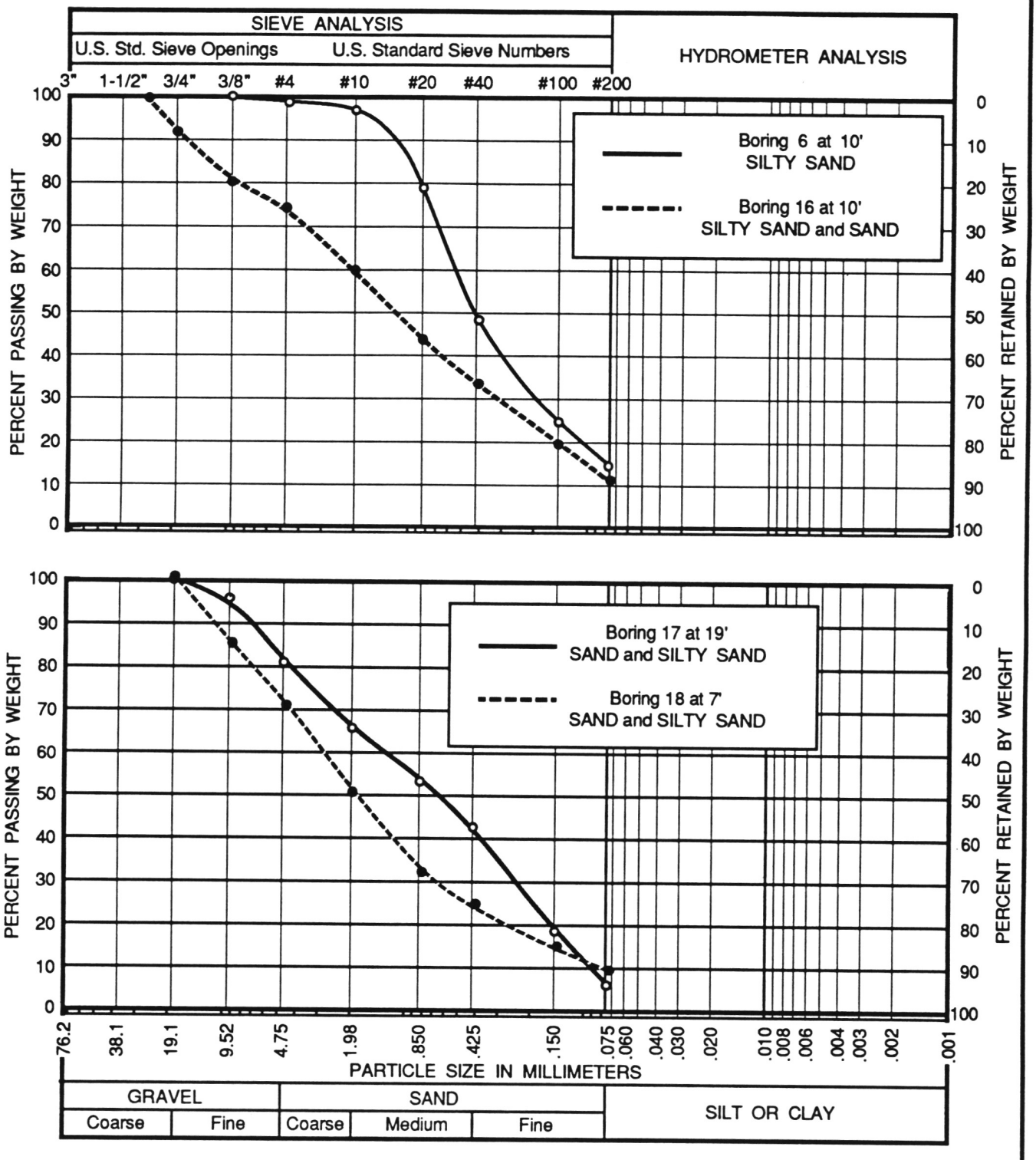


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.2

JOB L92045.AE4 DATE 1/4/93 D.R. k O.E. MS CHKD.

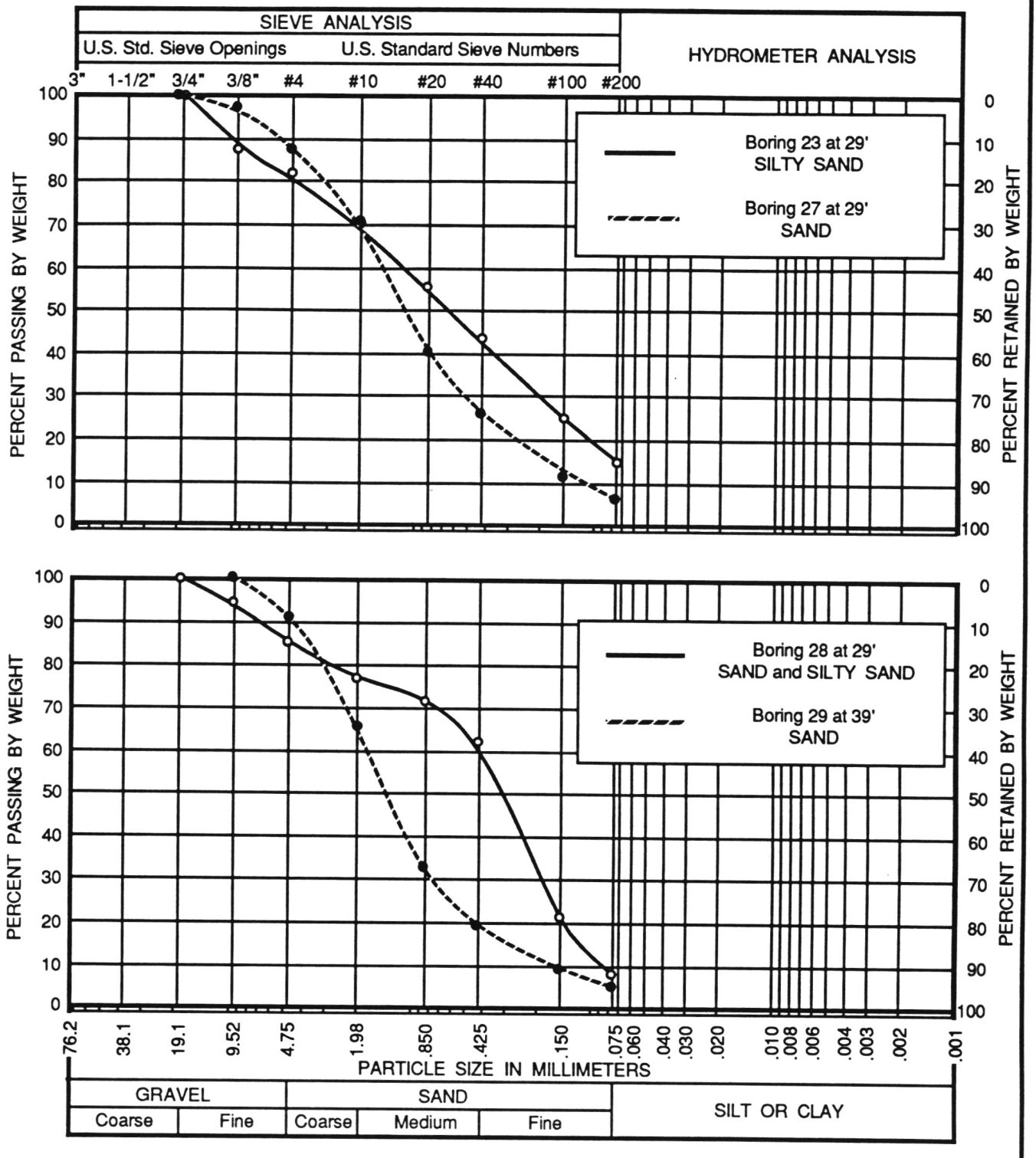


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.3

JOB L92045.AE4 DATE 1/4/93 DR nh O.E. MS CHKD.



PARTICLE SIZE DISTRIBUTION

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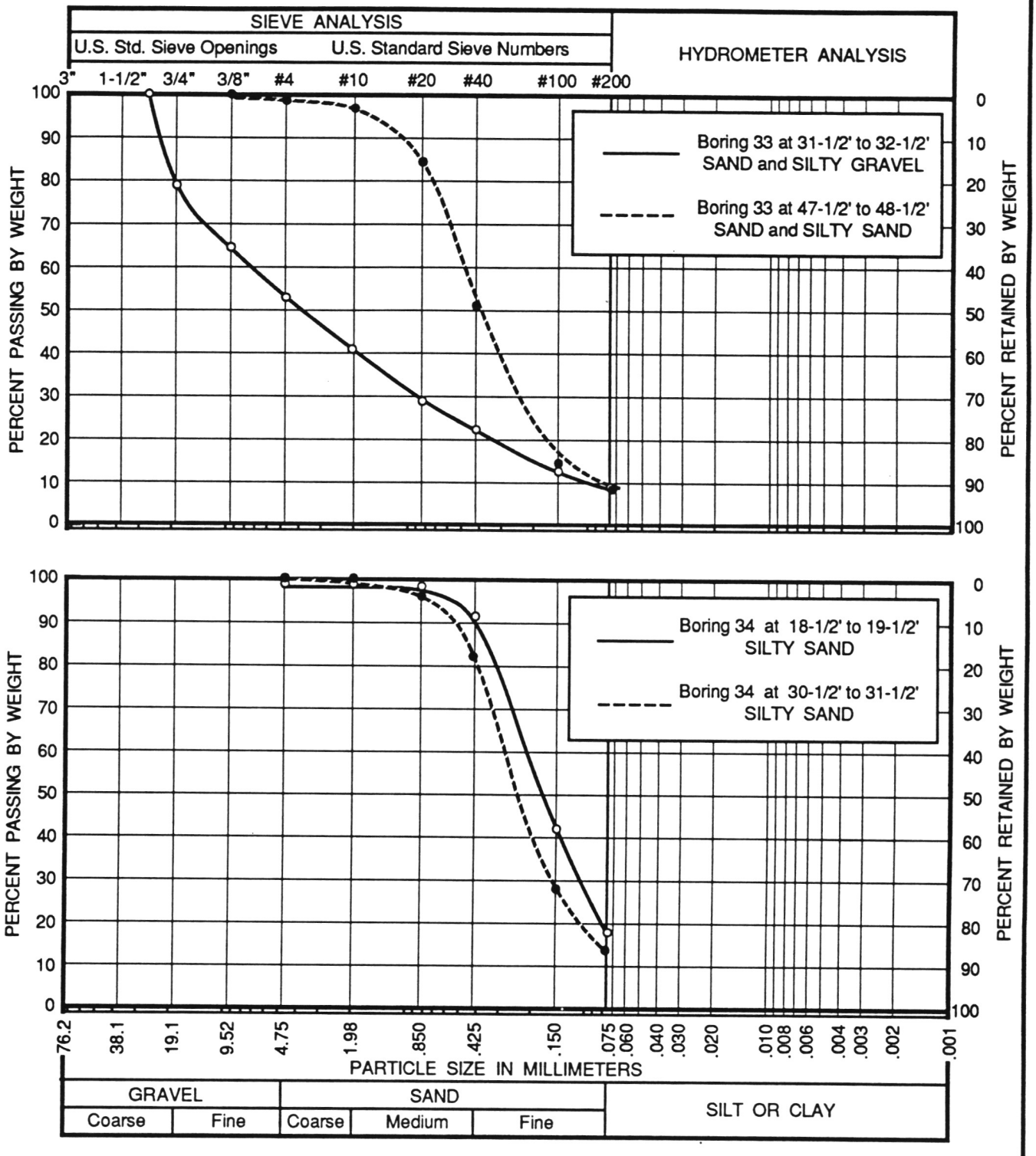
PLATE B-6.4

JOB L92045.AE4 DATE 1/11/93 DR. lk O.E. MS CHKD

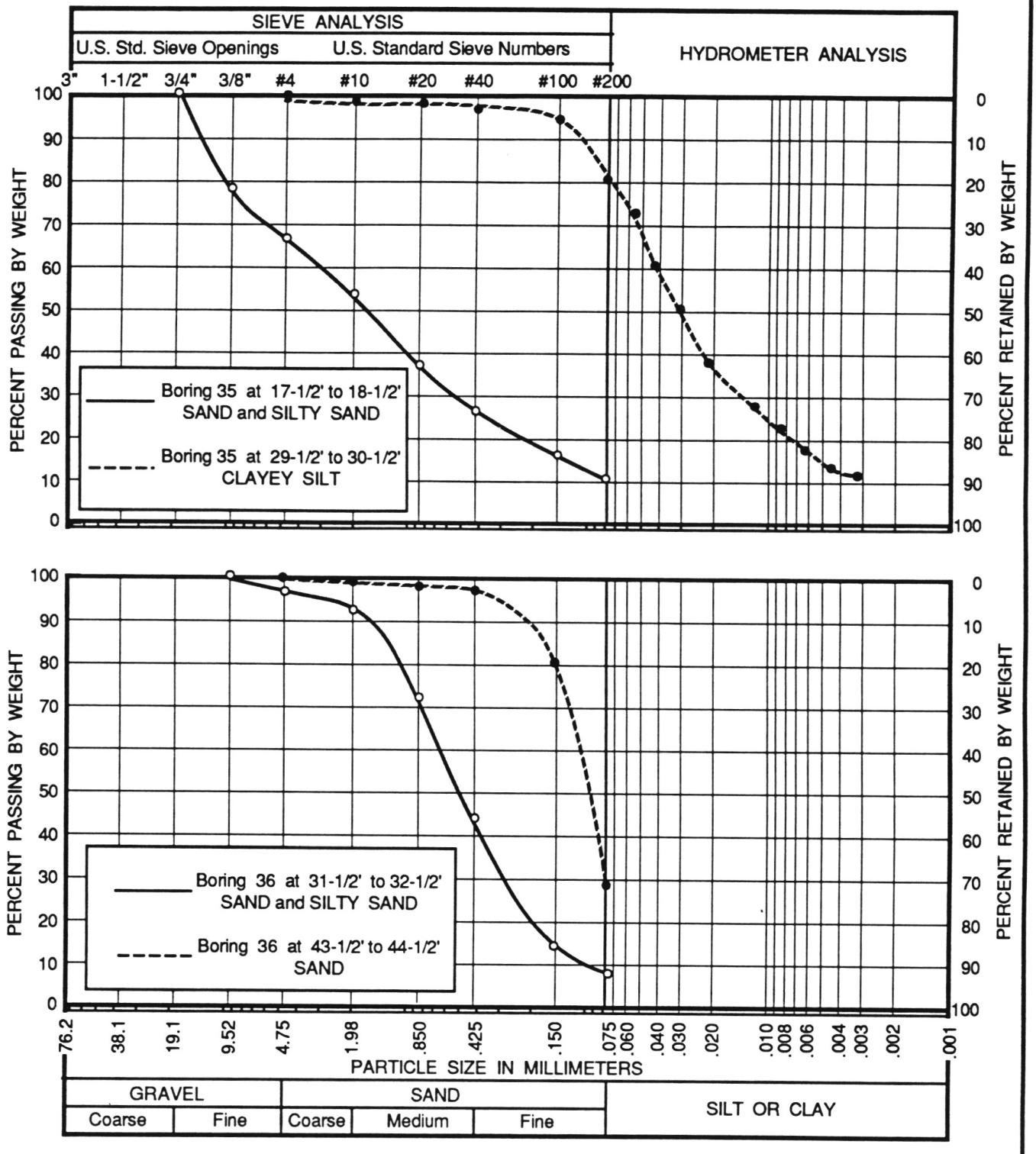


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.5

JOB L92045.AE4 DATE 1/11/93 DR. lk O.E. MS CHKD

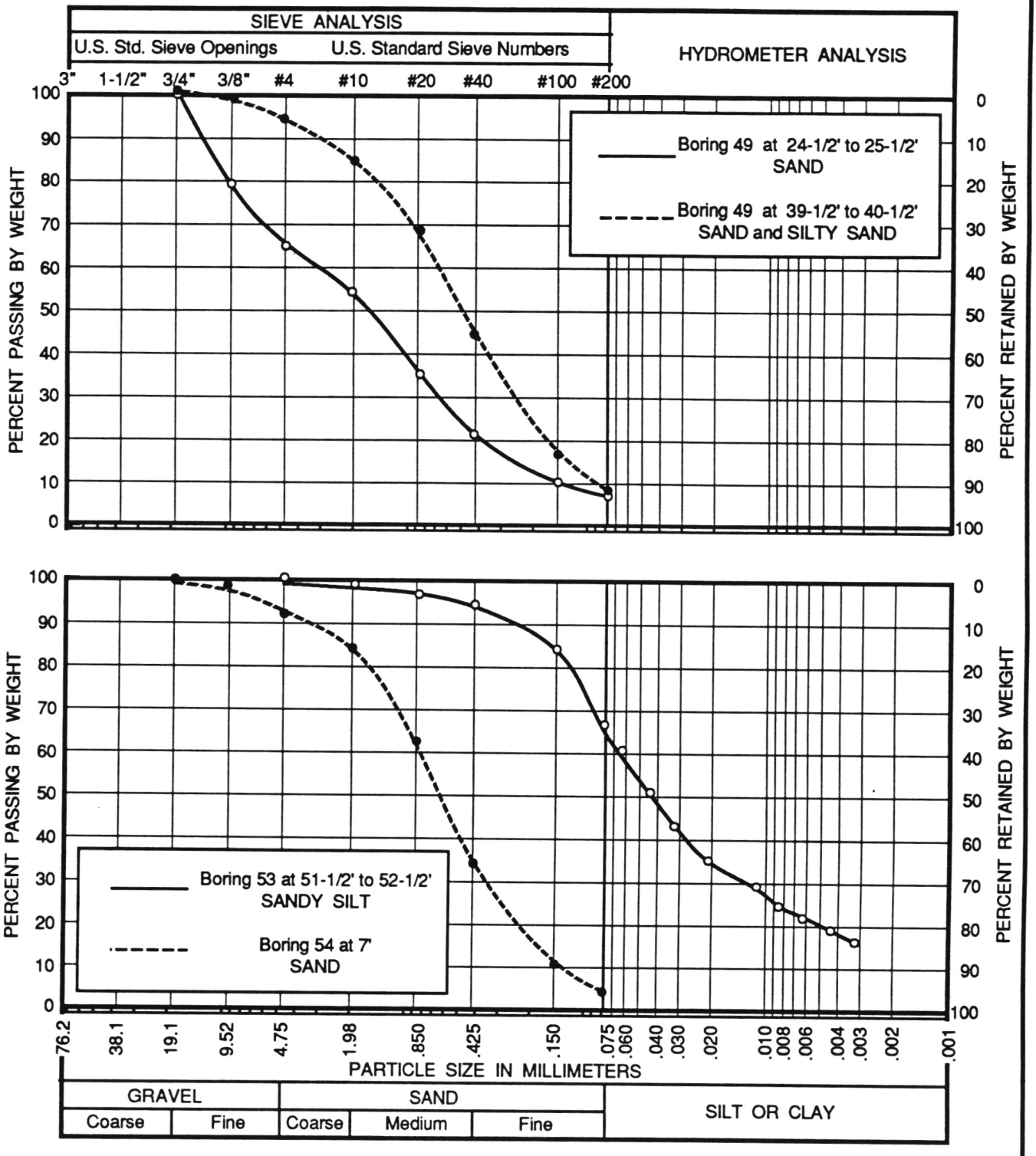


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.6

JOB L92045.AE4 DATE 1/11/93 DR. k O.E. MS CHKD

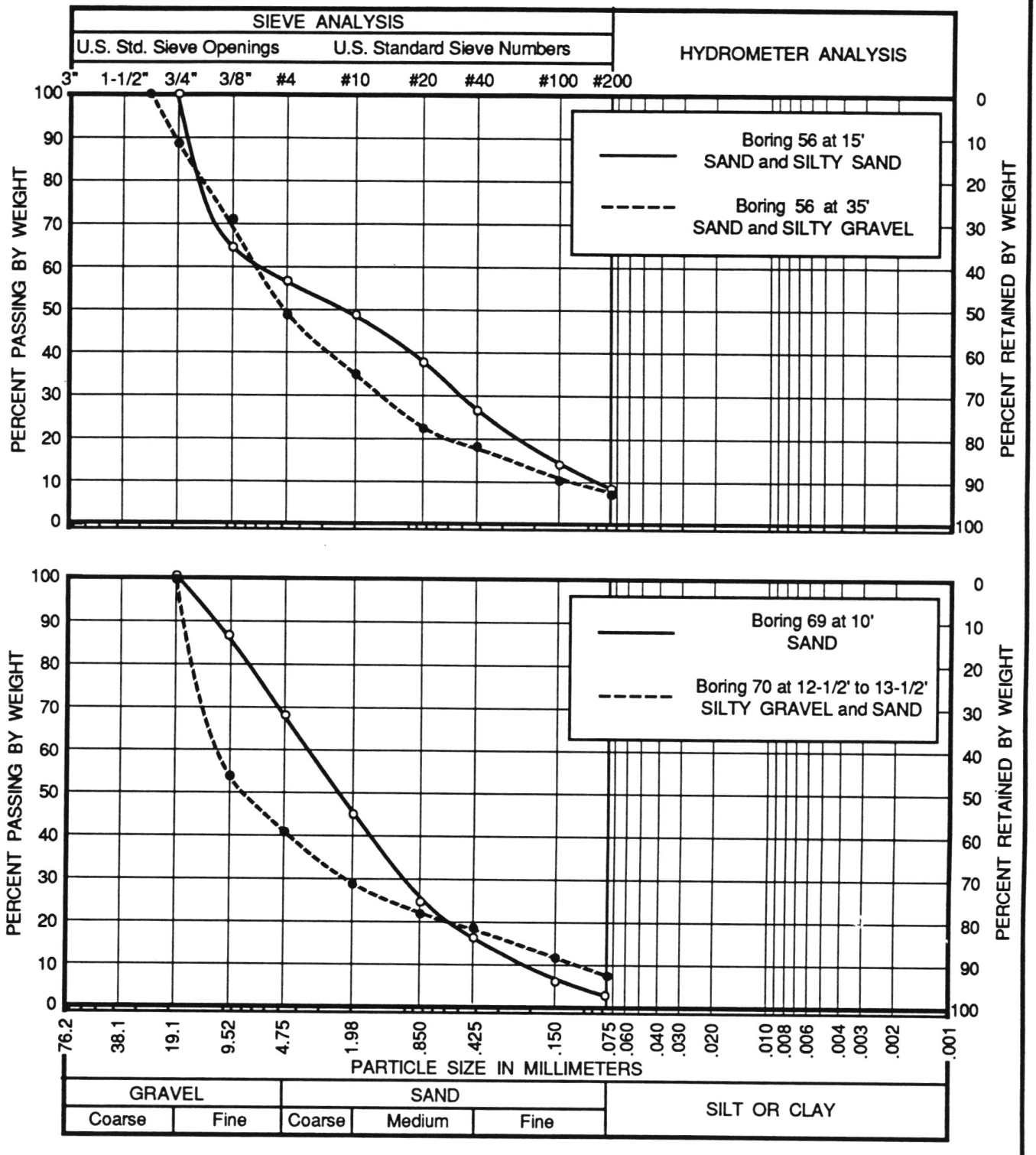


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.7

JOB L92045.AE4 DATE 2/2/93 DR. k O.E. MS CHKD

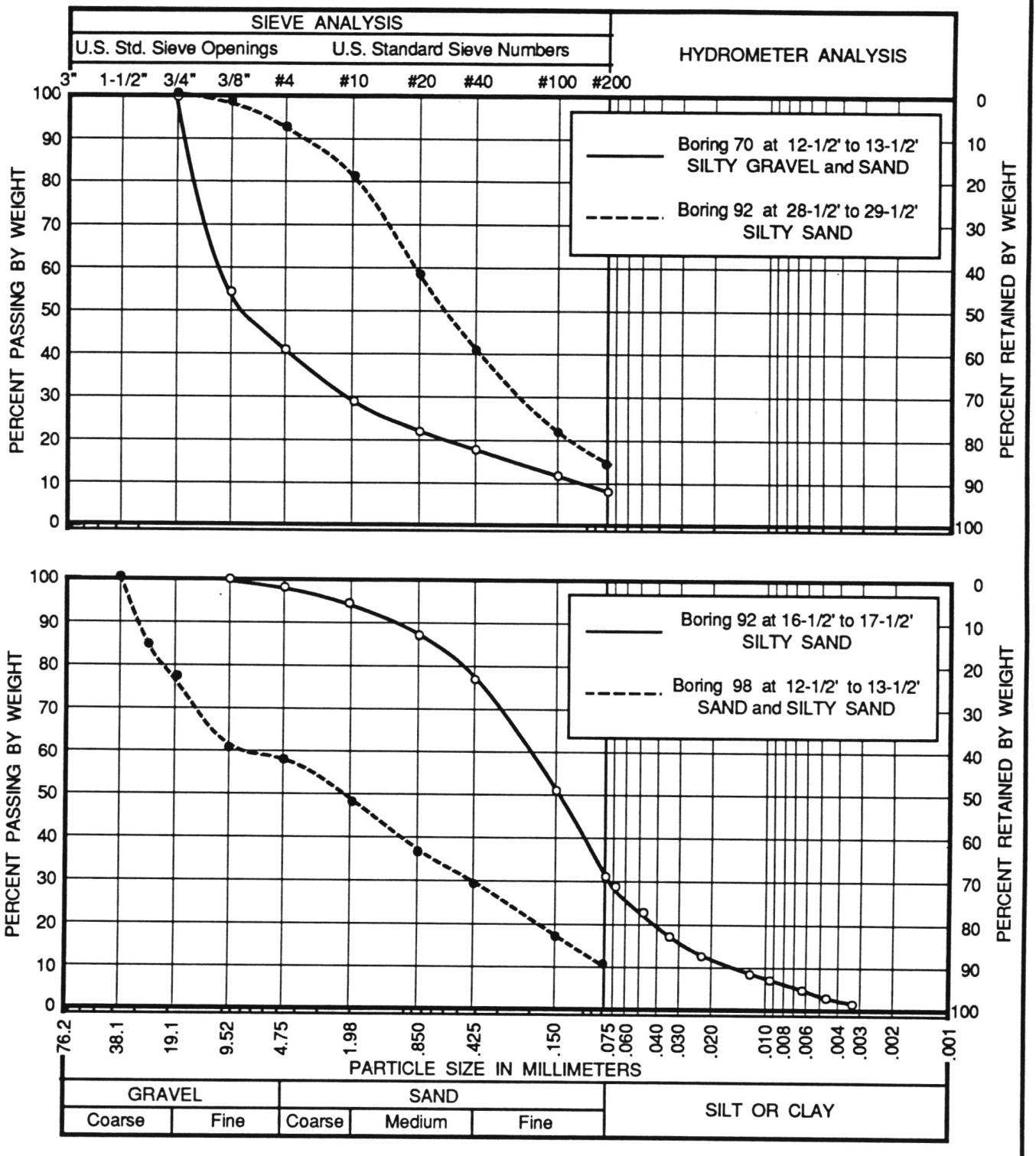


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.8

JOB L92045.AE4 DATE 1/11/93 DR. lk O.E. MS CHKD

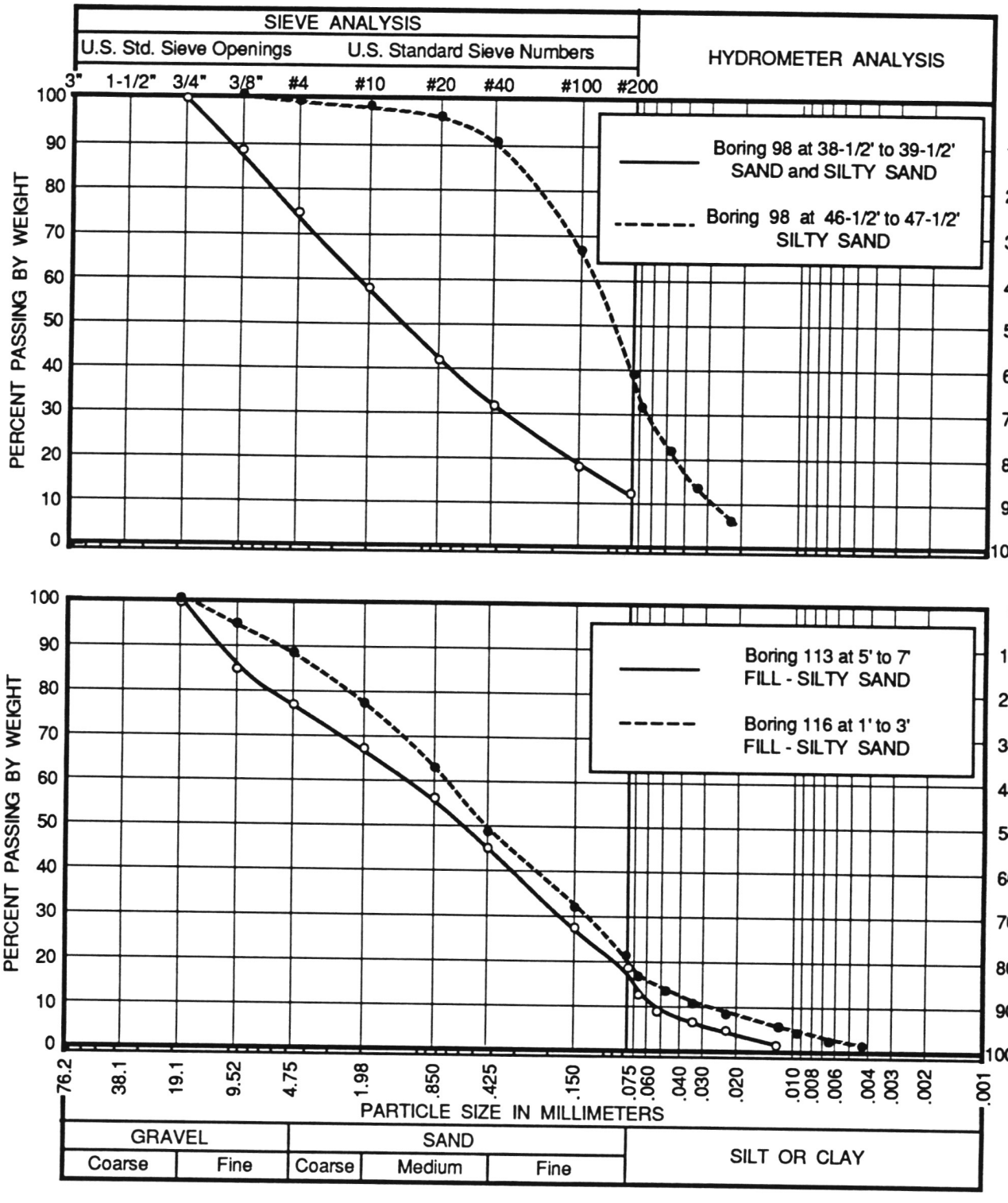


PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.9

JOB L92045.AE4 DATE 2/2/93 DR. k O.E. MS CHKD



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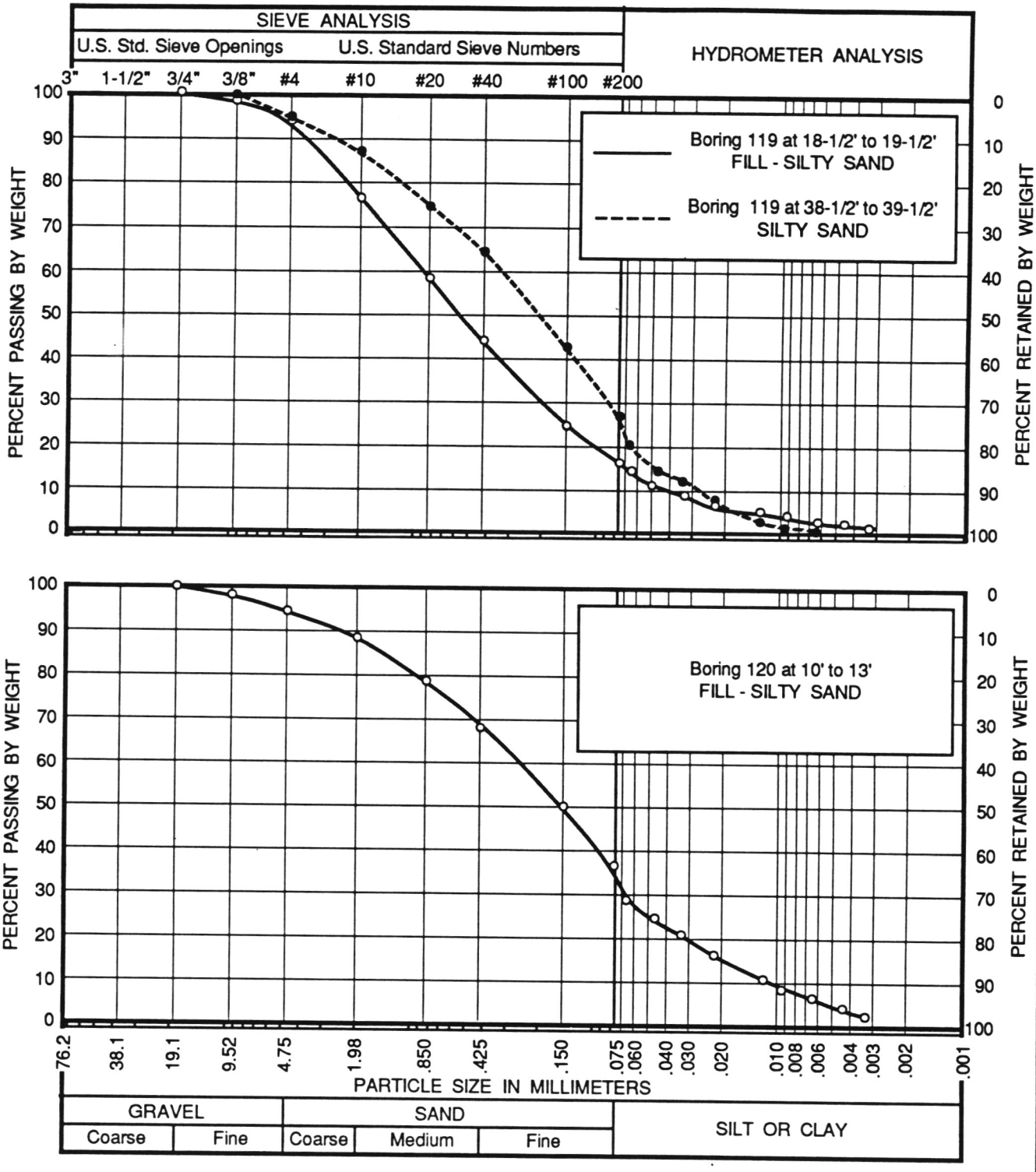
LAW/CRANDALL, INC.

PLATE B-6.10

JOB L92045.AE4 DATE 2/2/93 DR. lk O.E. MS CHKD



PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

PLATE B-6.11

JOB L92045.AE4 DATE 2/8/93 W.P. nh/lk O.E. MS CHKD

BORING NUMBER AND SAMPLE DEPTH	PERCENT PASSING NO. 200 SIEVE	SOIL TYPE
16 at 24'	8	SAND and SILTY SAND
18 at 24'	5	SAND
20 at 14'	6	SAND and SILTY SAND
22 at 10'	45	SILTY SAND
28 at 49'	3	SAND
29 at 10'	20	SILTY SAND
58 at 9'	10	SAND and SILTY SAND
64 at 14'	7	SAND and SILTY SAND
79 at 14'	20	SILTY SAND
84 at 3'	49	SILTY SAND
93 at 59'	14	SILTY SAND
96 at 3'	45	SILTY SAND
112 at 7'	28	SILTY SAND

PERCENT PASSING NO. 200 SIEVE

LAW/CRANDALL, INC.

PLATE B-6.12

APPENDIX C
EARTHQUAKE DATA BASE SEARCH

The seismicity of the region surrounding the project was determined from a search of a data base of earthquakes. The data base of earthquakes includes those with a Richter magnitude greater than 4.0, within a radius of 100 kilometers (62 miles) from the center of the alignment, compiled by the California Institute of Technology for the period 1932 to 1991, and those earthquakes for the period 1812 to 1931 compiled by Richter and the U.S. National Oceanic and Atmospheric Administration (NOAA). The database printout of the earthquakes is presented on the following pages.

The information listed for each earthquake found in the data base listing includes data and time in Greenwich Civil Time (GCT), location of the epicenter in latitude and longitude, quality of epicentral determination (Q), depth in kilometers, and magnitude. Where a depth of 0.0 is given, the solution was based on an assumed 16-kilometer focal depth. The explanation of the letter code for the quality factor of the data is presented on the first page of the listing.

LIST OF HISTORIC EARTHQUAKES OF MAGNITUDE 4.0 OR
GREATER WITHIN 100 KM OF THE SITE
(CAL TECH DATA 1932-1991)

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
11-01-1932	04:45:00	34.00 N	117.25 W	E	86	.0	4.0
03-11-1933	01:54:08	33.62 N	117.97 W	A	57	.0	6.3
03-11-1933	02:04:00	33.75 N	118.08 W	C	41	.0	4.9
03-11-1933	02:05:00	33.75 N	118.08 W	C	41	.0	4.3
03-11-1933	02:09:00	33.75 N	118.08 W	C	41	.0	5.0
03-11-1933	02:10:00	33.75 N	118.08 W	C	41	.0	4.6
03-11-1933	02:11:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	02:16:00	33.75 N	118.08 W	C	41	.0	4.8
03-11-1933	02:17:00	33.60 N	118.00 W	E	59	.0	4.5
03-11-1933	02:22:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	02:27:00	33.75 N	118.08 W	C	41	.0	4.6
03-11-1933	02:30:00	33.75 N	118.08 W	C	41	.0	5.1
03-11-1933	02:31:00	33.60 N	118.00 W	E	59	.0	4.4
03-11-1933	02:52:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	02:57:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	02:58:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	02:59:00	33.75 N	118.08 W	C	41	.0	4.6
03-11-1933	03:05:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	03:09:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	03:11:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	03:23:00	33.75 N	118.08 W	C	41	.0	5.0
03-11-1933	03:36:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	03:39:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	03:47:00	33.75 N	118.08 W	C	41	.0	4.1
03-11-1933	04:36:00	33.75 N	118.08 W	C	41	.0	4.6
03-11-1933	04:39:00	33.75 N	118.08 W	C	41	.0	4.9
03-11-1933	04:40:00	33.75 N	118.08 W	C	41	.0	4.7
03-11-1933	05:10:22	33.70 N	118.07 W	C	46	.0	5.1
03-11-1933	05:13:00	33.75 N	118.08 W	C	41	.0	4.7
03-11-1933	05:15:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	05:18:04	33.57 N	117.98 W	C	62	.0	5.2
03-11-1933	05:21:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	05:24:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	05:53:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	05:55:00	33.75 N	118.08 W	C	41	.0	4.0

NOTE: Q IS A FACTOR RELATING THE QUALITY OF EPICENTRAL DETERMINATION

A = SPECIALLY INVESTIGATED
B = EPICENTER PROBABLY WITHIN 5 KM, ORIGIN TIME TO NEAREST SECOND
C = EPICENTER PROBABLY WITHIN 15 KM, ORIGIN TIME TO A FEW SECONDS
D = EPICENTER NOT KNOWN WITHIN 15 KM, ROUGH LOCATION
E = EPICENTER ROUGHLY LOCATED, ACCURACY LESS THAN "D"
P = PRELIMINARY

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
03-11-1933	06:11:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	06:18:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	06:29:00	33.85 N	118.27 W	C	30	.0	4.4
03-11-1933	06:35:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	06:58:03	33.68 N	118.05 W	C	49	.0	5.5
03-11-1933	07:51:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	07:59:00	33.75 N	118.08 W	C	41	.0	4.1
03-11-1933	08:08:00	33.75 N	118.08 W	C	41	.0	4.5
03-11-1933	08:32:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	08:37:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	08:54:57	33.70 N	118.07 W	C	46	.0	5.1
03-11-1933	09:10:00	33.75 N	118.08 W	C	41	.0	5.1
03-11-1933	09:11:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	09:26:00	33.75 N	118.08 W	C	41	.0	4.1
03-11-1933	10:25:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	10:45:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	11:00:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	11:04:00	33.75 N	118.13 W	C	40	.0	4.6
03-11-1933	11:29:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	11:38:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	11:41:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	11:47:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	12:50:00	33.68 N	118.05 W	C	49	.0	4.4
03-11-1933	13:50:00	33.73 N	118.10 W	C	43	.0	4.4
03-11-1933	13:57:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	14:25:00	33.85 N	118.27 W	C	30	.0	5.0
03-11-1933	14:47:00	33.73 N	118.10 W	C	43	.0	4.4
03-11-1933	14:57:00	33.88 N	118.32 W	C	29	.0	4.9
03-11-1933	15:09:00	33.73 N	118.10 W	C	43	.0	4.4
03-11-1933	15:47:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	16:53:00	33.75 N	118.08 W	C	41	.0	4.8
03-11-1933	19:44:00	33.75 N	118.08 W	C	41	.0	4.0
03-11-1933	19:56:00	33.75 N	118.08 W	C	41	.0	4.2
03-11-1933	22:00:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	22:31:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	22:32:00	33.75 N	118.08 W	C	41	.0	4.1
03-11-1933	22:40:00	33.75 N	118.08 W	C	41	.0	4.4
03-11-1933	23:05:00	33.75 N	118.08 W	C	41	.0	4.2
03-12-1933	00:27:00	33.75 N	118.08 W	C	41	.0	4.4
03-12-1933	00:34:00	33.75 N	118.08 W	C	41	.0	4.0
03-12-1933	04:48:00	33.75 N	118.08 W	C	41	.0	4.0
03-12-1933	05:46:00	33.75 N	118.08 W	C	41	.0	4.4
03-12-1933	06:01:00	33.75 N	118.08 W	C	41	.0	4.2
03-12-1933	06:16:00	33.75 N	118.08 W	C	41	.0	4.6
03-12-1933	07:40:00	33.75 N	118.08 W	C	41	.0	4.2

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
03-12-1933	08:35:00	33.75 N	118.08 W	C	41	.0	4.2
03-12-1933	15:02:00	33.75 N	118.08 W	C	41	.0	4.2
03-12-1933	16:51:00	33.75 N	118.08 W	C	41	.0	4.0
03-12-1933	17:38:00	33.75 N	118.08 W	C	41	.0	4.5
03-12-1933	18:25:00	33.75 N	118.08 W	C	41	.0	4.1
03-12-1933	21:28:00	33.75 N	118.08 W	C	41	.0	4.1
03-12-1933	23:54:00	33.75 N	118.08 W	C	41	.0	4.5
03-13-1933	03:43:00	33.75 N	118.08 W	C	41	.0	4.1
03-13-1933	04:32:00	33.75 N	118.08 W	C	41	.0	4.7
03-13-1933	06:17:00	33.75 N	118.08 W	C	41	.0	4.0
03-13-1933	13:18:28	33.75 N	118.08 W	C	41	.0	5.3
03-13-1933	15:32:00	33.75 N	118.08 W	C	41	.0	4.1
03-13-1933	19:29:00	33.75 N	118.08 W	C	41	.0	4.2
03-14-1933	00:36:00	33.75 N	118.08 W	C	41	.0	4.2
03-14-1933	12:19:00	33.75 N	118.08 W	C	41	.0	4.5
03-14-1933	19:01:50	33.62 N	118.02 W	C	56	.0	5.1
03-14-1933	22:42:00	33.75 N	118.08 W	C	41	.0	4.1
03-15-1933	02:08:00	33.75 N	118.08 W	C	41	.0	4.1
03-15-1933	04:32:00	33.75 N	118.08 W	C	41	.0	4.1
03-15-1933	05:40:00	33.75 N	118.08 W	C	41	.0	4.2
03-15-1933	11:13:32	33.62 N	118.02 W	C	56	.0	4.9
03-16-1933	14:56:00	33.75 N	118.08 W	C	41	.0	4.0
03-16-1933	15:29:00	33.75 N	118.08 W	C	41	.0	4.2
03-16-1933	15:30:00	33.75 N	118.08 W	C	41	.0	4.1
03-17-1933	16:51:00	33.75 N	118.08 W	C	41	.0	4.1
03-18-1933	20:52:00	33.75 N	118.08 W	C	41	.0	4.2
03-19-1933	21:23:00	33.75 N	118.08 W	C	41	.0	4.2
03-20-1933	13:58:00	33.75 N	118.08 W	C	41	.0	4.1
03-21-1933	03:26:00	33.75 N	118.08 W	C	41	.0	4.1
03-23-1933	08:40:00	33.75 N	118.08 W	C	41	.0	4.1
03-23-1933	18:31:00	33.75 N	118.08 W	C	41	.0	4.1
03-25-1933	13:46:00	33.75 N	118.08 W	C	41	.0	4.1
03-30-1933	12:25:00	33.75 N	118.08 W	C	41	.0	4.4
03-31-1933	10:49:00	33.75 N	118.08 W	C	41	.0	4.1
04-01-1933	06:42:00	33.75 N	118.08 W	C	41	.0	4.2
04-02-1933	08:00:00	33.75 N	118.08 W	C	41	.0	4.0
04-02-1933	15:36:00	33.75 N	118.08 W	C	41	.0	4.0
05-16-1933	20:58:55	33.75 N	118.17 W	C	40	.0	4.0
08-04-1933	04:17:48	33.75 N	118.18 W	C	40	.0	4.0
10-02-1933	09:10:18	33.78 N	118.13 W	A	37	.0	5.4
10-02-1933	13:26:01	33.62 N	118.02 W	C	56	.0	4.0
10-25-1933	07:00:46	33.95 N	118.13 W	C	18	.0	4.3
11-13-1933	21:28:00	33.87 N	118.20 W	C	27	.0	4.0
11-20-1933	10:32:00	33.78 N	118.13 W	B	37	.0	4.0
01-09-1934	14:10:00	34.10 N	117.68 W	A	45	.0	4.5

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
01-18-1934	02:14:00	34.10 N	117.68 W	A	45	.0	4.0
01-20-1934	21:17:00	33.62 N	118.12 W	B	55	.0	4.5
04-17-1934	18:33:00	33.57 N	117.98 W	C	62	.0	4.0
10-17-1934	09:38:00	33.63 N	118.40 W	B	57	.0	4.0
11-16-1934	21:26:00	33.75 N	118.00 W	B	43	.0	4.0
06-19-1935	11:17:00	33.72 N	117.52 W	B	74	.0	4.0
07-13-1935	10:54:17	34.20 N	117.90 W	A	27	.0	4.7
09-03-1935	06:47:00	34.03 N	117.32 W	B	79	.0	4.5
12-25-1935	17:15:00	33.60 N	118.02 W	B	58	.0	4.5
02-23-1936	22:20:43	34.13 N	117.34 W	A	77	.0	4.5
02-26-1936	09:33:28	34.14 N	117.34 W	A	77	.0	4.0
08-22-1936	05:21:00	33.77 N	117.82 W	B	50	.0	4.0
10-29-1936	22:35:36	34.38 N	118.62 W	C	51	.0	4.0
01-15-1937	18:35:47	33.56 N	118.06 W	B	62	.0	4.0
03-19-1937	01:23:38	34.11 N	117.43 W	A	68	.0	4.0
07-07-1937	11:12:00	33.57 N	117.98 W	B	62	.0	4.0
09-01-1937	13:48:08	34.21 N	117.53 W	A	60	.0	4.5
09-01-1937	16:35:34	34.18 N	117.55 W	A	58	.0	4.5
05-21-1938	09:44:00	33.62 N	118.03 W	B	56	.0	4.0
05-31-1938	08:34:55	33.70 N	117.51 W	B	76	.0	5.5
07-05-1938	18:06:56	33.68 N	117.55 W	A	74	.0	4.5
08-06-1938	22:00:56	33.72 N	117.51 W	B	75	.0	4.0
08-31-1938	03:18:14	33.76 N	118.25 W	A	40	.0	4.5
11-29-1938	19:21:16	33.90 N	118.43 W	A	33	.0	4.0
12-07-1938	03:38:00	34.00 N	118.42 W	B	26	.0	4.0
12-27-1938	10:09:29	34.13 N	117.52 W	B	60	.0	4.0
04-03-1939	02:50:45	34.04 N	117.23 W	A	87	.0	4.0
11-04-1939	21:41:00	33.77 N	118.12 W	B	38	.0	4.0
11-07-1939	18:52:08	34.00 N	117.28 W	A	83	.0	4.7
12-27-1939	19:28:49	33.78 N	118.20 W	A	37	.0	4.7
01-13-1940	07:49:07	33.78 N	118.13 W	B	37	.0	4.0
02-08-1940	16:56:17	33.70 N	118.07 W	B	46	.0	4.0
02-11-1940	19:24:10	33.98 N	118.30 W	B	19	.0	4.0
04-18-1940	18:43:44	34.03 N	117.35 W	A	76	.0	4.4
05-18-1940	09:15:12	34.60 N	118.90 W	C	87	.0	4.0
06-05-1940	08:27:27	33.83 N	117.40 W	B	78	.0	4.0
07-20-1940	04:01:13	33.70 N	118.07 W	B	46	.0	4.0
10-11-1940	05:57:12	33.77 N	118.45 W	A	46	.0	4.7
10-12-1940	00:24:00	33.78 N	118.42 W	B	43	.0	4.0
10-14-1940	20:51:11	33.78 N	118.42 W	B	43	.0	4.0
11-01-1940	07:25:03	33.78 N	118.42 W	B	43	.0	4.0
11-01-1940	20:00:46	33.63 N	118.20 W	B	53	.0	4.0
11-02-1940	02:58:26	33.78 N	118.42 W	B	43	.0	4.0
01-30-1941	01:34:47	33.97 N	118.05 W	A	19	.0	4.1
03-22-1941	08:22:40	33.52 N	118.10 W	B	66	.0	4.0

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
03-25-1941	23:43:41	34.22 N	117.47 W	B	66	.0	4.0
04-11-1941	01:20:24	33.95 N	117.58 W	B	57	.0	4.0
10-22-1941	06:57:19	33.82 N	118.22 W	A	32	.0	4.9
11-14-1941	08:41:36	33.78 N	118.25 W	A	37	.0	5.4
04-16-1942	07:28:33	33.37 N	118.15 W	C	82	.0	4.0
09-03-1942	14:06:01	34.48 N	118.98 W	C	85	.0	4.5
09-04-1942	06:34:33	34.48 N	118.98 W	C	85	.0	4.5
04-06-1943	22:36:24	34.68 N	119.00 W	C	99	.0	4.0
10-24-1943	00:29:21	33.93 N	117.37 W	C	76	.0	4.0
06-19-1944	00:03:33	33.87 N	118.22 W	B	27	.0	4.5
06-19-1944	03:06:07	33.87 N	118.22 W	C	27	.0	4.4
02-24-1946	06:07:52	34.40 N	117.80 W	C	47	.0	4.1
06-01-1946	11:06:31	34.42 N	118.83 W	C	70	.0	4.1
03-01-1948	08:12:13	34.17 N	117.53 W	B	59	.0	4.7
04-16-1948	22:26:24	34.02 N	118.97 W	B	74	.0	4.7
10-03-1948	02:46:28	34.18 N	117.58 W	A	55	.0	4.0
01-11-1950	21:41:35	33.94 N	118.20 W	A	19	.0	4.1
01-24-1950	21:56:59	34.67 N	118.83 W	C	87	.0	4.0
09-22-1951	08:22:39	34.12 N	117.34 W	A	77	.0	4.3
02-17-1952	12:36:58	34.00 N	117.27 W	A	84	.0	4.5
08-23-1952	10:09:07	34.52 N	118.20 W	A	46	.0	5.0
10-26-1954	16:22:26	33.73 N	117.47 W	B	77	.0	4.1
11-17-1954	23:03:51	34.50 N	119.12 W	B	98	.0	4.4
05-15-1955	17:03:26	34.12 N	117.48 W	A	64	.0	4.0
05-29-1955	16:43:35	33.99 N	119.06 W	B	83	.0	4.1
01-03-1956	00:25:49	33.72 N	117.50 W	B	75	.0	4.7
02-07-1956	02:16:57	34.53 N	118.64 W	B	64	.0	4.2
02-07-1956	03:16:39	34.59 N	118.61 W	A	67	.0	4.6
03-18-1957	18:56:28	34.12 N	119.22 W	B	97	.0	4.7
06-28-1960	20:00:48	34.12 N	117.47 W	A	65	.0	4.1
10-04-1961	02:21:32	33.85 N	117.75 W	B	48	.0	4.1
10-20-1961	19:49:51	33.65 N	117.99 W	B	54	.0	4.3
10-20-1961	20:07:14	33.66 N	117.98 W	B	53	.0	4.0
10-20-1961	21:42:41	33.67 N	117.98 W	B	52	.0	4.0
10-20-1961	22:35:34	33.67 N	118.01 W	B	51	.0	4.1
11-20-1961	08:53:35	33.68 N	117.99 W	B	51	.0	4.0
04-27-1962	09:12:32	33.74 N	117.19 W	B	99	.0	4.1
09-14-1963	03:51:16	33.54 N	118.34 W	B	65	.0	4.2
08-30-1964	22:57:37	34.27 N	118.44 W	B	31	.0	4.0
01-01-1965	08:04:18	34.14 N	117.52 W	B	60	.0	4.4
04-15-1965	20:08:33	34.13 N	117.43 W	B	68	.0	4.5
07-16-1965	07:46:22	34.48 N	118.52 W	B	52	.0	4.0
01-08-1967	07:37:30	33.63 N	118.47 W	B	60	.0	4.0
01-08-1967	07:38:05	33.66 N	118.41 W	C	55	.0	4.0
06-15-1967	04:58:06	34.00 N	117.97 W	B	22	.0	4.1

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
02-28-1969	04:56:12	34.57 N	118.11 W	A	51	.0	4.3
05-05-1969	16:02:10	34.30 N	117.57 W	B	59	.0	4.4
10-27-1969	13:16:02	33.55 N	117.81 W	B	70	.0	4.5
09-12-1970	14:10:11	34.27 N	117.52 W	A	63	.0	4.1
09-12-1970	14:30:53	34.27 N	117.54 W	A	61	.0	5.4
09-13-1970	04:47:49	34.28 N	117.55 W	A	60	.0	4.4
02-09-1971	14:00:42	34.41 N	118.40 W	B	39	.0	6.4
02-09-1971	14:01:08	34.41 N	118.40 W	D	39	.0	5.8
02-09-1971	14:01:33	34.41 N	118.40 W	D	39	.0	4.2
02-09-1971	14:01:40	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:01:50	34.41 N	118.40 W	D	39	.0	4.5
02-09-1971	14:01:54	34.41 N	118.40 W	D	39	.0	4.2
02-09-1971	14:01:59	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:02:03	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:02:30	34.41 N	118.40 W	D	39	.0	4.3
02-09-1971	14:02:31	34.41 N	118.40 W	D	39	.0	4.7
02-09-1971	14:02:44	34.41 N	118.40 W	D	39	.0	5.8
02-09-1971	14:03:25	34.41 N	118.40 W	D	39	.0	4.4
02-09-1971	14:03:46	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:04:07	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:04:34	34.41 N	118.40 W	C	39	.0	4.2
02-09-1971	14:04:39	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:04:44	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:04:46	34.41 N	118.40 W	D	39	.0	4.2
02-09-1971	14:05:41	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:05:50	34.41 N	118.40 W	D	39	.0	4.1
02-09-1971	14:07:10	34.41 N	118.40 W	D	39	.0	4.0
02-09-1971	14:07:30	34.41 N	118.40 W	D	39	.0	4.0
02-09-1971	14:07:45	34.41 N	118.40 W	D	39	.0	4.5
02-09-1971	14:08:04	34.41 N	118.40 W	D	39	.0	4.0
02-09-1971	14:08:07	34.41 N	118.40 W	D	39	.0	4.2
02-09-1971	14:08:38	34.41 N	118.40 W	D	39	.0	4.5
02-09-1971	14:08:53	34.41 N	118.40 W	D	39	.0	4.6
02-09-1971	14:10:21	34.36 N	118.31 W	B	31	.0	4.7
02-09-1971	14:10:28	34.41 N	118.40 W	D	39	.0	5.3
02-09-1971	14:16:13	34.34 N	118.33 W	C	29	.0	4.1
02-09-1971	14:19:50	34.36 N	118.41 W	B	35	.0	4.0
02-09-1971	14:34:36	34.34 N	118.64 W	C	50	.0	4.9
02-09-1971	14:39:18	34.39 N	118.36 W	C	36	.0	4.0
02-09-1971	14:40:17	34.43 N	118.40 W	C	41	.0	4.1
02-09-1971	14:43:47	34.31 N	118.45 W	B	34	.0	5.2
02-09-1971	15:58:21	34.33 N	118.33 W	B	29	.0	4.8
02-09-1971	16:19:26	34.46 N	118.43 W	B	46	.0	4.2
02-10-1971	03:12:12	34.37 N	118.30 W	B	31	.0	4.0
02-10-1971	05:06:36	34.41 N	118.33 W	A	36	.0	4.3

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
02-10-1971	05:18:07	34.43 N	118.41 W	A	42	.0	4.5
02-10-1971	11:31:35	34.38 N	118.45 W	A	40	.0	4.2
02-10-1971	13:49:54	34.40 N	118.42 W	A	40	.0	4.3
02-10-1971	14:35:27	34.36 N	118.49 W	A	41	.0	4.2
02-10-1971	17:38:55	34.40 N	118.37 W	A	37	.0	4.2
02-10-1971	18:54:42	34.45 N	118.44 W	A	45	.0	4.2
02-21-1971	05:50:53	34.40 N	118.44 W	A	41	.0	4.7
02-21-1971	07:15:12	34.39 N	118.43 W	A	39	.0	4.5
03-07-1971	01:33:41	34.35 N	118.46 W	A	38	.0	4.5
03-25-1971	22:54:10	34.36 N	118.47 W	A	39	.0	4.2
03-30-1971	08:54:43	34.30 N	118.46 W	A	34	.0	4.1
03-31-1971	14:52:23	34.29 N	118.51 W	A	37	.0	4.6
04-01-1971	15:03:04	34.43 N	118.41 W	A	42	.0	4.1
04-02-1971	05:40:25	34.28 N	118.53 W	A	38	.0	4.0
04-15-1971	11:14:32	34.26 N	118.58 W	B	41	.0	4.2
04-25-1971	14:48:07	34.37 N	118.31 W	B	32	.0	4.0
06-21-1971	16:01:08	34.27 N	118.53 W	B	38	.0	4.0
06-22-1971	10:41:19	33.75 N	117.48 W	B	75	.0	4.2
02-21-1973	14:45:57	34.06 N	119.03 W	B	80	.0	5.9
03-09-1974	00:54:32	34.40 N	118.47 W	C	42	.0	4.7
08-14-1974	14:45:55	34.43 N	118.37 W	A	40	.0	4.2
01-01-1976	17:20:13	33.96 N	117.89 W	A	31	.0	4.2
04-08-1976	15:21:38	34.35 N	118.66 W	A	52	.0	4.6
08-12-1977	02:19:26	34.38 N	118.46 W	B	40	.0	4.5
09-24-1977	21:28:24	34.46 N	118.41 W	C	45	.0	4.2
05-23-1978	09:16:51	33.91 N	119.17 W	C	95	.0	4.0
01-01-1979	23:14:39	33.94 N	118.68 W	B	51	.0	5.0
10-17-1979	20:52:37	33.93 N	118.67 W	C	50	.0	4.2
10-19-1979	12:22:38	34.21 N	117.53 W	B	60	.0	4.1
09-04-1981	15:50:50	33.67 N	119.11 W	C	100	5.0	5.3
10-23-1981	17:28:17	33.63 N	119.02 W	C	95	12.0	4.6
10-23-1981	19:15:52	33.64 N	119.06 W	C	97	6.2	4.6
04-13-1982	11:02:12	34.05 N	118.96 W	A	73	16.6	4.0
05-25-1982	13:44:30	33.54 N	118.21 W	A	63	13.7	4.1
01-08-1983	07:19:30	34.14 N	117.45 W	A	67	4.6	4.1
06-12-1984	00:27:52	34.54 N	118.99 W	A	89	11.7	4.1
10-26-1984	17:20:44	34.02 N	118.99 W	A	76	13.3	4.6
10-02-1985	23:44:12	34.02 N	117.24 W	A	86	15.2	4.8
10-01-1987	14:42:20	34.06 N	118.08 W	A	10	9.5	5.9
10-01-1987	14:45:41	34.05 N	118.10 W	A	9	13.5	4.7
10-01-1987	14:48:03	34.08 N	118.09 W	A	8	11.7	4.1
10-01-1987	14:49:06	34.06 N	118.10 W	A	9	11.7	4.7
10-01-1987	15:12:32	34.05 N	118.09 W	A	10	10.8	4.7
10-04-1987	10:59:38	34.07 N	118.10 W	A	8	8.3	5.3
10-24-1987	23:58:33	33.68 N	119.06 W	A	95	12.2	4.1

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
02-11-1988	15:25:56	34.08 N	118.05 W	A	12	12.5	4.7
06-26-1988	15:04:58	34.14 N	117.71 W	A	43	7.9	4.7
11-20-1988	05:39:29	33.51 N	118.07 W	C	67	6.0	4.5
12-03-1988	11:38:26	34.15 N	118.13 W	A	6	13.3	4.9
01-19-1989	06:53:29	33.92 N	118.63 W	A	47	11.9	5.0
02-18-1989	07:17:05	34.01 N	117.74 W	A	41	3.3	4.1
04-07-1989	20:07:30	33.62 N	117.90 W	A	60	12.8	4.5
06-12-1989	16:57:18	34.03 N	118.18 W	A	9	15.6	4.4
06-12-1989	17:22:25	34.02 N	118.18 W	A	10	15.5	4.1
12-28-1989	09:41:08	34.19 N	117.39 W	A	73	14.6	4.5
02-28-1990	23:43:37	34.14 N	117.70 W	A	43	5.3	5.2
03-01-1990	00:34:57	34.13 N	117.70 W	A	43	4.4	4.0
03-01-1990	03:23:03	34.15 N	117.72 W	A	42	11.4	4.7
03-02-1990	17:26:25	34.14 N	117.69 W	A	44	5.6	4.7
04-17-1990	22:32:27	34.11 N	117.72 W	A	42	3.6	4.8
06-28-1991	14:43:55	34.26 N	118.00 W	A	23	10.5	5.4
06-28-1991	17:00:56	34.25 N	117.99 W	A	23	9.5	4.3
07-05-1991	17:41:57	34.50 N	118.56 W	A	56	10.9	4.1

SEARCH OF EARTHQUAKE DATA FILE 1

SITE: LACTC, L92045.AE4, (2661.20672.0001), Los Angeles

COORDINATES OF SITE	34.11 N 118.17 W
DISTANCE PER DEGREE	110.9 KM-N 92.3 KM-W
MAGNITUDE LIMITS	4.0 - 8.5
TEMPORAL LIMITS	1932 - 1991
SEARCH RADIUS (KM)	100
NUMBER OF YEARS OF DATA	60
NUMBER OF EARTHQUAKES IN FILE	3140
NUMBER OF EARTHQUAKES IN AREA	323

LAW/CRANDALL, INC.

LIST OF HISTORIC EARTHQUAKES OF MAGNITUDE 6.0 OR
GREATER WITHIN 100 KM OF THE SITE
(RICHTER DATA 1906-1931)

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
09-20-1907	01:54:00	34.20 N	117.10 W	D	99	.0	6.0
05-15-1910	15:47:00	33.70 N	117.40 W	D	84	.0	6.0
07-23-1923	07:30:26	34.00 N	117.25 W	D	86	.0	6.3

S E A R C H O F E A R T H Q U A K E D A T A F I L E 2

SITE: LACTC, L92045.AE4, (2661.20672.0001), Los Angeles

COORDINATES OF SITE ..... 34.11 N 118.17 W

DISTANCE PER DEGREE ..... 110.9 KM-N 92.3 KM-W

MAGNITUDE LIMITS ..... 6.0 - 8.5

TEMPORAL LIMITS ..... 1906 - 1931

SEARCH RADIUS (KM) 100

NUMBER OF YEARS OF DATA 26

NUMBER OF EARTHQUAKES IN FILE 35

NUMBER OF EARTHQUAKES IN AREA 3

L A W / C R A N D A L L , I N C .

LIST OF HISTORIC EARTHQUAKES OF MAGNITUDE 7.0 OR
GREATER WITHIN 100 KM OF THE SITE
(NOAA/CDMG DATA 1812-1905)

DATE	TIME	LATITUDE	LONGITUDE	Q	DIST	DEPTH	MAGNITUDE
02-09-1890	04:06:00	34.00 N	117.50 W	D	63	.0	7.0

S E A R C H O F E A R T H Q U A K E D A T A F I L E 3

SITE: LACTC, L92045.AE4, (2661.20672.0001), Los Angeles

COORDINATES OF SITE	34.11 N 118.17 W
DISTANCE PER DEGREE	110.9 KM-N 92.3 KM-W
MAGNITUDE LIMITS	7.0 - 8.5
TEMPORAL LIMITS	1812 - 1905
SEARCH RADIUS (KM)	100
NUMBER OF YEARS OF DATA	94
NUMBER OF EARTHQUAKES IN FILE	9
NUMBER OF EARTHQUAKES IN AREA	1

L A W / C R A N D A L L , I N C .

SUMMARY OF EARTHQUAKE SEARCH

* * *

NUMBER OF HISTORIC EARTHQUAKES WITHIN 100 KM RADIUS OF SITE

MAGNITUDE RANGE	NUMBER
4.0 - 4.5	216
4.5 - 5.0	77
5.0 - 5.5	22
5.5 - 6.0	6
6.0 - 6.5	5
6.5 - 7.0	0
7.0 - 7.5	1
7.5 - 8.0	0
8.0 - 8.5	0

* * *

COMPUTATION OF RECURRENCE CURVE

LOG N = A - B M

* * *

BIN	MAGNITUDE	RANGE	NO/YR (N)
1	4.00	4.00 - 8.50	5.41
2	4.50	4.50 - 8.50	1.81
3	5.00	5.00 - 8.50	.530
4	5.50	5.50 - 8.50	.164
5	6.00	6.00 - 8.50	.637E-01
6	6.50	6.50 - 8.50	.556E-02 NU
7	7.00	7.00 - 8.50	.556E-02 NU
8	7.50	7.50 - 8.50	.000
9	8.00	8.00 - 8.50	.000

A = .951 B = .5234 (NORMALIZED)
A = 4.650 B = .9807 SIGMA = .376E-01

* * *

COMPUTATION OF DESIGN MAGNITUDE

CONSTANT AREA

* * *

TABLE OF DESIGN MAGNITUDES

RISK	RETURN PERIOD (YEARS)				DESIGN MAGNITUDE			
	DESIGN LIFE (YEARS)							
	25	50	75	100	25	50	75	100
.01 ..	2487	4974	7462	9949	8.02	8.20	8.28	8.32
.05 ..	487	974	1462	1949	7.44	7.71	7.85	7.95
.10 ..	237	474	711	949	7.14	7.43	7.59	7.70
.20 ..	112	224	336	448	6.82	7.12	7.29	7.41
.30 ..	70	140	210	280	6.62	6.92	7.09	7.21
.50 ..	36	72	108	144	6.33	6.63	6.81	6.93
.70 ..	20	41	62	83	6.08	6.39	6.57	6.69
.90 ..	10	21	32	43	5.80	6.10	6.28	6.41

MMIN = 4.00 MMAX = 8.50
MU = 5.34 BETA = 2.258

* * *

PROGRAM EQSCAN - VERSION 3.4
RECURRENCE CURVE COMPUTATION Date: 2/23/1993

LACTC, L92045.AE4, (2661.20672.0001), Los Angeles
19321991 CALTECH DATA 1932-1991 M>4

MAG	NO/YEAR
4	5.340908
5	.558412
6	.058384
7	.006104
8	.000638

THIS PAGE DOES NOT GO INTO THE REPORT;
PLEASE KEEP IN THE JOB FILE FOR REFERENCE. THANK YOU
****

APPENDIX D

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

ANALYTICAL REPORT

LOG NO: G92-05-050

Received: 05 MAY 92
Mailed : 19 MAY 92

Mr. Bill Mitchell
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AEFO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
05-050-1	B-3	05 MAY 92
05-050-2	B-10	05 MAY 92

PARAMETER	05-050-1	05-050-2
Nitric Acid Digestion with HCl, Date	05/06/92	05/06/92
Nitric Acid Digestion, Date	05/06/92	05/06/92
Arsenic by Graphite Furnace, mg/L	<0.002	0.002
Antimony, mg/L	<0.06	<0.06
Barium, mg/L	0.093	0.098
Beryllium, mg/L	0.029	<0.002
Cadmium by Graphite Furnace, mg/L	<0.001	<0.001
Chromium by Graphite Furnace, mg/L	<0.005	<0.005
Cobalt, mg/L	0.13	<0.04
Copper, mg/L	<0.02	<0.02
Lead by Graphite Furnace, mg/L	0.005	0.016
Mercury, mg/L	<0.0005	<0.0005
Molybdenum, mg/L	<0.04	<0.04
Nickel, mg/L	0.07	<0.04
Selenium by Graphite Furnace, mg/L	<0.005	<0.005
Silver, mg/L	<0.01	<0.01
Thallium, mg/L	<0.4	<0.4
Vanadium, mg/L	<0.04	<0.04
Zinc, mg/L	0.29	0.05
Petroleum Hydrocarbons (418.1), mg/L	0.2	<0.2

BCA

B C Analytical

801 Western Avenue
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Project: L92045.AEFO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
05-050-1	B-3	05 MAY 92
05-050-2	B-10	05 MAY 92

PARAMETER	05-050-1	05-050-2			
EPA Method 8270					
Date Analyzed	05/13/92	05/13/92			
Date Extracted	05/08/92	05/08/92			
Dilution Factor, Times	1	1			
1,2,4-Trichlorobenzene, ug/L	<5	<5			
1,2-Dichlorobenzene, ug/L	<5	<5			
1,2-Diphenylhydrazine, ug/L	<5	<5			
1,3-Dichlorobenzene, ug/L	<5	<5			
1,4-Dichlorobenzene, ug/L	<5	<5			
2,4,5-Trichlorophenol, ug/L	<20	<20			
2,4,6-Trichlorophenol, ug/L	<5	<5			
2,4-Dichlorophenol, ug/L	<10	<10			
2,4-Dimethylphenol, ug/L	<10	<10			
2,4-Dinitrophenol, ug/L	<30	<30			
2,4-Dinitrotoluene, ug/L	<5	<5			
2,6-Dinitrotoluene, ug/L	<5	<5			
2-Chloronaphthalene, ug/L	<20	<20			
2-Chlorophenol, ug/L	<10	<10			
2-Methyl-4,6-dinitrophenol, ug/L	<20	<20			
2-Methylnaphthalene, ug/L	<20	<20			
2-Methylphenol (o-Cresol), ug/L	<5	<5			
2-Nitroaniline, ug/L	<50	<50			
2-Nitrophenol, ug/L	<10	<10			
3,3'-Dichlorobenzidine, ug/L	<10	<10			
3-Nitroaniline, ug/L	<10	<10			
4-Bromophenylphenylether, ug/L	<5	<5			
4-Chloro-3-methylphenol, ug/L	<5	<5			

BCA

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801 Western Avenue
Glendale, CA 91201
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Received: 05 MAY 92
Mailed : 19 MAY 92

Mr. Bill Mitchell
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AEF0

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
05-050-1	B-3	05 MAY 92
05-050-2	B-10	05 MAY 92

PARAMETER	05-050-1	05-050-2
4-Chloroaniline, ug/L	<10	<10
4-Chlorophenylphenylether, ug/L	<5	<5
4-Methylphenol (p-Cresol), ug/L	<5	<5
4-Nitroaniline, ug/L	<20	<20
4-Nitrophenol, ug/L	<20	<20
Acenaphthene, ug/L	<5	<5
Acenaphthylene, ug/L	<5	<5
Aniline, ug/L	<10	<10
Anthracene, ug/L	<5	<5
Benzidine, ug/L	<200	<200
Benzo(a)anthracene, ug/L	<5	<5
Benzo(a)pyrene, ug/L	<5	<5
Benzo(b)fluoranthene, ug/L	<5	<5
Benzo(g,h,i)perylene, ug/L	<5	<5
Benzo(k)fluoranthene, ug/L	<5	<5
Benzyl Alcohol, ug/L	<5	<5
Benzoic acid, ug/L	<50	<50
Butylbenzylphthalate, ug/L	<5	<5
Chrysene, ug/L	<5	<5
Di-n-octylphthalate, ug/L	<5	<5
Dibenzo(a,h)anthracene, ug/L	<5	<5
Dibenzofuran, ug/L	<5	<5
Dibutylphthalate, ug/L	<10	<10
Diethylphthalate, ug/L	<10	<10
Dimethylphthalate, ug/L	<10	<10
Fluoranthene, ug/L	<5	<5
Fluorene, ug/L	<5	<5

BCA

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LOG NO: G92-05-050

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Mr. Bill Mitchell
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AEFO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
05-050-1	B-3	05 MAY 92
05-050-2	B-10	05 MAY 92

PARAMETER	05-050-1	05-050-2
Hexachlorobenzene, ug/L	<5	<5
Hexachlorobutadiene, ug/L	<5	<5
Hexachlorocyclopentadiene, ug/L	<5	<5
Hexachloroethane, ug/L	<5	<5
Indeno(1,2,3-c,d)pyrene, ug/L	<10	<10
Isophorone, ug/L	<5	<5
N-Nitrosodimethylamine, ug/L	<5	<5
N-Nitrosodiphenylamine, ug/L	<5	<5
N-Nitrosodi-n-propylamine, ug/L	<20	<20
Nitrobenzene, ug/L	<5	<5
Naphthalene, ug/L	<5	<5
Phenanthrene, ug/L	<5	<5
Phenol, ug/L	<10	<10
Pentachlorophenol, ug/L	<10	<10
Pyrene, ug/L	<10	<10
Bis(2-chloroethoxy)methane, ug/L	<10	<10
Bis(2-chloroethyl)ether, ug/L	<10	<10
Bis(2-chloroisopropyl)ether, ug/L	<10	<10
Bis(2-ethylhexyl)phthalate, ug/L	<10	<10

BCA

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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
05-050-1	B-3	05 MAY 92
05-050-2	B-10	05 MAY 92

PARAMETER	05-050-1	05-050-2	
TPH - Volatile Hydrocarbons			
Date Analyzed	05/08/92	05/07/92	
Dilution Factor, Times	1	1	
TPH-Volatile Hydrocarbons, ug/L	<100	<100	
Other TPH - Volatile Hydrocarbons	---	---	

B C Analytical

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Mr. Bill Mitchell
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200 Citadel Drive
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Project: L92045.AEFO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
05-050-1	B-3	05 MAY 92
05-050-2	B-10	05 MAY 92

PARAMETER	05-050-1	05-050-2
EPA Method 8010		
Date Analyzed	05/08/92	05/08/92
Date Confirmed	05/08/92	05/08/92
Dilution Factor, Times	1	1
1,1,1-Trichloroethane, ug/L	<0.5	<0.5
1,1,2,2-Tetrachloroethane, ug/L	<0.5	<0.5
1,1,2-Trichloroethane, ug/L	<0.5	<0.5
1,1-Dichloroethane, ug/L	<0.5	<0.5
1,1-Dichloroethene, ug/L	<0.5	<0.5
1,2-Dichloroethane, ug/L	<0.5	<0.5
1,2-Dichlorobenzene, ug/L	<0.5	<0.5
1,2-Dichloropropane, ug/L	<0.5	<0.5
1,3-Dichlorobenzene, ug/L	<0.5	<0.5
1,4-Dichlorobenzene, ug/L	<0.5	<0.5
2-Chloroethylvinylether, ug/L	<0.5	<0.5
Bromodichloromethane, ug/L	<0.5	<0.5
Bromomethane, ug/L	<0.5	<0.5
Bromoform, ug/L	<0.5	<0.5
Chlorobenzene, ug/L	<0.5	<0.5
Carbon Tetrachloride, ug/L	<0.5	<0.5
Chloroethane, ug/L	<0.5	<0.5
Chloroform, ug/L	<0.5	<0.5
Chloromethane, ug/L	<0.5	<0.5
Dibromochloromethane, ug/L	<0.5	<0.5
Dichlorodifluoromethane, ug/L	<3	<3
Freon 113, ug/L	<1	<1
Methylene chloride, ug/L	<0.5	<0.5

BCA

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Project: L92045.AEFO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
05-050-1	B-3	05 MAY 92
05-050-2	B-10	05 MAY 92

PARAMETER	05-050-1	05-050-2
Trichloroethene, ug/L	<0.5	<0.5
Trichlorofluoromethane, ug/L	<0.5	<0.5
Tetrachloroethene, ug/L	<0.5	<0.5
Vinyl chloride, ug/L	<0.5	<0.5
cis-1,2-Dichloroethene, ug/L	<0.5	<0.5
cis-1,3-Dichloropropene, ug/L	<0.5	<0.5
trans-1,2-Dichloroethene, ug/L	<0.5	<0.5
trans-1,3-Dichloropropene, ug/L	<0.5	<0.5
EPA Method 8020		
Date Analyzed	05/08/92	05/08/92
Date Confirmed	05/08/92	05/08/92
Dilution Factor, Times	1	1
1,2-Dichlorobenzene, ug/L	<0.5	<0.5
1,3-Dichlorobenzene, ug/L	<0.5	<0.5
1,4-Dichlorobenzene, ug/L	<0.5	<0.5
Benzene, ug/L	1.0	<0.5
Chlorobenzene, ug/L	<0.5	<0.5
Ethylbenzene, ug/L	<0.5	<0.5
Toluene, ug/L	<0.5	0.7
Total Xylene Isomers, ug/L	<1	1.4

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
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LOG NO: G92-05-050

Received: 05 MAY 92
Mailed : 19 MAY 92

Mr. Bill Mitchell
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AEFO

REPORT OF ANALYTICAL RESULTS

Jane Freemyer, Client Services Manager

BCA

CHAIN OF CUSTODY RECORD

BCA Log Number _____

Client name	Project or PO#
Law Crandall Inc	LG 2c 45. A+ FO
Address	**Phone #**
City, State, Zip	**Report attention**
	Bill Mitchell

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sampled by / Sample description	Number of containers	Analyses required: 418.1	8015 (Gas)	8010 8021	8270 Title 22 Metals			Hazardous sample Special handling required	Remarks
	5/5/92		GW	Mike Eagen B-3	11	X	X	X	X				
	5/5/92		GW	B-10	11	X	X	X	X				

	Signature	Print Name	Company	Date	Time
Relinquished by	Bill Mitchell	Bill Mitchell	Law Crandall Inc	5/5/92	3 PM
Received by	[illegible]	Steven Wong	BCA	5/5/92	1500
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

B C ANALYTICAL

1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
801 Western Avenue, Glendale, CA 91201 (818) 247-5737
1200 Pacific Avenue, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

ANALYTICAL REPORT

LOG NO: G92-09-285

Received: 22 SEP 92

Mailed: OCT U 2 1992

Mr. Herb Spitz
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AE-3

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-285-1	B-11	22 SEP 92
09-285-2	B-13	22 SEP 92

PARAMETER	09-285-1	09-285-2
Nitric Acid Digestion with HCl, Date	09/25/92	09/25/92
Nitric Acid Digestion, Date	09/25/92	09/25/92
Oil and Grease, gravimetric, mg/L	12	6.7
Nitrate Nitrogen		
Nitrate (as N), mg/L	1.2	4.5
Nitrate (as NO3), mg/L	5.2	20
Sulfide, mg/L	<0.1	<0.1
Biochemical Oxygen Demand, mg/L	61	42
Turbidity, NTU	860	3200
Phenolics, mg/L	<0.05	<0.05
Filterable Residue (TDS), mg/L	510	1200
Settleable Solids, mL/L	25	100
Suspended Solids (TSS), mg/L	4200	13000
Chloride, mg/L	33	99
Sulfate, mg/L	210	440
Arsenic by Graphite Furnace, mg/L	0.013	0.011
Cadmium by Graphite Furnace, mg/L	<0.001	<0.001
Chromium by Graphite Furnace, mg/L	0.0089	<0.005
Copper, mg/L	<0.02	0.046
Lead by Graphite Furnace, mg/L	0.023	0.31
Mercury, mg/L	<0.0005	<0.0005
Selenium by Graphite Furnace, mg/L	0.0051	0.0072
Silver, mg/L	<0.01	<0.01
Zinc, mg/L	0.046	0.23

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
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Fax: 818/247-9797

LOG NO: G92-09-285

Received: 22 SEP 92

Mr. Herb Spitz
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AE-3

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-285-1	B-11	22 SEP 92
09-285-2	B-13	22 SEP 92

PARAMETER	09-285-1	09-285-2
EPA Method 8010		
Date Analyzed	09/28/92	09/28/92
Date Confirmed	09/28/92	09/28/92
Dilution Factor, Times	1	1
1,1,1-Trichloroethane, ug/L	0.78	<0.5
1,1,2,2-Tetrachloroethane, ug/L	<0.5	<0.5
1,1,2-Trichloroethane, ug/L	<0.5	<0.5
1,1-Dichloroethane, ug/L	<0.5	<0.5
1,1-Dichloroethene, ug/L	<0.5	<0.5
1,2-Dichloroethane, ug/L	<0.5	<0.5
1,2-Dichlorobenzene, ug/L	<0.5	<0.5
1,2-Dichloropropane, ug/L	<0.5	<0.5
1,3-Dichlorobenzene, ug/L	<0.5	<0.5
1,4-Dichlorobenzene, ug/L	<0.5	<0.5
2-Chloroethylvinylether, ug/L	<0.5	<0.5
Bromodichloromethane, ug/L	<0.5	<0.5
Bromomethane, ug/L	<0.5	<0.5
Bromoform, ug/L	<0.5	<0.5
Chlorobenzene, ug/L	<0.5	<0.5
Carbon Tetrachloride, ug/L	<0.5	<0.5
Chloroethane, ug/L	<0.5	<0.5
Chloroform, ug/L	1.3	<0.5
Chloromethane, ug/L	<0.5	<0.5
Dibromochloromethane, ug/L	<0.5	<0.5
Dichlorodifluoromethane, ug/L	<3	<3
Freon 113, ug/L	<1	<1
Methylene chloride, ug/L	<0.5	<0.5

BCA

B C Analytical

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LOG NO: G92-09-285

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Mr. Herb Spitz
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AE-3

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
09-285-1	B-11	22 SEP 92
09-285-2	B-13	22 SEP 92

PARAMETER	09-285-1	09-285-2
Trichloroethene, ug/L	0.97	<0.5
Trichlorofluoromethane, ug/L	<0.5	<0.5
Tetrachloroethene, ug/L	<0.5	<0.5
Vinyl chloride, ug/L	<0.5	<0.5
cis-1,2-Dichloroethene, ug/L	3.9	<0.5
cis-1,3-Dichloropropene, ug/L	<0.5	<0.5
trans-1,2-Dichloroethene, ug/L	<0.5	<0.5
trans-1,3-Dichloropropene, ug/L	<0.5	<0.5
EPA Method 8020		
Date Analyzed	09/28/92	09/28/92
Date Confirmed	09/28/92	09/28/92
Dilution Factor, Times	1	1
1,2-Dichlorobenzene, ug/L	<0.5	<0.5
1,3-Dichlorobenzene, ug/L	<0.5	<0.5
1,4-Dichlorobenzene, ug/L	<0.5	<0.5
Benzene, ug/L	<0.5	<0.5
Chlorobenzene, ug/L	<0.5	<0.5
Ethylbenzene, ug/L	<0.5	<0.5
Toluene, ug/L	<0.5	<0.5
Total Xylene Isomers, ug/L	<1	<1

BCA

B C Analytical

801 Western Avenue
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LOG NO: G92-09-285

Received: 22 SEP 92

Mr. Herb Spitz
Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, California 90040

Project: L92045.AE-3

REPORT OF ANALYTICAL RESULTS

Jane Freemyer, Client Services Manager

BCA

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

ATE REPORTED : 10/02/92

MATRIX QC PRECISION (DUPLICATES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	R1 RESULT	R2 RESULT	UNIT	RELATIVE %DIFF
iochemical Oxygen Demand	09.23.92	92268	4290	3980	mg/L	7
rbidity	09.23.92	9283	1.7	1.7	NTU	0
Settleable Solids	09.23.92	9257	<0.1	<0.1	mL/L	NA

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

.TE REPORTED : 10/02/92

MATRIX QC ACCURACY (SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE RESULT	RBAR RESULT	UNIT	PERCENT RECOVERY
l and Grease, gravimetric	09.29.92	9251	188	203	<5	mg/L	93
trate Nitrogen							
Nitrate (as N)	09.28.92	92190	654	654	430	mg/L	100
Nitrate (as NO3)	09.28.92	92190	2900	2900	1900	mg/L	100
lfide	09.24.92	9259	1.4	1.5	<0.1	mg/L	93
Sulfide	09.29.92	9259	1.3	1.5	<0.1	mg/L	87
ochemical Oxygen Demand	09.23.92	92268	10100	10100	4135	mg/L	100
enolics	09.28.92	9269	0.971	1.00	<0.05	mg/L	97
lterable Residue (TDS)	09.24.92	9263	1605	1600	600	mg/L	101
Suspended Solids (TSS)	09.23.92	92154	238.5	250	<5	mg/L	95
loride	09.29.92	9258	175.5	180	80	mg/L	96
lfate	09.24.92	9248	36.4	39.6	20	mg/L	84
Arsenic by Graphite Furnace	09.29.92	921366	0.0373	0.0380	0.013	mg/L	97
dmium by Graphite Furnace	09.28.92	921366	0.0269	0.0250	<0.001	mg/L	108
comium by Graphite Furnace	09.30.92	921374	0.0524	0.0600	<0.005	mg/L	87
Copper	09.25.92	921367	0.6615	0.750	0.25	mg/L	82
Copper	09.25.92	921367	0.4185	0.500	<0.02	mg/L	84
ad (EPA 7421)							
Lead by Graphite Furnace	09.28.92	921366	0.0328	0.0250	0.0050	mg/L	139
Mercury (EPA 7470)							
Mercury	09.29.92	921371	0.0036	0.0031	0.0011	mg/L	125
rcury	09.29.92	921371	0.0005	0.0020	<0.0005	mg/L	25
Selenium by Graphite Furnace	09.29.92	921366	0.0452	0.0551	0.0051	mg/L	80
lver	09.25.92	921367	0.449	0.500	<0.01	mg/L	90
ic	09.25.92	921367	0.714	0.780	0.28	mg/L	87
EPA Method 8010							
1,1,2,2-Tetrachloroethane	09.28.92	92114	23.25	20.0	<0.5	ug/L	116
1,1-Dichloroethene	09.28.92	92114	15.4	20.0	<0.5	ug/L	77
1,2-Dichloroethane	09.28.92	92114	21.2	20.0	<0.5	ug/L	106
1,2-Dichloropropane	09.28.92	92114	20.4	20.0	<0.5	ug/L	102
Chlorobenzene	09.28.92	92114	20.05	20.0	<0.5	ug/L	100
Carbon Tetrachloride	09.28.92	92114	19.55	20.0	<0.5	ug/L	98
Dibromochloromethane	09.28.92	92114	17.8	20.0	<0.5	ug/L	89
Methylene chloride	09.28.92	92114	20.15	20.6	0.64	ug/L	98
Trichloroethene	09.28.92	92114	20.7	20.0	<0.5	ug/L	104
trans-1,2-Dichloroethene	09.28.92	92114	19.05	20.0	<0.5	ug/L	95
Bromochloromethane Reported	09.28.92	92114	34.7	30.0	37.2	ug/L	SOR

= Spike Out of Range
lative to high sample concentration)

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

DATE REPORTED : 10/02/92

MATRIX QC ACCURACY (SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	SBAR RESULT	TRUE RESULT	RBAR RESULT	UNIT	PERCENT RECOVERY
EPA Method 8020							
Benzene	09.28.92	92114	15.85	20.0	<0.5	ug/L	79
Chlorobenzene	09.28.92	92114	18.2	20.0	<0.5	ug/L	91
Ethylbenzene	09.28.92	92114	16.9	20.0	<0.5	ug/L	85
Toluene	09.28.92	92114	16.9	20.0	<0.5	ug/L	85
Total Xylene Isomers	09.28.92	92114	52.65	60.0	<1	ug/L	88
a,a,a-Trifluorotoluene Reported	09.28.92	92114	30.3	30.0	30.2	ug/L	SOR

SOR = Spike Out of Range
(Relative to high sample concentration)

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

TE REPORTED : 10/02/92

MATRIX QC PRECISION (DUPLICATE SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	RELATIVE %DIFF
l and Grease, gravimetric	09.29.92	9251	183	193	mg/L	5
trate Nitrogen						
Nitrate (as N)	09.28.92	92190	636	672	mg/L	6
Nitrate (as NO3)	09.28.92	92190	2820	2980	mg/L	6
lfide	09.24.92	9259	1.4	1.4	mg/L	0
Sulfide	09.29.92	9259	1.3	1.3	mg/L	0
enolics	09.28.92	9269	0.974	0.968	mg/L	1
lterable Residue (TDS)	09.24.92	9263	1600	1610	mg/L	1
spended Solids (TSS)	09.23.92	92154	237	240	mg/L	1
hloride	09.29.92	9258	176	175	mg/L	1
lfate	09.24.92	9248	36.3	36.5	mg/L	1
senic by Graphite Furnace	09.29.92	921366	0.0368	0.0378	mg/L	3
Cadmium by Graphite Furnace	09.28.92	921366	0.0268	0.0270	mg/L	1
romium by Graphite Furnace	09.30.92	921374	0.0508	0.0541	mg/L	6
pper	09.25.92	921367	0.659	0.664	mg/L	1
Copper	09.25.92	921367	0.417	0.420	mg/L	1
ad (EPA 7421)						
Lead by Graphite Furnace	09.28.92	921366	0.0321	0.0335	mg/L	4
cury (EPA 7470)						
Mercury	09.29.92	921371	0.0036	0.0036	mg/L	0
rcury	09.29.92	921371	0.0005	0.0005	mg/L	0
lenium by Graphite Furnace	09.29.92	921366	0.0435	0.0470	mg/L	8
Silver	09.25.92	921367	0.456	0.442	mg/L	3
nc	09.25.92	921367	0.707	0.721	mg/L	2
A Method 8010						
1,1,2,2-Tetrachloroethane	09.28.92	92114	22.9	23.6	ug/L	3
1,1-Dichloroethene	09.28.92	92114	15.1	15.7	ug/L	4
1,2-Dichloroethane	09.28.92	92114	20.5	21.9	ug/L	7
1,2-Dichloropropane	09.28.92	92114	19.9	20.9	ug/L	5
Chlorobenzene	09.28.92	92114	19.8	20.3	ug/L	2
Carbon Tetrachloride	09.28.92	92114	19.2	19.9	ug/L	4
Dibromochloromethane	09.28.92	92114	17.5	18.1	ug/L	3
Methylene chloride	09.28.92	92114	19.1	21.2	ug/L	10
Trichloroethene	09.28.92	92114	20.4	21.0	ug/L	3
trans-1,2-Dichloroethene	09.28.92	92114	18.5	19.6	ug/L	6
Bromochloromethane Reported	09.28.92	92114	34.7	34.7	ug/L	0
Bromochloromethane Theoretical	09.28.92	92114	30.0	30.0	ug/L	0

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

DATE REPORTED : 10/02/92

MATRIX QC PRECISION (DUPLICATE SPIKES)

PARAMETER	DATE ANALYZED	BATCH NUMBER	S1 RESULT	S2 RESULT	UNIT	RELATIVE %DIFF
PA Method 8020						
Benzene	09.28.92	92114	15.4	16.3	ug/L	6
Chlorobenzene	09.28.92	92114	17.6	18.8	ug/L	7
Ethylbenzene	09.28.92	92114	16.4	17.4	ug/L	6
Toluene	09.28.92	92114	16.4	17.4	ug/L	6
Total Xylene Isomers	09.28.92	92114	51.0	54.3	ug/L	6
a,a,a-Trifluorotoluene Reported	09.28.92	92114	30.0	30.6	ug/L	2
a,a,a-Trifluorotoluene Theoretica	09.28.92	92114	30.0	30.0	ug/L	0

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

ATE REPORTED : 10/02/92

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
il and Grease, gravimetric	09.29.92	9251	98	100	mg/L	98
itrate Nitrogen						
Nitrate (as N)	09.28.92	92190	5.12	4.50	mg/L	114
Nitrate (as NO3)	09.28.92	92190	22.7	20.0	mg/L	114
lfide	09.24.92	9259	1.4	1.5	mg/L	93
ulfide	09.29.92	9259	1.4	1.5	mg/L	93
ochemical Oxygen Demand	09.23.92	92268	172	200	mg/L	86
rbidity	09.23.92	9283	1.84	1.77	NTU	104
urbidity	09.23.92	9283	19.2	18.4	NTU	104
Turbidity	09.23.92	9283	199	198	NTU	101
enolics	09.28.92	9269	0.500	0.500	mg/L	100
enolics	09.28.92	9269	0.197	0.200	mg/L	99
Filterable Residue (TDS)	09.24.92	9263	1000	1000	mg/L	100
spended Solids (TSS)	09.23.92	92154	96	100	mg/L	96
loride	09.29.92	9258	20.2	20	mg/L	101
Sulfate	09.24.92	9248	19.6	20	mg/L	98
rsenic by Graphite Furnace	09.29.92	921366	0.0503	0.0500	mg/L	101
dmium by Graphite Furnace	09.28.92	921366	0.0031	0.0030	mg/L	103
romium by Graphite Furnace	09.30.92	921374	0.0097	0.0100	mg/L	97
pper	09.25.92	921367	2.61	3.00	mg/L	87
ad (EPA 7421)						
Lead by Graphite Furnace	09.28.92	921366	0.0470	0.0500	mg/L	94
Mercury (EPA 7470)						
Mercury	09.29.92	921371	0.0043	0.0040	mg/L	108
Selenium by Graphite Furnace	09.29.92	921366	0.0981	0.100	mg/L	98
Silver	09.25.92	921367	0.447	0.500	mg/L	89
Zinc	09.25.92	921367	2.73	3.00	mg/L	91
Method 8010						
1,1,1-Trichloroethane	09.28.92	92114	17.1	20.0	ug/L	86
1,1,2,2-Tetrachloroethane	09.28.92	92114	20.4	20.0	ug/L	102
1,1,2-Trichloroethane	09.28.92	92114	21.1	20.0	ug/L	106
1,1-Dichloroethane	09.28.92	92114	16.7	20.0	ug/L	84
1,1-Dichloroethene	09.28.92	92114	11.2	20.0	ug/L	56
1,2-Dichloroethane	09.28.92	92114	19.6	20.0	ug/L	98
1,2-Dichlorobenzene	09.28.92	92114	19.5	20.0	ug/L	98
1,2-Dichloropropane	09.28.92	92114	19.2	20.0	ug/L	96
1,3-Dichlorobenzene	09.28.92	92114	15.5	20.0	ug/L	78

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

DATE REPORTED : 10/02/92

LABORATORY CONTROL STANDARDS

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
1,4-Dichlorobenzene	09.28.92	92114	17.8	20.0	ug/L	89
2-Chloroethylvinylether	09.28.92	92114	11.5	20.0	ug/L	58
Bromodichloromethane	09.28.92	92114	18.7	20.0	ug/L	94
Bromoform	09.28.92	92114	17.6	20.0	ug/L	88
Chlorobenzene	09.28.92	92114	18.5	20.0	ug/L	93
Carbon Tetrachloride	09.28.92	92114	17.7	20.0	ug/L	89
Chloroethane	09.28.92	92114	6.17	20.0	ug/L	31
Chloroform	09.28.92	92114	19.3	20.0	ug/L	97
Dibromochloromethane	09.28.92	92114	17.6	20.0	ug/L	88
Methylene chloride	09.28.92	92114	17.5	20.0	ug/L	88
Trichloroethene	09.28.92	92114	19.1	20.0	ug/L	96
Trichlorofluoromethane	09.28.92	92114	7.74	20.0	ug/L	39
Tetrachloroethene	09.28.92	92114	18.3	20.0	ug/L	92
cis-1,3-Dichloropropene	09.28.92	92114	18.3	20.0	ug/L	92
trans-1,2-Dichloroethene	09.28.92	92114	15.2	20.0	ug/L	76
trans-1,3-Dichloropropene	09.28.92	92114	16.9	20.0	ug/L	85
Bromochloromethane Reported	09.28.92	92114	33.5	30.0	ug/L	112
Bromochloromethane Theoretical	09.28.92	92114	30.0	30.0	ug/L	100
Method 8020						
1,2-Dichlorobenzene	09.28.92	92114	18.2	20.0	ug/L	91
1,3-Dichlorobenzene	09.28.92	92114	14.4	20.0	ug/L	72
1,4-Dichlorobenzene	09.28.92	92114	14.9	20.0	ug/L	75
Benzene	09.28.92	92114	14.6	20.0	ug/L	73
Chlorobenzene	09.28.92	92114	16.6	20.0	ug/L	83
Ethylbenzene	09.28.92	92114	16.0	20.0	ug/L	80
Toluene	09.28.92	92114	15.9	20.0	ug/L	80

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

TE REPORTED : 10/02/92

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
tric Acid Digestion with HCl	09.25.92	921367	9/25/92	NA	Date	3010
rnace Digest (EPA 3005)	09.25.92	921366	9/25/92	NA	Date	3020
Oil and Grease, gravimetric	09.29.92	9251	0	5	mg/L	413.1
trate Nitrogen						
Nitrate (as N)	09.28.92	92190	0	0.05	mg/L	353.2
Nitrate (as NO3)	09.28.92	92190	0	0.2	mg/L	353.2
lfide	09.24.92	9259	0	0.1	mg/L	376.2
lfide	09.29.92	9259	0	0.1	mg/L	376.2
ochemical Oxygen Demand	09.23.92	92268	0.50	7	mg/L	405.1
Turbidity	09.23.92	9283	0	0.1	NTU	180.1
enolics	09.28.92	9269	0.008	0.05	mg/L	420.1
lterable Residue (TDS)	09.24.92	9263	0	10	mg/L	160.1
Suspended Solids (TSS)	09.23.92	92154	0	5	mg/L	160.2
loride	09.29.92	9258	0	0.5	mg/L	325.3
lfate	09.24.92	9248	0	2	mg/L	375.4
rsenic by Graphite Furnace	09.29.92	921366	0.0012	0.002	mg/L	7060
dmium by Graphite Furnace	09.28.92	921366	0	0.0001	mg/L	7131
romium by Graphite Furnace	09.30.92	921374	0.0021	0.0005	mg/L	7191
per	09.25.92	921367	0.004	0.02	mg/L	6010
ad (EPA 7421)						
Date Analyzed	09.28.92	921366	9/28/92	NA	Date	7421
Lead by Graphite Furnace	09.28.92	921366	0	0.002	mg/L	7421
Mercury (EPA 7470)						
Date Analyzed	09.29.92	921371	9/29/92	NA	Date	7470
Date Extracted	09.29.92	921371	9/28/92	NA	Date	7470
Mercury	09.29.92	921371	0	0.0005	mg/L	7470
Selenium by Graphite Furnace	09.29.92	921366	0	0.004	mg/L	7740
lver	09.25.92	921367	0	0.01	mg/L	6010
nc	09.25.92	921367	0	0.01	mg/L	6010
EPA Method 8010						
Date Analyzed	09.28.92	92114	9/28/92	NA	Date	8010
1,1,1-Trichloroethane	09.28.92	92114	0.21	0.5	ug/L	8010
1,1,2,2-Tetrachloroethane	09.28.92	92114	0	0.5	ug/L	8010
1,1,2-Trichloroethane	09.28.92	92114	0	0.5	ug/L	8010
1,1-Dichloroethane	09.28.92	92114	0	0.5	ug/L	8010
1,1-Dichloroethene	09.28.92	92114	0	0.5	ug/L	8010
1,2-Dichloroethane	09.28.92	92114	0	0.5	ug/L	8010

BC ANALYTICAL

BATCH QC REPORT
ORDER: G9209285

ATE REPORTED : 10/02/92

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
1,2-Dichlorobenzene	09.28.92	92114	0	0.5	ug/L	8010
1,2-Dichloropropane	09.28.92	92114	0	0.5	ug/L	8010
1,3-Dichlorobenzene	09.28.92	92114	0	0.5	ug/L	8010
1,4-Dichlorobenzene	09.28.92	92114	0	0.5	ug/L	8010
2-Chloroethylvinylether	09.28.92	92114	0	0.5	ug/L	8010
Bromodichloromethane	09.28.92	92114	0	0.5	ug/L	8010
Bromomethane	09.28.92	92114	0	0.5	ug/L	8010
Bromoform	09.28.92	92114	0	0.5	ug/L	8010
Chlorobenzene	09.28.92	92114	0	0.5	ug/L	8010
Carbon Tetrachloride	09.28.92	92114	0	0.5	ug/L	8010
Chloroethane	09.28.92	92114	0	0.5	ug/L	8010
Chloroform	09.28.92	92114	0	0.5	ug/L	8010
Chloromethane	09.28.92	92114	0	0.5	ug/L	8010
Dibromochloromethane	09.28.92	92114	0	0.5	ug/L	8010
Dichlorodifluoromethane	09.28.92	92114	0	3	ug/L	8010
Freon 113	09.28.92	92114	0	1	ug/L	8010
Methylene chloride	09.28.92	92114	0	0.5	ug/L	8010
Trichloroethene	09.28.92	92114	0	0.5	ug/L	8010
Trichlorofluoromethane	09.28.92	92114	0	0.5	ug/L	8010
Tetrachloroethene	09.28.92	92114	0	0.5	ug/L	8010
Vinyl chloride	09.28.92	92114	0	0.5	ug/L	8010
cis-1,2-Dichloroethene	09.28.92	92114	0	0.5	ug/L	8010
cis-1,3-Dichloropropene	09.28.92	92114	0	0.5	ug/L	8010
trans-1,2-Dichloroethene	09.28.92	92114	0	0.5	ug/L	8010
trans-1,3-Dichloropropene	09.28.92	92114	0	0.5	ug/L	8010
EPA Method 8020						
Date Analyzed	09.28.92	92114	9/28/92	NA	Date	8020
1,2-Dichlorobenzene	09.28.92	92114	0	0.5	ug/L	8020
1,3-Dichlorobenzene	09.28.92	92114	0	0.5	ug/L	8020
1,4-Dichlorobenzene	09.28.92	92114	0	0.5	ug/L	8020
Benzene	09.28.92	92114	0	0.5	ug/L	8020
Chlorobenzene	09.28.92	92114	0	0.5	ug/L	8020
Ethylbenzene	09.28.92	92114	0	0.5	ug/L	8020
Toluene	09.28.92	92114	0	0.5	ug/L	8020
Total Xylene Isomers	09.28.92	92114	0	1	ug/L	8020

CHAIN OF CUSTODY RECORD

BCA Log Number G12-01-20

Client name	Project or PO#
L/C	L9204F·AE-3
Address	**Phone #**
200 CITADEL DR.	
City, State, Zip	**Report attention**
L.A., CA., 90040	H. SPITZ

Lab Sample number	Date sampled 1992	Time sampled	Type* See key below	Sampled by F. BUENAVENTURA / Sample description	Number of containers	Oil + Grease	Sulfide	BOD	NITRATE as N	Turbidity	Phenolics	TDS TSS, SiO2	Hazardous sample Special handling required	Remarks
1	9/22	11:10	GW	B-11	12	✓	✓	✓	✓	✓	✓	✓	✓	Sulfate
2	9/22	2:15	GW	B-13	12	✓	✓	✓	✓	✓	✓	✓	✓	Arsenic by G.F.
														Cadmium by G.F.
														Chromium by G.F.
														Cu
						PLUS ALL OF THESE								Lead by G.F.
						FOR B-11 & 13								Mercury
														Selenium by G.F.
														Silver
														Zinc
														VH. 8010
														VA. 8020

	Signature	Print Name	Company	Date	Time
Relinquished by	[signature]	F. Buenaventura	L/C	9/22	3:20
Received by lab	S. ArrowSmith	S. Arrowsmith	BC Analytical	9/22/92	5.20.
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

B C ANALYTICAL

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
- ☐ 1200 Pacifico Avenue, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

CKY incorporated
Analytical Laboratories

Date: 02/17/93
93A083

Law Crandall Inc.
200 Citadel Drive
Los Angeles CA 90040

Attn: Mr. Herbert M. Spitz

Subject: Laboratory Report
Project: Metro Rail (2661.20672.0001)

Enclosed is the laboratory report for samples received on 01/28/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

Method	No. of Analysis
EPA 413.2	4 Waters
EPA 601/602	4 Waters
EPA 3005/6010	4 Waters
EPA 160.1 (TDS)	4 Waters
EPA 405.1 (BOD)	4 Waters
EPA 160.5 (Sett. Solids)	4 Waters
EPA 300 (Cl, Na, S)	4 Waters
EPA 9065 (Phenolics)	4 Waters
EPA 376.1 (Sulfide)	4 Waters
EPA 180.1 (Turbidity)	4 Waters

The results are summarized on twenty four pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Y. Pang, Ph.D.
Laboratory Director

P.S.- All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

EPA METHOD 413.2
OIL AND GREASE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	02/17/93
CONTROL NO:	93A083	**DATE ANALYZED:**	02/17/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	ND	1
Well #47	93A083-2	ND	1
Well #49	93A083-3	ND	1
Well #56	93A083-4	ND	1
Method Blank	93A083	ND	1

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
SAMPLE ID:	Well #36	**MATRIX TYPE:**	Water
CONTROL NO:	93A083-1		

PARAMETERS (601)	**RESULTS (ug/L)**	**DETECTION LIMIT (ug/L)**
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	130	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	93	

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
SAMPLE ID:	Well #47	**MATRIX TYPE:**	Water
CONTROL NO:	93A083-2		

PARAMETERS (601)	**RESULTS (ug/L)**	**DETECTION LIMIT (ug/L)**
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	2.7	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	121	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	92	

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
SAMPLE ID:	Well #49	**MATRIX TYPE:**	Water
CONTROL NO:	93A083 -3		

PARAMETERS (601)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	18	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	6	1
cis 1,2 Dichloroethene	190*	1
1,1-Dichloroethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	25	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	8	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	120	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	99	

* Dilution Factor: 5

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
SAMPLE ID:	Well #56	**MATRIX TYPE:**	Water
CONTROL NO:	93A083-4		

PARAMETERS (601)	**RESULTS (ug/L)**	**DETECTION LIMIT (ug/L)**
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	38	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	121	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	90	

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
SAMPLE ID:	Method Blank	**MATRIX TYPE:**	Water
CONTROL NO:	93A083		

PARAMETERS (601)	**RESULTS (ug/L)**	**DETECTION LIMIT (ug/L)**
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	135	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	96	

EPA 3005/6010/7000
TTLC METALS BY ICP/AA

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	01/30/93
SAMPLE ID:	Well #36	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083-1	**MATRIX TYPE:**	Water

PARAMETERS	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Arsenic	ND	0.01
Cadmium	ND	0.01
Chromium - Total	0.02	0.01
Copper	0.03	0.02
Lead	0.02	0.01
Mercury	ND	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	0.11	0.05

EPA 3005/6010/7000
TTLC METALS BY ICP/AA

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	01/30/93
SAMPLE ID:	Well #47	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083-2	**MATRIX TYPE:**	Water

PARAMETERS	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Arsenic	0.05	0.01
Cadmium	0.01	0.01
Chromium - Total	0.13	0.01
Copper	0.48	0.02
Lead	0.09	0.01
Mercury	0.0014	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	1.1	0.05

EPA 3005/6010/7000
TTLC METALS BY ICP/AA

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	01/30/93
SAMPLE ID:	Well #49	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083-3	**MATRIX TYPE:**	Water

PARAMETERS	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Arsenic	ND	0.01
Cadmium	ND	0.01
Chromium - Total	ND	0.01
Copper	0.02	0.02
Lead	ND	0.01
Mercury	ND	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	ND	0.05

EPA 3005/6010/7000
TTLC METALS BY ICP/AA

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	01/30/93
SAMPLE ID:	Well #56	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083-4	**MATRIX TYPE:**	Water

PARAMETERS	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Arsenic	ND	0.01
Cadmium	ND	0.01
Chromium - Total	ND	0.01
Copper	ND	0.02
Lead	ND	0.01
Mercury	ND	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	ND	0.05

EPA 3005/6010/7000
TTLC METALS BY ICP/AA

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	01/30/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

PARAMETERS	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Arsenic	ND	0.01
Cadmium	ND	0.01
Chromium - Total	ND	0.01
Copper	ND	0.02
Lead	ND	0.01
Mercury	ND	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	ND	0.05

EPA 405.1
B.O.D.

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	01/29/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	2.7	1.0
Well #47	93A083-2	1.2	1.0
Well #49	93A083-3	2.7	1.0
Well #56	93A083-4	1.2	1.0

EPA 160.5
SETTLEABLE SOLIDS

CLIENT:	Law Crandall	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/02/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	ND	0.50
Well #47	93A083-2	130	0.50
Well #49	93A083-3	ND	0.50
Well #56	93A083-4	ND	0.50

EPA 160.1
TDS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	01/29/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	340	10
Well #47	93A083-2	940	10
Well #49	93A083-3	1100	10
Well #56	93A083-4	960	10
Method Blank	93A083	ND	10

EPA 300
CHLORIDES

CLIENT:	Law Crandall	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	11	2.0
Well #47	93A083-2	100	2.0
Well #49	93A083-3	110	2.0
Well #56	93A083-4	76	2.0
Method Blank	93A083	ND	0.20

EPA 300
NITRATE

CLIENT:	Law Crandall	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	3.9	0.5
Well #47	93A083-2	4.1	0.5
Well #49	93A083-3	ND	0.5
Well #56	93A083-4	15	0.5
Method Blank	93A083	ND	0.05

EPA 300
SULFATE

CLIENT:	Law Crandall	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	58	2.0
Well #47	93A083-2	260	2.0
Well #49	93A083-3	220	2.0
Well #56	93A083-4	190	2.0
Method Blank	93A083	ND	0.20

EPA 9065
PHENOLICS

CLIENT:	Law Crandall	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	ND	0.05
Well #47	93A083-2	ND	0.05
Well #49	93A083-3	ND	0.05
Well #56	93A083-4	ND	0.05
Method Blank	93A083	ND	0.05

EPA 376.1
SULFIDE

CLIENT:	Law Crandall	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/01/93
CONTROL NO:	93A083	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Well #36	93A083-1	ND	0.20
Well #47	93A083-2	ND	0.20
Well #49	93A083-3	ND	0.20
Well #56	93A083-4	ND	0.20
Method Blank	93A083	ND	0.20

EPA 180.1
TURBIDITY

CLIENT:	Law Crandall	**DATE REC'D:**	01/28/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	NA
CONTROL NO:	93A083	**DATE ANALYZED:**	02/01/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (ntu)	DETECTION LIMIT (ntu)
Well #36	93A083-1	370	0.10
Well #47	93A083-2	1600	0.10
Well #49	93A083-3	98	0.10
Well #56	93A083-4	43	0.10
Method Blank	93A083-5	ND	0.10

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: Metro Rail
CONTROL NO: 93A083

METHOD EPA 3005/6010/7000
MATRIX: Water

SAMPLE ID: 93A083-4

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP % REC.	RPD
Arsenic	ND	0.025	100		
Cadmium	ND	0.025	112		
Chromium	ND	0.025	108		
Copper	ND	1	95		
Lead	ND	0.025	100		
Selenium	ND	0.025	60		
Silver	ND	1	91		
Zinc	ND	1	120		
Mercury	ND	0.005	100	80	20

METHOD EPA 601
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	DUP. % REC.	RPD
1,1 DCE	ND	6.3	84	74	13
TCE	ND	5.0	80	68	16
Chlorobenzene	ND	3.4	98	82	18

METHOD EPA 602
MATRIX: Water

SAMPLE ID: Method Blank

COMPOUND	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	DUP. % REC.	RPD
Benzene	ND	9	86	95	10
Toluene	ND	7	76	95	23
Chlorobenzene	ND	4	87	93	7

QUALITY CONTROL DATA

CLIENT: Law Crandall
PROJECT: Metro Rail
CONTROL NO: 93A083

METHOD EPA 160.1
MATRIX: Water

SAMPLE ID: 93A083-3

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
TDS	1100	1100	0

METHOD EPA 405.1
MATRIX: Water

SAMPLE ID: 93A083-4

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
BOD	1.2	1.2	0

QUALITY CONTROL DATA

CLIENT: Law Crandall
PROJECT: Metro Rail
CONTROL NO: 93A083

METHOD EPA 180.1
MATRIX: Water

SAMPLE ID: 93A083-4

PARAMETER	SAMPLE RESULT (ntu)	DUP. SAMPLE RESULT (ntu)	RPD %
Turbidity	43	44	2

METHOD EPA 160.5
MATRIX: Water

SAMPLE ID: 93A083-2

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
Sett. Solids	ND	ND	0

METHOD EPA 413.2
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
TROG	ND	30	97	97	0

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: Metro Rail
CONTROL NO: 93A083

METHOD EPA 376.1
MATRIX: Water

SAMPLE ID: 93A083-4

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Sulfide	ND	5.0	99	101	2

METHOD EPA 9065
MATRIX: Water

SAMPLE ID: 93A083-4

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Phenolics	ND	0.5	96	102	6

METHOD EPA 300
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Chloride	ND	8.0	89	89	0
Nitrate	ND	5.0	92	92	0

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

CLIENT NAME: LAMI / CRANDALL
ADDRESS: 200 CITADEL DR.
PHONE NO (213) 889-5300 FAX NO.
PROJECT NAME: METRO RAIL (2661.20672.0001)
SEND REPORT TO: H. SPITZ

DATE: 1/28/93
PAGE 1 OF

C K Y incorporated
Analytical Laboratories
630 Maple Ave.
Torrance, Calif. 90503
Tel: 310-618-8889
Fax: 310-618-0818

VOA SPL → R6A3

SAMPLER NAME/SIGNATURE: FRED BUENAVENTURA [signature]

TURN AROUND TIME: NORMAL ☐ RUSH ☐

ANALYSES REQUIRED

	SAMPLE NUMBER	SAMPLING DATE/TIME		PRESERVATIVE	CONTAINER SIZE/TYPE	SAMPLE DESCRIPTION WATER	SOIL	OTHER	418.1	M8015	8010/601	8020/602	8080/608	8240/624	8270/625	CAM Metals
01	WELL # 36	1/27/92	3:45		2 VOA	✓										
					1 Li Plastic											
					1 500 ml plastic											
					1 500 ml. Glass											
02	WELL # 47	1/27/92	3:10		2 VOA											
					1 Li Plastic											
					1 500 ml. Plastic											
					1 500 ml. Bottle											
03	WELL # 49	1/27/92	9:20		2 VOA											
					1 Li Plastic											
					1 500 ml. plastic											
04	WELL # 56	1/27/92	11:30		2 VOA, 1 Li. Plastic											
					1 500 ml. Plastic											
					1 500 ml. Bottle											

COMMENTS: Analyze for NPDES as per Attach "QUOTATION".

Relinquished by: (Signature)	Date:	Received by: (Signature)	Date:	Relinquished by: (Signature)	Date:	Received by: (Signature)	Date:
[signature]	1/28/93	Craig Hagan	1/28/93			Chris Barkow	1-28-93
Company: LAMI/CRANDALL	Time: 3:10	Company: CKY	Time: 3:10	Company:	Time:	Company:	Time: 6:10 PM

Storage/Disposal of Samples: Sample will be stored at CKY for 30 days at no charge and at $10/sample/month thereafter. Disposal of sample by the Laboratory will be charged at $10/sample.

C K Y incorporated
Analytical Laboratories

Date: 02/11/93
93B007

Law Crandall Inc.
200 Citadel Drive
Los Angeles CA 90040

Attn: Mr. Herbert M. Spitz

Subject: Laboratory Report
Project: Metro Rail

Enclosed is the laboratory report for samples received on 02/02/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

Method	No. of Analysis
EPA 413.2	1 Water
EPA 376.1 (Sulfide)	1 Water
EPA 300 (Chloride, Nitrate, Sulfate)	1 Water
EPA TTLC 3005/6010	1 Water
EPA 405.1 (BOD)	1 Water
EPA 180.1 (Turbidity)	1 Water
EPA 9065 (Phenolics)	1 Water
EPA 160.5 (Sett. Solids)	1 Water
EPA 601/602	1 Water
EPA 160.2 (Susp. Solids)	1 Water
EPA 160.1 (TDS)	1 Water

The results are summarized on twenty one pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Pang, Ph.D.
Laboratory Director

P.S. All requested analyses for the above referenced project have been completed. Unless instructed otherwise, the remaining portions of the samples will be disposed of after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

EPA METHOD 413.2
OIL AND GREASE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	02/05/93
CONTROL NO:	93B007	**DATE ANALYZED:**	02/05/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	3	1
Method Blank	93B007	ND	1

EPA 376.1
SULFIDE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/05/93
CONTROL NO:	93B007	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	1.3	0.2
Method Blank	93B007	ND	0.2

EPA 300
TOTAL ANIONS

CHLORIDE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/03/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
CONTROL NO:	93B007	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	180	20
Method Blank	93B007	ND	0.20

EPA 300
TOTAL ANIONS

NITRATE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/03/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
CONTROL NO:	93B007	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	ND	0.05
Method Blank	93B007	ND	0.05

EPA 300
TOTAL ANIONS

SULFATE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/03/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
CONTROL NO:	93B007	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	400	20
Method Blank	93B007	ND	0.20

EPA 3005/6010/7000
TTLC METALS BY ICP/AA

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	02/04/93
SAMPLE ID:	B-70	**DATE ANALYZED:**	02/08/93
CONTROL NO:	93B007-1	**MATRIX TYPE:**	Water

PARAMETERS	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Arsenic	ND	0.01
Cadmium	ND	0.01
Chromium - Total	0.57	0.01
Copper	0.89	0.02
Lead	0.08	0.01
Mercury	0.0005	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	2.2	0.05

EPA 3005/6010/7000
TTLC METALS BY ICP/AA

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	02/04/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	02/08/93
CONTROL NO:	93B007	**MATRIX TYPE:**	Water

PARAMETERS	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
Arsenic	ND	0.01
Cadmium	ND	0.01
Chromium - Total	ND	0.01
Copper	ND	0.02
Lead	ND	0.01
Mercury	ND	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	ND	0.05

EPA 405.1
B.O.D.

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/09/93
CONTROL NO:	93B007	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	7.8	1.0

EPA 180.1
TURBIDITY

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	NA
CONTROL NO:	93B007	**DATE ANALYZED:**	02/05/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (ntu)	DETECTION LIMIT (ntu)
B-70	93B007-1	6100	40
Method Blank	93B007	ND	1.0

EPA 9065
PHENOLICS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	N/A
CONTROL NO:	93B007	**DATE ANALYZED:**	02/08/93
MATRIX:	Water		

SAMPLE ID:	**CONTROL NO:**	**RESULTS** (mg/L)	**DETECTION LIMIT** (mg/L)
B-70	93B007-1	ND	0.05
Method Blank	93B007	ND	0.05

EPA 160.5
SETTLEABLE SOLIDS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	NA
CONTROL NO:	93B007	**DATE ANALYZED:**	02/04/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	170	0.50
Method Blank	93B007	ND	0.50

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
SAMPLE ID:	B-70	**MATRIX TYPE:**	Water
CONTROL NO:	93B007-1		

PARAMETERS (601)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	105	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	72	

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE ANALYZED:**	02/04/93
SAMPLE ID:	Method Blank	**MATRIX TYPE:**	Water
CONTROL NO:	93B007		

PARAMETERS (601)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	135	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	96	

EPA 160.2
SUSPENDED SOLIDS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	NA
CONTROL NO:	93B007	**DATE ANALYZED:**	02/04/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	2900	10
Method Blank	93B007	ND	10

EPA 160.1
TOTAL DISSOLVED SOLIDS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/02/93
PROJECT:	Metro Rail	**DATE EXTRACTED:**	NA
CONTROL NO:	93B007	**DATE ANALYZED:**	02/04/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-70	93B007-1	1500	10
Method Blank	93B007	ND	10

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: Metro Rail
CONTROL NO: 93B007

METHOD EPA 413.2
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
TROG	ND	30	107	103	4

METHOD EPA 405.1
MATRIX: Water

SAMPLE ID: 93B007-1

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.
BOD	7.8	7.8	0

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: Metro Rail
CONTROL NO: 93B007

METHOD EPA 3005/6010/7000
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.
Chromium	ND	0.025	100
Arsenic	ND	0.025	104
Selenium	ND	0.025	84
Cadmium	ND	0.025	112
Lead	ND	0.025	112
Copper	ND	1.0	100
Silver	ND	1.0	96
Zinc	ND	1.0	110
Mercury	ND	0.005	100

METHOD EPA 376.1
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Sulfide	ND	10	103	101	2

METHOD EPA 300
MATRIX: Water

SAMPLE ID: 93B007-1

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Chloride	180	200	90	90	0
Sulfate	400	200	80	85	6

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: Metro Rail
CONTROL NO: 93B007

METHOD EPA 160.5
MATRIX: Water

SAMPLE ID: 93B007-1

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
Sett. Solids	170	170	0

METHOD EPA 9065
MATRIX: Water

SAMPLE ID: 93B007-1

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Phenolics	ND	0.50	102	104	2

METHOD EPA 180.1
MATRIX: Water

SAMPLE ID: 93B007-1

PARAMETER	SAMPLE RESULT (ntu)	DUP. SAMPLE RESULT (ntu)	RPD %
Turbidity	6100	6300	3

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: Metro Rail
CONTROL NO: 93B007

METHOD EPA 601
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	DUP. % REC.	RPD
1,1 DCE	ND	6.3	84	74	13
TCE	ND	5.0	80	68	16
Chlorobenzene	ND	3.4	98	82	18

METHOD EPA 602
MATRIX: Water

SAMPLE ID: Method Blank

COMPOUND	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	DUP. % REC.	RPD
Benzene	ND	8.9	86	95	10
Toluene	ND	6.8	76	95	23
Chlorobenzene	ND	3.5	87	93	7

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: Metro Rail
CONTROL NO: 93B007

METHOD EPA 160.2
MATRIX: Water

SAMPLE ID: 93B007-1

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
Susp. Solids	2900	2900	0

METHOD EPA 160.1
MATRIX: Water

SAMPLE ID: 93B007-1

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
TDS	1500	1500	0

CHAIN OF CUSTODY RECORD

93B007

Log Number

Client name	Job number or Purchase Order number
LAW / CRANDALL	2661.20672.0001

Project name: METRO RAIL

Project manager: H. SPITZ

Sampler(s): R. SCOTT SOPERNAUGH

Sample number	Date sampled	Time sampled	Matrix Type	Sample description	Number of containers	ANALYZE FOR NPDES	Hazardous sample / Special handling required	Remarks
B-70	2/2/93	11am.	WATER	VOA	2			Kept CHILLED 1/
				~~1 Liter Glass~~	~~2~~	NOT SENT		2/
				500ML GLASS	1			3/
				1 LITER PLASTIC	1			4/
				500ML PLASTIC	1			5/

	Signature	Company	Date	Time
Relinquished by		LAW/CRANDALL	2/2/93	12:30
Received by		CKY INC.	2/2/93	12:30
Relinquished by		CKY INC.	2/2/93	1:25
Received by		CKY	2/2/93	13 34
Relinquished by				
Received by				

Law/Crandall, Inc.
200 Citadel Drive
Los Angeles, CAlifornia 90040

Phone No. (213) 889-5300
FAX No. (213) 721-6700

T = 3°C

ANALYTICAL RECORD

CLIENT	LAW/CROMDAL
PROJECT	METRO FALL
NO. OF SAMPLES	1

CKY CONTROL NO.	93B007
DATE DUE	2/9/93

RECEIVED ON	2/2/93
RECEIVED BY	BLP
LOGGED BY	BLP

COPY TO	DATE	TIME
CYNTHIA		
NERISSA		
KENETTE		

ANALYSIS	NO. SAMPLES/ MATRIX	SUPERVISOR/ DATE	TYPED BY/ DATE	REVIEWED BY/DATE	PRICE/ SAMPLE	TOTAL PRICE
SULFIDE	1 WATER					
BOD						
NO_3/NO_2						
TURBIDITY						
FILTERABLE RESIDUE						
NON-FILTERABLE RESIDUE						
SETTLEABLE SOLIDS						
CHLORIDE						
SULFATE						
Metals (As, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn)						
PHENOLICS (EPA 9065)						
OIL & GREASE						
8010						
8020						

REPORT CIRCULATION

	INITIAL	DATE
FINAL REVIEW		
FINAL TYPING		
FINAL SIGNATURE		
TELEFAX		
INVOICE		
MAIL		

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C K Y incorporated
Analytical Laboratories

Date: 02/22/93
93B033

Law Crandall Inc.
200 Citadel Drive
Los Angeles CA 90040

Attn: Mr. Herbert M. Spitz

Subject: Laboratory Report
Project: LACTC

Enclosed is the laboratory report for samples received on 02/08/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

Method	No. of Analysis
EPA 160.5	1 Water
EPA 601/602	1 Water
EPA 180.1	1 Water
EPA 160.1	1 Water
EPA 9065	1 Water
EPA 300 Cl, NO3 and SO4	1 Water
EPA 3005/6010/7000	1 Water
EPA 405.1	1 Water
EPA 160.2	1 Water
EPA 413.2	1 Water
EPA 376.1	1 Water

The results are summarized on nineteen pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Pang, Ph.D.
Laboratory Director

P.S. All requested analyses for the above referenced project have been completed. Unless instructed otherwise, the remaining portions of the samples will be disposed of after fifteen (15) days from the date of this report.

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EPA 160.5
SETTLEABLE SOLIDS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE EXTRACTED:**	NA
CONTROL NO:	93B033	**DATE ANALYZED:**	02/09/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	60	0.50
Method Blank	93B033	ND	0.50

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE ANALYZED:**	02/09/93
SAMPLE ID:	Method Blank	**MATRIX TYPE:**	Water
CONTROL NO:	93B033		

PARAMETERS (601)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	100	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	95	

EPA METHODS - 601/602

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE ANALYZED:**	02/09/93
SAMPLE ID:	B-53	**MATRIX TYPE:**	Water
CONTROL NO:	93B033-1		

PARAMETERS (601)	**RESULTS (ug/L)**	**DETECTION LIMIT (ug/L)**
Dichlorodifluoromethane	ND	5
Chloromethane	ND	5
Vinyl Chloride	ND	5
Bromomethane	ND	5
Chloroethane	ND	5
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene Chloride	ND	5
Trans-1,2-Dichloroethene	ND	1
cis 1,2 Dichloroethene	ND	1
1,1-Dichloroethane	ND	1
Chloroform	9	1
1,1,1-Trichloroethane	ND	1
Carbon Tetrachloride	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	3	1
1,2-Dichloropropane	ND	1
Bromodichloromethane	ND	1
2-Chloroethylvinylether	ND	1
Trans-1,3-Dichloropropene	ND	1
Cis-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
Tetrachloroethene	85*	5
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
Bromoform	ND	1
1,1,2,2-Tetrachloroethane	ND	1
M-Dichlorobenzene	ND	1
P-Dichlorobenzene	ND	1
O-Dichlorobenzene	ND	1
% Surrogate Recovery:	115	
PARAMETERS (602)		
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
Xylenes	ND	1
% Surrogate Recovery:	99	

* Dilution Factor: 5

EPA 180.1
TURBIDITY

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE EXTRACTED:**	NA
CONTROL NO:	93B033	**DATE ANALYZED:**	02/11/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (NTU)	DETECTION LIMIT (NTU)
B-53	93B033-1	1300	20
Method Blank	93B033	ND	1.0

EPA 160.1
TOTAL DISSOLVED SOLIDS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE EXTRACTED:**	NA
CONTROL NO:	93B033	**DATE ANALYZED:**	02/11/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	1000	10
Method Blank	93B033	ND	10

EPA 9065
PHENOLICS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE EXTRACTED:**	N/A
CONTROL NO:	93B033	**DATE ANALYZED:**	02/12/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	ND	0.05
Method Blank	93B033	ND	0.05

EPA 300
CHLORIDES

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE ANALYZED:**	02/09/93
CONTROL NO:	93B033	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	93	20
Method Blank	93B033	ND	0.20

EPA 300
NITRATE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE ANALYZED:**	02/09/93
CONTROL NO:	93B033	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	7.6	0.50
Method Blank	93B033	ND	0.05

EPA 300
SULFATE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE ANALYZED:**	02/09/93
CONTROL NO:	93B033	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	290	20
Method Blank	93B033	ND	0.20

EPA 376.1
SULFIDE

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE ANALYZED:**	02/10/93
CONTROL NO:	93B033	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	ND	0.2
Method Blank	93B033	ND	0.2

EPA 3005/6010/7000
TOTAL METALS BY ICP/AAS

CLIENT:	Law Crandall & Assoc.	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE EXTRACTED:**	02/14/93
SAMPLE ID:	B-53	**DATE ANALYZED:**	02/14/93
CONTROL NO:	93B033-1	**MATRIX TYPE:**	Water

PARAMETERS	**RESULTS (mg/L)**	**DETECTION LIMIT (mg/L)**
Arsenic	0.02	0.01
Cadmium	ND	0.01
Chromium - Total	0.08	0.01
Copper	0.15	0.02
Lead	0.03	0.01
Mercury	ND	0.0002
Selenium	ND	0.01
Silver	ND	0.02
Zinc	0.32	0.05

EPA 405.1
B.O.D.

CLIENT:	Law/Crandall	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE ANALYZED:**	02/17-22/93
CONTROL NO:	93B033	**MATRIX TYPE:**	Water

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	2.4	0.1

EPA 160.2
SUSPENDED SOLIDS

CLIENT:	Law/Crandall	**DATE REC'D:**	02/08/93
PROJECT:	LACTC	**DATE EXTRACTED:**	NA
CONTROL NO:	93B033	**DATE ANALYZED:**	02/09/93
MATRIX:	Water		

SAMPLE ID:	CONTROL NO:	RESULTS (mg/L)	DETECTION LIMIT (mg/L)
B-53	93B033-1	2,200	10
Method Blank	93B033	ND	10

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: LACTC
CONTROL NO: 93B033

==========

METHOD EPA 160.5
MATRIX: Water

SAMPLE ID: 93B033-1

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
Sett. Solids	60	60	0

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METHOD EPA 601
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	DUP. % REC.	RPD
1,1 DCE	ND	6	78	75	4
TCE	ND	5	88	74	17
Chlorobenzene	ND	3	100	94	6

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: LACTC
CONTROL NO: 93B033

METHOD EPA 300
MATRIX: Water

SAMPLE ID: 93B033-1

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Nitrate	7.6	20	87	87	0
Chloride	93	200	94	94	0
Sulfate	290	200	80	80	0

METHOD EPA 9065
MATRIX: Water

SAMPLE ID: 93B033-1

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Phenolics	ND	0.50	104	102	2

METHOD EPA 160.1
MATRIX: Water

SAMPLE ID: 93B033-1

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
TDS	1000	1000	0

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: LACTC
CONTROL NO: 93B033

==========

METHOD EPA 180.1
MATRIX: Water

SAMPLE ID: 93B033-1

PARAMETER	SAMPLE RESULT (ntu)	DUP. SAMPLE RESULT (ntu)	RPD %
Turbiditty	1300	1300	0

==========

METHOD EPA 376.1
MATRIX: Water

SAMPLE ID: 93B027-1

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
Sulfide	41	40	2

==========

METHOD EPA 376.1
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.	DUP. % REC.	RPD
Sulfide	ND	10	97	95	2

QUALITY CONTROL DATA

CLIENT: Law Crandall & Assoc.
PROJECT: LACTC
CONTROL NO: 93B033

METHOD EPA 3005/7000/6010
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (mg/L)	AMOUNT SPIKED (mg/L)	% REC.
Arsenic	ND	0.025	104
Cadmium	ND	0.025	112
Chromium	ND	0.025	116
Lead	ND	0.025	108
Selenium	ND	0.025	96
Copper	ND	1.0	100
Silver	ND	1.0	99
Zinc	ND	1.0	110

METHOD EPA 3005/7000/6010
MATRIX: Water

SAMPLE ID: 93B033-1

PARAMETER	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
Arsenic	0.02	0.02	0
Cadmium	ND	ND	0
Chromium	0.08	0.09	12
Lead	0.03	0.04	29
Selenium	ND	ND	0
Copper	0.15	0.16	6
Silver	ND	ND	0
Zinc	0.32	0.33	3

QUALITY CONTROL DATA

CLIENT: Law/Crandall
PROJECT: LACTC
CONTROL NO: 93B033

METHOD EPA 405.1
MATRIX: Water

SAMPLE ID: 93B033-1

COMPOUND	SAMPLE RESULT (mg/L)	DUP. SAMPLE RESULT (mg/L)	RPD %
BOD	2.4	2.4	0

QUALITY CONTROL DATA

CLIENT: Law/Crandall
PROJECT: LACTC
CONTROL NO: 93B033

==========

METHOD EPA 160.2
MATRIX: Water

SAMPLE ID: 93B033-1

COMPOUND	**SAMPLE** RESULT (mg/L)	**DUP. SAMPLE** RESULT (mg/L)	RPD %
Suspended Solids	2200	2100	5

==========

CKY INC., ANALYTICAL LABORATORIES, 630 Maple Ave., Torrance, Calif. 90503 Tel. (310) 618-8889 Fax: (310) 618-0818

93B033 DUE 2-16-93 - I3/R6A

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

DATE: 2-5-93
PAGE 1 OF 1

CKY incorporated
Analytical Laboratories
630 Maple Ave.
Torrance, Calif. 90503
Tel: 213-618-8889
Fax: 213-618-0818

CLIENT NAME: Law/Crandall
ADDRESS: 200 Citadell Dr.
L.A. 90040
PHONE NO 213-889-5300 FAX NO. 213-721-6200
PROJECT NAME: LACTC
SEND REPORT TO: H. Spitz

SAMPLER NAME/SIGNATURE

TURN AROUND TIME
NORMAL ☒
RUSH ☐

SAMPLE NUMBER	SAMPLING DATE/TIME		PRESER-VATIVE	CONTAINER SIZE/TYPE	SAMPLE DESCRIPTION WATER	SOIL	OTHER	ANALYSES REQUIRED: 418.1	M8015	8010/601	8020/602	8080/608	8240/624	8270/625	CAM Metals	WPDES
B-53	2-5-93	1400		1L plastic												✓
✓	✓	✓		500ml Plastic												✓
✓	✓	✓		500ml Glass												✓
✓	✓	✓		(2) VOA												✓
[illegible]	[illegible] Tuesday															

COMMENTS: 2-5 Placed into cold storage to wait for P/U by CKY
PLEASE CONSIDER ABOVE AS ONE SAMPLE - DO NOT TEST EACH CONTAINER FOR EVERY WPDES TEST. THANK YOU. CKY

Relinquished by: (Signature)	Date:	Received by: (Signature)	Date:	Relinquished by: (Signature)	Date:	Received by: (Signature)	Date:
Company: Law/Crandall	Time: 9:45a	Company: L/C	Time: 1:00	Company: L/C	Time: 1:35	Company: CKY	Time: 1:35

Storage/Disposal of Samples: Sample will ~~be stored~~ at CKY for 30 days at no charge and at $10/sample/month thereafter. Disposal of sample by the Laboratory will be charged at $10/sample.

Relinquished by: [signature] 2/5/93

APPENDIX E

M. J. SCHIFF & ASSOCIATES

Consulting Corrosion Engineers

1291 NORTH INDIAN HILL BOULEVARD
CLAREMONT, CALIFORNIA 91711-3897
909/626-0967
FAX 909/621-1419

May 7, 1993

LAW/CRANDALL, INC.
200 Citadel Drive
Los Angeles, California 90040-1554

Attention: Mr. Mike Shahabi

Re: Soil Corrosivity Study
Metro Pasadena Line
Union Station to Pasadena, California
Your #L92045.AE-4, MJS&A #93001

Gentlemen:

Laboratory tests have been completed on samples of groundwater and soil from your boring logs for the subject light rail project. You requested that we provide a report covering deleterious effects which the soils and waters might have on underground utilities, concrete structures, and piles.

The testing protocol specified measurement of pH, sulfide concentration, sulfate concentration, chloride concentration, and conductivity.

pH was measured on each groundwater sample and on a saturated paste for each soil sample. The tests on the soil samples were made using 1:5 soil:water extracts. (Contact with PSG, MTA's consultant, indicated that soil conductivity should be based on the soil-water extract, unless stated otherwise, expressed as micromhos/centimeter.) Sulfides were determined by distillation process. Test results are shown on Table 1.

A factor commonly used in determining soil corrosivity is electrical conductivity. The electrical conductivity of groundwater or soil is a measure of their ability to conduct electrical current. Corrosion of submerged or buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the groundwater or soil. Corrosion currents, following Ohm's Law, are directly proportional to electrical conductivity. Higher electrical conductivities indicate a corrosive environment.

A correlation between electrical conductivity and corrosivity toward ferrous metals is:

*Conductivity of Soil:Water Extract micromhos/centimeter	Corrosivity Category
> 200	severely corrosive
100 to 200	corrosive
20 to 100	moderately corrosive
< 20	mildly corrosive

*corrected for dilution factor

It should be noted that the conductivity of a soil water extract will be lower than the original soil sample through dilution with distilled water.

As stated above, the conductivity of the waters is a measure of their ability to conduct corrosion currents. However, other factors can act as corrosion inhibitors and barrier coatings. For example, calcium carbonate can deposit on a metal surface if the water is over saturated with calcium. This would be a protective deposit. It would be necessary to perform additional tests for calcium, total dissolved solids and alkalinity to evaluate this characteristic.

It is not likely that those groundwaters and soils with pH values below about 7.5 would precipitate out protective calcareous deposits; they would tend to be corrosive. The degree of corrosivity would depend on access of oxygen which would be severely limited at the greater depths.

Electrical conductivities of the groundwater samples are considered to be high and would support dissimilar metal and other types of corrosion cells.

Electrical conductivities of the soil:water extracts were moderate to high. This was due, at least in part, to sulfate content since chlorides were relatively low. Bicarbonates, a corrosion inhibiting ion as well as a contributor to conductivity, were not determined.

Groundwater and soil pH values varied from 2.9 to 8.5. This range is very strongly acidic to moderately alkaline. Acid attack on concrete is of concern when pH is less than about 5.5. Steel, copper, zinc, lead, and aluminum are all susceptible to attack where pH is below about 4.5. Three samples had a pH less than 5.5. They were B3 at 51 feet, B4 at 64 feet, and B64 at 0 to 2 feet.

The chemical content of the groundwater and soil samples ranged from low to very high. Chloride ions are particularly corrosive to ferrous metals. The highest concentration was 242 ppm which is not at a level where the chlorides can overcome the corrosion inhibiting effect of concrete on reinforcing steel. The higher sulfate concentrations were in a range where moderately sulfate resistant cement is advisable.

Sulfides, which are aggressive to copper and ferrous metals, were detected at several locations. The groundwater sample from boring 1 had a very high sulfide level, possibly due to bacterial activity.

We classify soils along this route as ranging from mildly to severely corrosive to ferrous metals, and, in some locations, deleterious to concrete and copper.

The scope of this study is limited to a determination of soil corrosivity. If the architects and/or engineers desire more specific information, designs, specifications, or review of design, we will be happy to work with them as a separate phase of this project.

Respectfully submitted,
M. J. SCHIFF & ASSOCIATES

Paul R. Smith for

M. J. Schiff, P.E.
cb
Enc: Table 1

TABLE 1
LABORATORY TESTS ON SOIL & WATER SAMPLES

Location and Depth		Type	pH	Ec**	Chloride* Cl	Sulfate* SO4	Sulfide* S
Preliminary Study - Union Station to Los Angeles River:							
B1		groundwater	7.0	1,630	43	460	40
B2	2.5'	sandy silt	8.3	110	35	72	ND
B2	21.5'	gravel	not tested				
B3	51.5'	siltstone	2.9	580	35	1,608	0.7
B4	22.5'	sand	6.7	74	71	120	ND
B4	34.5'	sandy silt	7.1	65	71	96	0.2
B4	64.5'	clayey silt	4.2	651	71	2,040	0.7
B6	3.5'	sand	8.1	40	71	96	1.2
B6	15.5'	sand	8.2	35	35	48	0.2
B6	29.5'	sand/gravel and clayey silt	5.6	232	35	504	0.9
B8	5.0'	sand	7.1	35	35	48	0.3
B8	10.0'	sandstone/ siltstone	7.5	342	35	696	0.2
B10	19.0'	sandstone/ siltstone	7.4	232	35	504	0.3
B10		groundwater	7.0	2,030	57	619	ND
Preliminary Study - Los Angeles River to Pasadena:							
B11		groundwater	7.4	741	5	140	ND
B11	64-69'	sandstone	6.9	640	71	1,416	ND
B12	0-3'	silty sand	7.5	560	71	1,488	3.15
B13		groundwater	7.3	1,760	97	472	ND
B14	0-3'	sandy silt	6.5	90	71	96	ND
B15	10'	sandstone	7.7	60	71	72	0.44

TABLE 1
LABORATORY TESTS ON SOIL & WATER SAMPLES

Location and Depth		Type	pH	Ec**	Chloride* Cl	Sulfate* SO4	Sulfide* S
B17	0-1'	fill-sandy silt	6.6	60	35	48	0.32
B19	5-7'	siltstone	7.0	50	35	144	ND
B21	5'	sandy clay	7.2	140	71	240	ND
B22	5'	sandy silt	7.1	40	35	312	ND
B24	19'	silty sand and sand	7.8	30	35	trace	ND
B25	5-7'	sandy clay	6.9	40	71	48	0.23
B26	4-5'	sandy clay	7.4	190	142	288	ND
B27	19'	sandy silt	7.1	30	35	trace	ND
Comprehensive Study - Union Station to Pasadena:							
B34		groundwater	6.8	1,600	242	128	ND
B36		groundwater	6.7	462	11	81	ND
B41	0-2'	fill-silty sand	8.3	100	71	48	0.58
B47	35'	siltstone	8.2	170	71	240	1.26
B47		groundwater	6.8	548	21	110	ND
B49		groundwater	7.1	989	74	298	ND
B53		groundwater	6.9	1,250	106	389	ND
B55	1-2.5'	silty clay	7.9	150	71	288	ND
B56		groundwater	7.2	949	74	278	ND
B57	5.5'	clayey silt	6.9	120	71	144	ND
B57	14.5'	siltstone	7.7	130	71	168	ND
B62	0-4'	fill-silty sand and sandy silt	7.8	180	71	264	0.11

TABLE 1
LABORATORY TESTS ON SOIL & WATER SAMPLES

Location and Depth		Type	pH	Ec**	Chloride* Cl	Sulfate* SO4	Sulfide* S
B64	0-2'	fill-silty sand	4.8	300	71	168	ND
B70	24.5-29.5'	siltstone	7.9	720	71	1,992	0.59
B70		groundwater	8.5	2,110	185	600	ND
B73	29.5'	siltstone	7.9	140	71	264	1.31
B74	44.5'	clay siltstone	6.9	230	35	624	0.13
B78	3.5-6'	silty clay	5.9	40	35	168	ND
B82	35.5'	sandy silt	7.2	60	71	24	ND
B83	0-4'	fill-sandy silt	5.6	40	35	48	ND
B87	5-8'	silty clay	5.5	50	35	72	ND
B92	7.5-13.5'	silty sand	7.0	40	71	24	ND
B94	1-3'	silty sand and sand	7.5	30	35	48	ND
B98	1.5'	fill-silty sand and sandy silt	7.8	50	35	72	0.17
B102	0-2.5'	fill-silty sand	7.6	80	71	48	ND
B105	3.5'	fill-silty sand	7.3	140	71	216	ND
B113	1.5'	fill-silty sand	7.8	40	35	72	0.11
B116	3.5'	fill-silty sand	7.7	60	35	120	ND
B119	1.5'	fill-silty sand and sandy silt	7.5	30	35	96	ND

TABLE 1
LABORATORY TESTS ON SOIL & WATER SAMPLES

Location and Depth		Type	pH	Ec**	Chloride* Cl	Sulfate* SO4	Sulfide* S
B122	1-3'	fill-silty sand and sandy silt	7.8	40	35	120	0.58

**Ec of 1:5 soil:water extract and groundwater samples in micromhos/cm

*mg/kg (ppm) of dry soil or mg/L (ppm) of groundwater sample

ND = not detected, less than 0.1 mg/kg.

Metro Pasadena Line
Union Station to Pasadena
MJS&A #93001
F18/93001-2