

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H3-1(69)	1992	133	225

	BASALT
	CLINKER
	TUFF
	WEATHERED ROCK
	CINDER
	BOULDER

	GRAVEL
	SAND
	SILT
	CLAY
	SILTY CLAY
	CLAYEY SILT






2" O.D. STANDARD SPLIT SPOON SAMPLER
3" O.D. SPLIT TUBE SAMPLER
SHELBY TUBE
NX CORING

RQD

ROCK QUALITY DESIGNATION

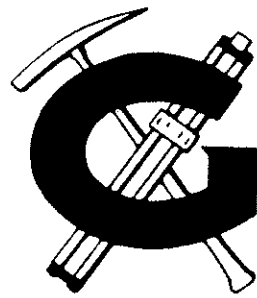


WATER LEVEL

W.O. 90-1953	North Halawa Highway - Unit II
ERNEST K. HIRATA & ASSOCIATES, INC.	BORING LEGEND

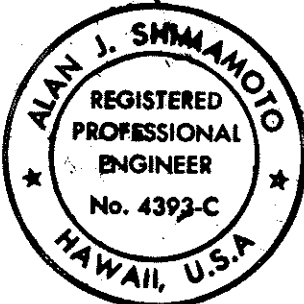
LEGEND	
GRAPH	SOIL DESCRIPTION
	ASPHALT CONCRETE
	BASE
	CLAYEY, WITH CLAY
	CLAY
	SILTY, WITH SILT
	SILT
	SANDY, WITH SAND
	SAND
	GRAVELLY
	GRAVEL, PEBBLES, DECOMPOSED ROCK
	ORGANIC MATERIAL
	COBBLES
	BOULDERS
	BASALT
	CLINKER
	TUFF

BORING LOG LEGEND	
MAJOR ROCK TYPES	MAJOR SOIL TYPES
BASALT	BOULDERS
TUFF	GRAVEL
DECOMPOSED ROCK	SAND
CLINKER	SILT
CINDERS	CLAY
SECONDARY DESCRIPTION	SAMPLING SYMBOLS
GRAVELLY	SHELBY TUBE SAMPLE
SANDY	3" O.D. CALIFORNIA SAMPLE
SILTY	2" O.D. STANDARD PENETRATION SAMPLE
CLAYEY	WATER LEVEL
	NX-CORE RUN
	FEWELL GEOTECHNICAL ENGINEERING, LTD. FILE 953-1

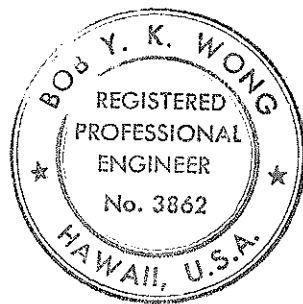


CW ASSOCIATES, INC. dba
GEOLABS - HAWAII
 Geology Soils and Foundation Engineering

GENERAL NOTES:
 * ELEVATIONS ESTIMATED BY
 ERNEST K. HIRATA & ASSOCIATES
 FROM TOPOGRAPHIC MAPS
 PROVIDED BY R.M. TOWILL CORP.
 DATED MAY 3, 1989.

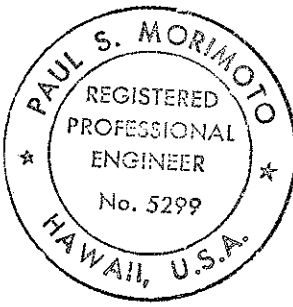


FEWELL GEOTECHNICAL ENGINEERING, LTD.
Alan J. Shimamoto



THIS WORK WAS
 PREPARED BY ME OR
 UNDER MY SUPERVISION

Bou Y. K. Wong
 SIGNATURE



THIS WORK WAS PREPARED BY
 ME OR UNDER MY SUPERVISION
Paul S. Morimoto
 SIGNATURE

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
BORING LOGS
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. 1-H3-1(69) & (70)
SCALE: NONE DATE: AS NOTED
SHEET NO. 11 OF 23 SHEETS

DATE	
DESIGNED BY	
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H3-1(69)	1992	124	325

BORING: IB1-1 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 485'± DATE: 10-30-90 DEPTH TO WATER: 87' DATE: 10-30-90 PAGE 1 OF 3 WATER ELEV.: 398'± TIME: 10:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=80, PI=25	29		12	1	Orange and Brown Clayey SILT (MH) with gravel and cobbles, stiff, moist
	52		17	2	
			11	3	
qu=1940 p.s.f.	55	66	21	4	(ALLUVIUM)
LL=64, PI=25	51		12	5	
Gradation: 42% Gravel 44% Sand 14% Silt/Clay	52		PUSH	6	
					Brown and Gray Gravelly SAND (SW-SM) with silt, loose to medium dense, moist (WEATHERED CLINKER)

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A1

BORING: IB1-1 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 485'± DATE: 10-30-90 DEPTH TO WATER: 87' DATE: 10-30-90 PAGE 3 OF 3 WATER ELEV.: 398'± TIME: 10:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			50% REC 0% RQD RUN # 5	7.0	Red Highly Weathered TUFF (WH), soft, extremely broken
			33% REC 0% RQD RUN # 6	7.5	Gray and Brown Highly Weathered CLINKER (WH), medium dense to dense
	54		29 10	8.0	
			24% REC 0% RQD RUN # 7	8.0	
			60/.5' R RUN # 8	8.5	Gray Moderately Weathered BASALT (WM), medium hard to hard, broken
			89% REC 22% RQD RUN # 9	9.0	Red Highly Weathered TUFF (WH), soft, broken
				9.5	Brownish and Gray Moderately Weathered CLINKER (WM), dense BOH @ 92.0'
				10.0	(WEATHERED CLINKER)
				10.5	

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A3

BORING: IB1-2 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 477'± DATE: 10-25-90 DEPTH TO WATER: 47' DATE: 10-26-90 PAGE 2 OF 3 WATER ELEV.: 430'± TIME: 9:30 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			63	7	Gray and Brown Silty SAND (ML-SM) with gravel, medium dense, moist (WEATHERED CLINKER)
	56		25	8	Gray Silty GRAVEL (GM) with sand and remnant rock structure, medium dense to dense, moist
			36	9	
			64	10	
	45		85	11	(SAPROLITE)
qu=1640 p.s.f.	45	71	85	11	Mottled Orange and Gray Highly Weathered CLINKER (WH), dense
	54		27	12	Gray Highly Weathered BASALT (WH), medium hard to hard, extremely broken
			100/.9'	13	Gray Moderately Weathered BASALT (WM), hard, broken
			70/.2'	14	

Plate A5

BORING: IB1-1 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 485'± DATE: 10-30-90 DEPTH TO WATER: 87' DATE: 10-30-90 PAGE 2 OF 3 WATER ELEV.: 398'± TIME: 10:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
	58	56	18	7	Brown and Gray Gravelly SAND (SW-SM) with silt, loose to medium dense, moist (WEATHERED CLINKER)
	70		9	8	Gray Moderately to Highly Weathered BASALT (WM-WH), medium hard to hard, extremely broken
			103	9	
	38	73	103	9	
			70% REC 0% RQD RUN # 1	9.0	Grayish Brown Highly Weathered CLINKER (WH), dense
			60% REC 0% RQD RUN # 2	9.5	
			55% REC 0% RQD RUN # 3	10.0	Gray Moderately Weathered BASALT (WM) with occasional seams of completely weathered basalt, hard, extremely broken
			98% REC 7% RQD RUN # 4	10.5	
			50% REC 0% RQD RUN # 5	11.0	Red Highly Weathered TUFF (WH), soft, extremely broken

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A2

BORING: IB1-2 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 477'± DATE: 10-25-90 DEPTH TO WATER: 47' DATE: 10-26-90 PAGE 1 OF 3 WATER ELEV.: 430'± TIME: 9:30 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=83, PI=23	63		15	1	Brown and Gray Clayey SILT (MH) with cobbles and organics, medium stiff, saturated
			10	2	(FILL)
qu=610 p.s.f. GRADATION: 12% Gravel 52% Sand 36% Silt/Clay	62	63	28	3	Brownish Gray Silty SAND (GM) with gravel, medium dense, moist
	52		52	4	Grades to dense @ 20.0'
					(SAPROLITE)
qu=1710 p.s.f.	57	65	22	5	Gray and Brown Silty SAND (ML-SM) with gravel, medium dense, moist
	70		18	6	(WEATHERED CLINKER)

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A4

BORING: IB 1-2 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 477'± DATE: 10-25-90 DEPTH TO WATER: 47' DATE: 10-26-90 PAGE 3 OF 3 WATER ELEV.: 430'± TIME: 9:30 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			95% REC 17% RQD RUN # 1	7.0	Gray Moderately Weathered BASALT (WM), hard, broken
			90% REC 40% RQD RUN # 2	7.5	Grayish Brown Highly Weathered CLINKER (WH), dense
				8.0	Red Highly Weathered TUFF (WH), medium hard, occasionally broken
				8.5	Grayish Brown Moderately Weathered Vesicular BASALT (WM), medium hard, massive
				9.0	BOH @ 80.0'
				9.5	
				10.0	
				10.5	

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A6



FEWELL GEOTECHNICAL ENGINEERING, LTD.

Alan J. Shimamoto

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. 1-H3-1(69) & (70)

SCALE: NONE

DATE: AS NOTED

SHEET NO. 124 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	135	325

BORING: IB1-3 IP-1		PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1		SURFACE ELEV.: 447'±			
DATE: 10-10-90		DEPTH TO WATER: 10.5'		DATE: 10-10-90	
PAGE 1 OF 2		WATER ELEV.: 436'±		TIME: 3:00 PM	
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=73, PI=32 qu=1130 p.s.f.	61	61	PUSH	1	Brown Clayey SILT (MH) with gravel, <u>medium stiff</u> , moist to saturated
					(FILL.)
	30		33	2	Gray/Brown Sandy SILT (MH-SM) with decomposed gravel, <u>very stiff</u> , moist
	58	67	44	3	(WEATHERED CINDERS)
	59		24	4	Mottled Gray Clayey SILT (MH) with trace sand and remnant rock structure, <u>very stiff</u> , moist
	45		105/8'	5	(SAPROLITE)
			92% REC RUN #1		Gray Moderately Weathered BASALT (WM), <u>medium hard</u> , extremely broken
			10% RQD		
			85% REC RUN #2		Gray Brown Highly Weathered CLINKER (WH), <u>dense</u>
			9% RQD		Red Highly Weathered TUFF (WH), <u>medium hard</u> , broken

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A7

BORING: IB1-4 IP-2		PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1		SURFACE ELEV.: 452'±			
DATE: 10-2-90		DEPTH TO WATER: 19.0'		DATE: 10-4-90	
PAGE 1 OF 3		WATER ELEV.: 433'±		TIME: 11:15 AM	
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
qu=790 p.s.f. LL=81, PI=37	41	77	PUSH	1	Brown Clayey SILT (MH) with gravel, sand and cobbles, <u>soft to medium stiff</u> , moist to saturated
					(ALLUVIUM)
	42		6	2	
	50	71	PUSH	3	Brown Gray Clayey SILT (MH) with sand and gravel, <u>soft to medium stiff</u> , saturated
			90% REC RUN #1		(ALLUVIUM)
			0% RQD		
			83% REC RUN #2		
			0% RQD		
			83% REC RUN #3		Gray BOULDERS, COBBLES and GRAVEL in a sand matrix, <u>dense</u> , saturated
			0% RQD		
			85% REC RUN #4		(ALLUVIUM)
			10% RQD		

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A9

BORING: IB1-4 IP-2		PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1		SURFACE ELEV.: 452'±			
DATE: 10-2-90		DEPTH TO WATER: 19.0'		DATE: 10-4-90	
PAGE 3 OF 3		WATER ELEV.: 433'±		TIME: 11:15 AM	
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			100% REC RUN #11		Gray Slightly Weathered BASALT (WS) with clinker, <u>hard</u> , broken
			60% RQD		
			100% REC RUN #12		
			77% RQD		
					BOH @ 75.0'

FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A11

BORING: IB1-3 IP-1		PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1		SURFACE ELEV.: 447'±			
DATE: 10-12-90		DEPTH TO WATER: 10.5'		DATE: 10-12-90	
PAGE 2 OF 2		WATER ELEV.: 436'±		TIME: 3:00 PM	
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			85% REC RUN #2		Gray Slightly Moderately Weathered Vesicular BASALT (WS-WM), <u>hard</u> , occasionally broken
			9% RQD		
			87% REC RUN #3		
			25% RQD		
			80% REC RUN #4		Gray Fresh Vesicular BASALT (F), <u>very hard</u> , occasionally broken to massive
			30% RQD		
			100% REC RUN #5		
			70% RQD		
			100% REC RUN #6		Red and Gray Slightly Weathered Welded CLINKER (WS), <u>medium hard</u> , occasionally broken to massive
			88% RQD		
			100% REC RUN #7		Gray Fresh Vesicular BASALT (F), <u>very hard</u> , massive
			80% RQD		
					BOH @ 62.0'

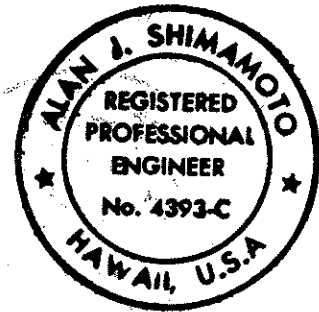
FEWELL GEOTECHNICAL ENGINEERING, LTD.

Plate A8

BORING: IB1-4 IP-2		PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1		SURFACE ELEV.: 452'±			
DATE: 10-2-90		DEPTH TO WATER: 19.0'		DATE: 10-4-90	
PAGE 2 OF 3		WATER ELEV.: 433'±		TIME: 11:15 AM	
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			85% REC RUN #4		
			10% RQD		
			95% REC RUN #5		Gray Moderately to Highly Weathered BASALT (WM-WH), <u>medium hard</u> , extremely broken
			17% RQD		
			60% REC RUN #6		
			0% RQD		
			68% REC RUN #7		Brown Gray Highly Weathered CLINKER (WH), <u>medium hard</u> , extremely broken
			10% RQD		
			50% REC RUN #8		Red Highly Weathered TUFF (WH), <u>medium hard</u> , broken
			17% RQD		Gray Brown Moderately to Highly Vesicular BASALT (WM-WH), <u>medium hard</u> , broken
			80% REC RUN #9		Gray Brown Moderately to Highly Weathered CLINKER (WM-WH), <u>medium hard</u> , extremely broken
			20% RQD		
			100% REC RUN #10		Gray Fresh to Slightly Weathered BASALT (F-WS), <u>hard to very hard</u> , broken
			85% RQD		
			100% REC RUN #11		Red Gray Moderately Weathered CLINKER (WM), <u>medium hard</u> , broken
			60% RQD		Gray Slightly Weathered BASALT (WS) with clinker, <u>hard</u> , broken

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Plate A10



FEWELL GEOTECHNICAL ENGINEERING, LTD.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE

DATE: AS NOTED

SHEET No. 135 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	136	325

BORING: IB1-5 IP-3		PROJECT: Interstate Route H-3, North Halawa Highway							
FILE: 953-1		SURFACE ELEV.: 457'±							
DATE: 9-21-90		DEPTH TO WATER: 16'		DATE: 10-2-90					
PAGE 1 OF 3		WATER ELEV.: 441'±		TIME: 12:45 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH H	CLASSIFICATION			
LL=80, PI=36	51	72	PUSH	1	0.5				
				2	1.0				
qu=830 p.s.f.	55	69	PUSH	3	1.5		Brown Clayey SILT (MH) with gravel and sand, <u>soft to medium stiff</u> , moist to saturated		
					57% REC 0% RQD	RUN # 1	2.0		Grades with occasional boulders
					10% REC 0% RQD	RUN # 2	2.5		
					R				
					80% REC 0% RQD				
						4 RUN # 3	3.0		Gray BOULDERS, COBBLES and GRAVEL in a sand matrix, <u>dense</u> , saturated
					69% REC 0% RQD	RUN # 4	3.5		

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A12

BORING: IB1-5 IP-3			PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1			SURFACE ELEV.: 457'±			
DATE: 9-21-90			DEPTH TO WATER: 16'		DATE: 10-2-90	
PAGE 3 OF 3			WATER ELEV.: 441'±		TIME: 12:45 PM	
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	S A M P L E	D E P T H	CLASSIFICATION
			73% REC 35% RQD	RUN # 1 1	-7.0	Gray Fresh BASALT (F), <u>very hard</u> , broken BOH @ 72.0'
					-7.5	
					-8.0	
					-8.5	
					-9.0	
					-9.5	
					-10.0	
					-10.5	
					-11.0	
					-11.5	
					-12.0	
					-12.5	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A14

BORING: IB1-6 IP-4		PROJECT: Interstate Route H-3, North Halawa Highway							
FILE: 953-1		SURFACE ELEV.: 476'±							
DATE: 9-18-90		DEPTH TO WATER: 35.5'		DATE: 9-21-90					
PAGE 2 OF 2		WATER ELEV.: 440.5'±		TIME: 9:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION			
	52	66	PUSH	7	3.5	 Gray Clayey SILT (ML-MH) with gravel and cobbles, <u>stiff</u> , moist (ALLUVIUM)			
	21	109	52	8	4.0		 Gray BOULDERS, COBBLES and GRAVEL with sand and silt, <u>dense</u> (ALLUVIUM)		
			89%REC 0% RQD	RUN # 1	4.5				
			54%REC 0% RQD	RUN # 2	5.0				
			90%REC 13% RQD	RUN # 3	5.5				
			88%REC 0% RQD	RUN # 4	6.0				
			73%REC 0% RQD	RUN # 5	6.5				
			100%REC 0% RQD	RUN # 6	7.0				
								Gray Moderately Weathered BASALT (WM), <u>medium hard to hard</u> , extremely broken	
								BOH @ 70.0'	

Plate A16

BORING: IB1-5 IP-3		PROJECT: Interstate Route H-3, North Halawa Highway				
FILE: 953-1		SURFACE ELEV.: 457'±				
DATE: 9-21-90		DEPTH TO WATER: 16'		DATE: 10-2-90		
PAGE 2 OF 3		WATER ELEV.: 441'±		TIME: 12:45 PM		
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
			68% REC 0% RQD	RUN # 4	3.5'	Gray BOULDERS, COBBLES and GRAVEL with sand, <u>dense</u> , saturated (ALLUVIUM)
			75% REC 0% RQD	RUN # 5	4.0'	
			79% REC 7% RQD	RUN # 6	4.5'	Gray Moderately to Highly Weathered BASALT (WM-WH), <u>medium hard to hard</u> , extremely broken
			92% REC 18% RQD	RUN # 7	5.0'	
			90% REC 0% RQD	RUN # 8	5.5'	
			53	5	6.0'	Gray Brown Highly Weathered CLINKER (WH), <u>dense</u>
			90% REC 33% RQD	RUN # 9	6.5'	Red Highly Weathered TUFF (WH), <u>medium hard</u> , broken
			100% REC 9% RQD	RUN # 10	7.0'	Brownish Gray Moderately to Highly Weathered Vesicular BASALT (WM-WH), <u>medium hard</u> , broken
			73% REC 35% RQD	RUN # 11	7.5'	Gray Brown Slightly to Moderately Weathered CLINKER (WS-WM), <u>dense</u>
					8.0'	Gray Fresh BASALT(F), <u>very hard</u> , broken

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A13

BORING: IB1-6 IP-4		PROJECT: Interstate Route H-3, North Halawa Highway				
FILE: 953-1		SURFACE ELEV.: 476'±				
DATE: 9-18-90		DEPTH TO WATER: 35.5'		DATE: 9-21-90		
PAGE 1 OF 2		WATER ELEV.: 440.5'±		TIME: 9:00 AM		
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH	CLASSIFICATION
qu=1160 p.s.f. LL=78, PI=38 qu=920 p.s.f.	40		11	1	0.5	Brown Clayey SILT (MH) with gravel, <u>soft to medium stiff</u> , moist
	49	76	11	2	1.0	
					1.5	
	56		6	3	2.0	
					2.5	
	PUSH			4	3.0	
					3.5	
	54	71	12	5	4.0	
					4.5	
	54		4	6	5.0	
5.5						
(FILL)						
Gray Clayey SILT (ML-MH) with gravel and cobbles, <u>stiff</u> , moist (ALLUVIUM)						

BORING: IB1-7 IP-5		PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1		SURFACE ELEV.: 458'±			
DATE: 9-5-90		DEPTH TO WATER: 22.0'		DATE: 9-5-90	
PAGE 1 OF 2		WATER ELEV. 436'±		TIME: 11:00 AM	
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=81, PI=41 qu=1490 p.s.f.	53	80	16	1	2" A.C. Over Tan Silty CORAL fragments, dense to very dense, damp (FIL.L)
				5	Brown Clayey SILT (MH) with gravel, <u>very hard</u> , damp
	13	PUSH	2	10	Gray Clayey SILT (ML) with remnant rock structure and seams of highly weathered basalt, <u>stiff</u> , moist (SAPROLITE)
				15	
	19	60/5* 0% REC 0% ROD	3 RUN #1	20	Reddish Brown Clayey SILT (M) with decomposed gravel, <u>stiff to very stiff</u> , damp (SAPROLITE)
				25	
	41	79	PUSH	4	Gray Clayey SILT (MH) with remnant rock structure, <u>very stiff</u> to <u>very hard</u> , damp (SAPROLITE)
				5	
	41	58	PUSH	6	Brown Gray Clayey SILT (MH) with gravel and seams of highly weathered basalt, <u>very stiff</u> , damp (SAPROLITE)
				30	
40	81	PUSH	35		

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A17

BORING: IB1-8 IP-6		PROJECT: Interstate Route H-3, North Halawa Highway			
FILE: 953-1		SURFACE ELEV.: 495'±			
DATE: 11-9-90		DEPTH TO WATER: NONE ENCOUNTERED			
PAGE 1 OF 2					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=92, PI=36	30	73	85	1	Brown Clayey SILT (MH) with gravel and cobbles, <u>very stiff</u> , moist
	42		11	2	
	53	59	PUSH R	3	
	61		10	4	
qu=1680 p.s.f.	35	87	60	5	BOULDERS, COBBLES, and GRAVEL in Clayey Silt with sand matrix, <u>dense</u> , moist
	25		31	6	
					(ALLUVIUM)

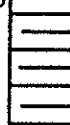
FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A19

ERNEST K. HIRATA & ASSOCIATES, INC.							
Soils and Foundation Engineering							
99-1433 Koaha Place * Aiea, Hawaii 96701-1028 * Phone 486-0787							
BORING LOG				W.Q. 90-1953			
BORING NO. IB1-9 IP-7		DRIVING WT. 140 lb.		DATE OF DRILLING 5-7-90			
SURFACE ELEV. 462±		DROP 30 in.		WATER LEVEL @ 17 ft.			
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH	71	46			Clayey SILT - Brown, moist, firm to medium stiff, with weathered gravel.
5							
10							
15							
20							
25		90/9"		30			COMpletely WEATHERED ROCK - Mottled gray, brown, dense to medium hard.
25							
30							
30							

Plate A21

BORING: IB1-7 IP-5		PROJECT: Interstate Route H-3, North Halawa Highway				
FILE: 953-1		SURFACE ELEV.: 458'±				
DATE: 9-5-90		DEPTH TO WATER: 22.0'		DATE: 9-5-90		
PAGE 2 OF 2		WATER ELEV.: 436'±		TIME: 11:00 AM		
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION	
	57		32	7	3.5	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A18

BORING: IB1-8 IP-6		PROJECT: Interstate Route H-3, North Halawa Highway				
FILE: 953-1		SURFACE ELEV.: 495'±				
DATE: 11-9-90		DEPTH TO WATER: NONE ENCOUNTERED				
PAGE 2 OF 2						
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION	
			85% REC 0% RQD	RUN # 1	35	 BOULDERS, COBBLES, and GRAVEL in Clayey Silt with sand matrix, <u>dense</u> , moist (ALLUVIUM)
			60% REC 7% RQD	RUN # 2	40	
			30% REC 0% RQD	RUN # 3	45	 Gray Moderately Weathered BASALT (WM), <u>medium hard</u> , very broken
			31	7	50	
			9% REC 0% RQD	RUN # 4	55	
			57	8	60	 Grayish Brown Highly Weathered CLINKER (WH), <u>dense to very dense</u>
			85% REC 9% RQD	RUN # 5	65	
			10% REC 0% RQD	RUN # 6	70	 Brownish Gray Moderately Weathered BASALT (WM), <u>medium hard to hard</u> , broken
			36	9	75	
					80	 Brown Gray Highly Weathered CLINKER (WH), <u>dense</u>
					85	
					90	BOH @ 64.5'
		95				
		100				

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A20

ERNEST K. HIRATA & ASSOCIATES, INC.							
Soils and Foundation Engineering							
99-1433 Koahe Place * Aiea, Hawaii 96701-1028 * Phone 486-0787							
BORING LOG				W.O. 90-1953			
BORING NO. IB1-9 (Cont.) IP-7		DRIVING WT. 140 lb.		DATE OF DRILLING 5-8-90			
SURFACE ELEV. 462±		DROP 30 in.		WATER LEVEL @ 17 ft.			
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30							End Dennison coring at 31 feet. Begin NX coring from 31 feet. 96% Recovery from 31 to 36 feet. RQD = 14% Grading to moderately vesicular from 33.5 to 42 feet.
							100% Recovery from 36 to 41 feet. RQD = 54%
35							78% Recovery from 41 to 45 feet. RQD = 25%
							64% Recovery from 45 to 50 feet. RQD = 8%
40							58% Recovery from 50 to 55 feet. RQD = 26%
							60% Recovery from 55 to 59 feet. RQD = 13%.
45							End boring at 59 feet.
50							
55							
60							

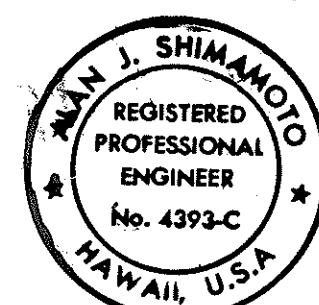
Plate A22

Plate A22

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	127	325



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Paul S. Morimoto
Signature



FEWELL GEOTECHNICAL ENGINEERING, LTD.
Alan J. Shimamoto
Signature

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) & (70)	
SCALE: NONE	DATE: AS NOTED
SHEET NO. 127 OF 325 SHEETS	

1377

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	120	325

BORING: IB1-10 IP-8 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 463'±					
DATE: 8-30-90 DEPTH TO WATER: 30' DATE: 9-7-90					
PAGE 1 OF 2 WATER ELEV.: 433'± TIME: 1:30 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=67, PI=24			21	1	Brown Clayey SILT (MH) with gravel, very stiff, damp (ALLUVIUM)
	14		70/6" 75% REC 0% RQD RUN #1	2	Gray Boulders in Matrix of Brown Clayey SILT (MH) with cobbles and gravel, dense to very dense, damp (ALLUVIUM)
	17		100% REC 0% RQD RUN #2	3	
	31		40/4" R	4	
	21	99	27	5	Brown Clayey SILT (MH) with cobbles and Gravel, very stiff, damp (ALLUVIUM)
36			PUSH	6	Gray/Brown Gravelly SILT (GM-ML) with seams of highly weathered basalt, very stiff, damp (SAPROLITE)

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A23

BORING: IB1-11 IP-9 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 465'±					
DATE: 8-30-90 DEPTH TO WATER: 47' DATE: 9-5-90					
PAGE 1 OF 2 WATER ELEV.: 418'± TIME: 10:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=62, PI=16			12	1	Brown Clayey SILT (MH) with gravel and trace of organic debris, soft to medium stiff, damp (FILL)
				2	Brown Clayey SILT (MH) with sand, gravel and trace of roots, medium stiff, damp (ALLUVIUM)
LL=55, PI=17	21	101	10/3" R	2	BOULDERS, COBBLES and GRAVEL (GM) in matrix of Brown Clayey Silt, dense to very dense, damp (ALLUVIUM)
	26		54	3	
	21		92% REC 0% RQD RUN #1	4	
			102	4	
			70% REC 27% RQD RUN #2	5	
			72% REC 22% RQD RUN #3	6	Gray Slightly Weathered Vesicular BASALT (WS), hard, very broken
				7	Brown Gray Highly Weathered CLINKER (WH), soft, very broken
				8	Gray Slightly Weathered Vulgar BASALT (F-WS), hard, moderately broken

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A25

BORING: IB1-12 IP-10 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 471'±					
DATE: 9-10-90 DEPTH TO WATER: 29.5' DATE: 9-12-90					
PAGE 1 OF 2 WATER ELEV.: 441.5'± TIME: 3:15 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=70, PI=28	62	56	PUSH	1	Brown Clayey SILT (MH) with gravel and cobbles, medium stiff, moist (COLLUVIUM)
	39		11	2	
LL=81, PI=41	39		PUSH	3	Brown Clayey SILT (MH) with gravel and cobbles, stiff, moist to wet (ALLUVIUM)
			70	4	
	59		24	5	Red Brown Clayey SILT (MH) with gravel, very stiff, moist to saturated (RESIDUAL)
	16		70/4" 58% REC 9% RQD RUN #1	6	Gray Moderately Weathered BASALT (WM), medium hard, extremely broken

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A27

BORING: IB1-10 IP-8 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 463'±					
DATE: 8-30-90 DEPTH TO WATER: 30' DATE: 9-7-90					
PAGE 2 OF 2 WATER ELEV.: 433'± TIME: 1:30 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
24			50	7	Gray/Brown Gravelly SILT (GM-ML) with seams of highly weathered basalt, very stiff, damp
			80% REC 30% RQD RUN #3	8	Gray Moderately to Slightly Weathered BASALT (WM-WS) with vesicles, hard, broken to occasionally broken
			93% REC 31% RQD RUN #4	9	
			70% REC 14% RQD RUN #5	10	Brown Gray Highly Weathered CLINKER gravel (GM), medium hard, very broken
				11	Gray Moderately to Slightly Weathered BASALT (WM-WS), hard, broken to occasionally broken
				12	BOH @ 60.0'

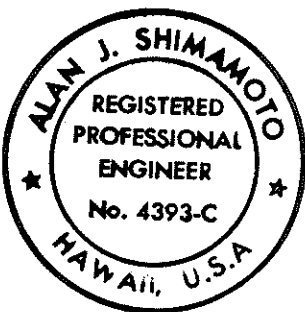
FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A24

BORING: IB1-11 IP-9 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 465'±					
DATE: 8-30-90 DEPTH TO WATER: 47' DATE: 9-5-90					
PAGE 2 OF 2 WATER ELEV.: 418'± TIME: 10:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			72% REC 22% RQD RUN #3	13	Gray Slightly Weathered Vulgar BASALT (F-WS), hard, occasionally broken
			75% REC 13% RQD RUN #4	14	Brown Gray Highly Weathered CLINKER (WH), soft, extremely broken
			77% REC 35% RQD RUN #5	15	Gray Slightly Weathered BASALT (F-WS), hard, occasionally broken
			100% REC 64% RQD RUN #6	16	
				17	BOH @ 60.0'

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A26

BORING: IB1-12 IP-10 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 471'±					
DATE: 9-10-90 DEPTH TO WATER: 29.5' DATE: 9-12-90					
PAGE 2 OF 2 WATER ELEV.: 441.5'± TIME: 3:15 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			56% REC 9% RQD RUN #1	17	Gray Moderately Weathered BASALT (WM), medium hard, extremely broken
			55% REC 10% RQD RUN #2	18	Brown Gray Highly Weathered CLINKER (WH), medium dense to dense
			100% REC 44% RQD RUN #3	19	Gray Fresh to Slightly Weathered BASALT (F-WS), very hard, occasionally broken
			70% REC 17% RQD RUN #4	20	
			100% REC 75% RQD RUN #5	21	Brown Gray Moderately to Highly Weathered CLINKER (WM-WH), dense
			90% REC 70% RQD RUN #6	22	Gray Fresh BASALT (F), very hard, occasionally broken to massive
				23	BOH @ 62.0'

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A28



FEWELL GEOTECHNICAL ENGINEERING, LTD.

Alan J. Shimamoto

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

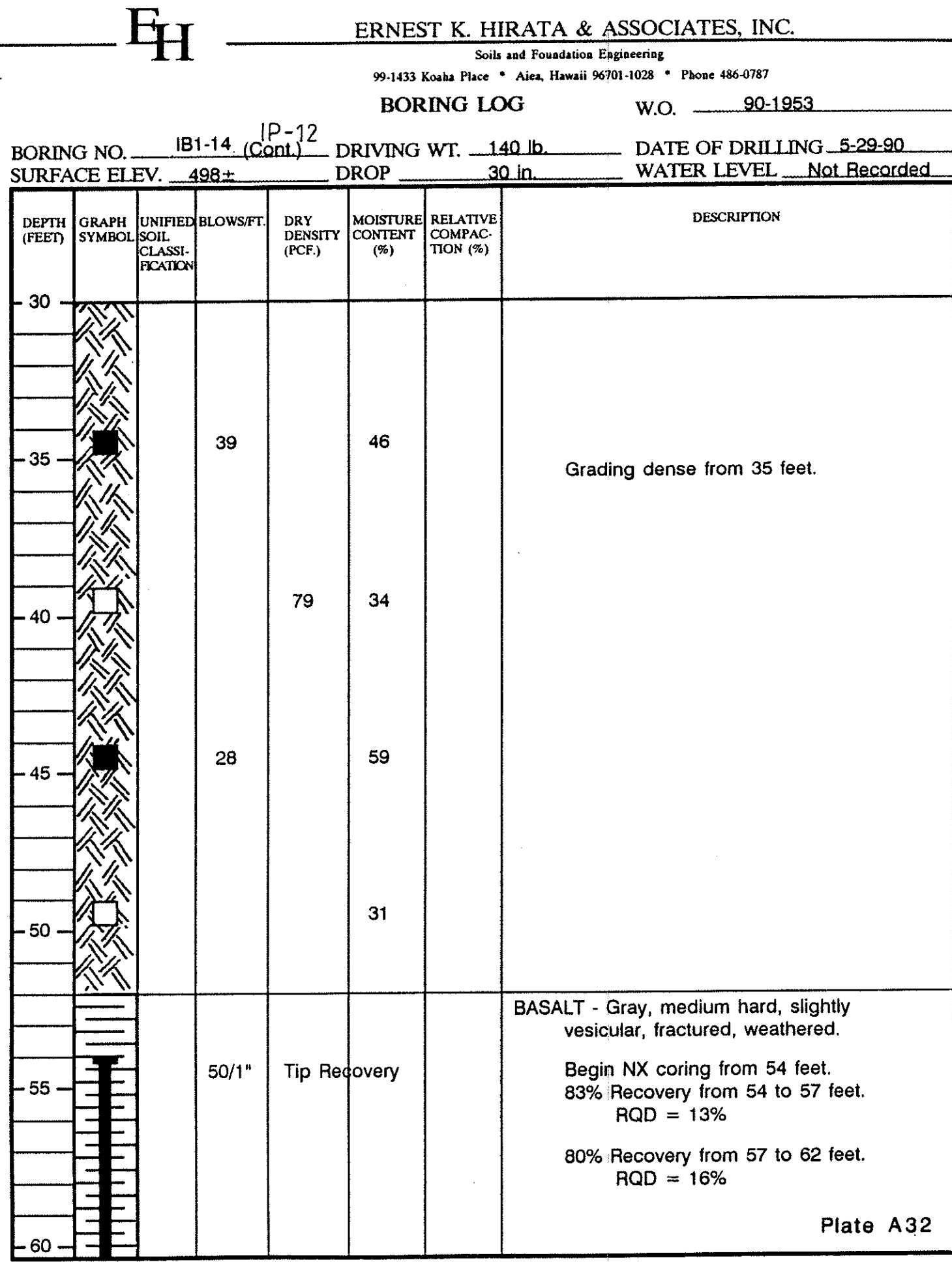
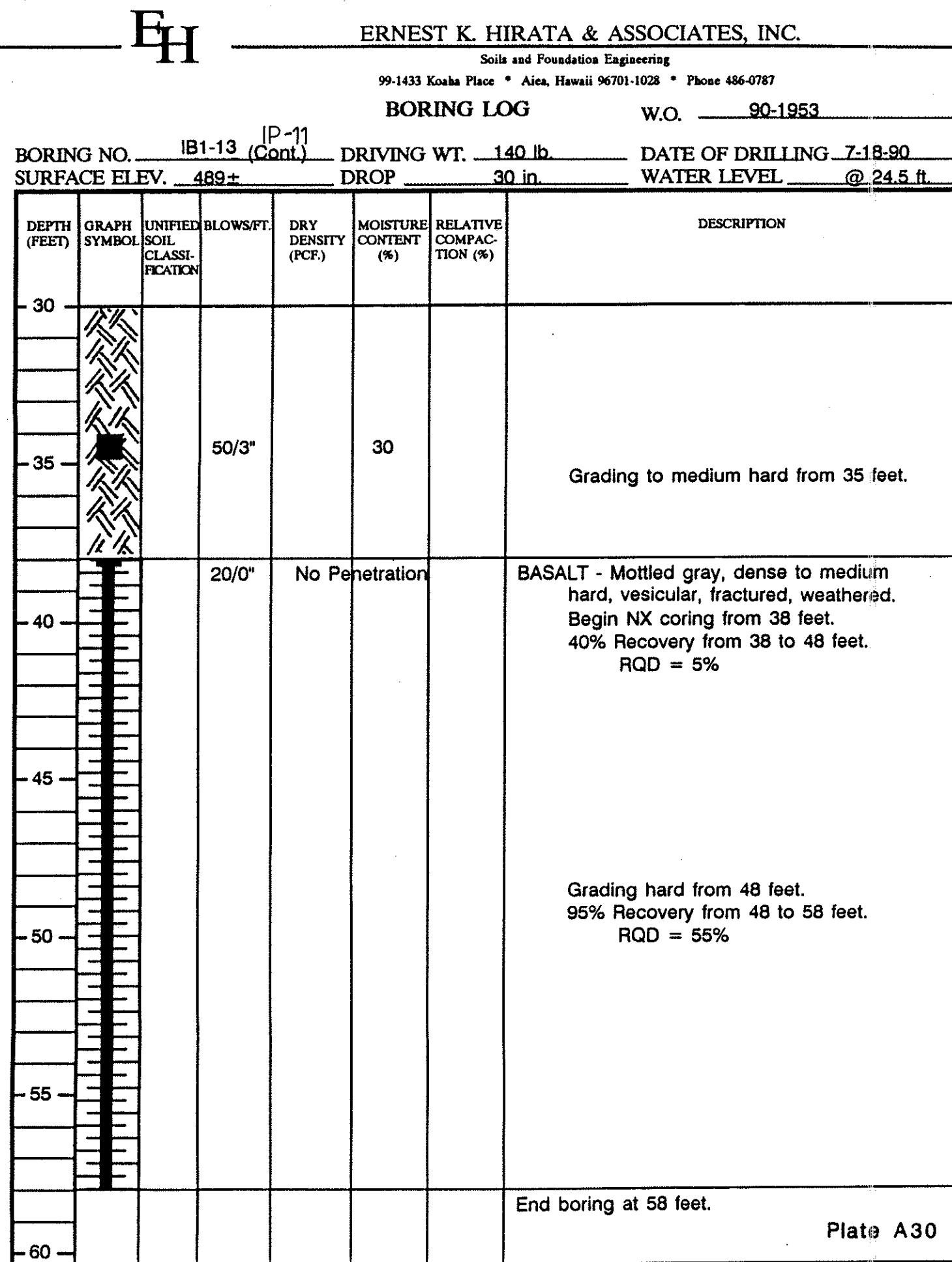
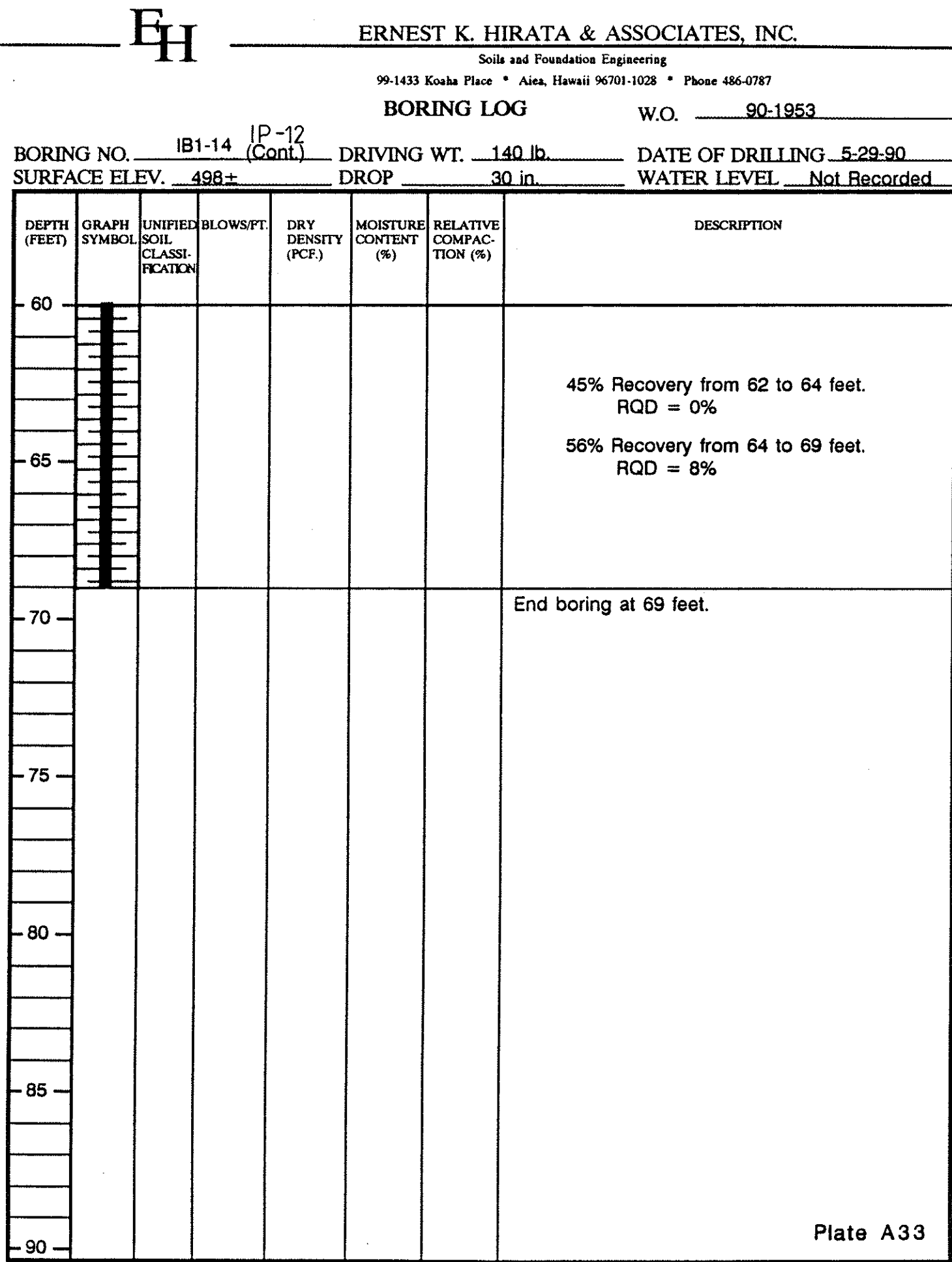
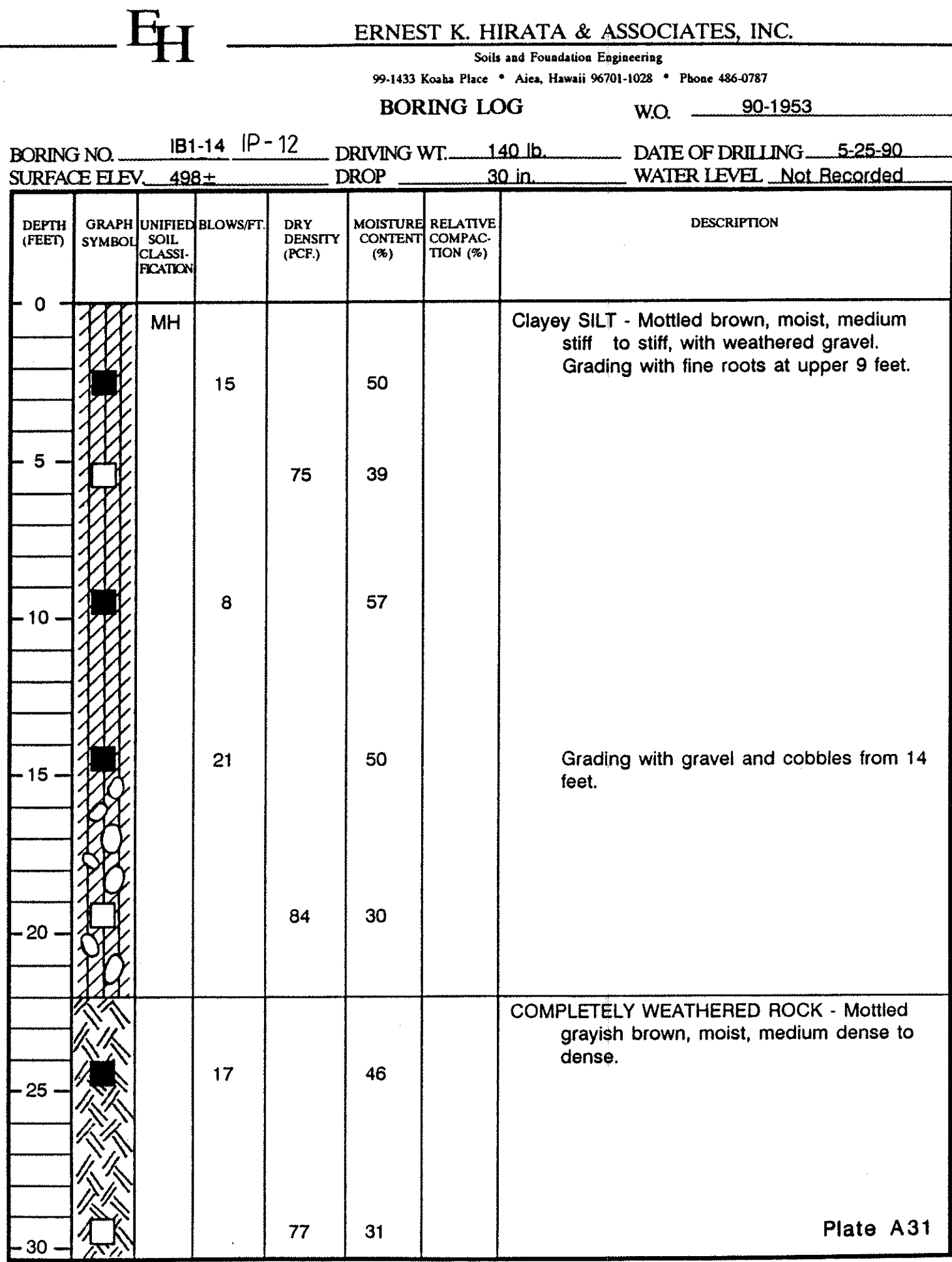
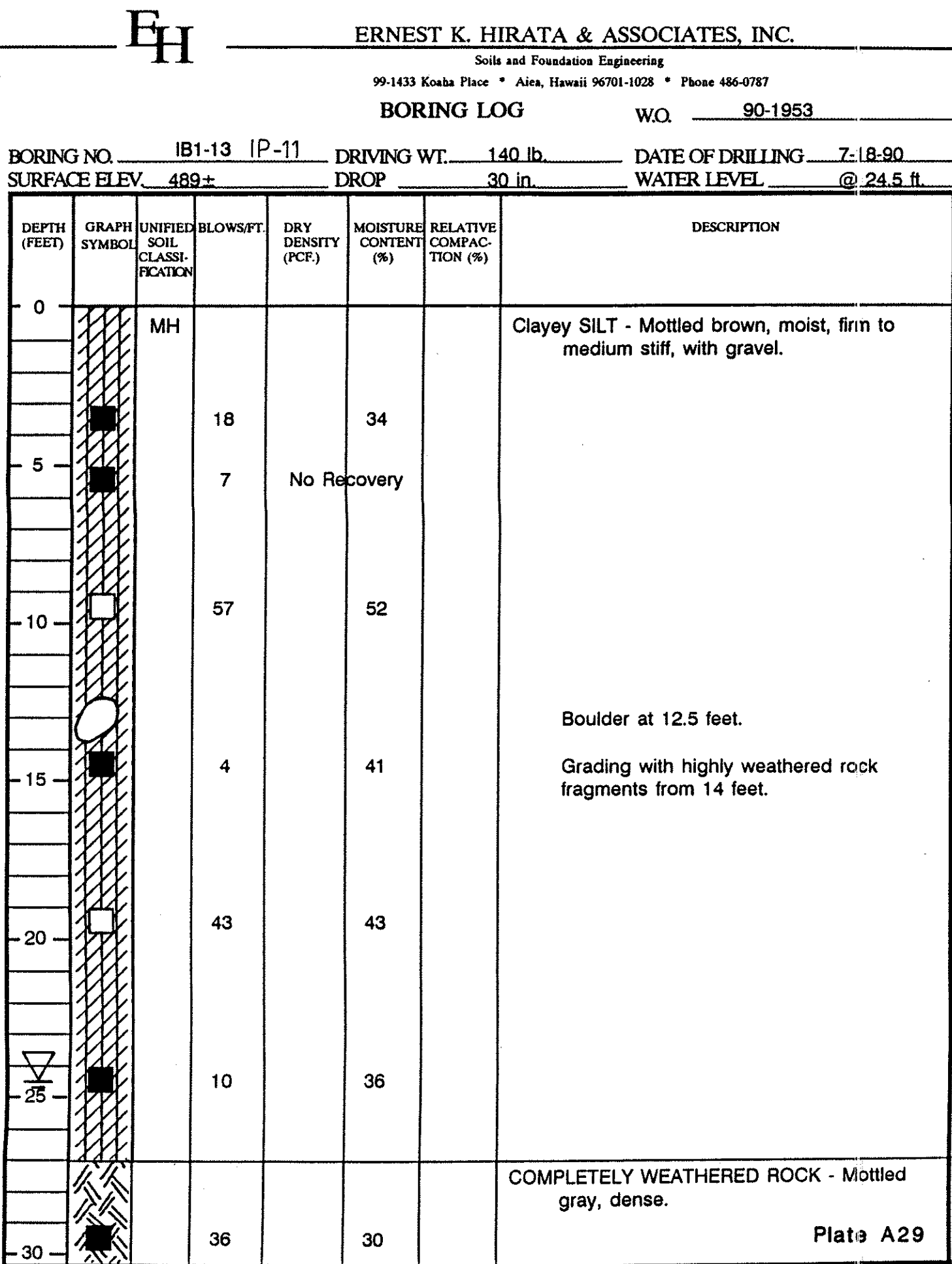
BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE DATE: AS NOTED

SHEET NO. 126 OF 33 SHEETS

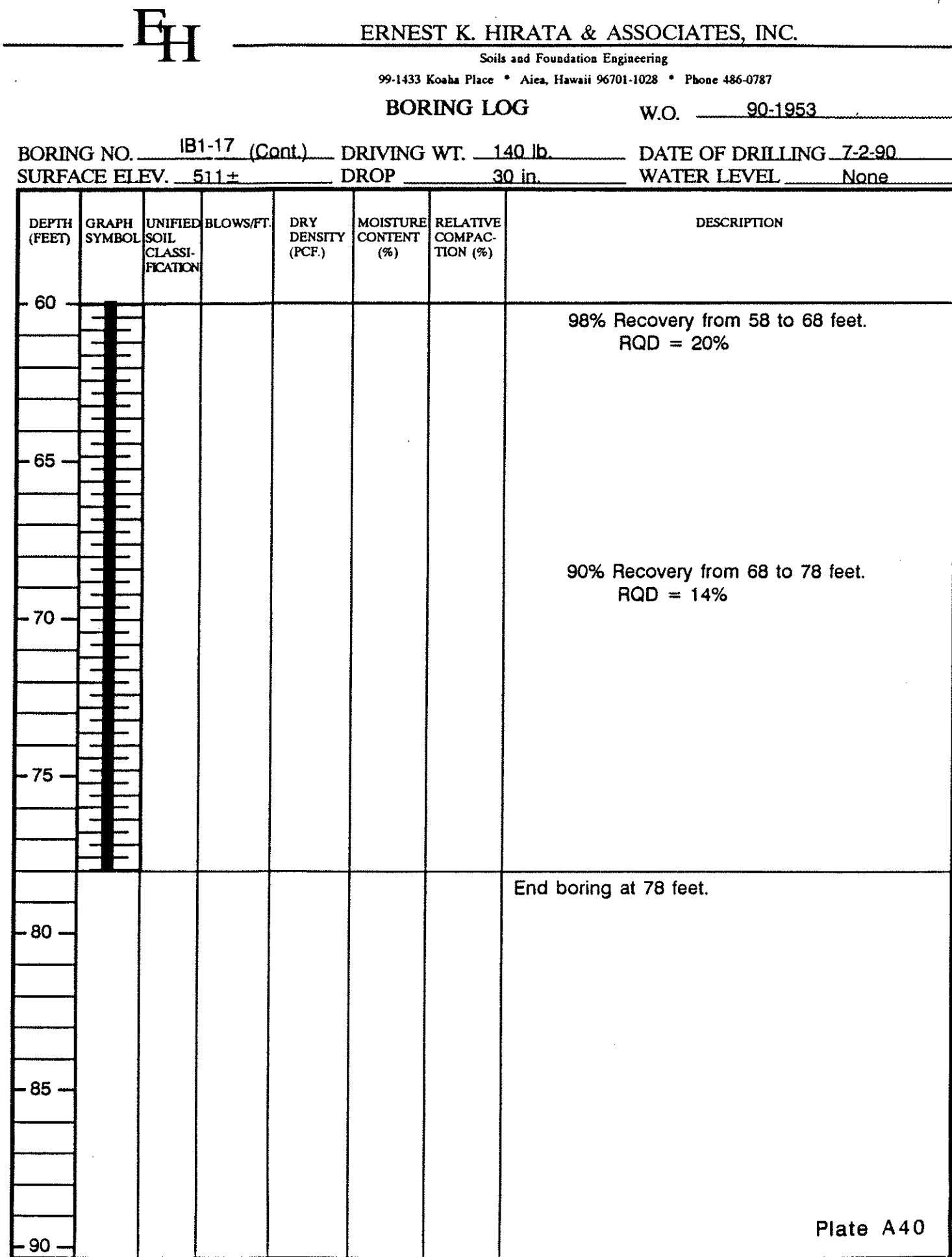
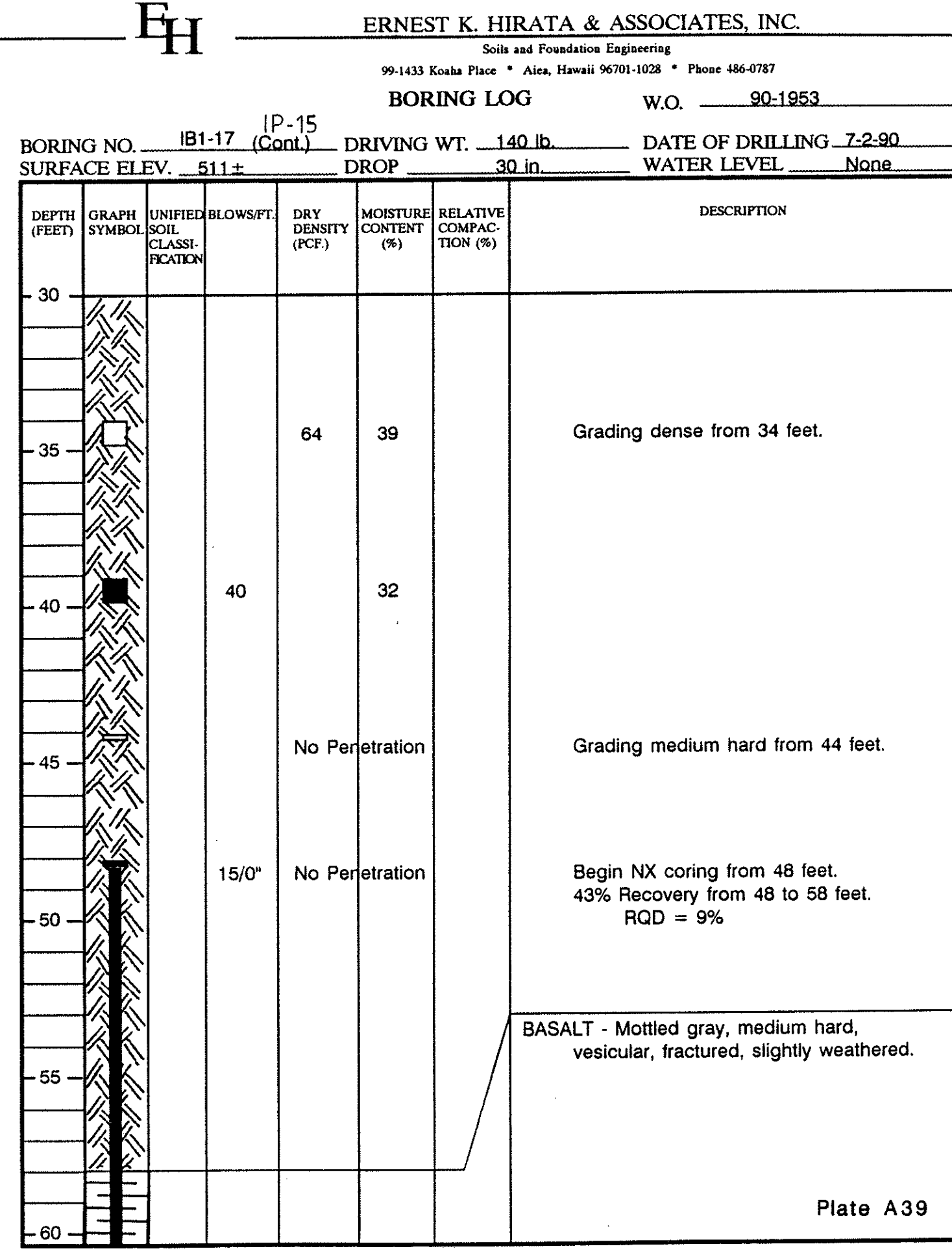
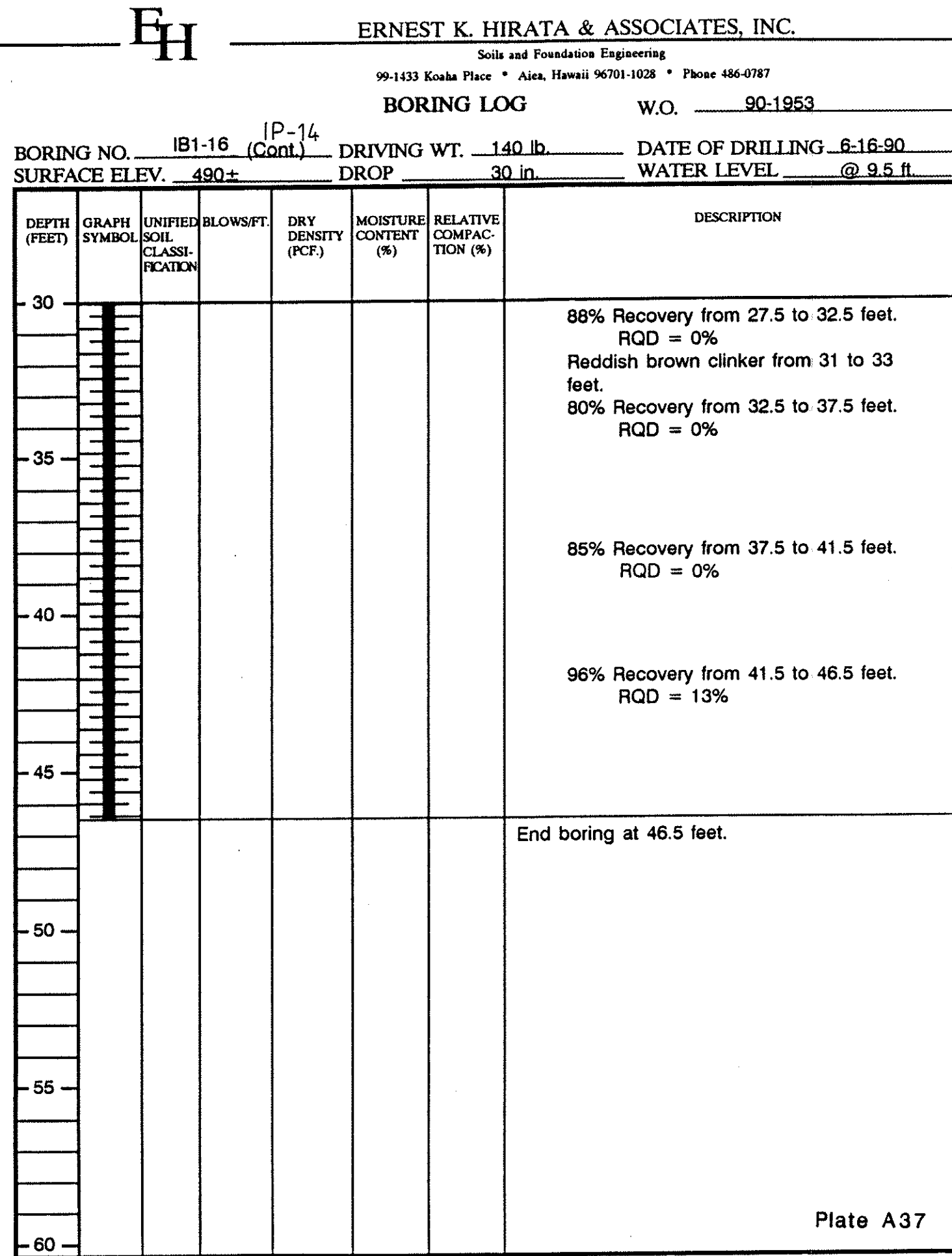
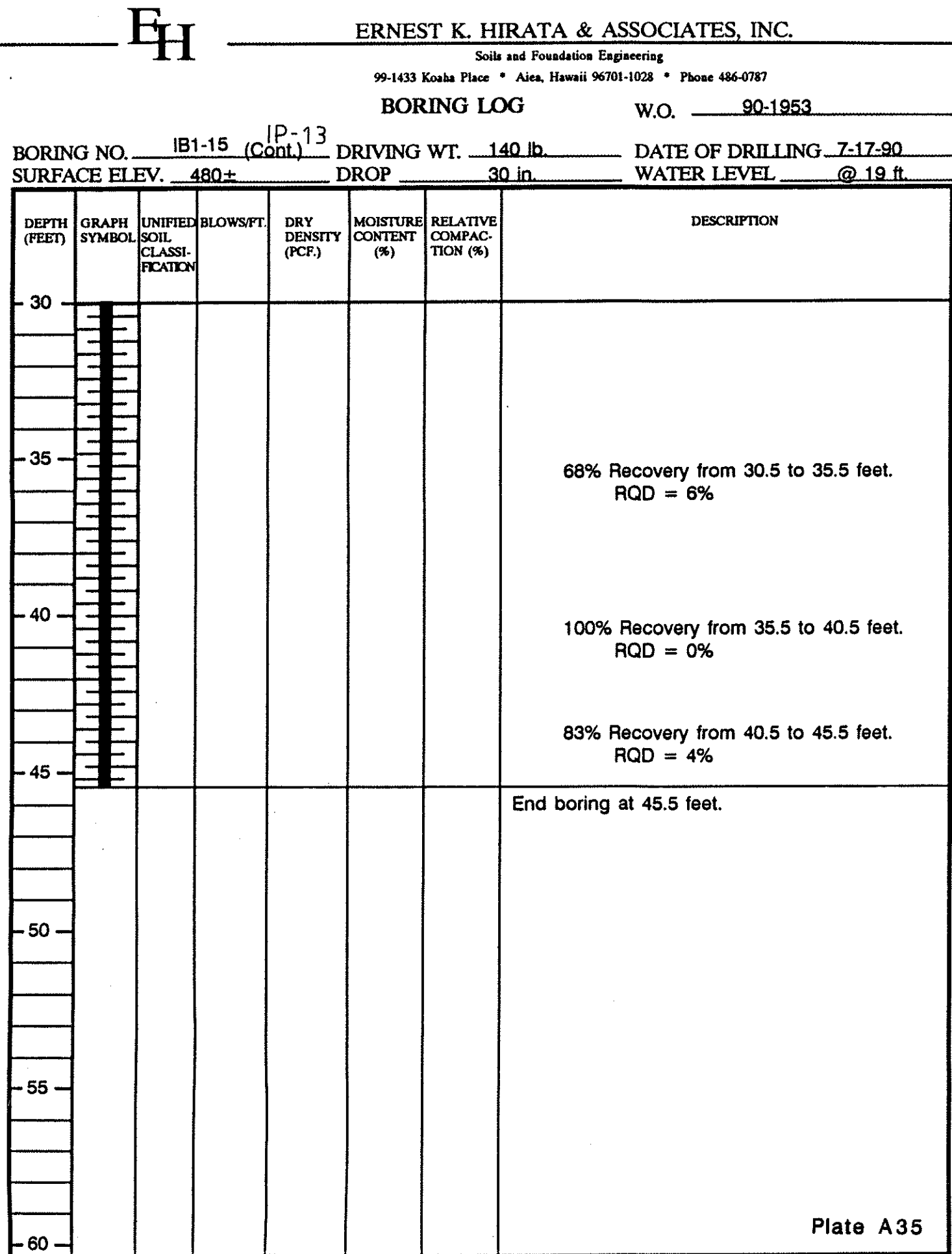
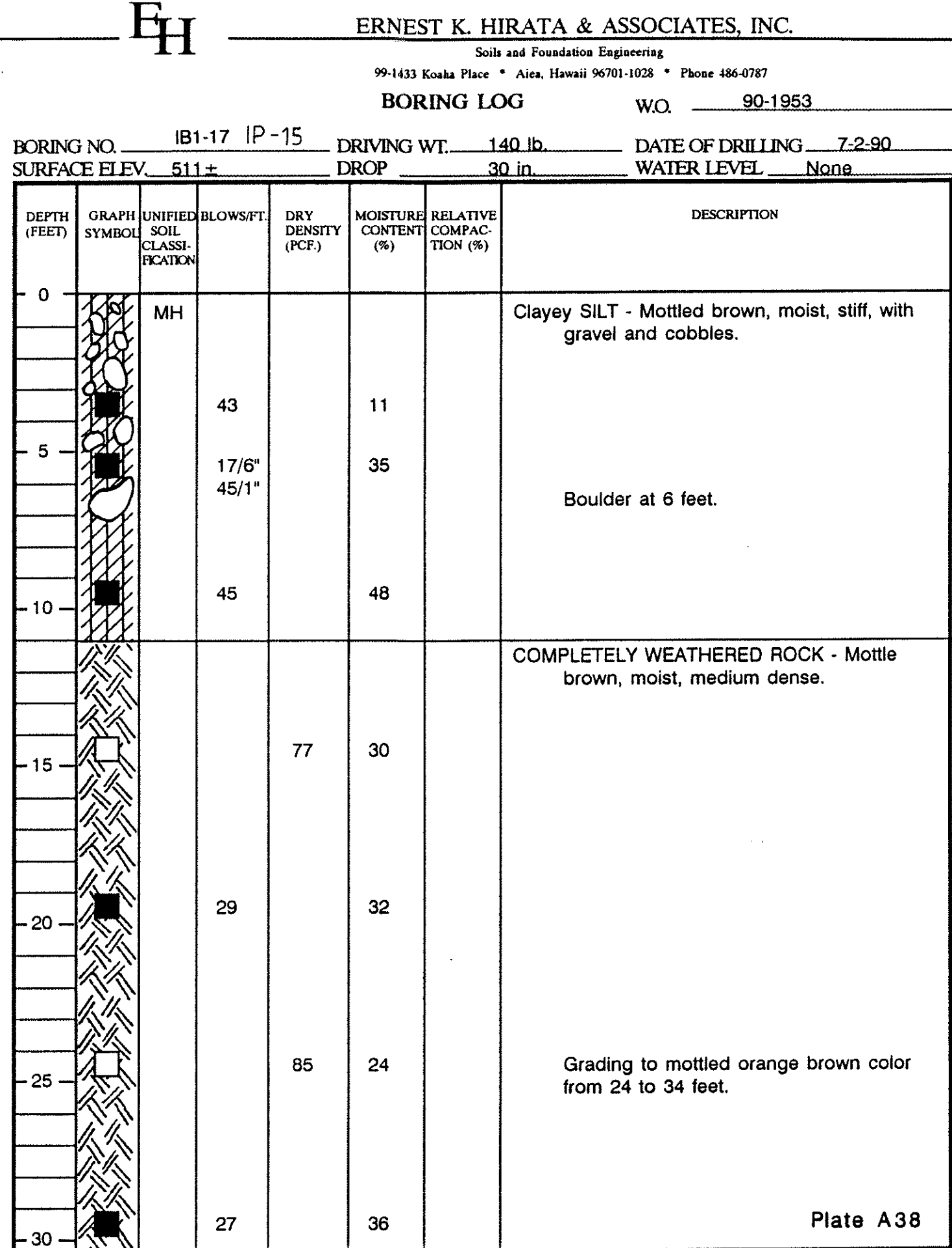
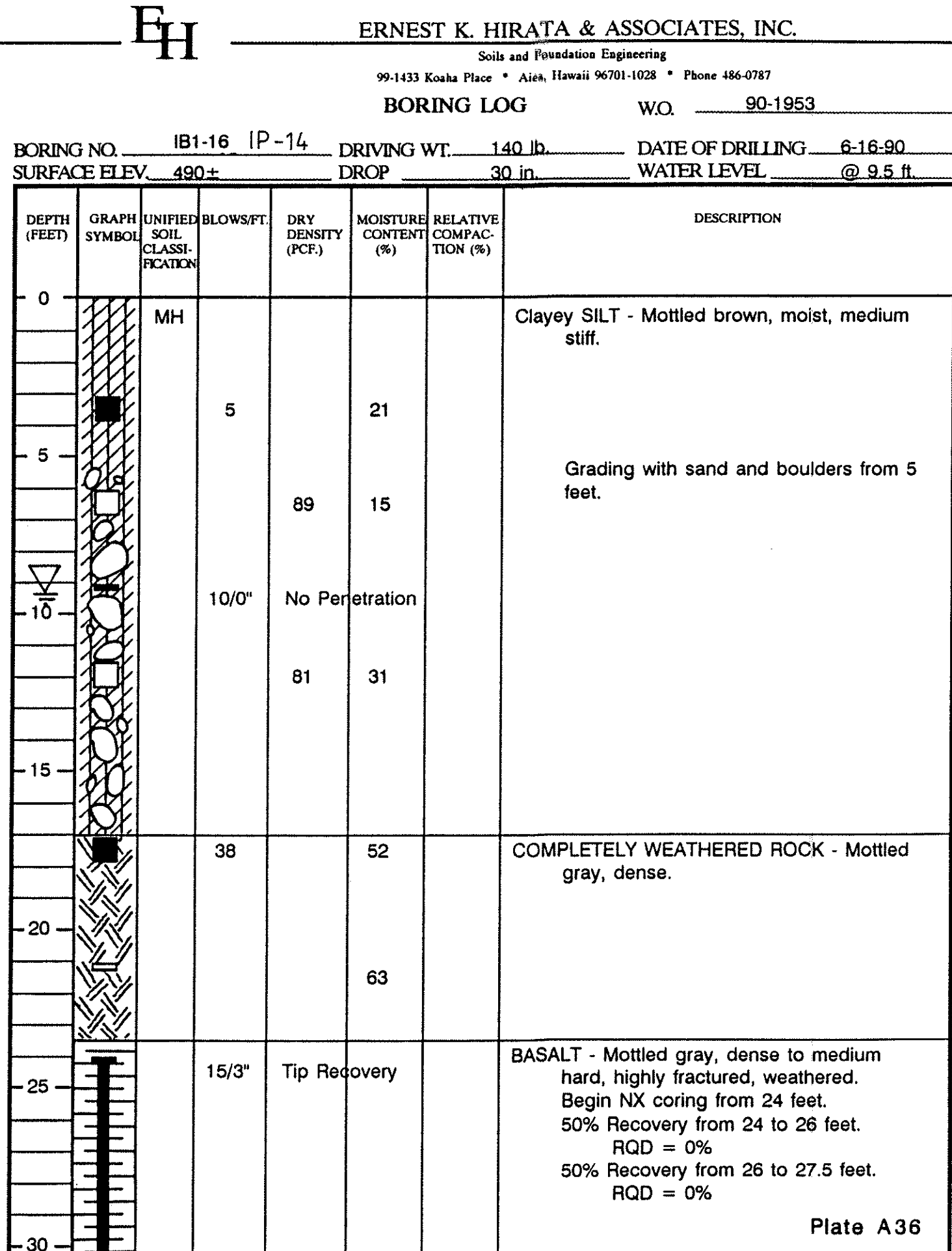
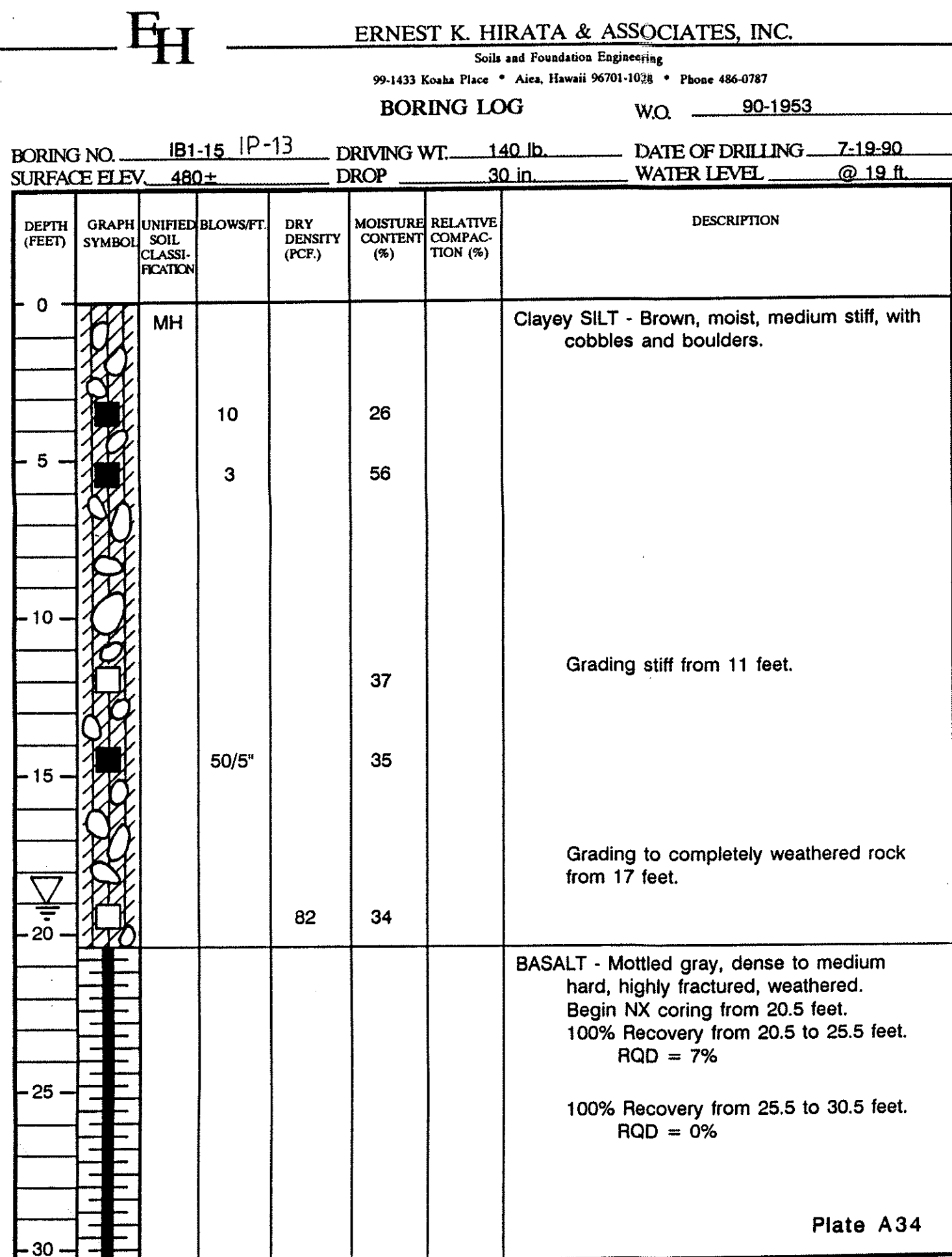
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	131	225



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Paul S. Morimoto
Signature

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
BORING LOGS
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) & (70)
SCALE: NONE DATE: AS NOTED
SHEET No. 131 OF 225 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	140	325



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Signature

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) & (70)	
SCALE: NONE	DATE: AS NOTED
SHEET NO. 213 OF 33 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	141	325

EH

ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place * Aiea, Hawaii 96701-1028 * Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-18 IP-16 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 7-6-90
SURFACE ELEV. 496± DROP 30 in. WATER LEVEL @ 11 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT. (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH					Clayey SILT - Mottled brown, moist, stiff, with gravel and cobbles.
5			12		28		Grading with cobbles and boulders from 3 feet.
10			15/1"		No Recovery		
15			15/0"		No Penetration		Begin NX coring from 14 feet. 80% Recovery from 14 to 16.5 feet. RQD = 80% 30% Recovery from 16.5 to 21.5 feet. RQD = 20% End NX coring at 21.5 feet.
20							COMPLETELY WEATHERED ROCK - Mottled grayish brown, medium dense.
25							
30			27		29		

Plate A41

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ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place * Aiea, Hawaii 96701-1028 * Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-18 IP-16 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 7-6-90
SURFACE ELEV. 496± DROP 30 in. WATER LEVEL @ 11 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT. (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							80% Recovery from 58 to 63 feet. RQD = 6%
65							100% Recovery from 63 to 68 feet. RQD = 46%
70							End boring at 68 feet.
75							
80							
85							
90							

Plate A43

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ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place * Aiea, Hawaii 96701-1028 * Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-19 ABUT A2 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 7-23-90
SURFACE ELEV. 540± DROP 30 in. WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT. (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30							
35				57	47		
40			51		11		Grading dense to medium hard from 39 feet.
45			25/0"		No Penetration		
50			20/0"		No Penetration		BASALT - Mottled gray, medium hard, vesicular, fractured, slightly weathered. Begin NX coring from 51 feet. 93% Recovery from 51 to 61 feet. RQD = 32%
55							
60							

Plate A45

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ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place * Aiea, Hawaii 96701-1028 * Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-18 IP-16 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 7-6-90
SURFACE ELEV. 496± DROP 30 in. WATER LEVEL @ 11 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT. (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30			25		37		
35			22		35		
40			50/2"		No Recovery		BASALT - Mottled gray, dense to medium hard, highly fractured, weathered. Begin NX coring from 39 feet. 68% Recovery from 39 to 43 feet. RQD = 0% 98% Recovery from 43 to 48 feet. RQD = 0% Grading medium hard from 48 feet. 100% Recovery from 48 to 53 feet. RQD = 32%
45							
50							
55							
60							100% Recovery from 53 to 58 feet. RQD = 14%

Plate A42

EH

ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place * Aiea, Hawaii 96701-1028 * Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-19 ABUT A2 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 7-23-90
SURFACE ELEV. 540± DROP 30 in. WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT. (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0							COMPLETELY WEATHERED ROCK - Mottled grayish brown and red, moist, medium dense to dense.
5			22		34		
10			39		38		
15			69		48		
20			23		36		
25			70		46		
30			26		35		

Plate A44

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ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place * Aiea, Hawaii 96701-1028 * Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-19 ABUT A2 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 7-23-90
SURFACE ELEV. 540± DROP 30 in. WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT. (PCF)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							100% Recovery from 61 to 71 feet. RQD = 16%
65							
70							End boring at 71 feet.
75							
80							
85							
90							

Plate A46



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Paul S. Morimoto
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE

DATE: AS NOTED

SHEET NO. 141 OF 325 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1 (69)	1992	142	325

ERNEST K. HIRATA & ASSOCIATES, INC.
Soils and Foundation Engineering
99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-20 ABUT A2 SURFACE ELEV. 544± DRIVING WT. 140 lb. DATE OF DRILLING 7-16-90
DROP 30 in. WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0			36		42		COMPLETELY WEATHERED ROCK - Mottled grayish brown and red, moist, dense.
5			72		37		
10			31		37		
15			78		26		Grading dense to medium hard from 14 feet.
20			80		31		
25			45		26		
30			47		30		

Plate A47

ERNEST K. HIRATA & ASSOCIATES, INC.
Soils and Foundation Engineering
99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-20 ABUT A2 SURFACE ELEV. 544± DRIVING WT. 140 lb. DATE OF DRILLING 7-16-90
DROP 30 in. WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60			43		36		
65			68		37		
70			48		38		
75			45		33		
80			110/7"		29		
85							
90			60/0"	No Penetration			BASALT - Gray, dense to medium hard, weathered.

Plate A49

BORING: OB1-21 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway
FILE: 953-1 SURFACE ELEV.: 480'±
DATE: 10-23-90 DEPTH TO WATER: 65' DATE: 10-24-90
PAGE 1 OF 3 WATER ELEV.: 415'± TIME: 9:40 AM

LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	S A M P L E	DEPTH	CLASSIFICATION
	77	58	R	1	1	Brown Clayey SILT (MH) with gravel and cobbles, stiff, moist to saturated (FILL)
LL=73, PI=23	66		14	2	10	Mottled Orange Brown Clayey SILT (MH), stiff, moist (RESIDUAL)
qu=1930 p.s.f.	57	67	29	3	15	Mottled Orange and Gray Clayey SILT (MH) with decomposed gravel, very stiff, moist (SAPROLITE)
Direct Shear: $\phi=41^\circ$ C=550 p.s.f.	40		37	4	20	
	67	60	21	5	25	Mottled Reddish Brown Clayey SILT (ML) with sand and weathered gravel, stiff, moist (WEATHERED CLINKER)
	52		6	6	30	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A51

ERNEST K. HIRATA & ASSOCIATES, INC.
Soils and Foundation Engineering
99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-20 ABUT A2 SURFACE ELEV. 544± DRIVING WT. 140 lb. DATE OF DRILLING 7-16-90
DROP 30 in. WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30							
35			50		37		
40			78		30		
45			100/9"		33		
50			25		33		
55			71		39		
60			60/4"		37		

Plate A48

ERNEST K. HIRATA & ASSOCIATES, INC.
Soils and Foundation Engineering
99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. IB1-20 ABUT A2 SURFACE ELEV. 544± DRIVING WT. 140 lb. DATE OF DRILLING 7-16-90
DROP 30 in. WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
90							Begin NX coring from 89 feet. 40% Recovery from 89 to 99 feet. RQD = 4 %
95							
100							End boring at 99 feet.
105							
110							
115							
120							

Plate A50

BORING: OB1-21 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway
FILE: 953-1 SURFACE ELEV.: 480'±
DATE: 10-19-90 DEPTH TO WATER: 65' DATE: 10-24-90
PAGE 2 OF 3 WATER ELEV.: 415'± TIME: 9:40 AM

LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	S A M P L E	DEPTH	CLASSIFICATION
qu=1990 p.s.f.	40	76	90/1.8'	7	35	Mottled Reddish Brown Clayey SILT (ML) with sand and weathered gravel, stiff, moist (WEATHERED CLINKER)
			97% REC 8% RQD	RUN # 1	40	Gray Moderately Weathered BASALT (WM), hard, extremely broken
			97% REC 0% RQD	RUN # 2	45	Grayish Brown Highly Weathered Welded CLINKER (WH), medium hard, broken
			80% REC 0% RQD	RUN # 3	50	Gray Moderately Weathered BASALT (WM), medium hard to hard, broken
			65% REC 33% RQD	RUN # 4	55	Reddish Gray Highly Weathered Welded CLINKER (WH), medium hard, occasionally broken
			60% REC 17% RQD	RUN # 5	60	
			80% REC 7% RQD	RUN # 6	65	Gray Moderately to Highly Weathered BASALT (WM-WH), medium hard to hard, very broken
			62% REC 0% RQD	RUN # 7	70	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A52

BORING: OB1-21 ABUT A1 PROJECT: Interstate Route H-3, North Halawa Highway
FILE: 953-1 SURFACE ELEV.: 480'±
DATE: 10-23-90 DEPTH TO WATER: 65' DATE: 10-24-90
PAGE 3 OF 3 WATER ELEV.: 415'± TIME: 9:40 AM

LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	S A M P L E	DEPTH	CLASSIFICATION
			62% REC 0% RQD	RUN # 7	70	Gray/Brown Highly Weathered CLINKER (MH), medium dense
			90% REC 10% RQD	RUN # 8	75	Red Weathered TUFF (WH), medium hard, broken
			100% REC 45% RQD	RUN # 9	80	Gray Moderately Weathered Vesicular BASALT (WM), medium hard, broken
			87% REC 25% RQD	RUN # 10	85	Gray Slightly Weathered BASALT (WS), hard, massive
			95% REC 50% RQD	RUN # 11	90	Gray/Brown Highly Weathered CLINKER (WH), medium hard, broken
			75% REC 10% RQD	RUN # 12	95	Gray Slightly Weathered Vugula BASALT (WS), hard, broken
					100	Red/Gray Moderately Weathered Welded CLINKER (WM), medium hard to hard, occasionally broken to massive
					105	BOH @ 97.0'

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A53



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Paul S. Morimoto
Signature



FEWELL GEOTECHNICAL ENGINEERING, LTD.
Alan J. Shimamoto

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE DATE: AS NOTED

SHEET No. 142 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1 (69)	1992	143	325

BORING: OB1-22 ABUT A PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 502'±					
DATE: 10-12-90 DEPTH TO WATER: 28.5' DATE: 10-18-90					
PAGE 1 OF 3 WATER ELEV.: 473.5'± TIME: 11:30 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
qu=10150 p.s.f. LL=86, PI=28	39		13	1	Brown Clayey SILT (MH) with gravel and cobbles, <u>stiff</u> , moist
					(FILL)
qu=1500 p.s.f. Consol	51	68	54	2	Mottled Grayish Brown Clayey SILT (MH) with gravel and cobbles, <u>hard</u> , damp
					(ALLUVIUM)
	53		18	3	
	61	63	17	4	Mottled Grayish Brown Clayey SILT (MH) with gravel, <u>stiff</u> , moist
	58		17	5	
LL=91, PI=45	57		67	6	Gray BOULDERS, COBBLES, and GRAVEL with gray Silty Clay matrix, <u>dense</u>
			60% REC RUN # 1	7	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A54

BORING: OB1-22 ABUT A PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 502'±					
DATE: 10-12-90 DEPTH TO WATER: 28.5' DATE: 10-18-90					
PAGE 3 OF 3 WATER ELEV.: 473.5'± TIME: 11:30 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			100% REC RUN # 8	7.0	Grayish Brown Moderately Weathered Welded CLINKER (WM), <u>medium hard</u> , occasionally broken
			75% REC RUN # 9	7.5	
				7.5	Gray Fresh BASALT (F), <u>very hard</u> , massive
					BOH @ 77.0'
				8.0	
				8.5	
				9.0	
				9.5	
				10.0	
				10.5	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A56

BORING: OB1-23 OP-1 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 457'±					
DATE: 10-9-90 DEPTH TO WATER: 17.0' DATE: 10-9-90					
PAGE 2 OF 3 WATER ELEV.: 440'± TIME: 12:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
qu=850 p.s.f.	57	67	32	7	Mottled Red Orange Highly Weathered CLINKER (WH), <u>dense</u> , moist
	60		53	8	Gray Highly Weathered BASALT (WH) with seams of hard clayey silt, <u>medium hard</u> , broken
27			100% REC RUN # 1	9	
			17% RQD		
			100% REC RUN # 2	10	Gray Moderately Weathered BASALT (WM), <u>hard</u> , broken
			7% RQD		
			70% REC RUN # 3	11	Gray Brown Highly Weathered CLINKER (WH), <u>dense</u> , broken
			10% RQD		
				12	Red Highly Weathered TUFF (WH), <u>medium hard</u> , broken
			100% REC RUN # 4	13	Gray Brown Slightly to Moderately Weathered Vesicular BASALT (WS-WM), <u>hard</u> , broken
			55% RQD		
			100% REC RUN # 5	14	Red Moderately Weathered Welded CLINKER (WM), <u>medium hard</u> , broken
			88% RQD		
			100% REC RUN # 6	15	Gray Fresh Vulgar BASALT (F), <u>very hard</u> , occasionally broken to massive
			89% RQD		

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A58

BORING: OB1-22 ABUT A PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 502'±					
DATE: 10-12-90 DEPTH TO WATER: 28.5' DATE: 10-18-90					
PAGE 2 OF 3 WATER ELEV.: 473.5'± TIME: 11:30 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			60% REC RUN # 1	3.5	
			60% RQD		
			91% REC RUN # 2	4.0	
			9% RQD		
			100% REC RUN # 3	4.5	Gray BOULDERS, COBBLES, and GRAVEL in Gray Silty Clay matrix, <u>dense</u>
			10% RQD		
			63% REC RUN # 4	5.0	
			0% RQD		
			100% REC RUN # 5	5.5	
			0% RQD		
			82% REC RUN # 6	6.0	
			25% RQD		
				6.5	Brown Gray Moderately Weathered BASALT (WM), <u>hard</u> , broken
			100% REC RUN # 7	7.0	Gray Slightly Weathered BASALT (WS), <u>hard</u> , broken
			10% RQD		
			100% REC RUN # 8	7.5	Grayish Brown Moderately Weathered Welded CLINKER (WM), <u>medium hard</u> , occasionally broken
			37% RQD		

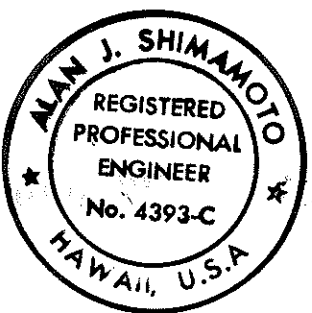
FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A55

BORING: OB1-23 OP-1 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 457'±					
DATE: 10-9-90 DEPTH TO WATER: 17.0' DATE: 10-9-90					
PAGE 1 OF 3 WATER ELEV.: 440'± TIME: 12:00 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
				1	
qu=660 p.s.f.	40		3	1.5	
				2	Brown Clayey SILT (MH) with gravel, cobbles and occasional boulders, <u>soft to medium stiff</u> , moist
				3	
qu=520 p.s.f.	56	68	PUSH	2	
	61		6	3	
	63	65	PUSH	4	
				5	
	58		6	5	
29			100% REC RUN # 6	6	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A57

BORING: OB1-23 OP-1 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 457'±					
DATE: 9-7-90 DEPTH TO WATER: 17.0' DATE: 10-9-90					
PAGE 3 OF 3 WATER ELEV.: 440'± TIME: 12:00 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			100% REC RUN # 6	7.0	Gray Fresh Vulgar BASALT (F), <u>very hard</u> , occasionally broken to massive
			89% RQD		
			100% REC RUN # 7	7.5	Red Gray Slightly Weathered Welded CLINKER (WS), <u>hard</u> , occasionally broken to massive
			90% RQD		
				8.0	
				8.5	
				9.0	
				9.5	
				10.0	
				10.5	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A59



FEWELL GEOTECHNICAL ENGINEERING, LTD.
Alan J. Shimamoto

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
BORING LOGS
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) & (70)
SCALE: NONE DATE: AS NOTED
SHEET NO. 143 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	144	325

BORING: OB1-24 OP-2 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1		SURFACE ELEV.: 460'±		DATE: 10-2-90	
DATE: 9-26-90		DEPTH TO WATER: 27.0'		TIME: 11:00 AM	
PAGE 1 OF 3		WATER ELEV.: 433'±			
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
qu=580 p.s.f.	44	73	10	1	Brown Clayey SILT (MH) with gravel, sand and cobbles, <u>soft to medium stiff</u> , moist to saturated
				2	
qu=800 p.s.f. LL=88, PI=43	64	73	2	3	Brownish Gray Sandy SILT (ML-SM) with trace gravel, <u>medium stiff</u> , saturated
				4	
	47	73	12	5	
				6	
			44% REC 0% RQD	RUN # 1	Gray BOULDERS, COBBLES and GRAVEL in sand matrix, <u>dense</u> , saturated
			45% REC 0% RQD	RUN # 2	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A60

BORING: OB1-24 OP-2 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1		SURFACE ELEV.: 460'±		DATE: 10-2-90	
DATE: 9-26-90		DEPTH TO WATER: 27.0'		TIME: 11:00 AM	
PAGE 3 OF 3		WATER ELEV.: 433'±			
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			68% REC 33% RQD	RUN # 8	Gray Fresh BASALT (F), <u>very hard</u> , broken
					BOH @ 72.0'

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A62

BORING: OB1-25 OP-3 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1		SURFACE ELEV.: 480'±		DATE: 9-18-90	
DATE: 9-17-90		DEPTH TO WATER: 40.5'		TIME: 9:00 AM	
PAGE 2 OF 3		WATER ELEV.: 439.5'±			
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			25% REC 0% RQD	RUN # 3	Brown Clayey SILT (MH) with cobbles, <u>soft to medium stiff</u> , moist (FILL)
			56% REC 0% RQD	RUN # 4	
			63% REC 0% RQD	RUN # 5	Gray BOULDERS, COBBLES and GRAVEL with sand and silt, <u>dense</u>
			40% REC 0% RQD	RUN # 6	
			67% REC 0% RQD	RUN # 7	
			58% REC 0% RQD	RUN # 8	
			82% REC 0% RQD	RUN # 9	Mottles Gray Highly Weathered BASALT (WH), <u>soft to medium hard</u> , extremely broken
			100% REC 7% RQD	RUN # 10	Gray Moderately Weathered BASALT (WM), <u>medium hard to hard</u> , extremely broken

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A64

BORING: OB1-24 OP-2 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1		SURFACE ELEV.: 460'±		DATE: 10-2-90	
DATE: 9-26-90		DEPTH TO WATER: 27.0'		TIME: 11:00 AM	
PAGE 2 OF 3		WATER ELEV.: 433'±			
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			45% REC 0% RQD	RUN # 2	Gray BOULDERS, COBBLES and GRAVEL in sand matrix, <u>dense</u> , saturated (ALLUVIUM)
			80% REC 0% RQD	RUN # 3	
			81% REC 7% RQD	RUN # 4	Gray Moderately to Highly Weathered BASALT (WM-WH), <u>medium hard</u> , extremely broken
			30% REC 0% RQD	RUN # 5	
			97/.7'	6	
			58% REC 15% RQD	RUN # 6	
			75% REC 20% RQD	RUN # 7	Gray Brown Moderately to Highly Weathered Vesicular BASALT (WM-WH), <u>medium hard</u> , broken
			66% REC 33% RQD	RUN # 8	Gray Fresh BASALT (F), <u>very hard</u> , broken

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A61

BORING: OB1-25 OP-3 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1		SURFACE ELEV.: 480'±		DATE: 9-18-90	
DATE: 9-17-90		DEPTH TO WATER: 40.5'		TIME: 9:00 AM	
PAGE 1 OF 3		WATER ELEV.: 439.5'±			
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=78, PI=32 qu=1410 p.s.f.	48	74	PUSH	1	Brown Clayey SILT (MH) with gravel, cobbles and occasional boulders, <u>soft to medium stiff</u> , moist
	44			2	
	53		PUSH	3	
qu=1100 p.s.f.	51	71	12	4	
			48% REC 0% RQD	RUN # 1	(FILL)
			30% REC 0% RQD	RUN # 2	
			10	6	
	55		17	7	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A63

BORING: OB1-25 OP-3 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1		SURFACE ELEV.: 480'±		DATE: 9-18-90	
DATE: 9-17-90		DEPTH TO WATER: 40.5'		TIME: 9:00 AM	
PAGE 3 OF 3		WATER ELEV.: 439.5'±			
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			100% REC 7% RQD	RUN # 10	Gray Moderately Weathered BASALT (WM), <u>medium hard to hard</u> , extremely broken
			90% REC 20% RQD	RUN # 11	
			95% REC 45% RQD	RUN # 12	Drades to broken
					Red Highly Weathered TUFF (WH), <u>medium hard</u> , broken
					Gray Slightly Weathered BASALT (WS), <u>hard</u> , occasionally broken
					BOH @ 81.0'

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A65



FEWELL GEOTECHNICAL ENGINEERING, LTD.
Alan J. Shimamoto

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
BORING LOGS
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) 8 (70)
SCALE: NONE DATE: AS NOTED
SHEET NO. 81 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1 (69)	1992	145	325

BORING: OB1-26 OP-4 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 462'±					
DATE: 9-7-90 DEPTH TO WATER: 46.0' DATE: 9-7-90					
PAGE 1 OF 2 WATER ELEV.: 416'± TIME: 3:00 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
qu=930 p.s.f.	43	69	PUSH	1	Brown Clayey SILT (MH) with gravel, medium stiff to stiff, moist
	49	27		2	
			85% REC RUN #1	1.5	Gray Slightly Weathered BASALT (WS), hard, extremely broken
			0% REC RUN #2	2.0	Red Brown Highly Weathered CLINKER (WH), medium dense
			78% REC RUN #3	2.5	Gray Slightly to Moderately Weathered BASALT (WS-WM), medium hard to hard, extremely broken
			30% REC RUN #4	3.5	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A66

BORING: OB1-27 OP-5 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 498'±					
DATE: 11-2-90 DEPTH TO WATER: NONE ENCOUNTERED					
PAGE 1 OF 2					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=80, PI=21	62	57	13	1	
				5	
qu=1490 p.s.f.	67		6	2	
				1.0	
	63	61	PUSH	3	Brown Clayey SILT (MH) with gravel, medium stiff to stiff, moist
				1.5	
	67		8	4	
				2.0	
qu=1740 p.s.f.	63	61	PUSH	5	
				2.5	
	32		66	6	(ALLUVIUM)
				3.0	Gray BOULDERS, COBBLES and GRAVEL with sand in brown clayey silt matrix, very dense, moist
				3.5	(ALLUVIUM)

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A68

BORING: OB1-28 OP-6 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 505'±					
DATE: 11-5-90 DEPTH TO WATER: NONE ENCOUNTERED					
PAGE 1 OF 2					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
LL=93, PI=40	49		23	1	Brown Clayey SILT (MH) with gravel and cobbles, very stiff, moist
				5	
qu=1930 p.s.f.	45	74	34	2	
				1.0	
	55		11	3	Grades to stiff @ 15.0'
				1.5	
			PUSH	4	
				2.0	
	46	70	68	5	
				2.5	
	58	60	29	6	
				3.0	
				3.5	(ALLUVIUM)

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A70

BORING: OB1-26 OP-4 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 462'±					
DATE: 9-7-90 DEPTH TO WATER: 46.0' DATE: 9-7-90					
PAGE 2 OF 2 WATER ELEV.: 416'± TIME: 3:00 PM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
			30% REC RUN #4	3.5	Gray Slightly Moderately Weathered BASALT (WS-WM), medium hard to hard, extremely broken
				4.0	Brown Gray Highly Weathered CLINKER (WH), dense, moist
				4.5	
			100% REC RUN #5	4.5	Gray Slightly Weathered BASALT (WS), medium hard to hard, extremely broken
				5.0	
			79% REC RUN #6	5.5	Brown Gray Highly Weathered CLINKER (WH), dense, moist
				6.0	
				6.5	Red Slightly Weathered TUFF, medium hard to hard
				7.0	Gray Fresh BASALT (F), hard, occasionally fractured
				7.5	BOH @ 60.0'
				8.0	

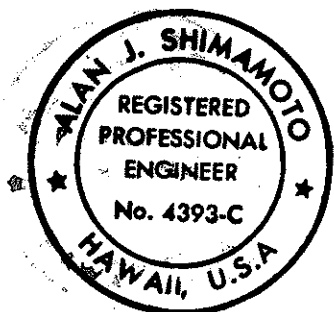
FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A67

BORING: OB1-27 OP-5 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 498'±					
DATE: 11-2-90 DEPTH TO WATER: NONE ENCOUNTERED					
PAGE 2 OF 2					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
	32	85	70/5' R	7	Gray BOULDERS, COBBLES and GRAVEL with sand in matrix, very dense, moist
				7.5	(ALLUVIUM)
			100% REC RUN #1	8.0	Gray Slightly Weathered BASALT (WS), hard, broken
			80% REC RUN #2	8.5	Brownish Gray Slightly to Moderately Weathered Welded CLINKER (WS-WM), medium hard to hard, occasionally broken
				9.0	
			100% REC RUN #3	9.5	Gray Fresh BASALT (F), very hard, massive
				10.0	
				10.5	BOH @ 50.0'
				11.0	
				11.5	
				12.0	
				12.5	
				13.0	
				13.5	
				14.0	
				14.5	
				15.0	
				15.5	
				16.0	
				16.5	
				17.0	

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A69

BORING: OB1-28 OP-6 PROJECT: Interstate Route H-3, North Halawa Highway					
FILE: 953-1 SURFACE ELEV.: 505'±					
DATE: 11-5-90 DEPTH TO WATER: NONE ENCOUNTERED					
PAGE 2 OF 2					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE DEPTH	CLASSIFICATION
	26		50/5' R	7	Brown Clayey SILT (MH) with gravel and cobbles, very stiff, moist
			88% REC RUN #1	7.5	Gray and Brown BOULDERS, COBBLES, and GRAVEL in silt matrix, very dense, moist
				8.0	
			65% REC RUN #2	8.5	
				9.0	
			40% REC RUN #3	9.5	(ALLUVIUM)
				10.0	
	32		50/5' R	8	Gray Moderately Weathered BASALT (WM), medium hard to hard, very broken
			100% REC RUN #4	8.5	Gray Slightly Weathered Vesicular BASALT (WS), very hard, occasionally broken to massive
				9.0	
			80% REC RUN #5	9.5	Gray Brown Moderately Weathered Welded CLINKER (WM), medium hard, broken
				10.0	
				10.5	BOH @ 62.0'
				11.0	
				11.5	
				12.0	
				12.5	
				13.0	
				13.5	
				14.0	
				14.5	
				15.0	
				15.5	
				16.0	
				16.5	
				17.0	

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Plate A71



FEWELL GEOTECHNICAL ENGINEERING, LTD.

Alan J. Shimamoto

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE DATE: AS NOTED

SHEET NO. 145 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	140	325

BORING: OB1-29 OP-7 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 469'± DATE: 11-29-90 DEPTH TO WATER: NONE ENCOUNTERED PAGE 1 OF 2					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH FT.
LL=40, PI=21	11		29	1	1
qu=910 p.s.f.	32	92	57.4' R	2	2
			46% REC RUN #1		1.5
			17% RQD		1.5
			100% REC RUN #2		1.5
			0% RQD		1.5
			100% REC RUN #3		2.0
			28% RQD		2.0
			100% REC RUN #4		2.5
			71% RQD		2.5
			87% REC RUN #5		3.0
			73% RQD		3.0
			81% REC RUN #6		3.5
			47% RQD		3.5

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A72

BORING: OB1-30 OP-8 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 463'± DATE: 8-8-90 DEPTH TO WATER: 23' DATE: 9-5-90 PAGE 1 OF 3 WATER ELEV.: 440'± TIME: 9:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH FT.
	20	103	90	1	1
			83% REC RUN #1		1.0
			0% RQD		1.0
			80% REC RUN #2		1.5
			0% RQD		1.5
					2.0
					2.5
					3.0
					3.5
					4.0
					4.5
					5.0
					5.5
					6.0
					6.5
					7.0
					7.5
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					9.5
					10.0
					10.5

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A74

BORING: OB1-30 OP-8 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 463'± DATE: 8-8-90 DEPTH TO WATER: 23' DATE: 9-5-90 PAGE 3 OF 3 WATER ELEV.: 440'± TIME: 9:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH FT.
			65% REC RUN #6		7.0
			0% RQD		7.0
					7.5
					8.0
					8.5
					9.0
					9.5
					10.0
					10.5

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A76

BORING: OB1-29 OP-7 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 469'± DATE: 11-29-90 DEPTH TO WATER: NONE ENCOUNTERED PAGE 2 OF 2					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH FT.
			81% REC RUN #6		3.5
			47% RQD		3.5
			100% REC RUN #7		4.0
			100% RQD		4.0
			50% REC RUN #8		4.5
			50% RQD		4.5
			70% REC RUN #9		5.0
			17% RQD		5.0
			70% REC RUN #10		5.5
			21% RQD		5.5
					6.0
					6.5
					7.0

FEWELL GEOTECHNICAL ENGINEERING, LTD.
Plate A73

BORING: OB1-30 OP-8 PROJECT: Interstate Route H-3, North Halawa Highway FILE: 953-1 SURFACE ELEV.: 463'± DATE: 8-8-90 DEPTH TO WATER: 23' DATE: 9-5-90 PAGE 2 OF 3 WATER ELEV.: 440'± TIME: 9:00 AM					
LAB TEST RESULTS	MOIST CONT %	DRY WT. PCF	BLOWS PER FT.	SAMPLE	DEPTH FT.
			R 0% REC RUN #3		3.5
			0% RQD		3.5
					4.0
					4.5
			79% REC RUN #4		5.0
			22% RQD		5.0
					5.5
					6.0
					6.5
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EH

ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.Q. 90-1953

BORING NO.		OB1-34		OP-12		DRIVING WT.		140 lb.		DATE OF DRILLING		6-4-90	
SURFACE ELEV.		510±		DROP		30 in.		WATER LEVEL		Not Recorded			
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION						
0		MH					Clayey SILT - Mottled brown, moist, firm to medium stiff, with gravel and cobbles.						
5				52	32								
8			8		49								
10				68	33								
15			7		48								
20					41		Grading stiff from 19 feet.						
25			29		14								
30			21		26								

Plate A83

Plate A83

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BORING LOG W.Q. 90-1953

BORING NO.		OB1-35		OP -13		DRIVING WT.		140 lb.		DATE OF DRILLING		7-16-90	
SURFACE ELEV.		486±		DROP		30 in.		WATER LEVEL		@ 10 ft.			
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION						
0		MH					Clayey SILT - Mottled brown, moist, stiff, with gravel. Grading with boulders from 2 feet.						
5		MH	26		35								
10		MH	52		30								
15		MH	10		47		COMPLETELY WEATHERED ROCK - Mottled grayish brown, moist, medium dense.						
20		MH											
25		MH	60		50		Grading medium hard from 24 feet.						
30		MH	20		44								
35		MH	82		47								
40		MH					BASALT - Mottled gray, dense to medium hard, vesicular, fractured, weathered. Begin NX coring from 29 feet.						
45		MH	15/0"	No Penetration			Plate A85						

Plate A85

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BORING LOG W.Q. 90-1953

BORING NO. OB1-36 OP-14		DRIVING WT. 140 lb.		DATE OF DRILLING 6-30-90			
SURFACE ELEV. 484±		DROP 30 in.		WATER LEVEL @ 9.6 ft.			
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH					Clayey SILT - Mottled brown, moist, firm to medium stiff, with gravel and few boulders.
4			47				
17			27				
3							
10							
15				85	41		COMPLETELY WEATHERED ROCK - Mottled brown, medium dense.
20			8	52			
			50/6"	30			
25							BASALT - Mottled gray, medium hard, highly fractured, weathered. Begin NX coring from 23.5 feet. 96% Recovery from 23.5 to 28.5 feet. RQD = 20%
30							

Plate A87

Plate A87

EH

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BORING LOG W.Q. 90-1953

BORING NO.		OB1-34		OP-12 (Cont.)		DRIVING WT.		140 lb.		DATE OF DRILLING		6-3-90	
SURFACE ELEV.		510±		DROP		30 in.		WATER LEVEL		Not Recorded			
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION						
30				55	27								
35							COMPLETELY WEATHERED ROCK - Mottled gray/brown, dense to medium hard.						
40			50/3"	No Recovery			BASALT - Gray, medium hard to hard, vesicular, fractured, slightly weathered. Begin NX coring from 39 feet. 92% Recovery from 39 to 44 feet. RQD = 74%						
45							94% Recovery from 44 to 49 feet. RQD = 0%						
50							96% Recovery from 49 to 54 feet. RQD = 40%						
55							End boring at 54 feet.						
60													

Plate A84

Plate A84

EH

ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.Q. 90-1953

BORING NO. OB1-35		OP-15 (Cont.)		DRIVING WT. 140 lb.		DATE OF DRILLING 7-16-90	
SURFACE ELEV. 486±		DROP 30 in.		WATER LEVEL		@ 10 ft.	
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30							73% Recovery from 29 to 39 feet. RQD = 16%
35							90% Recovery from 39 to 49 feet. RQD = 29%
40							End boring at 49 feet.
45							
50							
55							
60							

Plate A86

Plate A86

EH

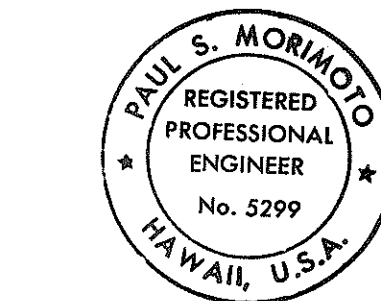
ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.Q. 90-1953

BORING NO. OB1-36 (Cont.)		DRIVING WT. 140 lb.		DATE OF DRILLING 6-30-90				
SURFACE ELEV. 484±		DROP 30 in.		WATER LEVEL @ 9.6 ft.				
DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF.)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION	
30							100% Recovery from 28.5 to 32.5 feet. RQD = 85%	
							Clinkers from 32.5 to 33.5 feet. 100% Recovery from 32.5 to 37.5 feet. RQD = 30%	
35								
40								100% Recovery from 37.5 to 42.5 feet. RQD = 34%
				</				

Plate A88

THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.
Paul S. Morimoto
SignatureSTATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE

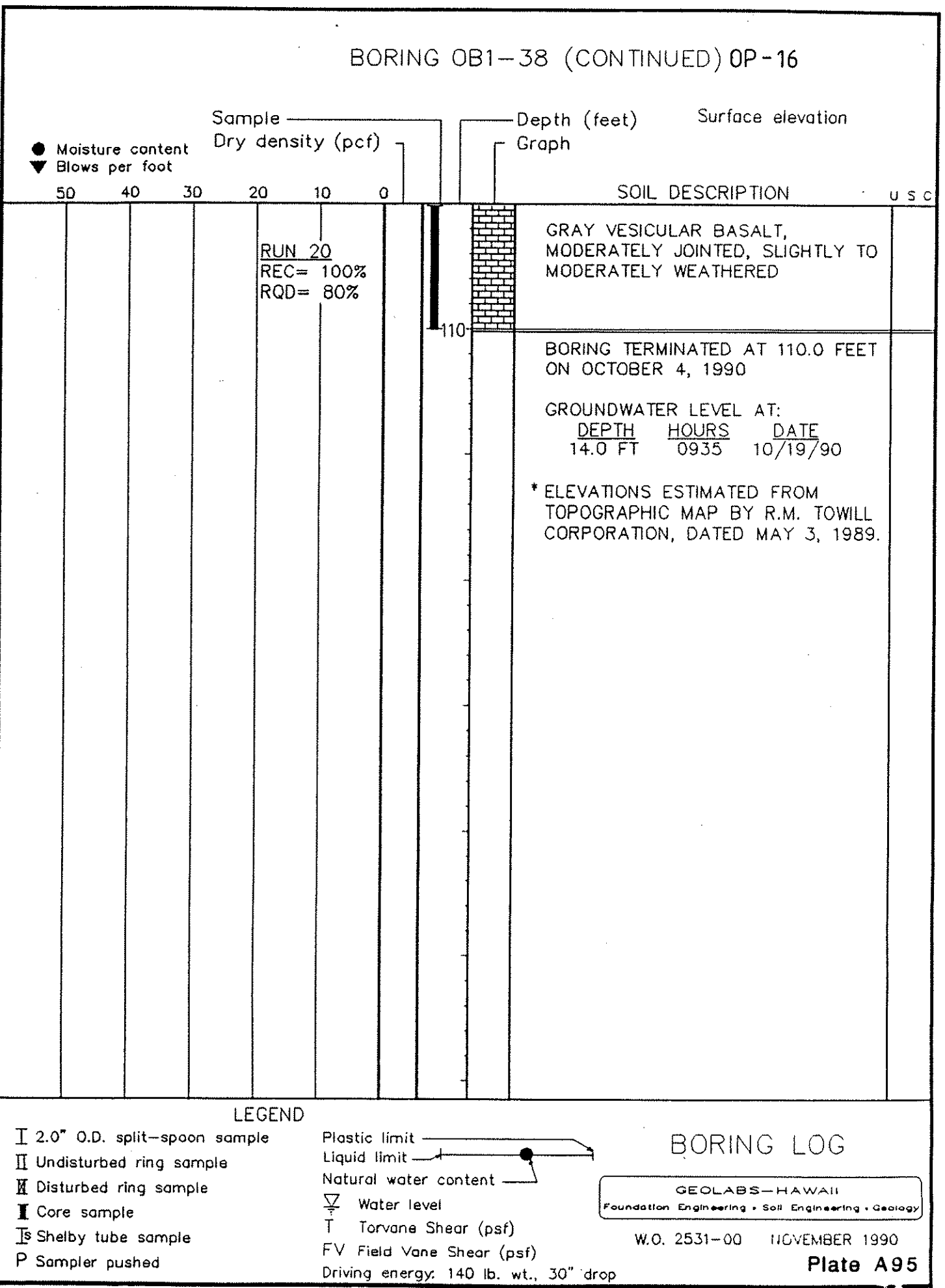
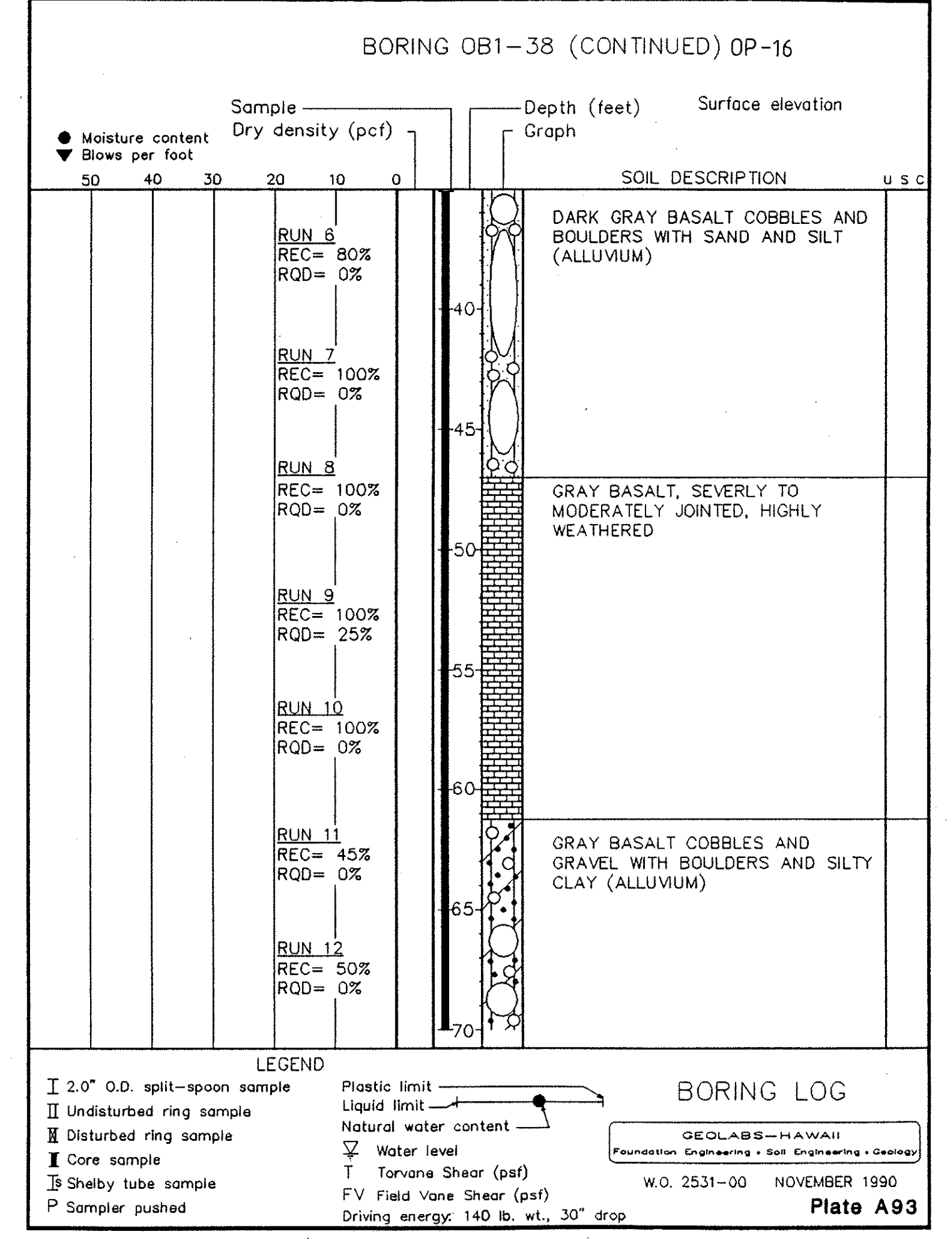
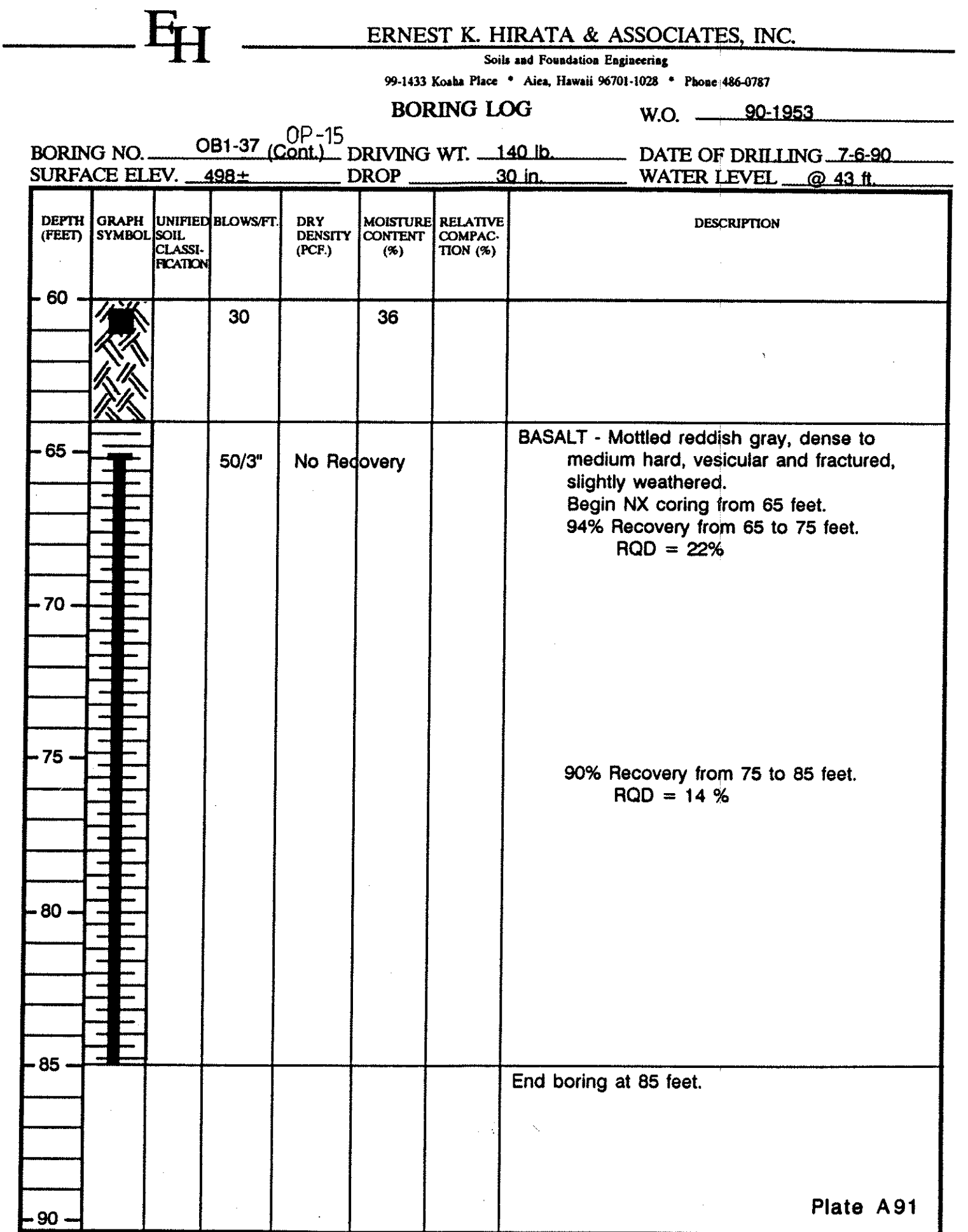
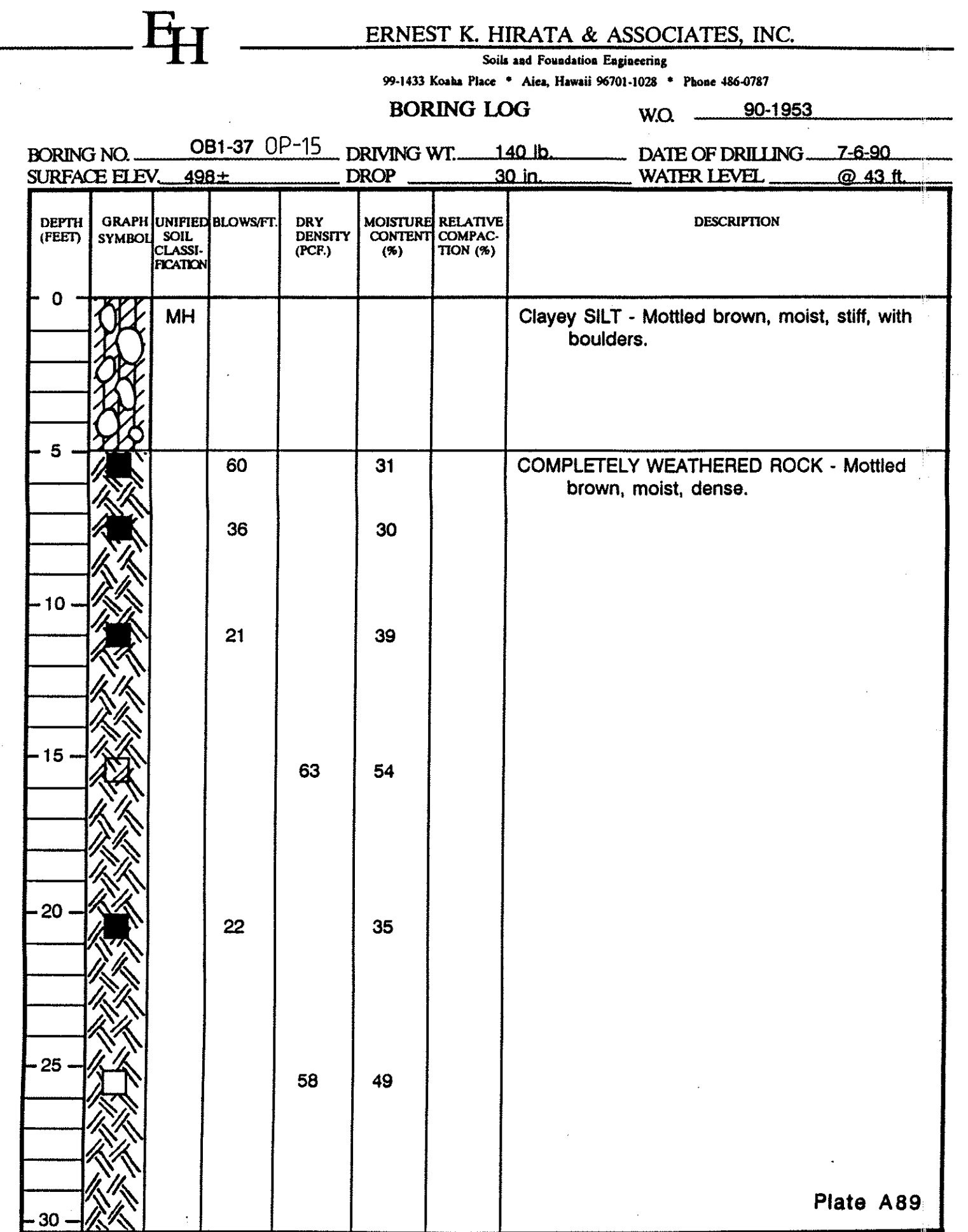
DATE: AS NOTED

SHEET NO. 81 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	149	325

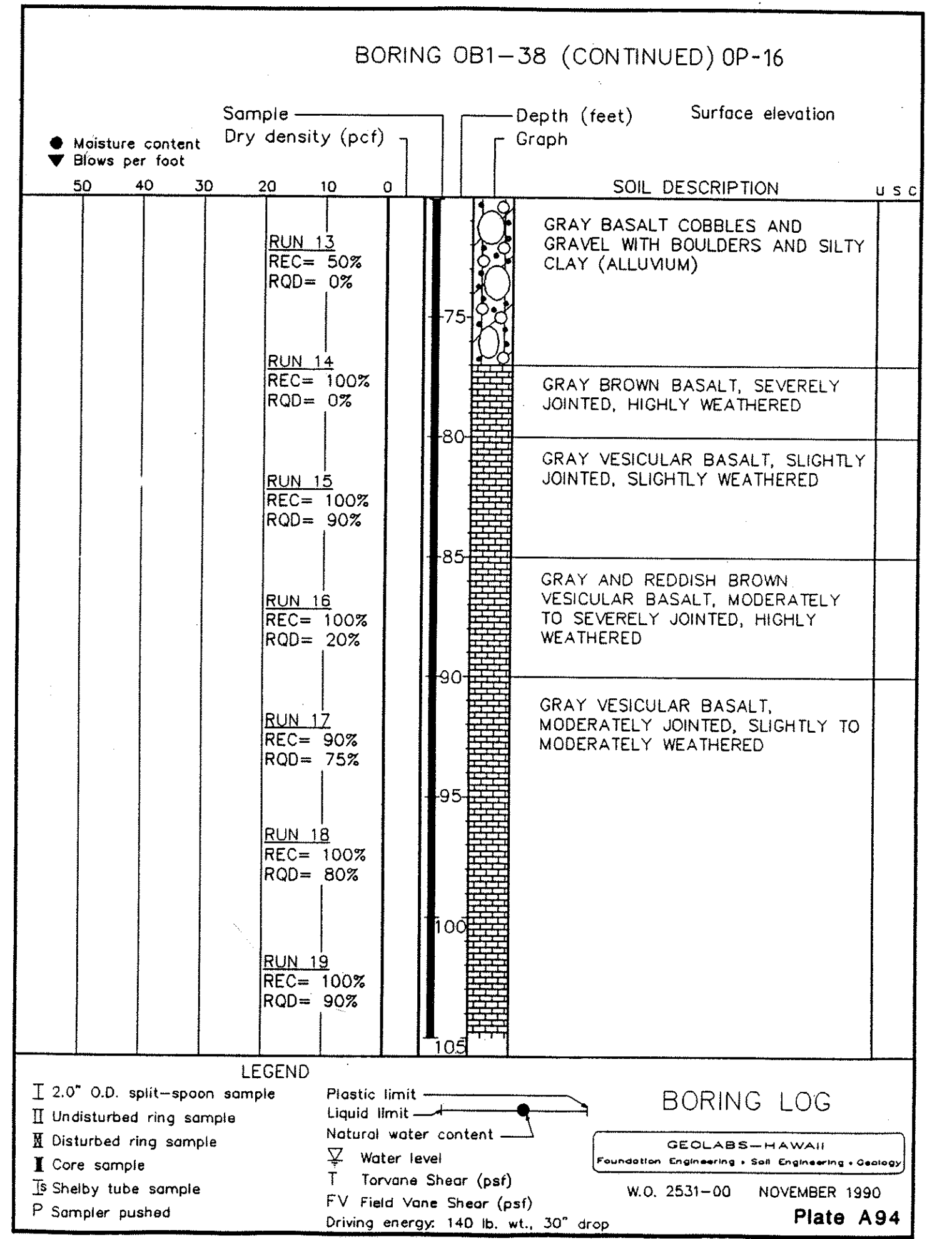
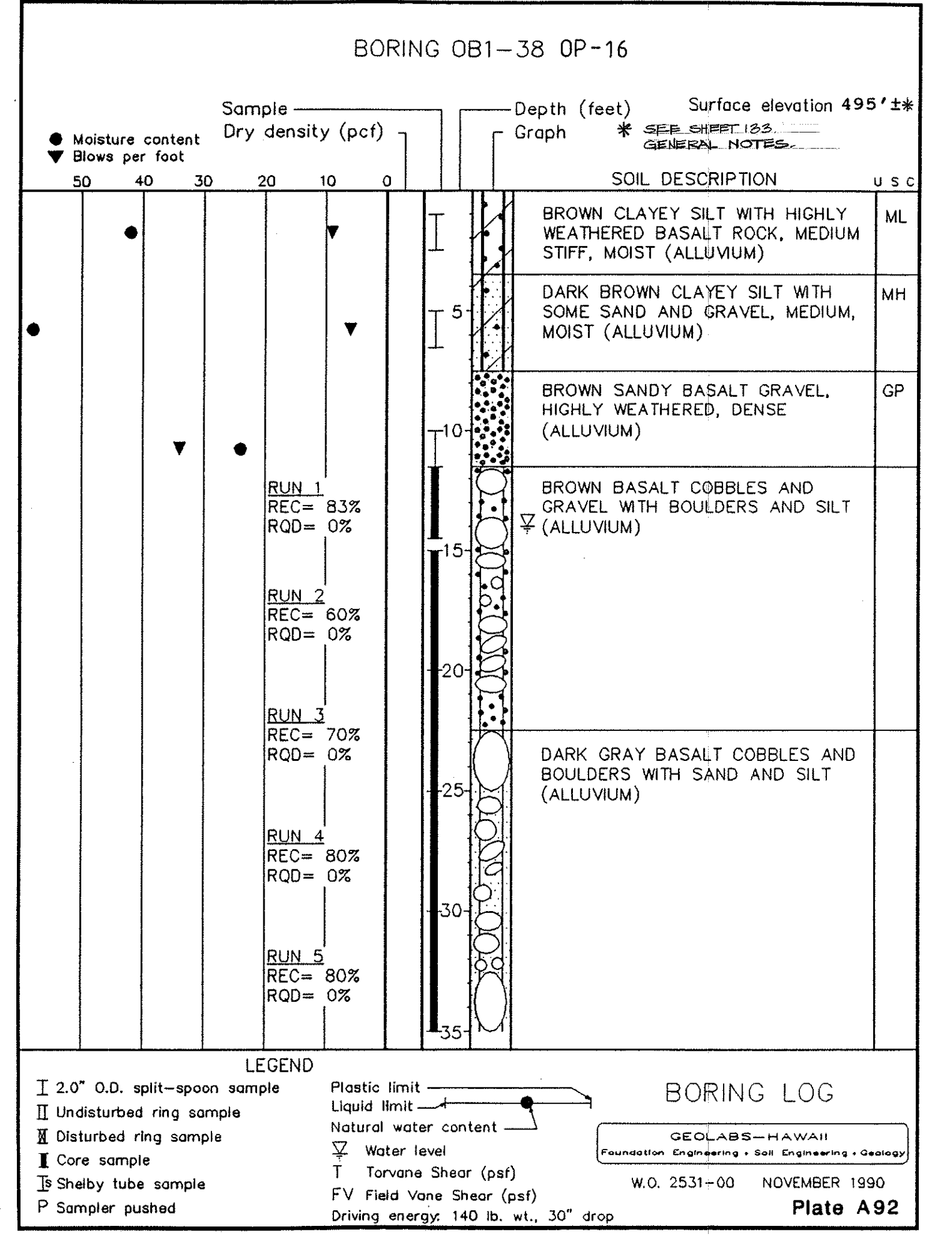
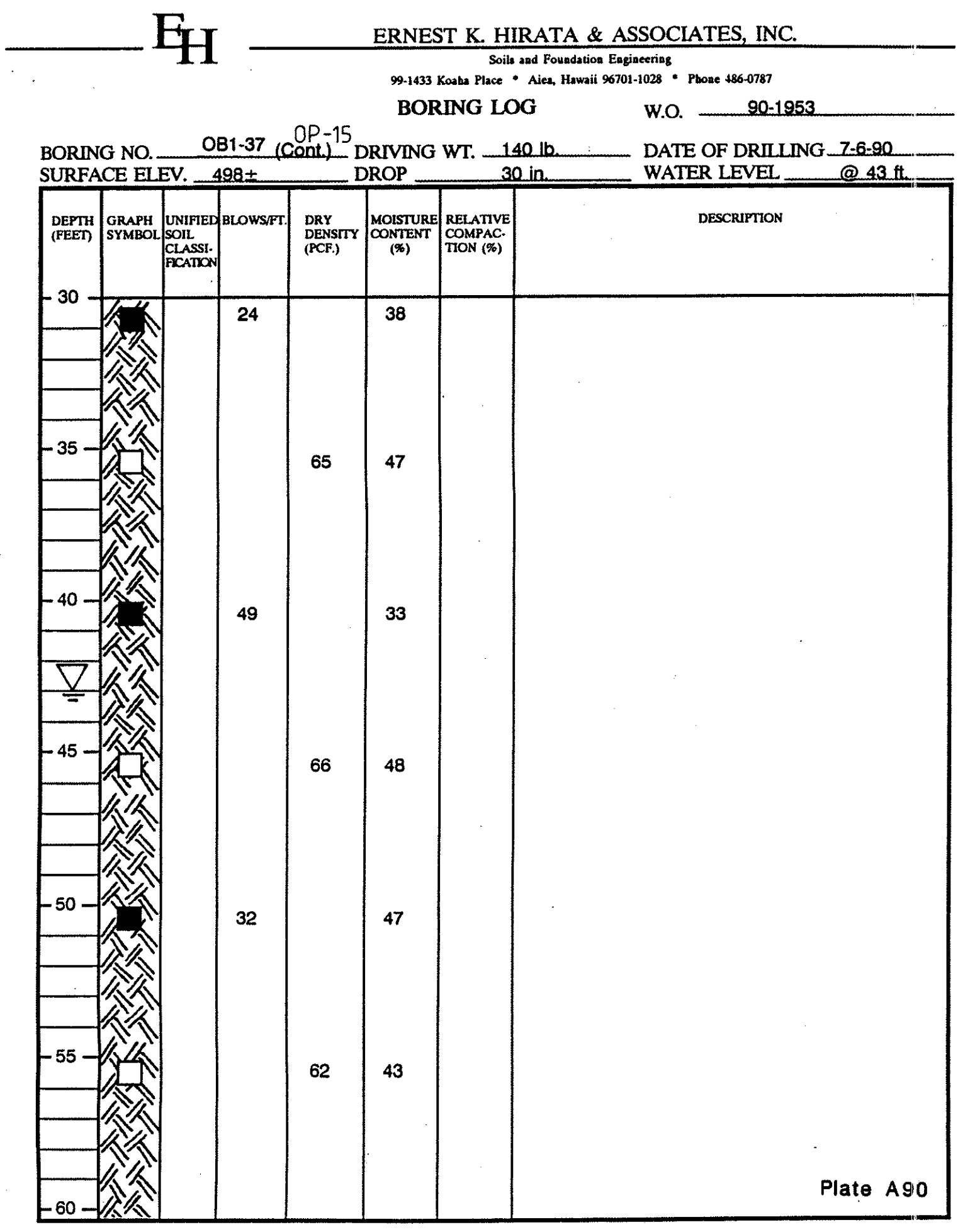
PAUL S. MORIMOTO
REGISTERED PROFESSIONAL ENGINEER
No. 5299
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Paul S. Morimoto
Signature



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Bob Y.K. Wong
SIGNATURE

BOB Y. K. WONG
REGISTERED PROFESSIONAL ENGINEER
No. 3862
HAWAII, U.S.A.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

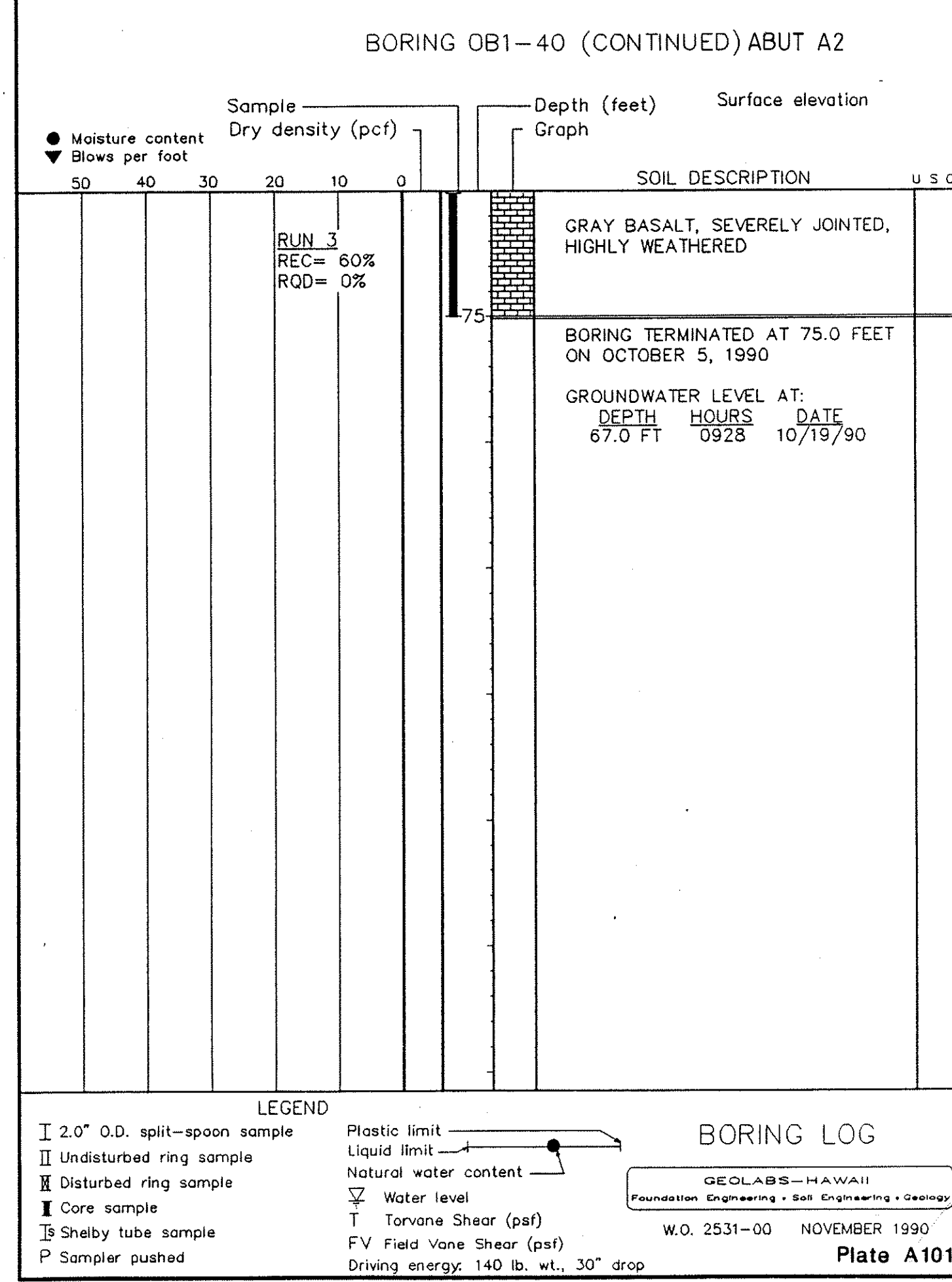
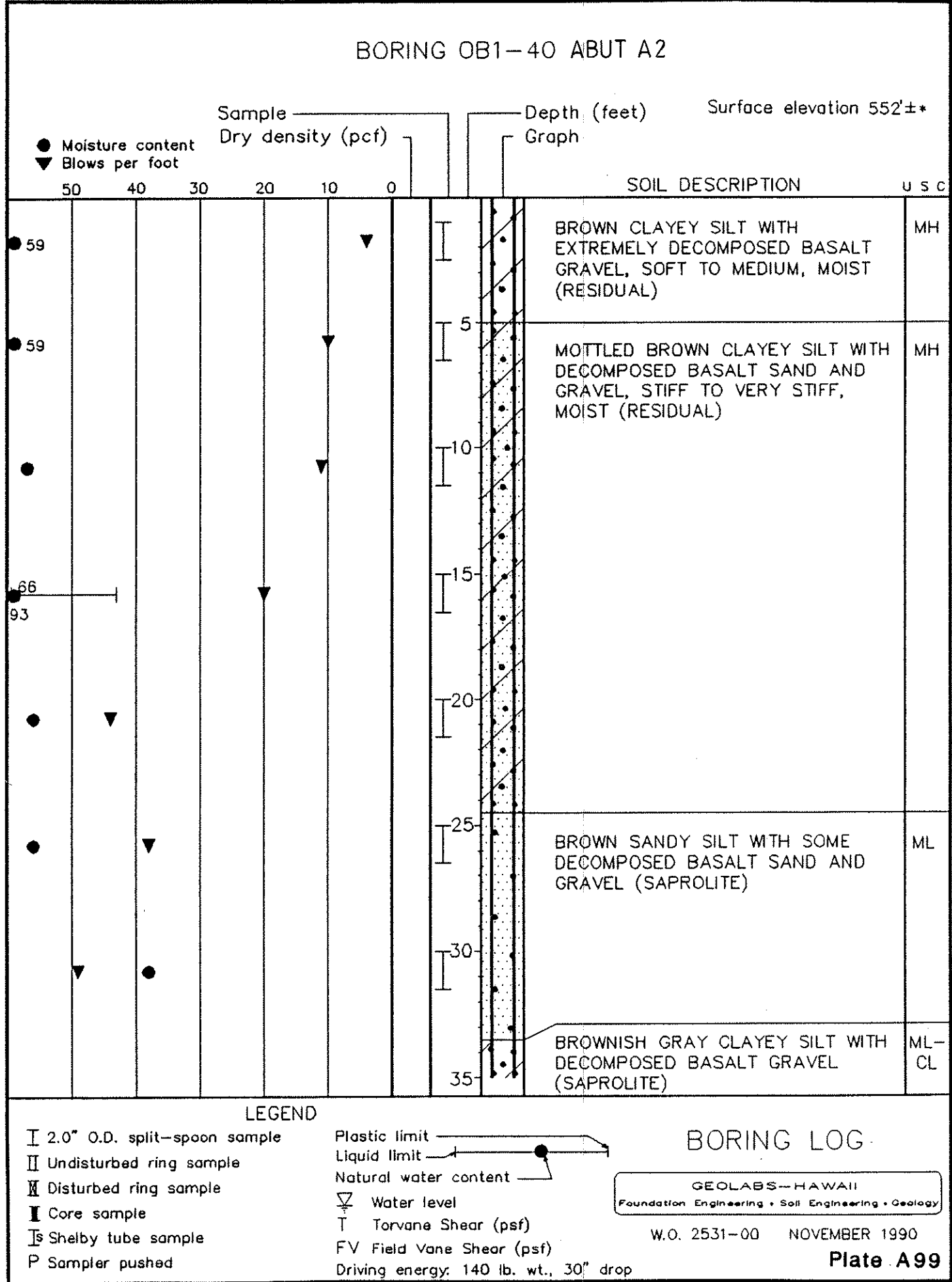
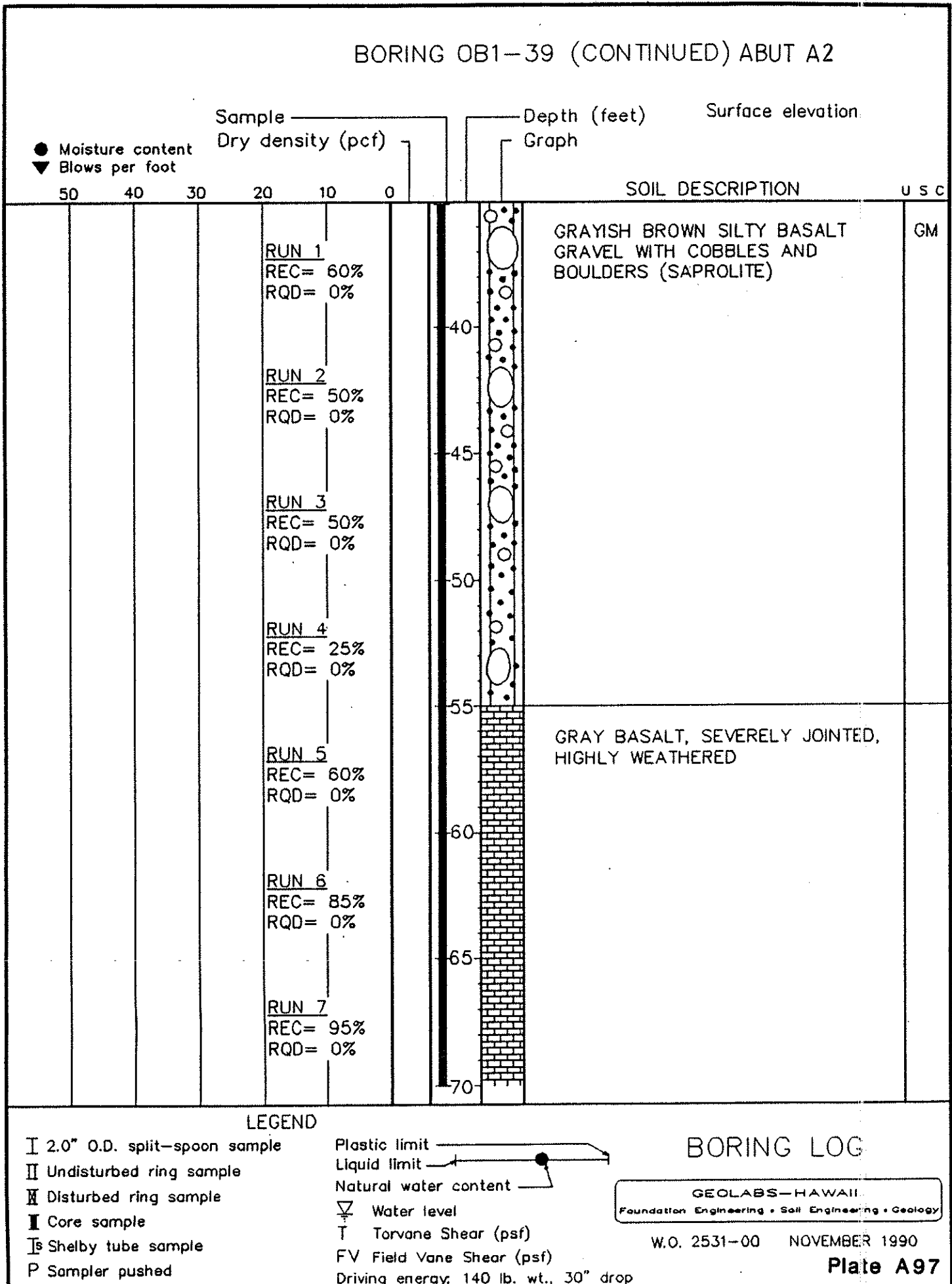
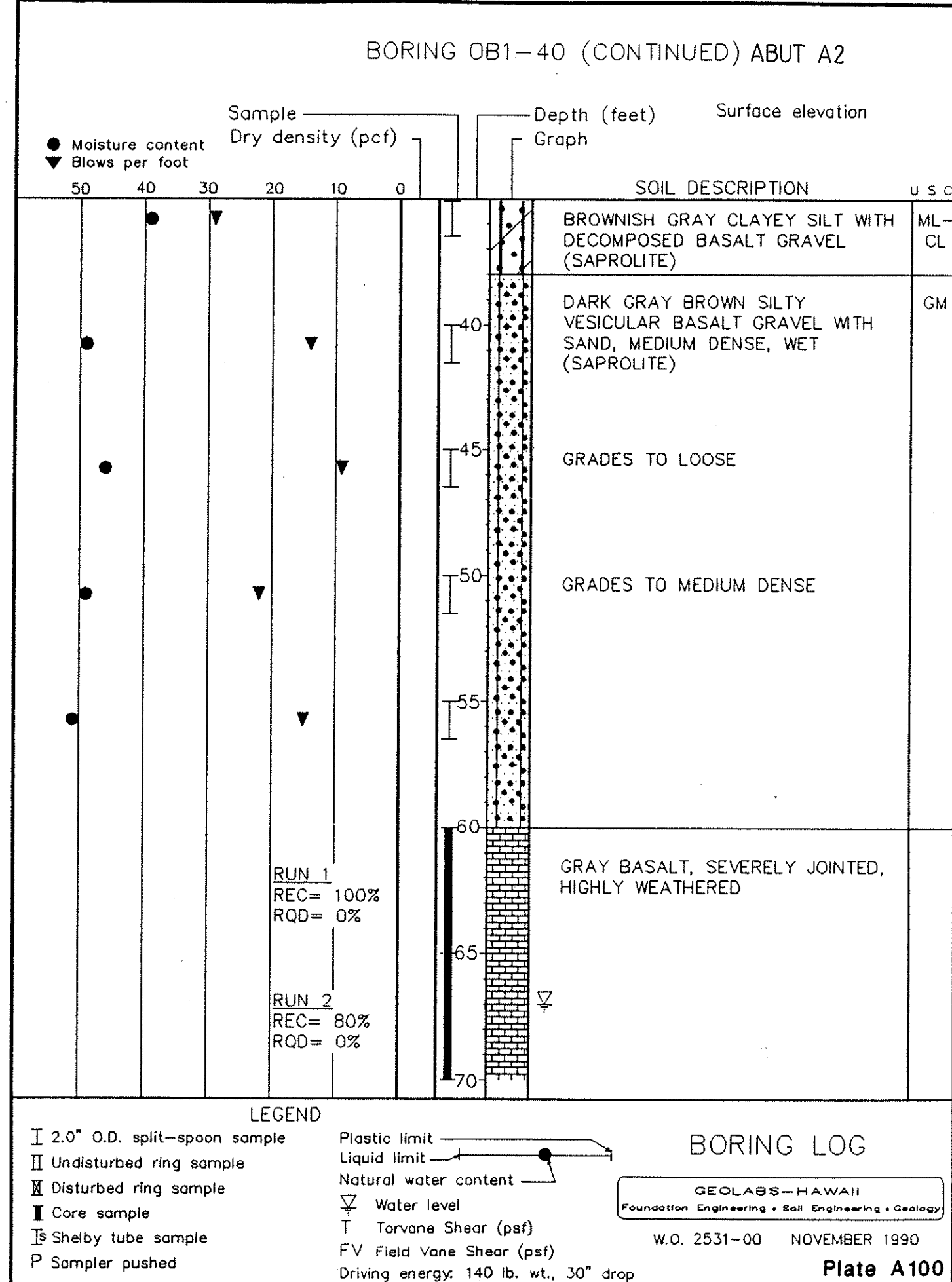
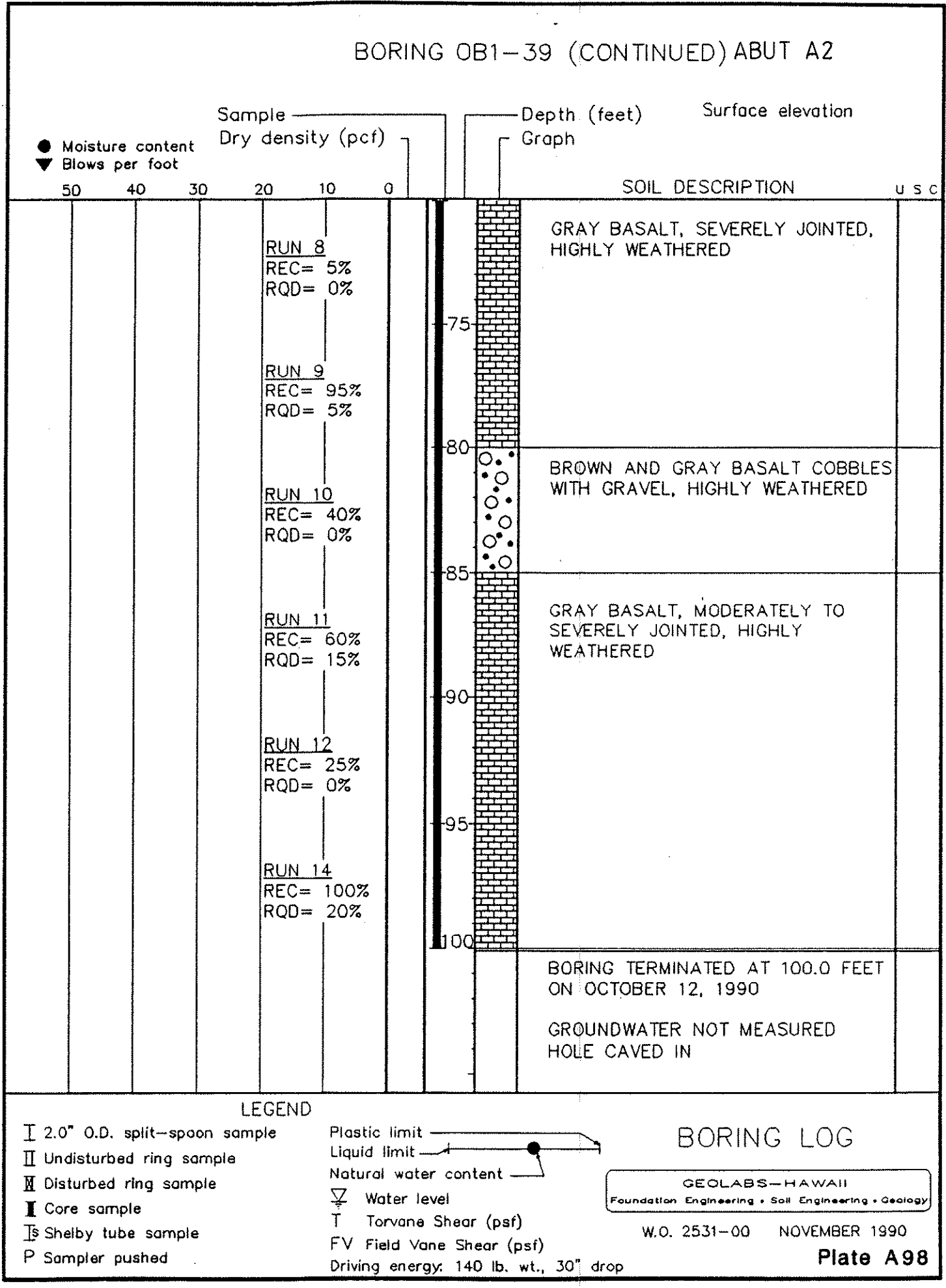
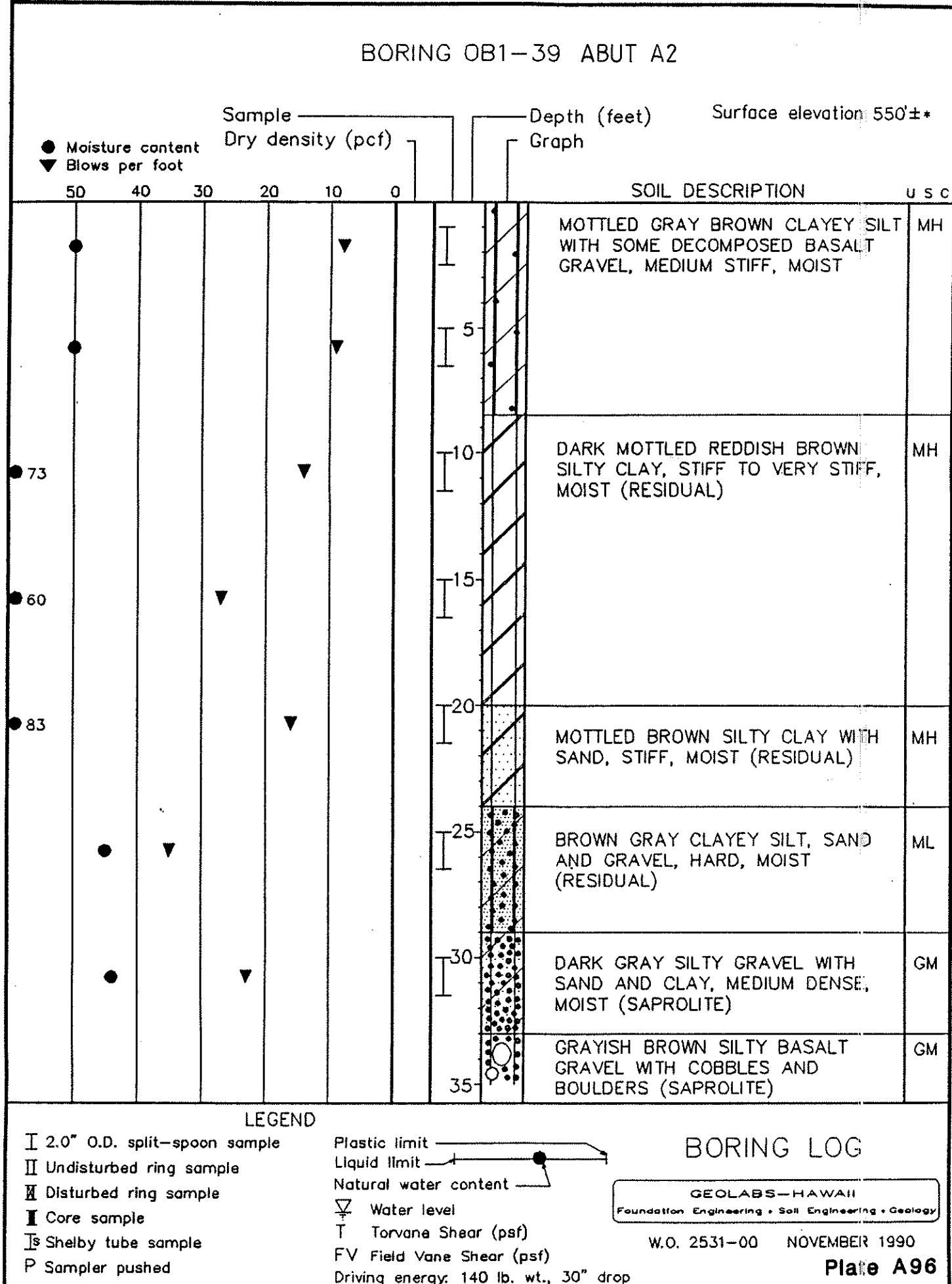
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE DATE: AS NOTED

SHEET NO. 149 OF 33 SHEETS

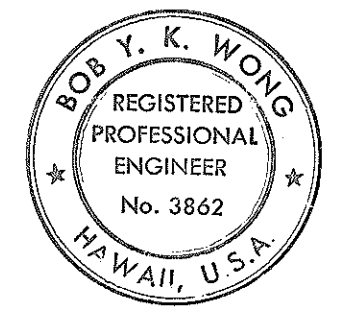
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SURVEY PLOTTED BY
DRAWN BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
ORIGINAL PLAN
NOTE BOOK
No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	150	225



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Bob Y. K. Wong



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) 8 (70)

SCALE: NONE DATE: AS NOTED

SHEET NO. 150 OF 33 SHEETS

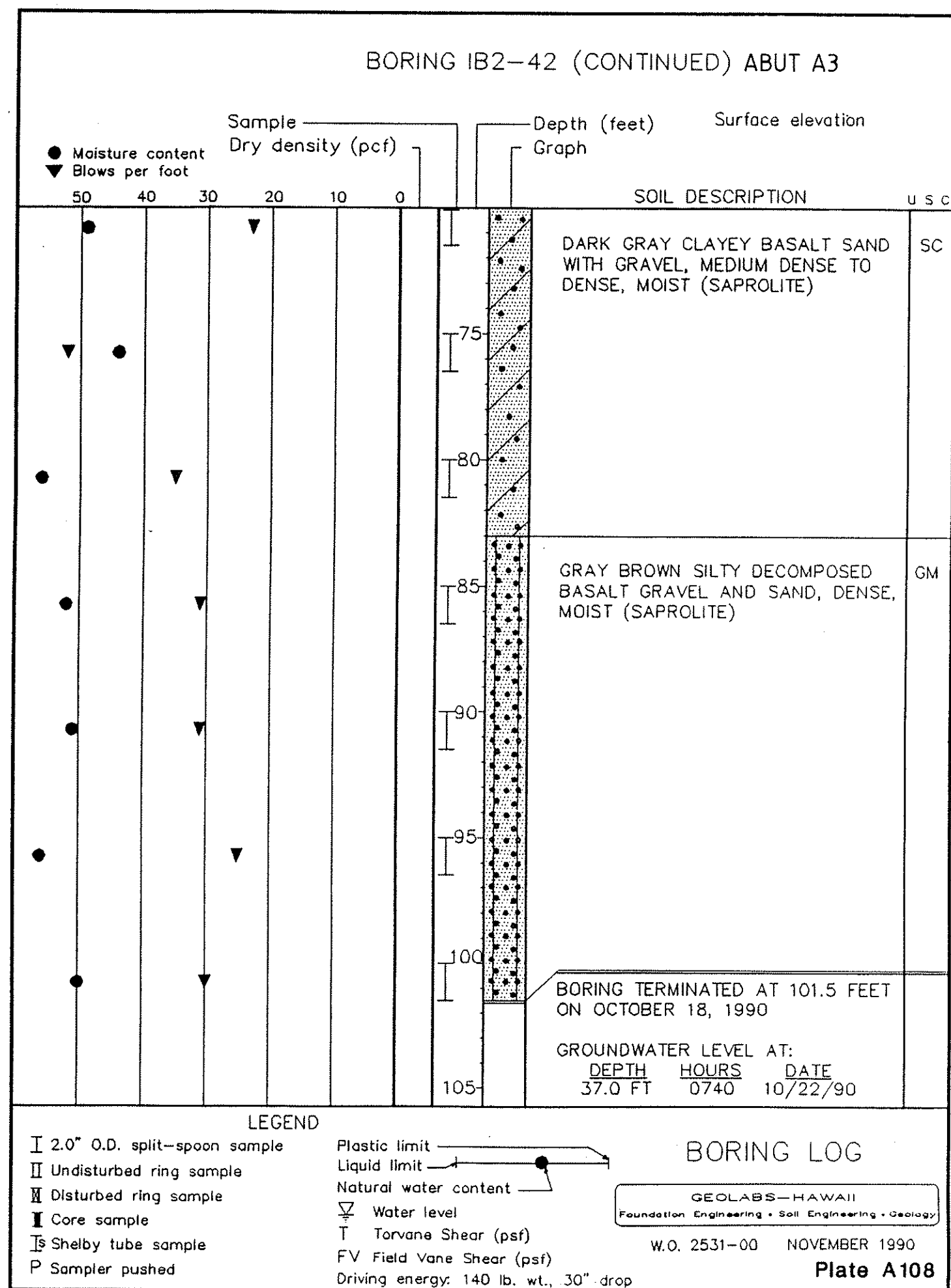
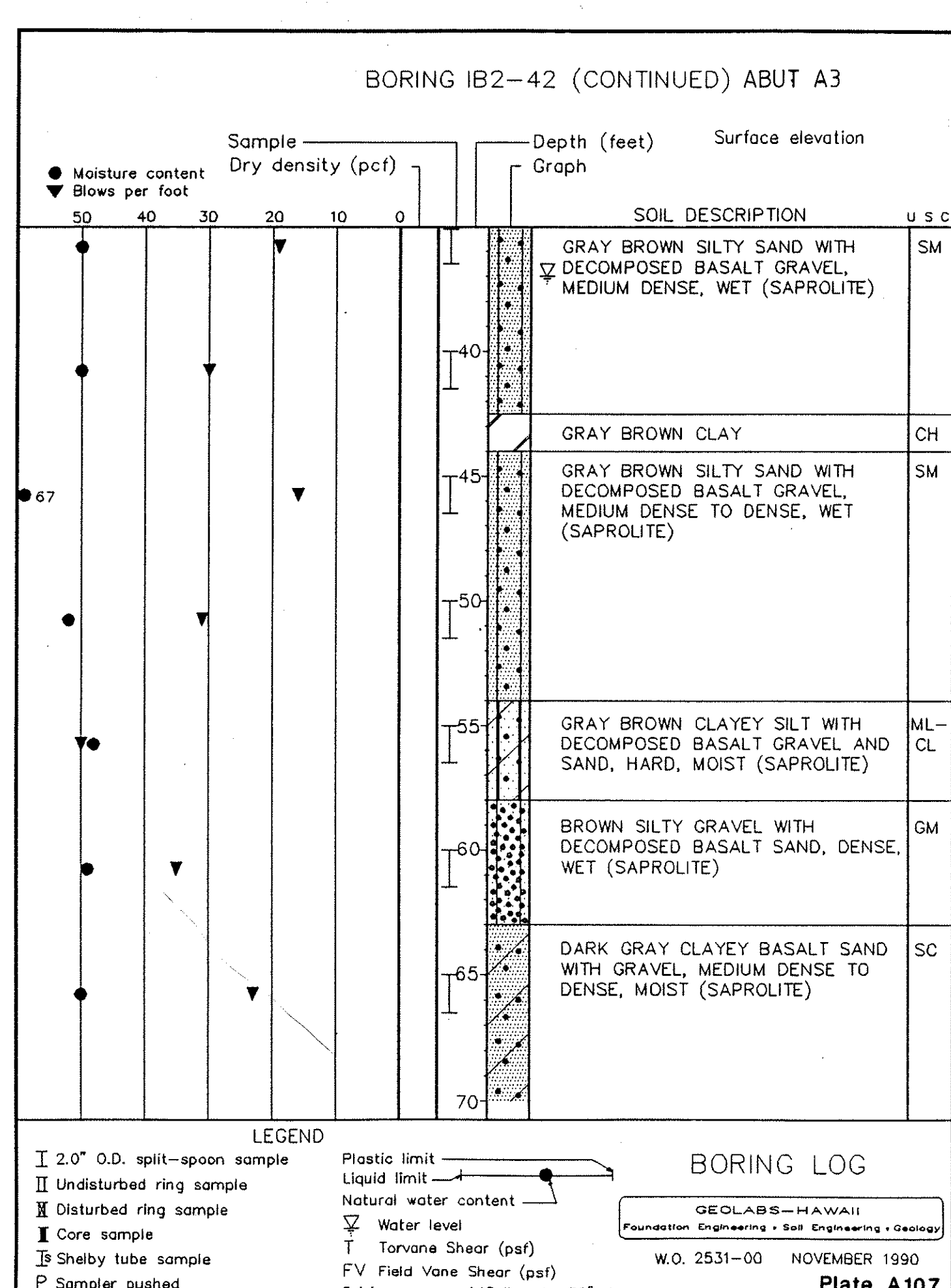
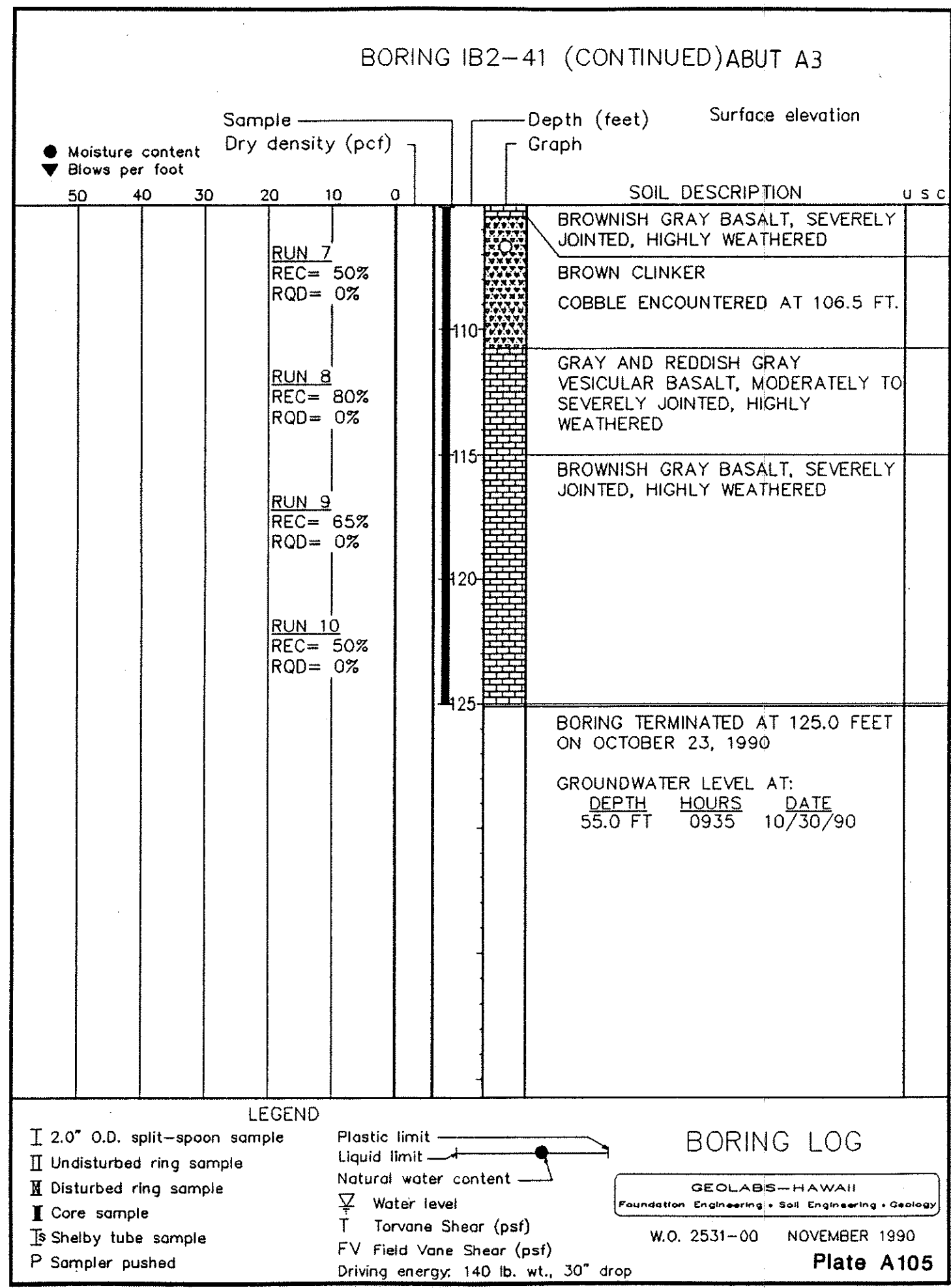
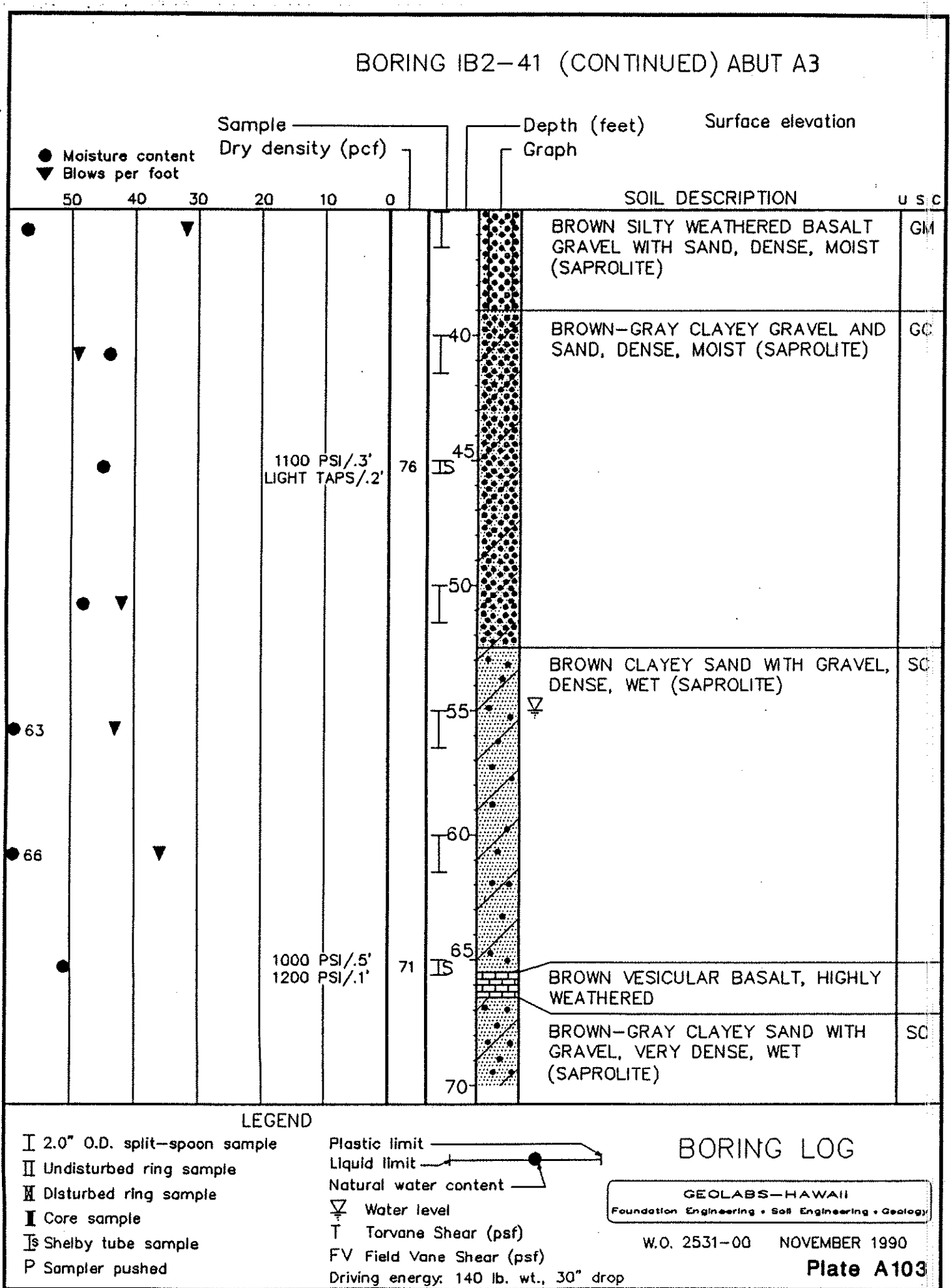
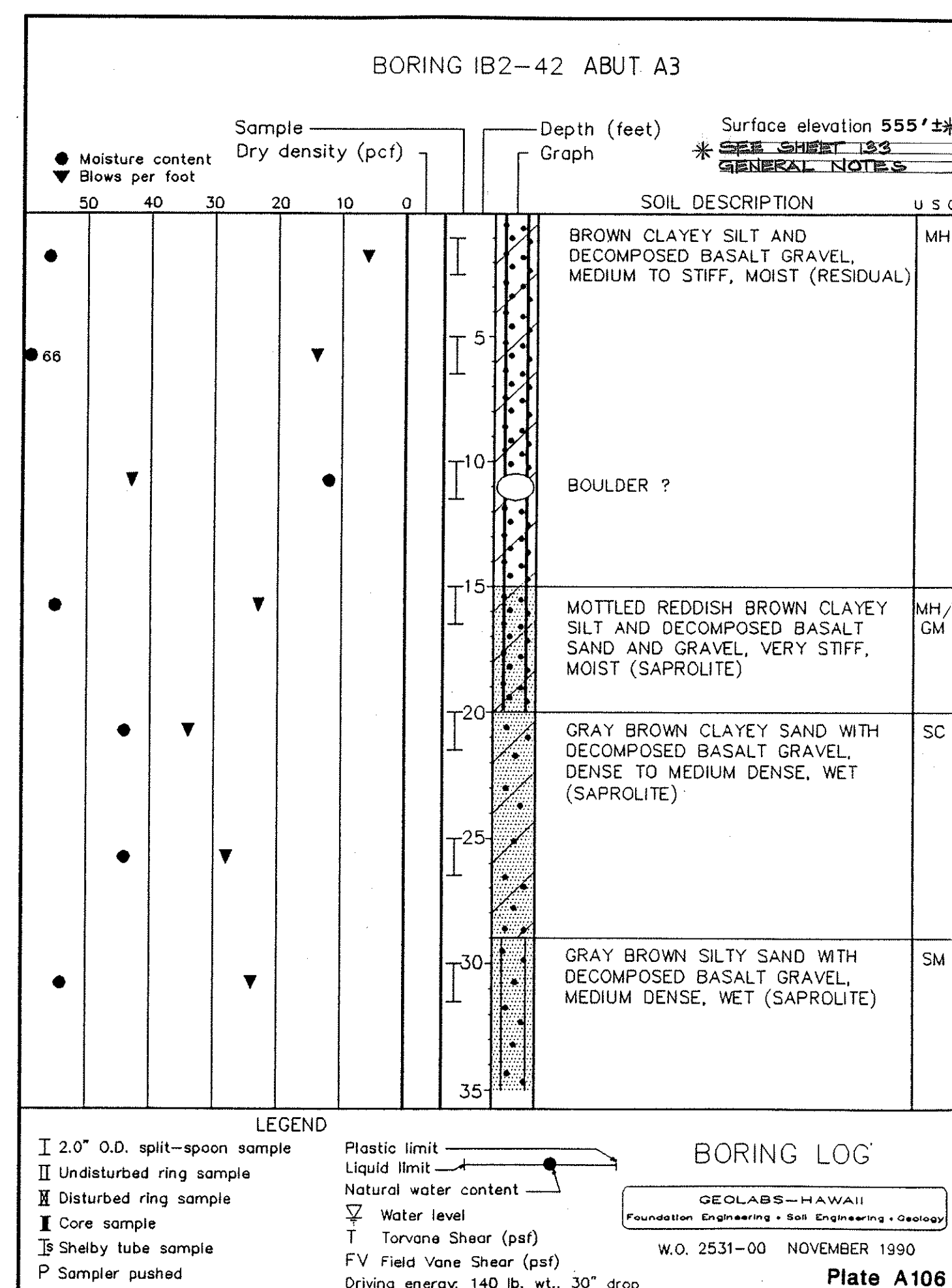
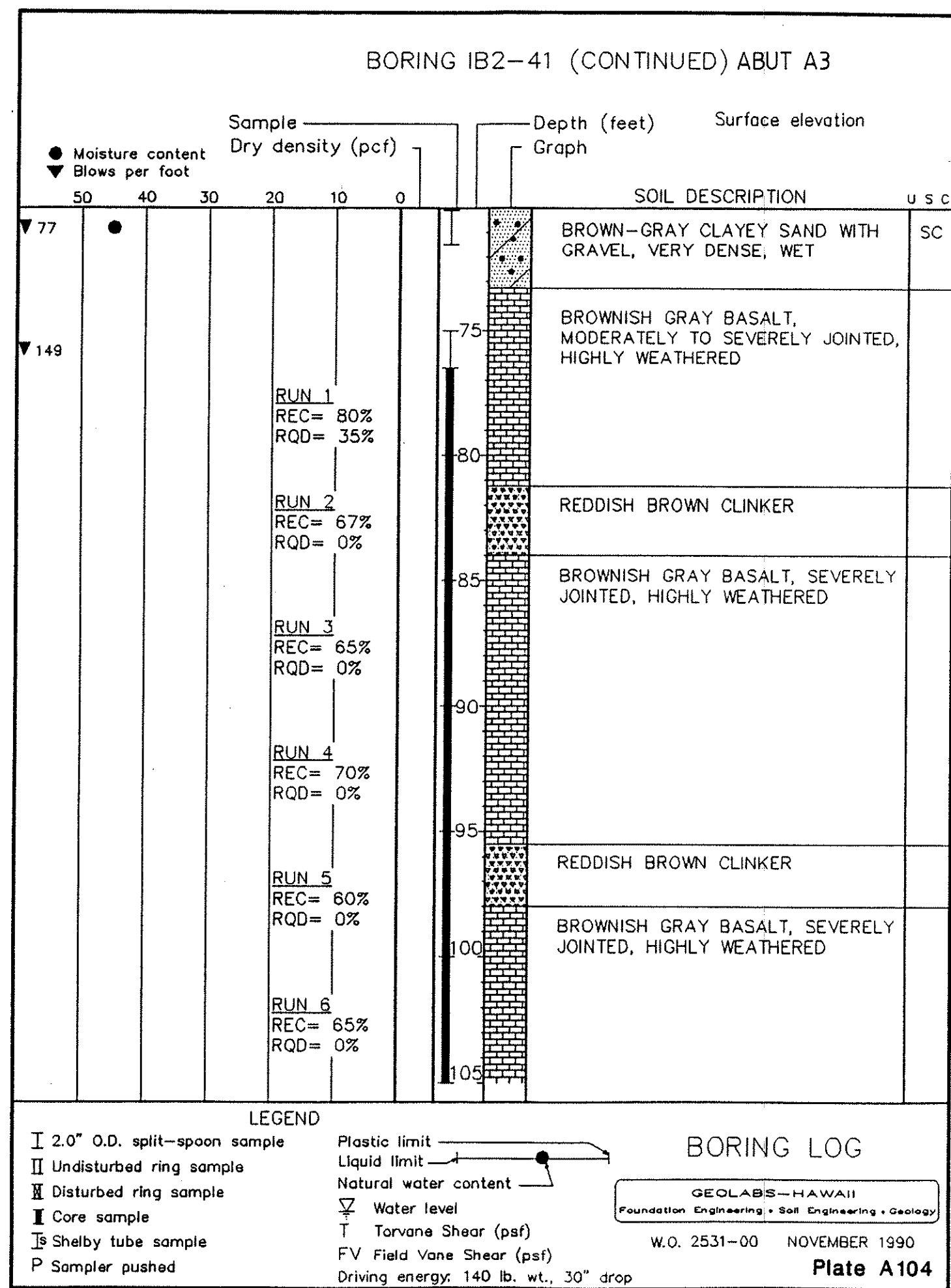
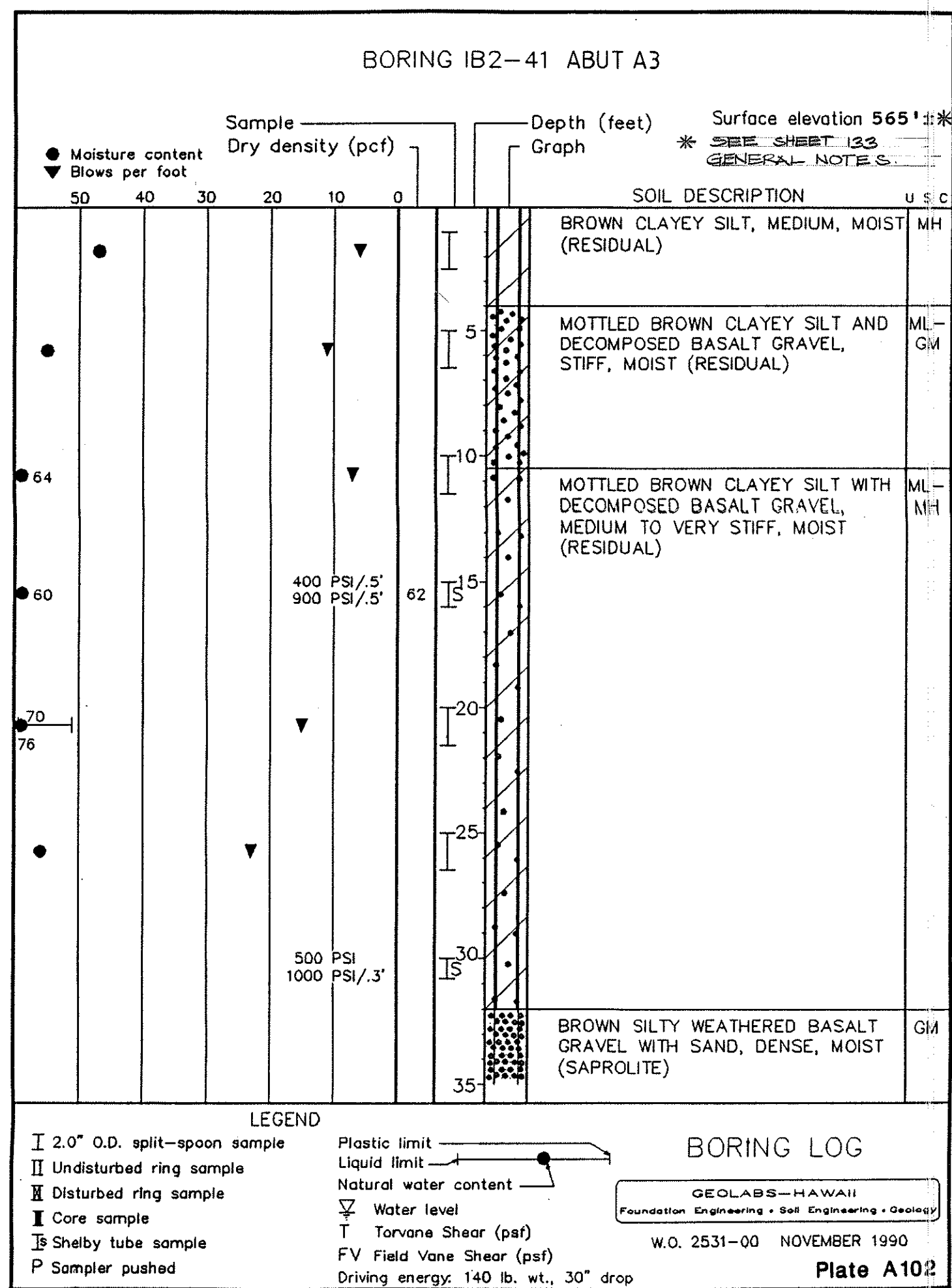
DATE

DESIGNED BY

CHECKED BY

NO.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	19	25



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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

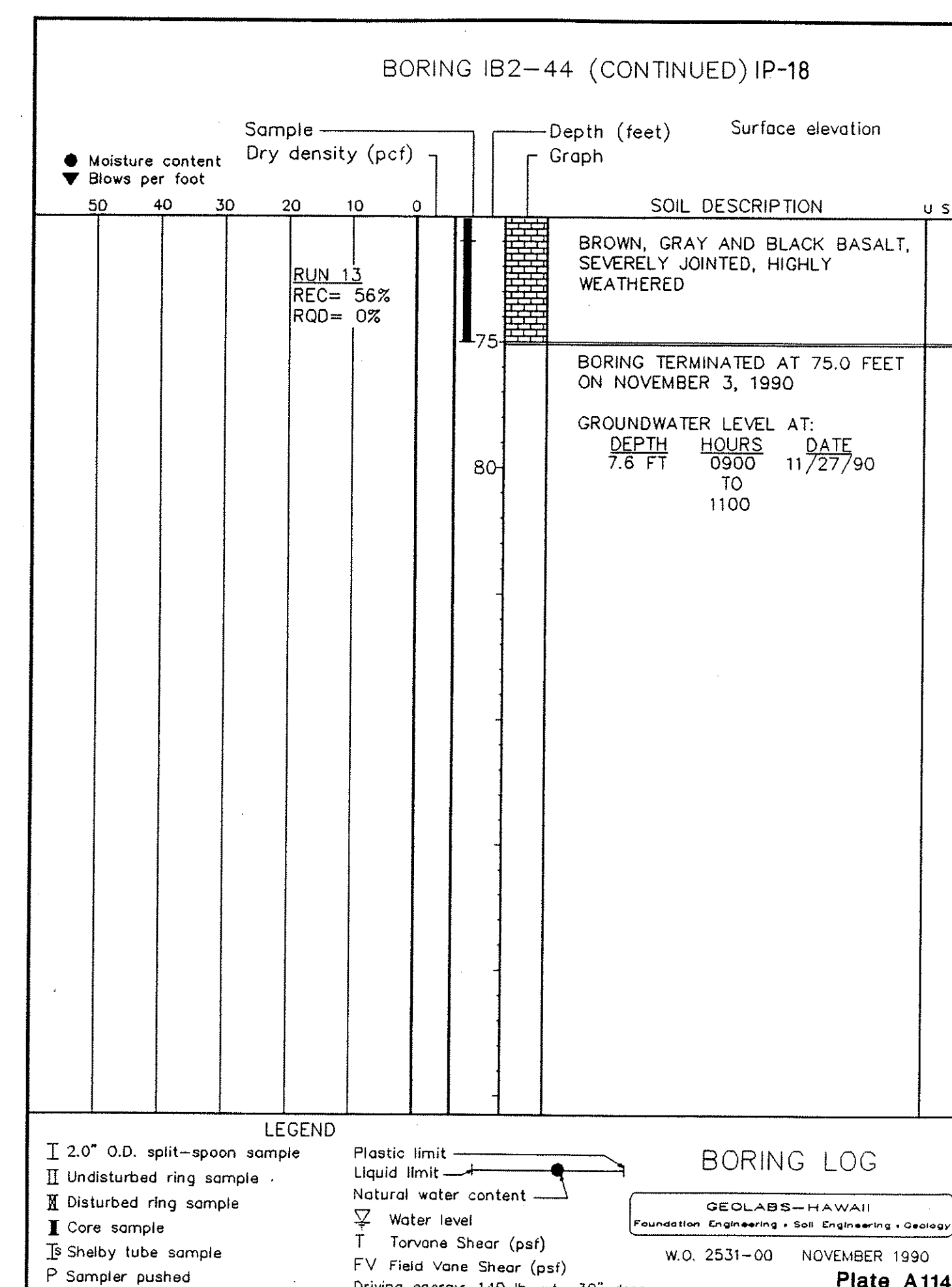
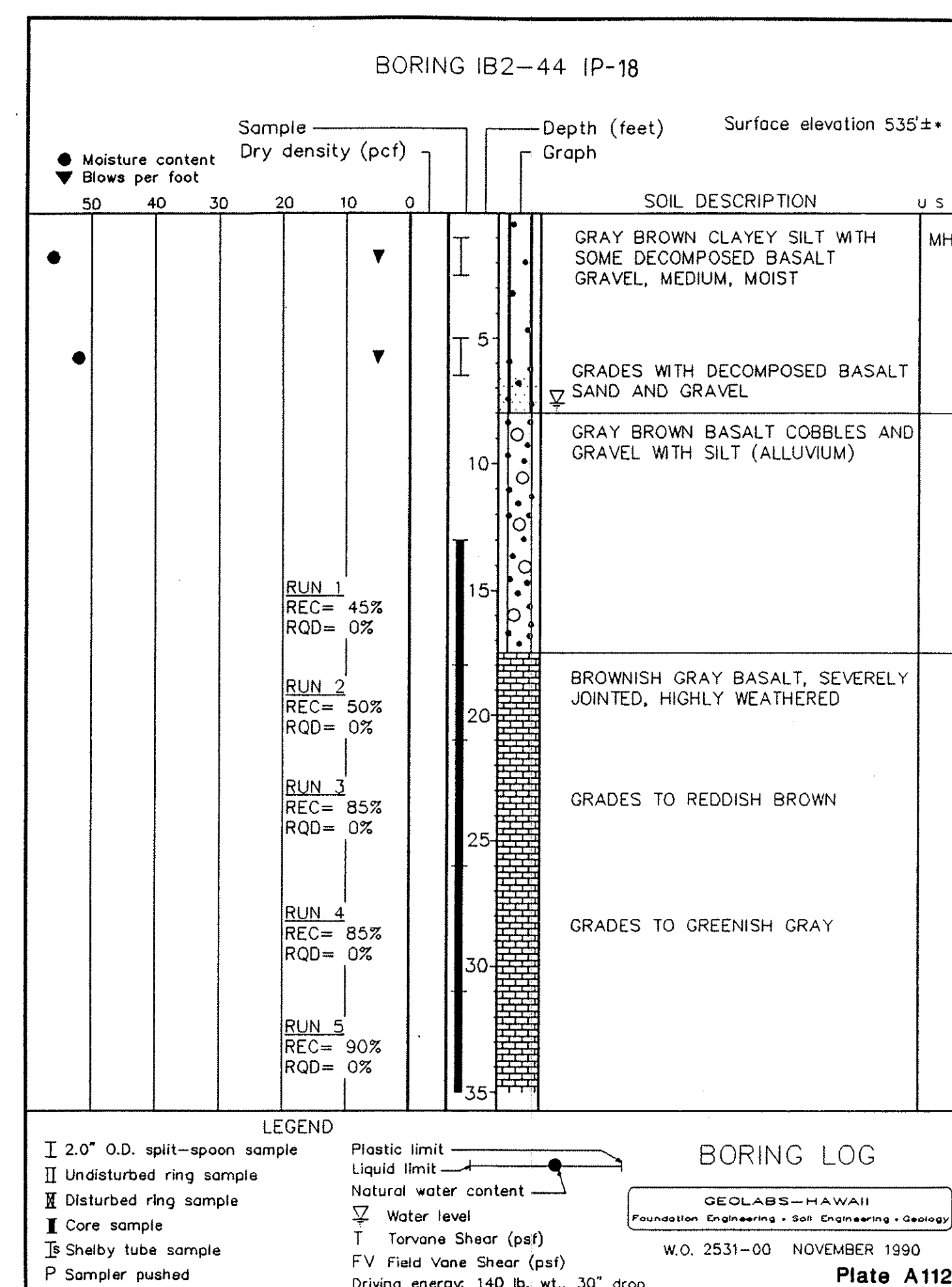
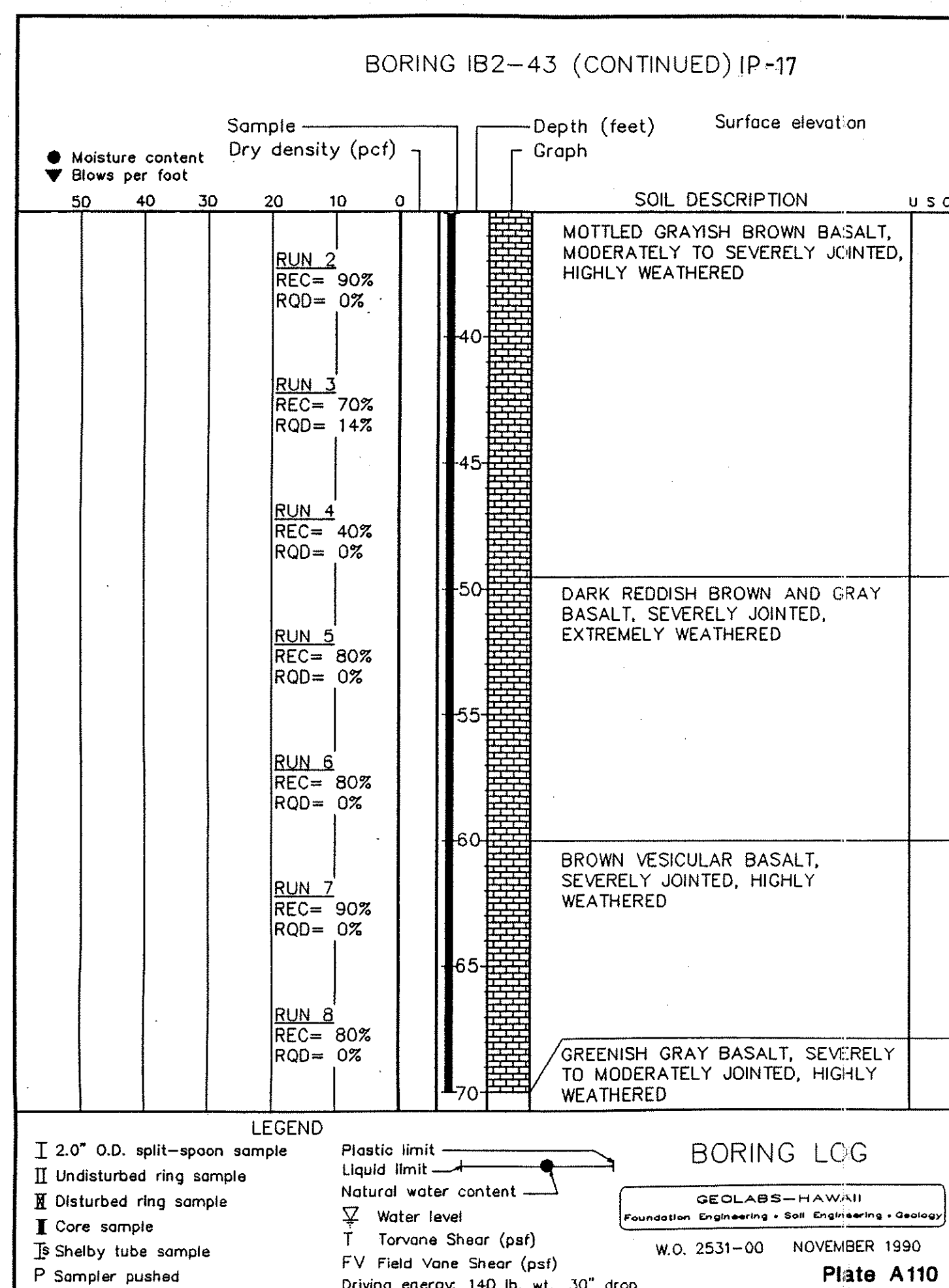
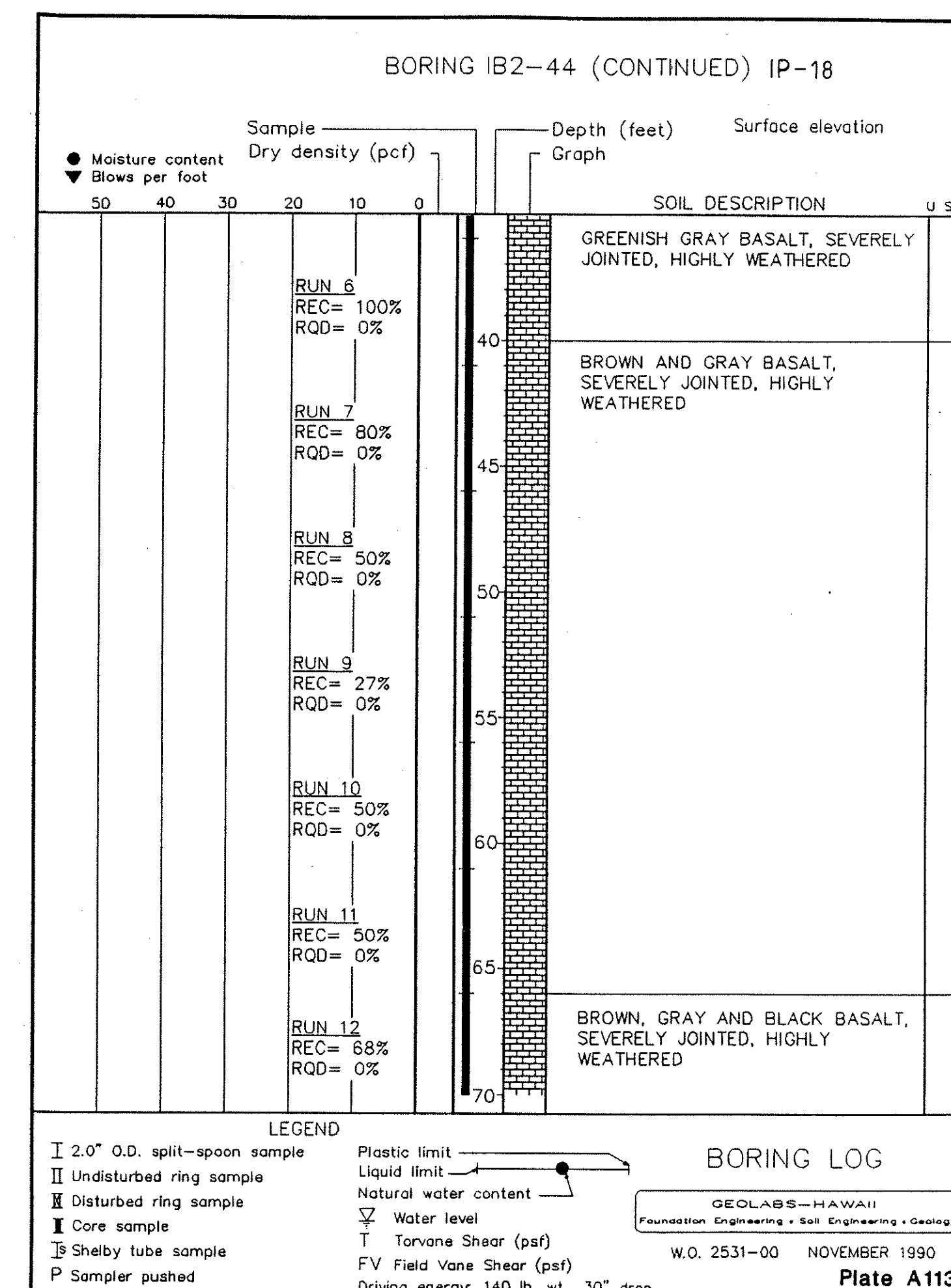
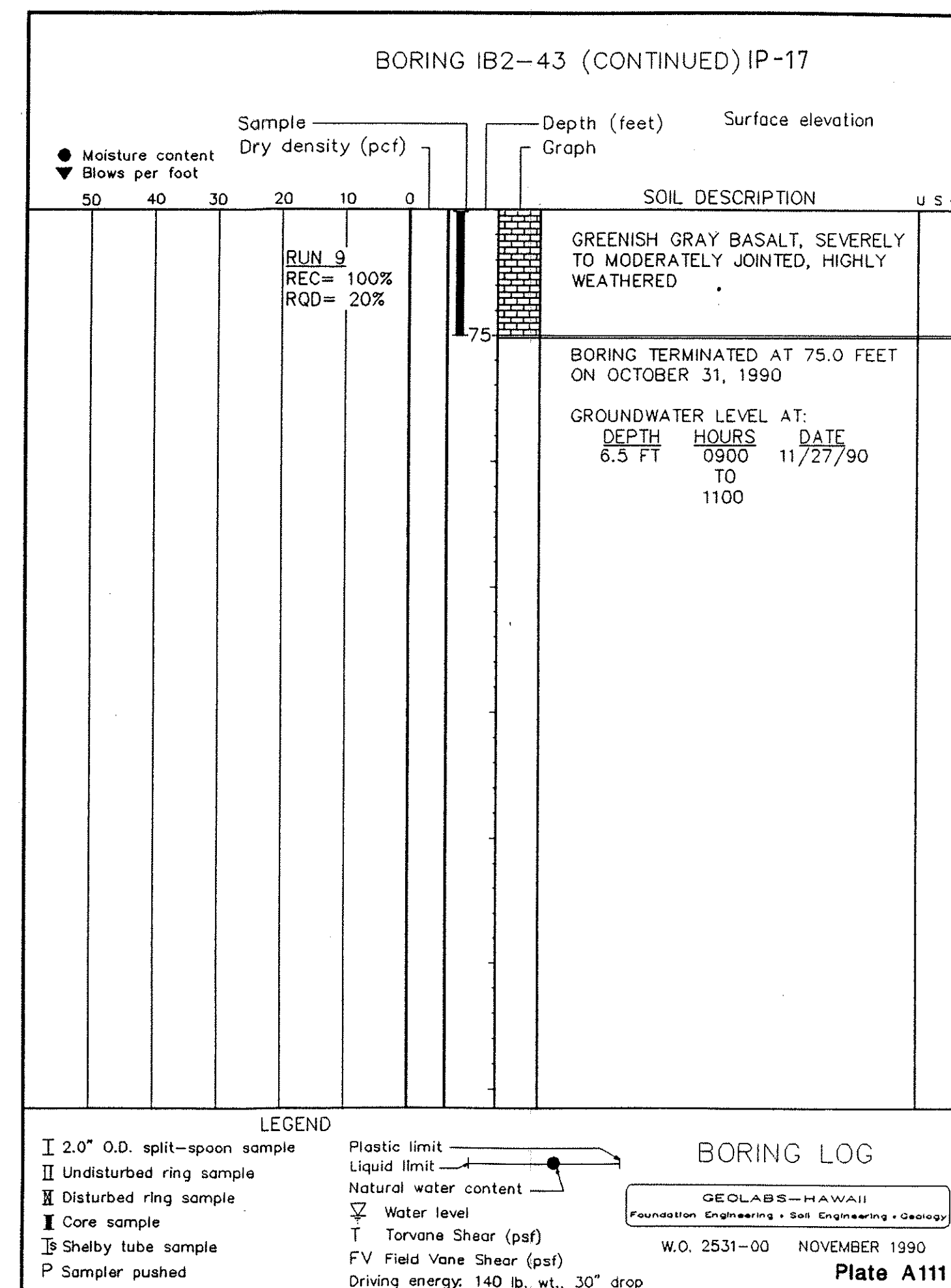
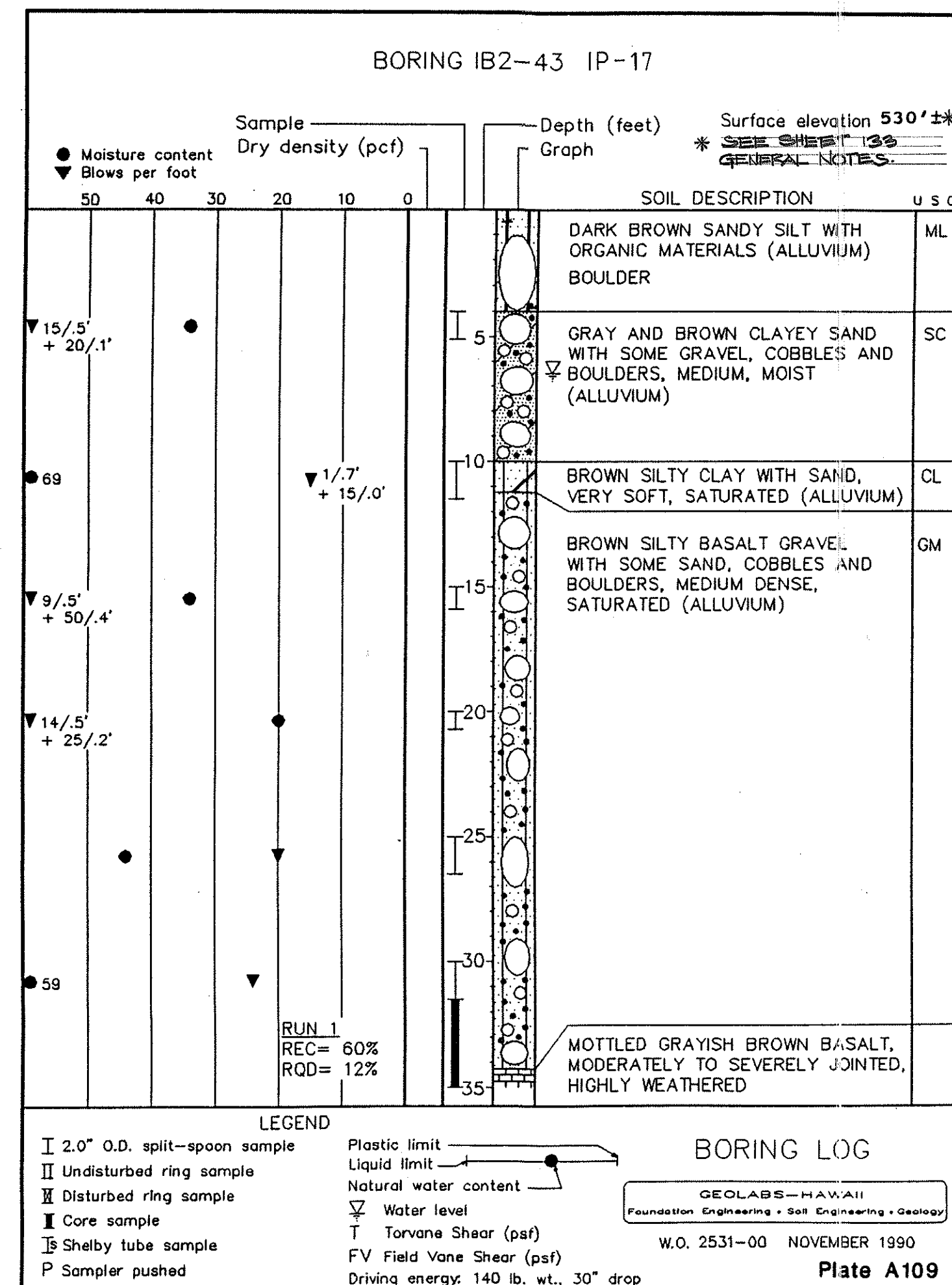
BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE DATE: AS NOTED

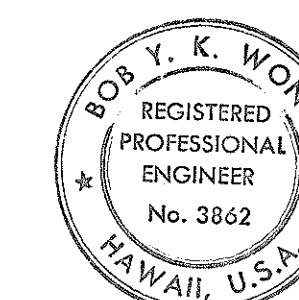
SHEET No. 19 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H3-1(69)	1992	152	325



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. 1-H3-1(69) 8 (70)

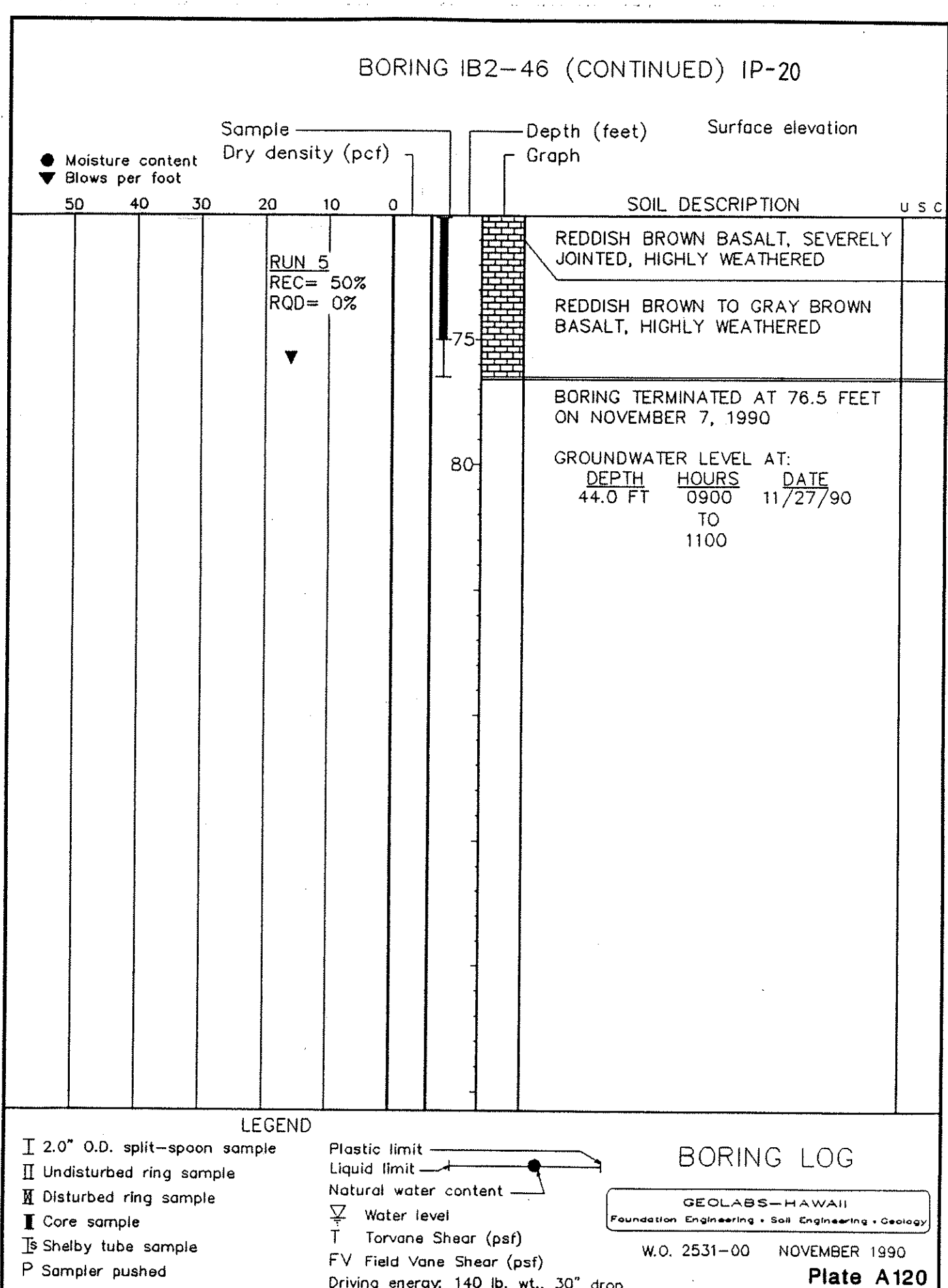
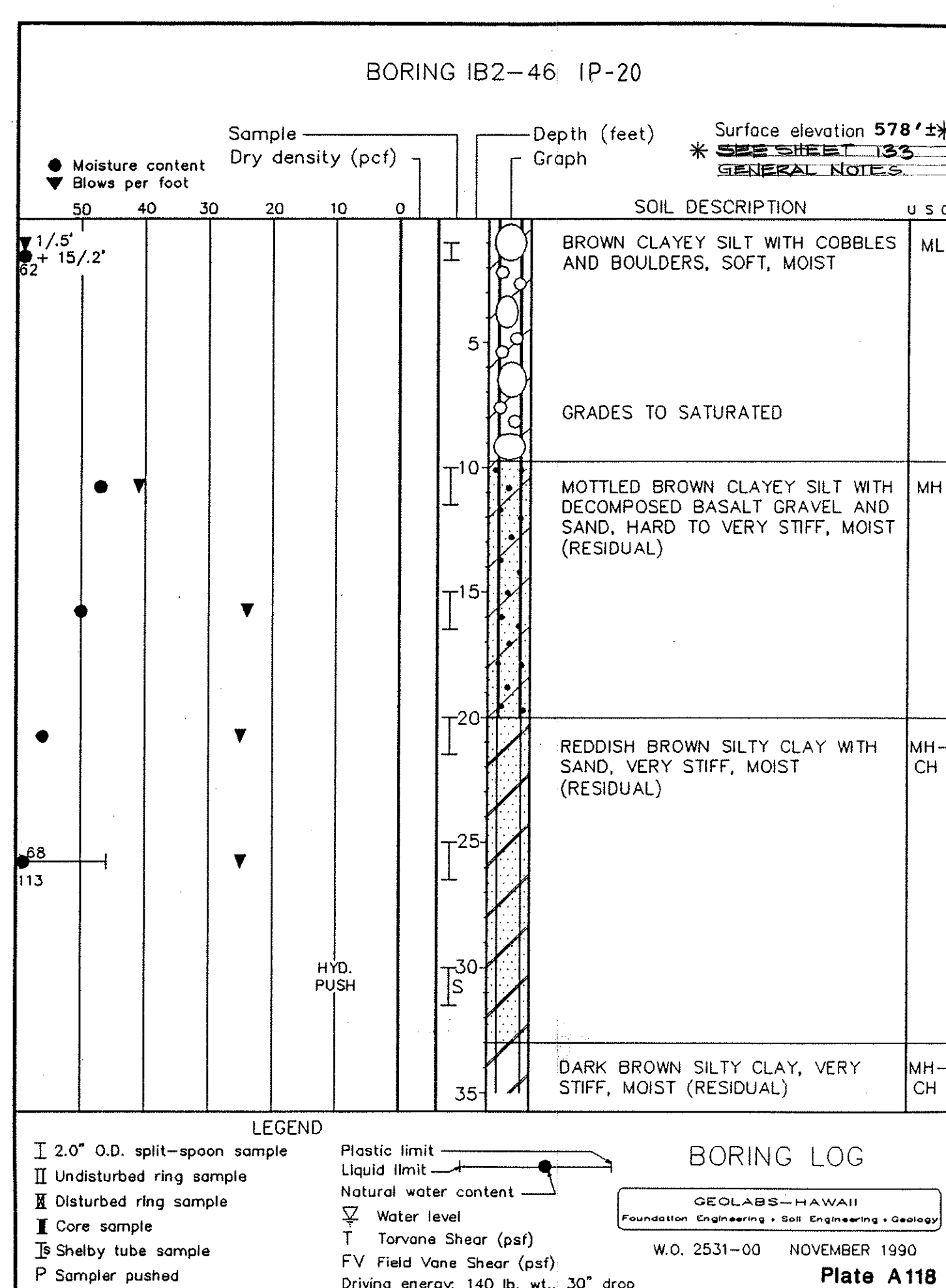
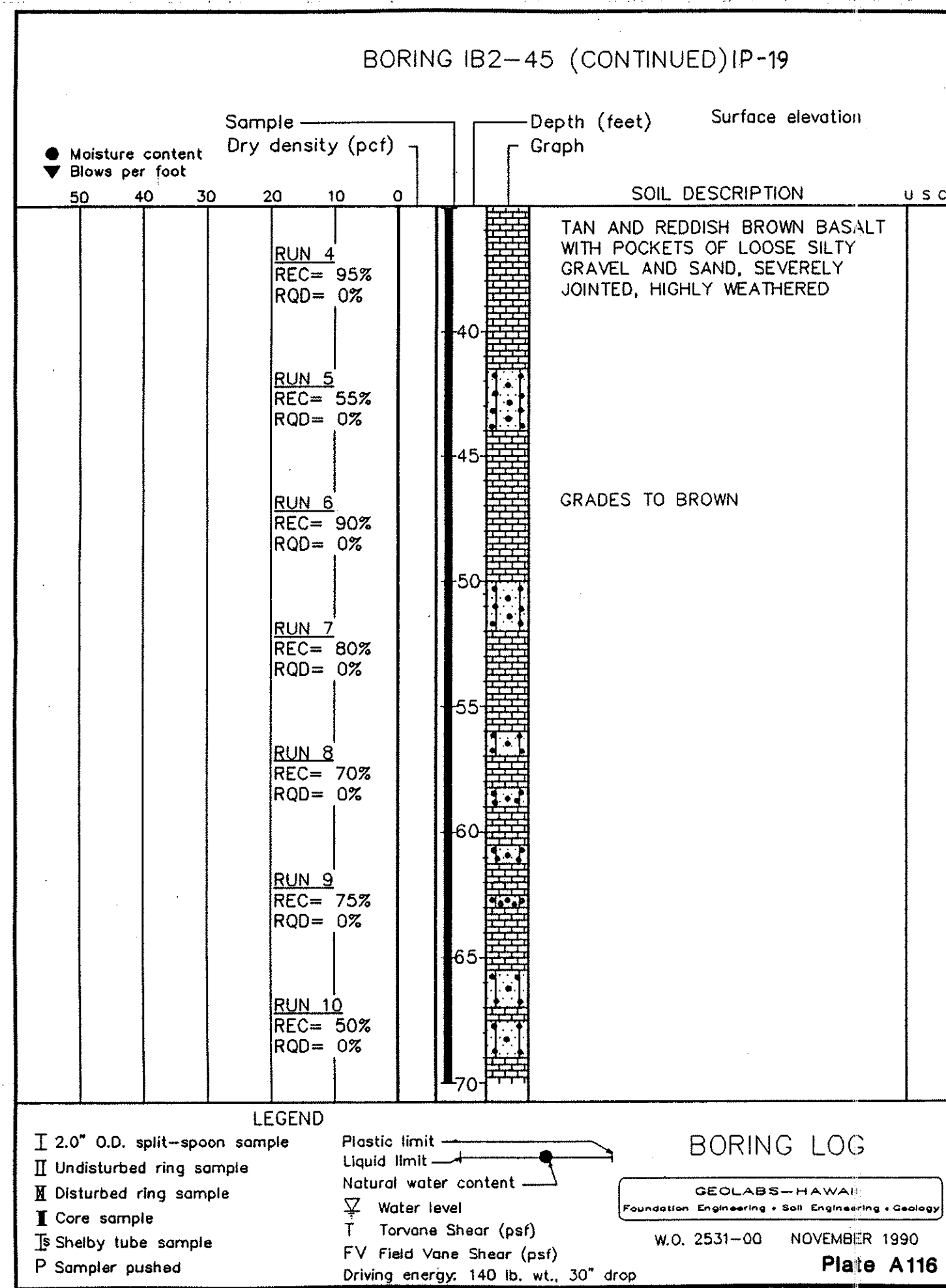
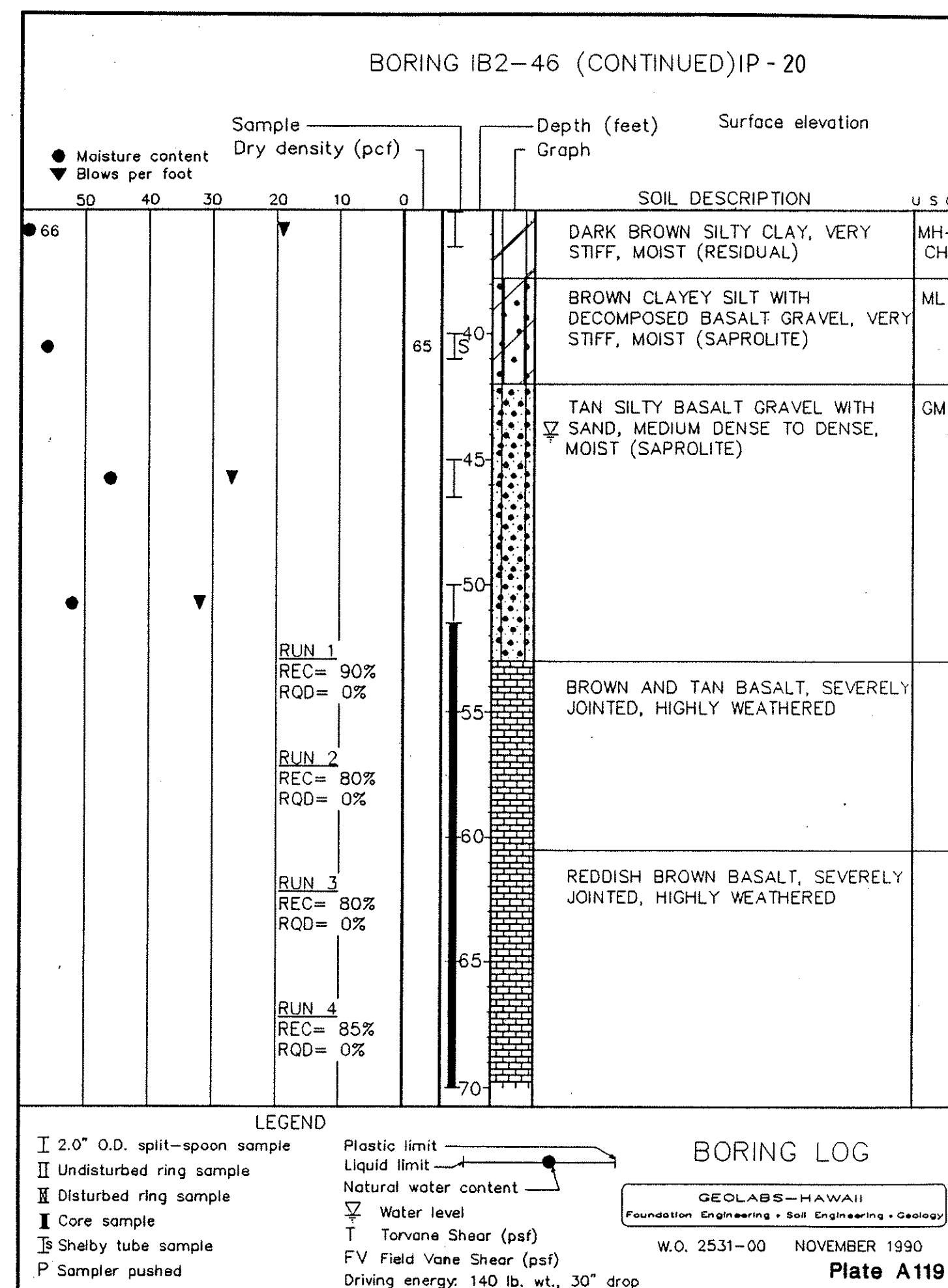
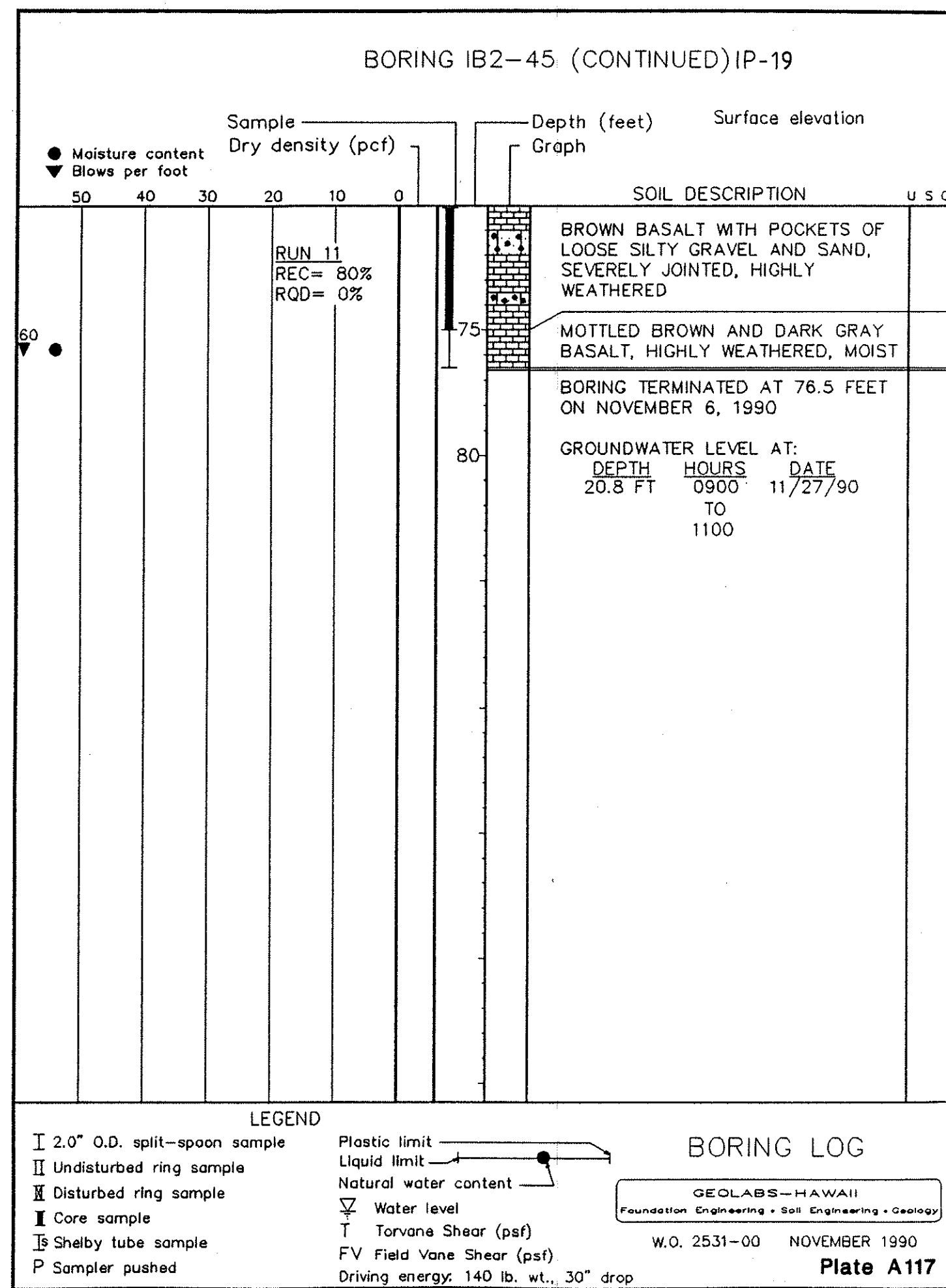
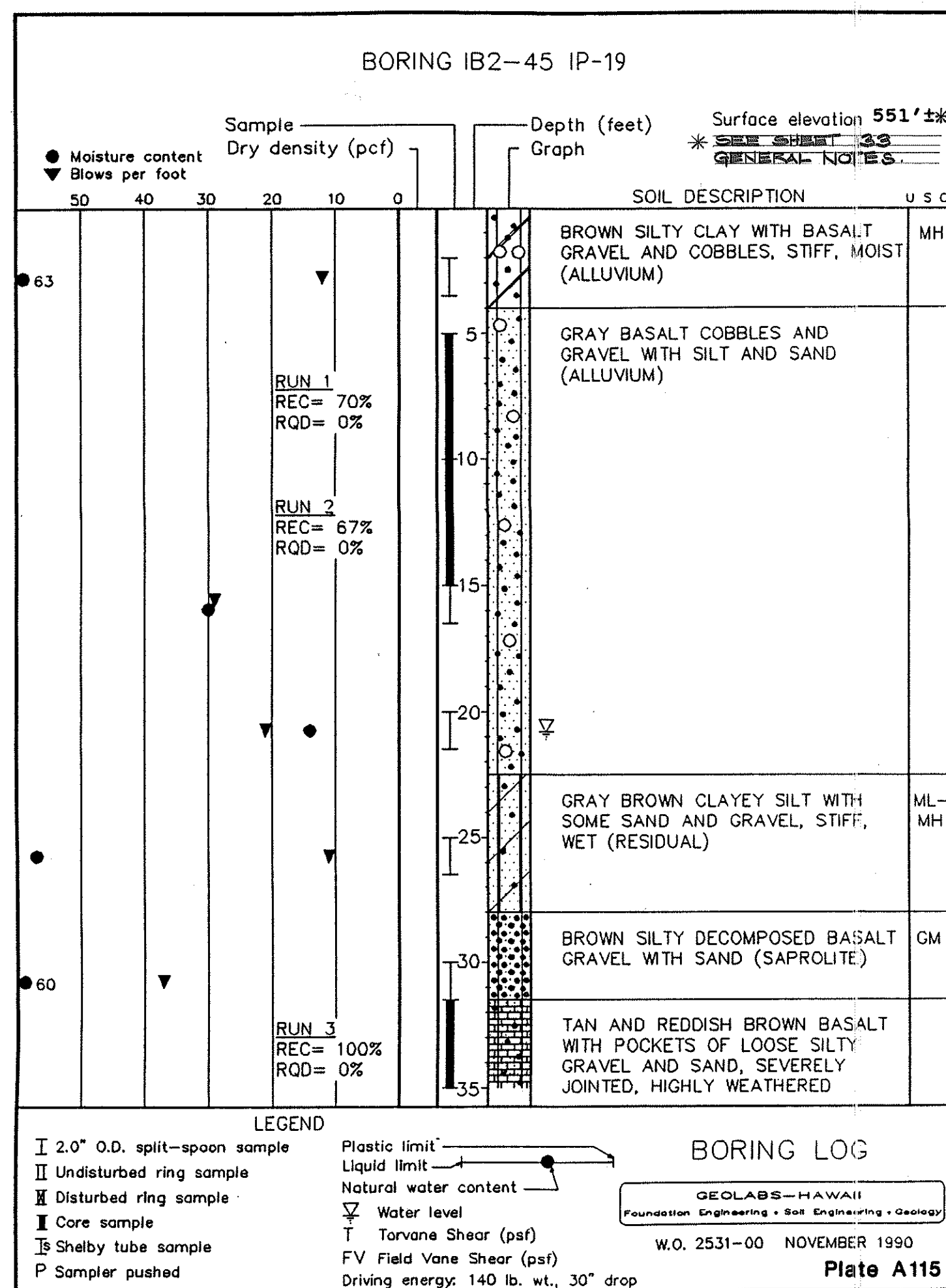
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DATE: AS NOTED

SHEET No. 31 OF 33 SHEETS

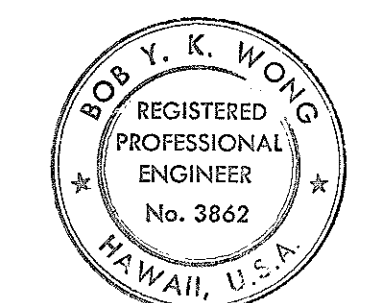
ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____
	DRAWN BY _____
	TRACED BY _____
	DESIGNED BY _____
	QUANTITIES BY _____
	CHECKED BY _____
No. _____	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H3-1(69)	1992	109	325



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

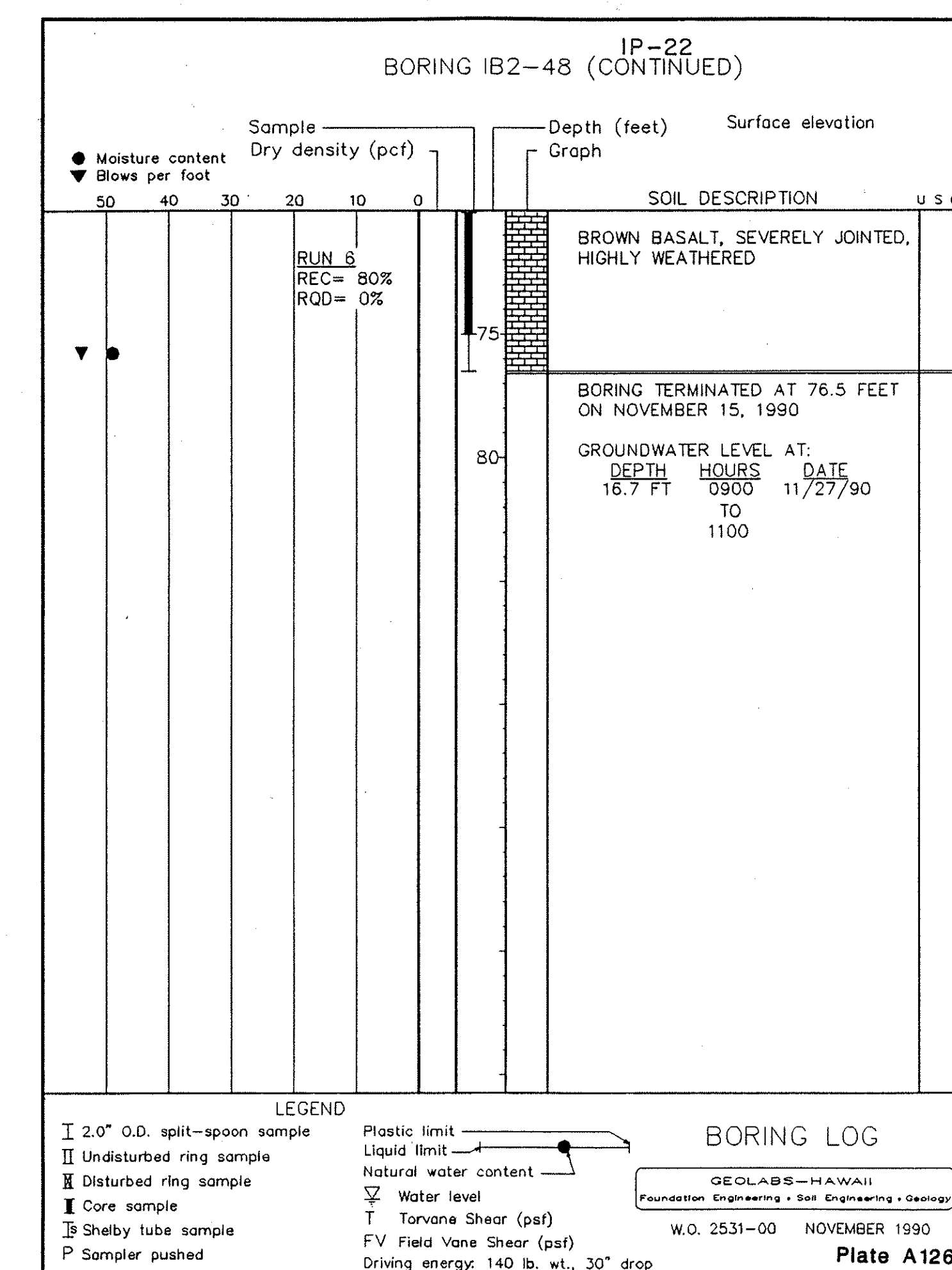
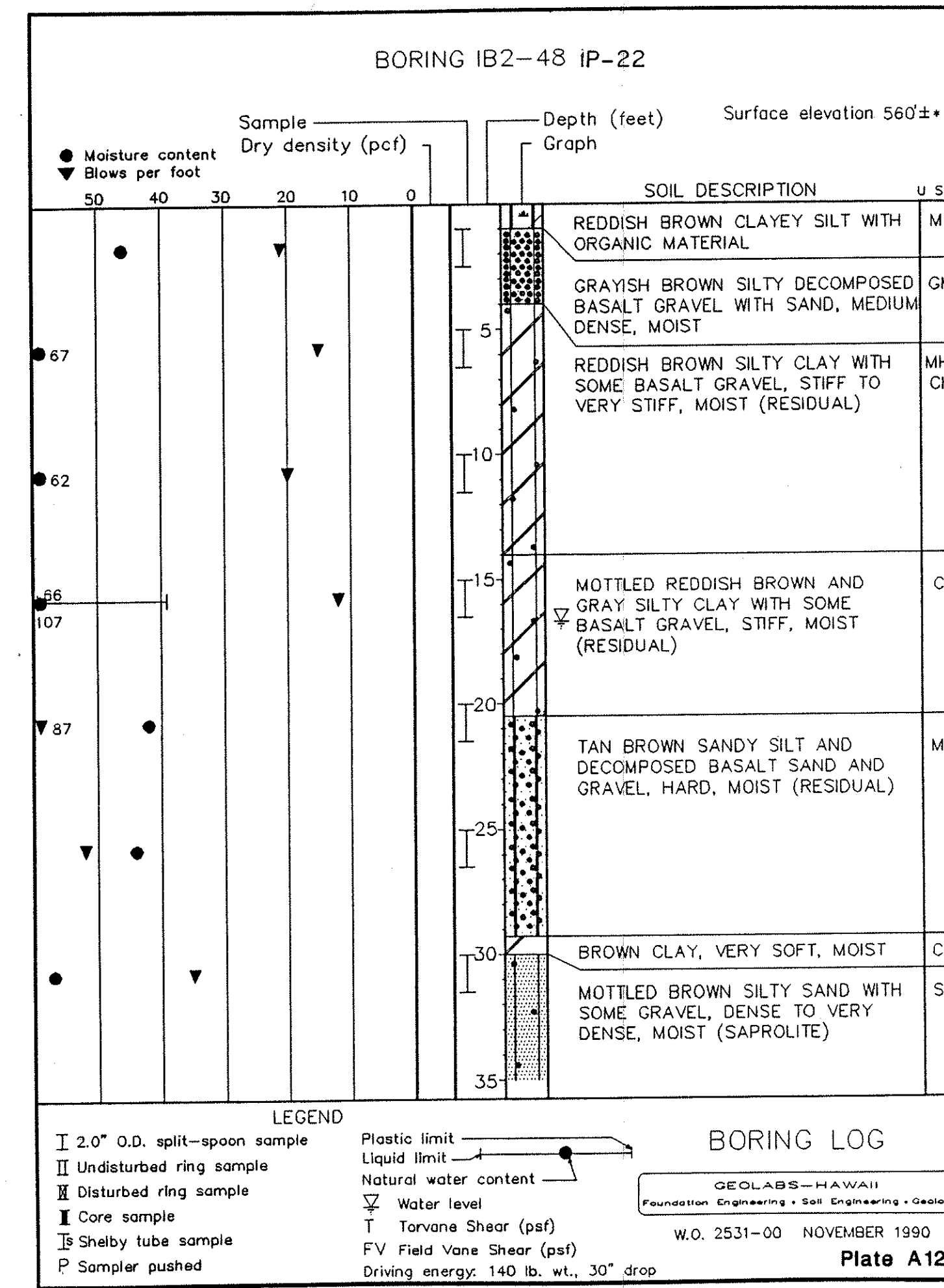
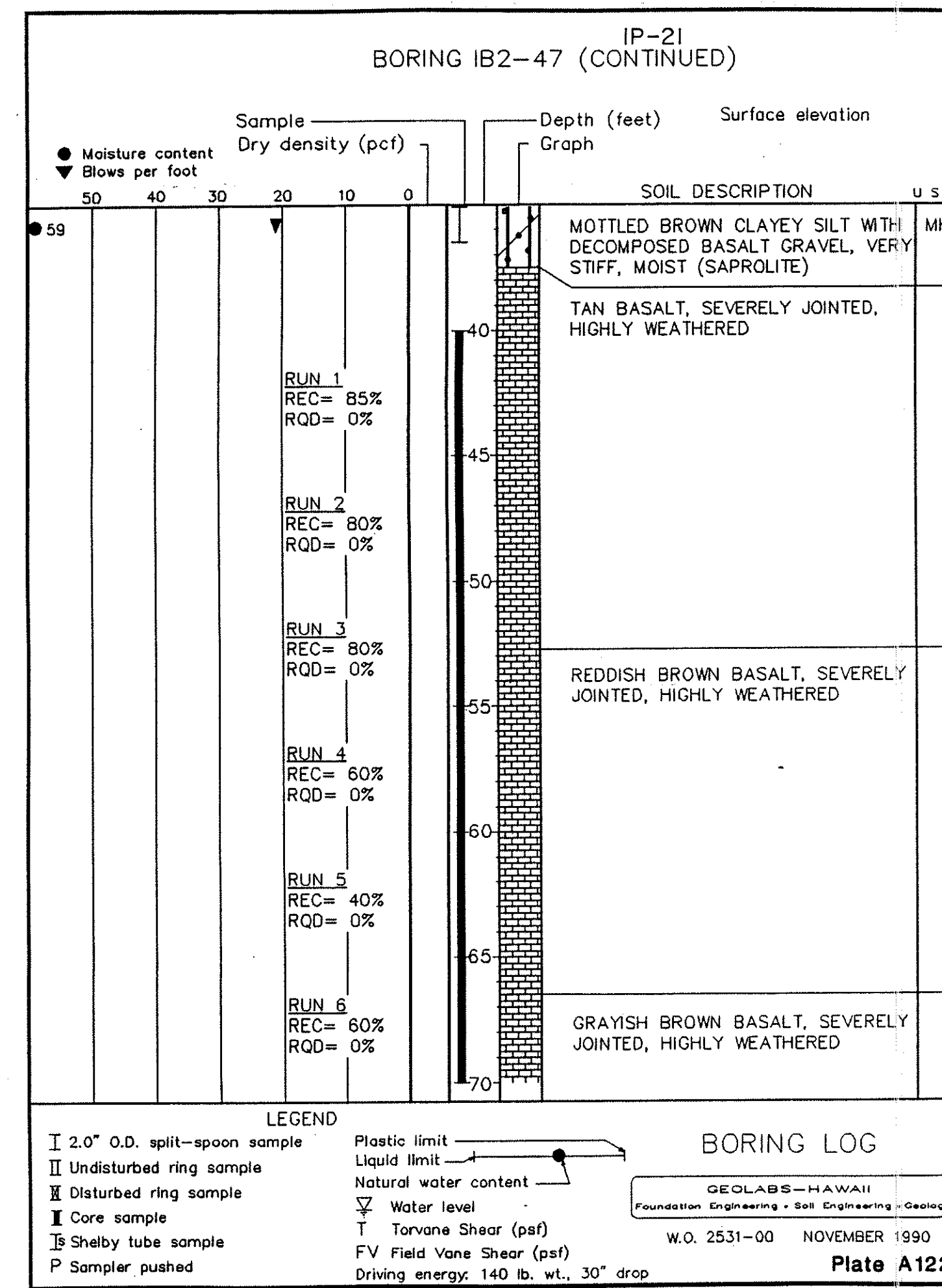
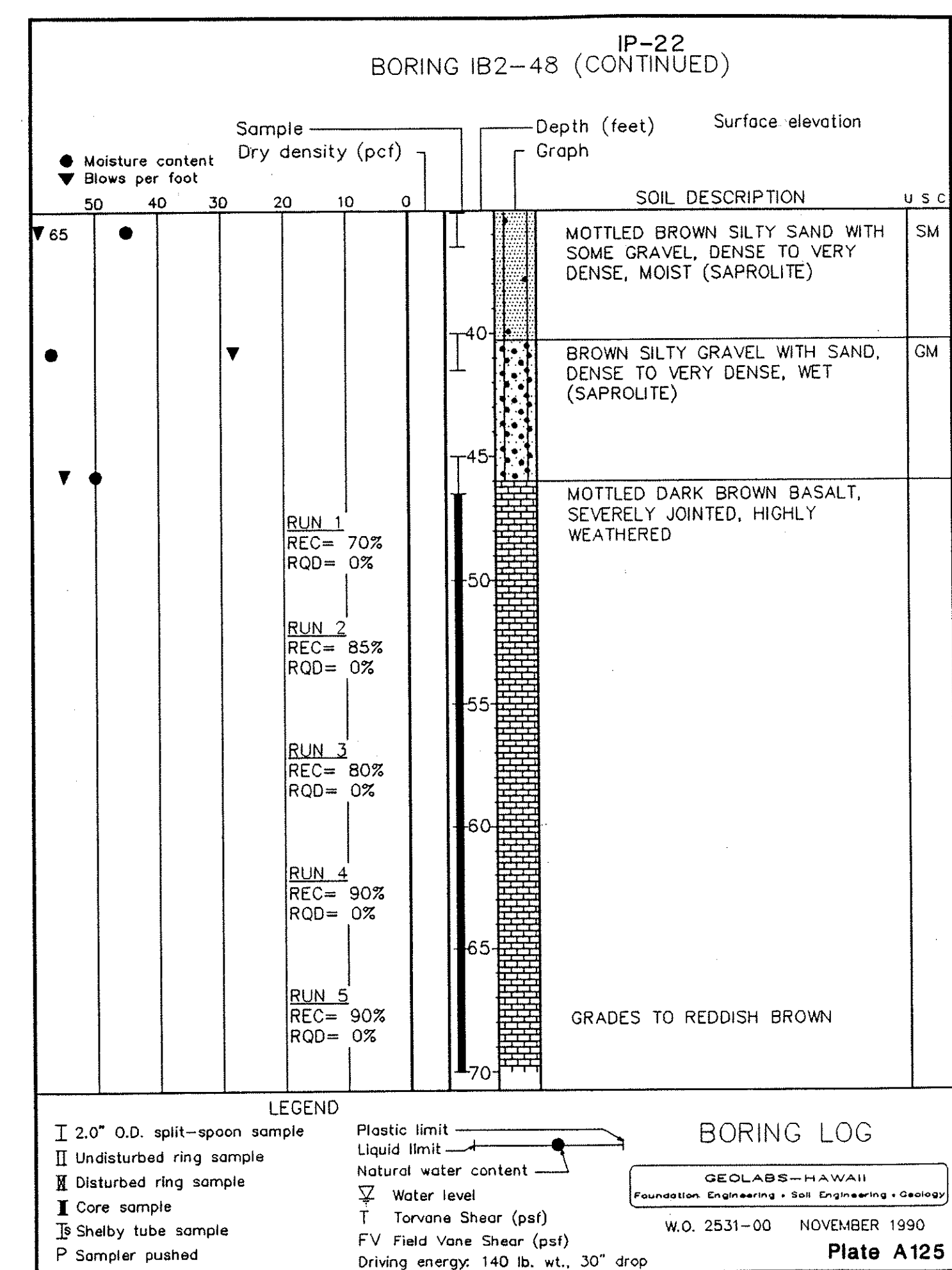
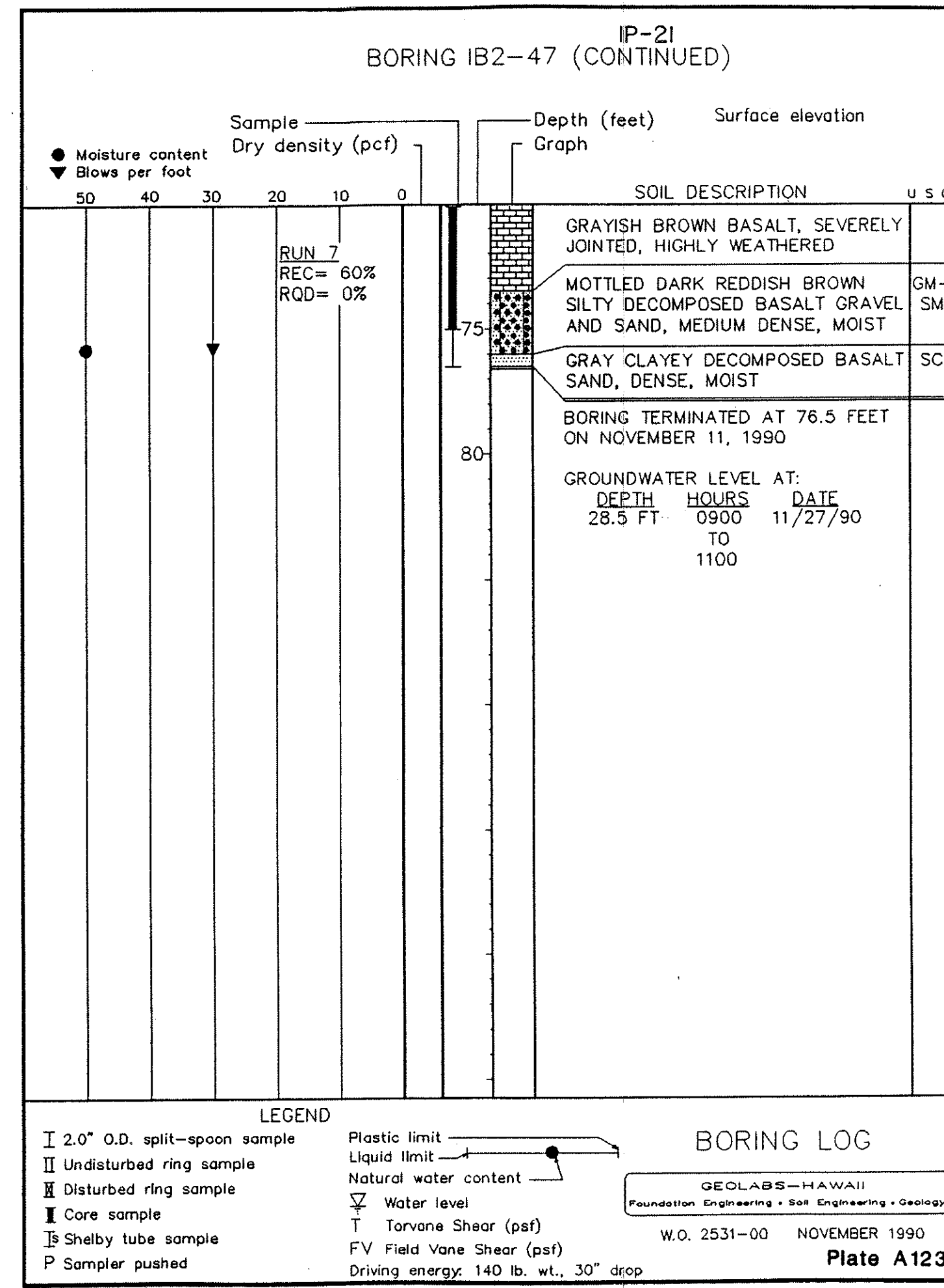
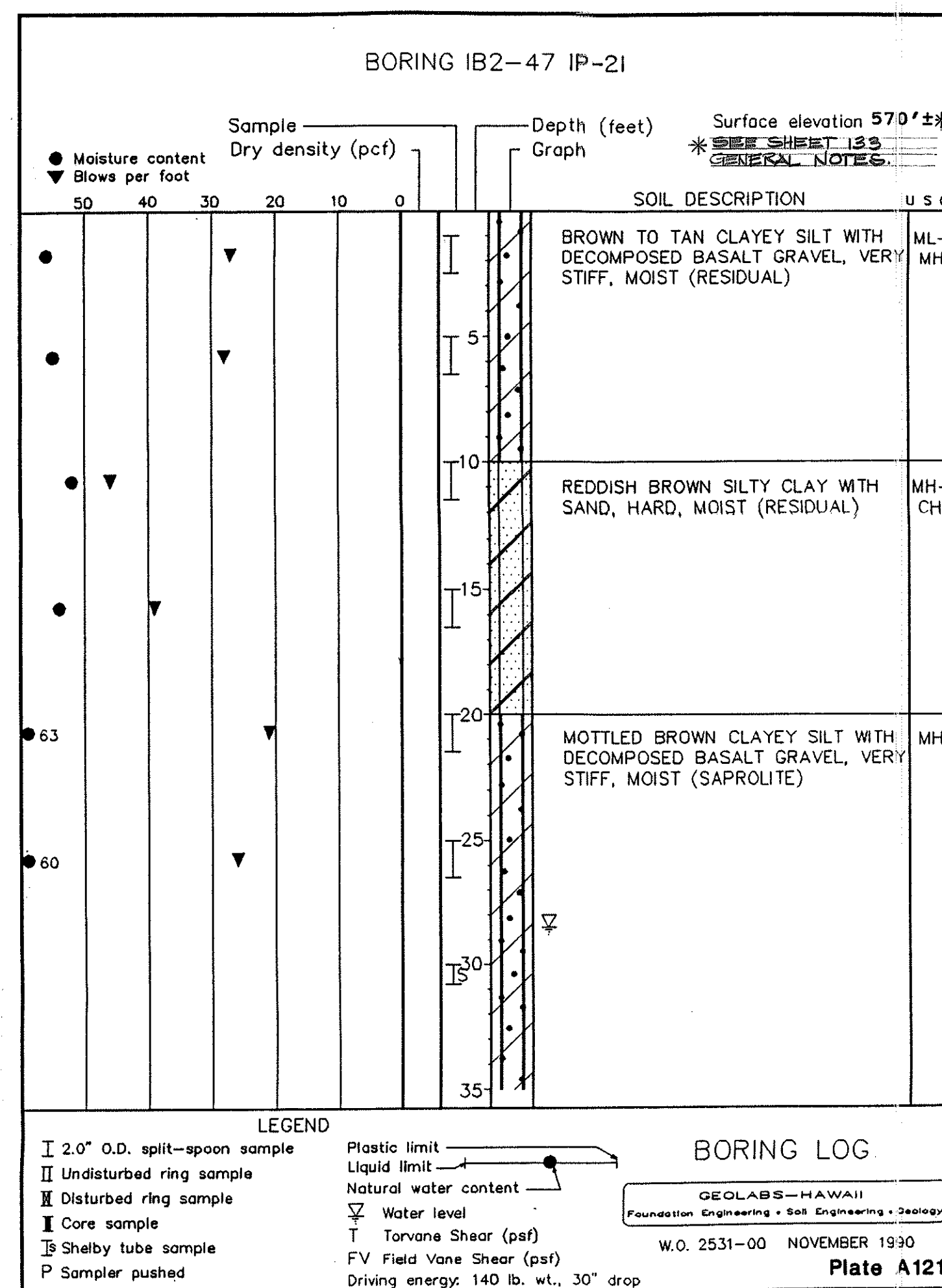
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. 1-H3-1(69) & (70)

SCALE: NONE

DATE: AS NOTED

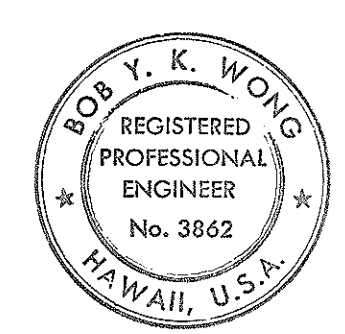
SHEET NO. 109 OF 325 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	154	325



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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE DATE: AS NOTED

SHEET NO. 154 OF 33 SHEETS

DATE

SURVEY PLOTTED BY

DRAWN BY

DESIGNED BY

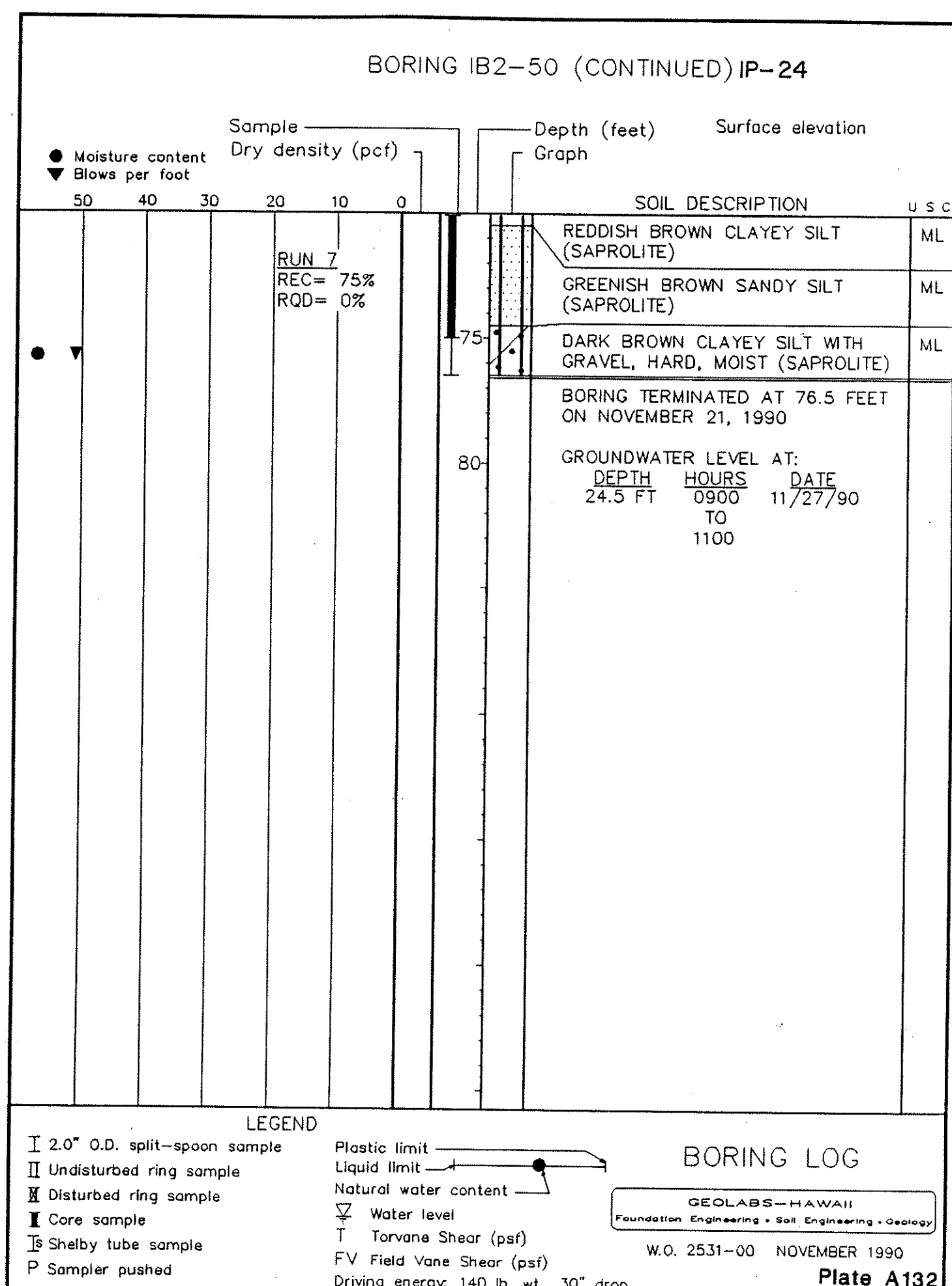
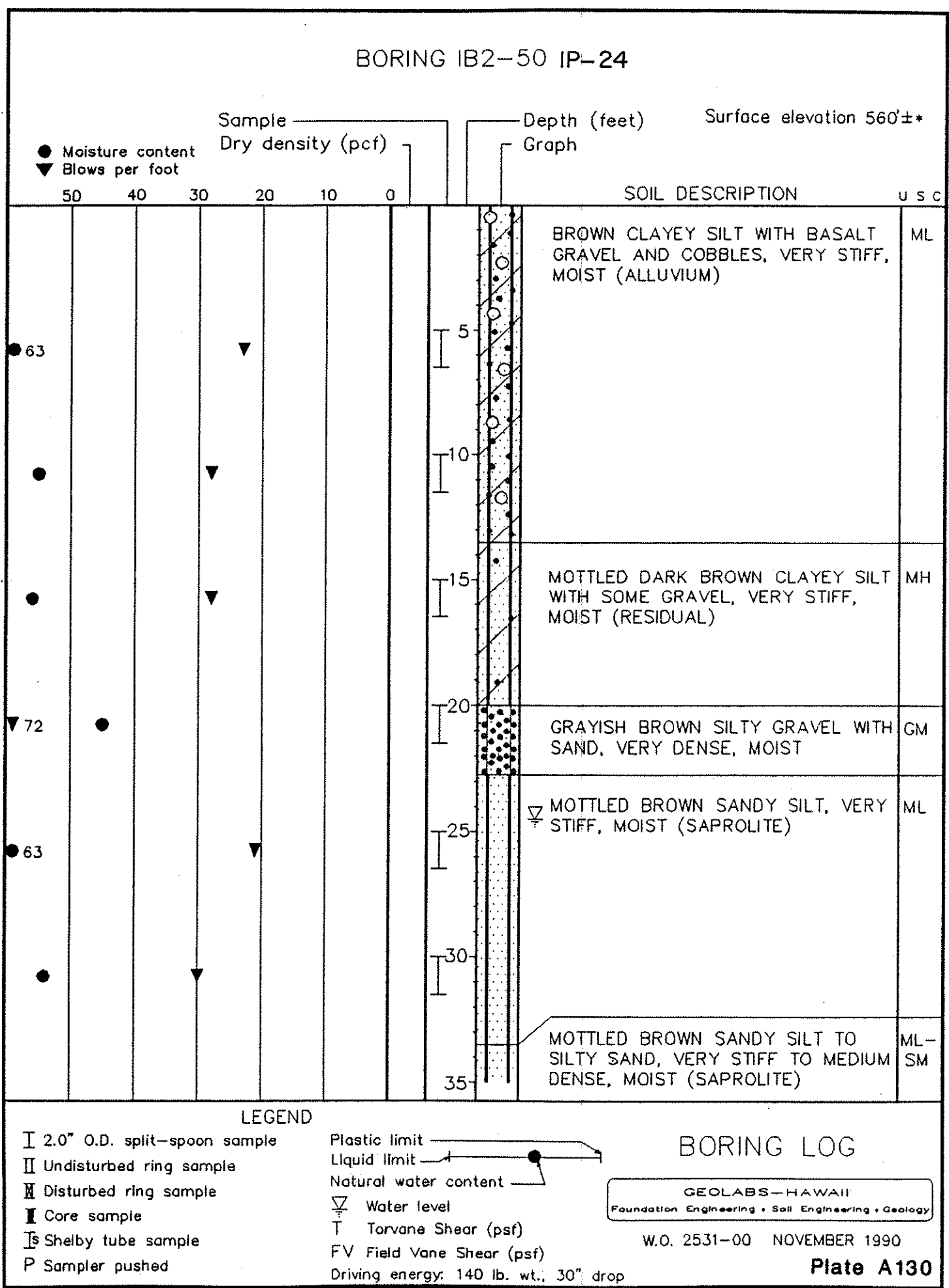
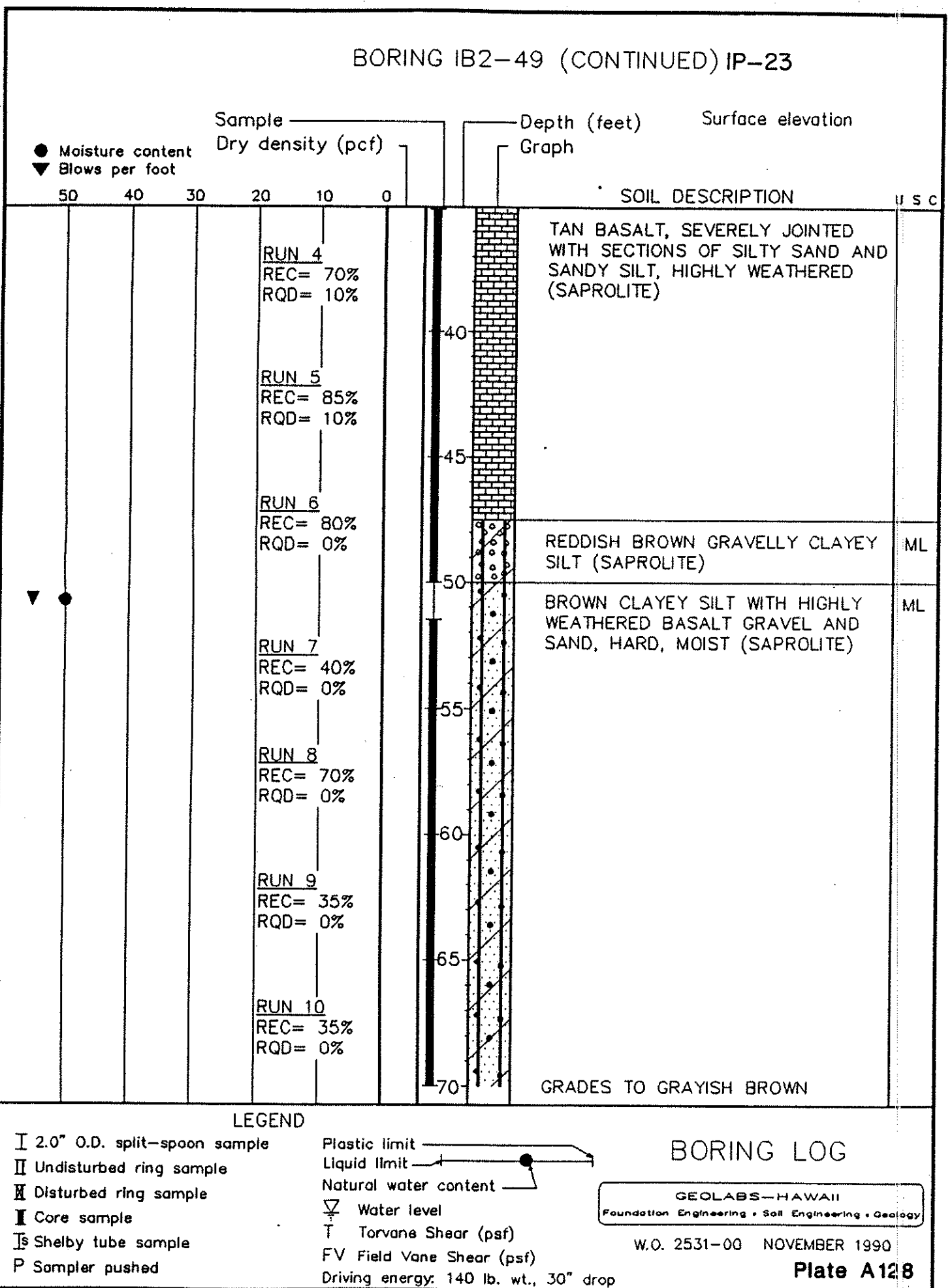
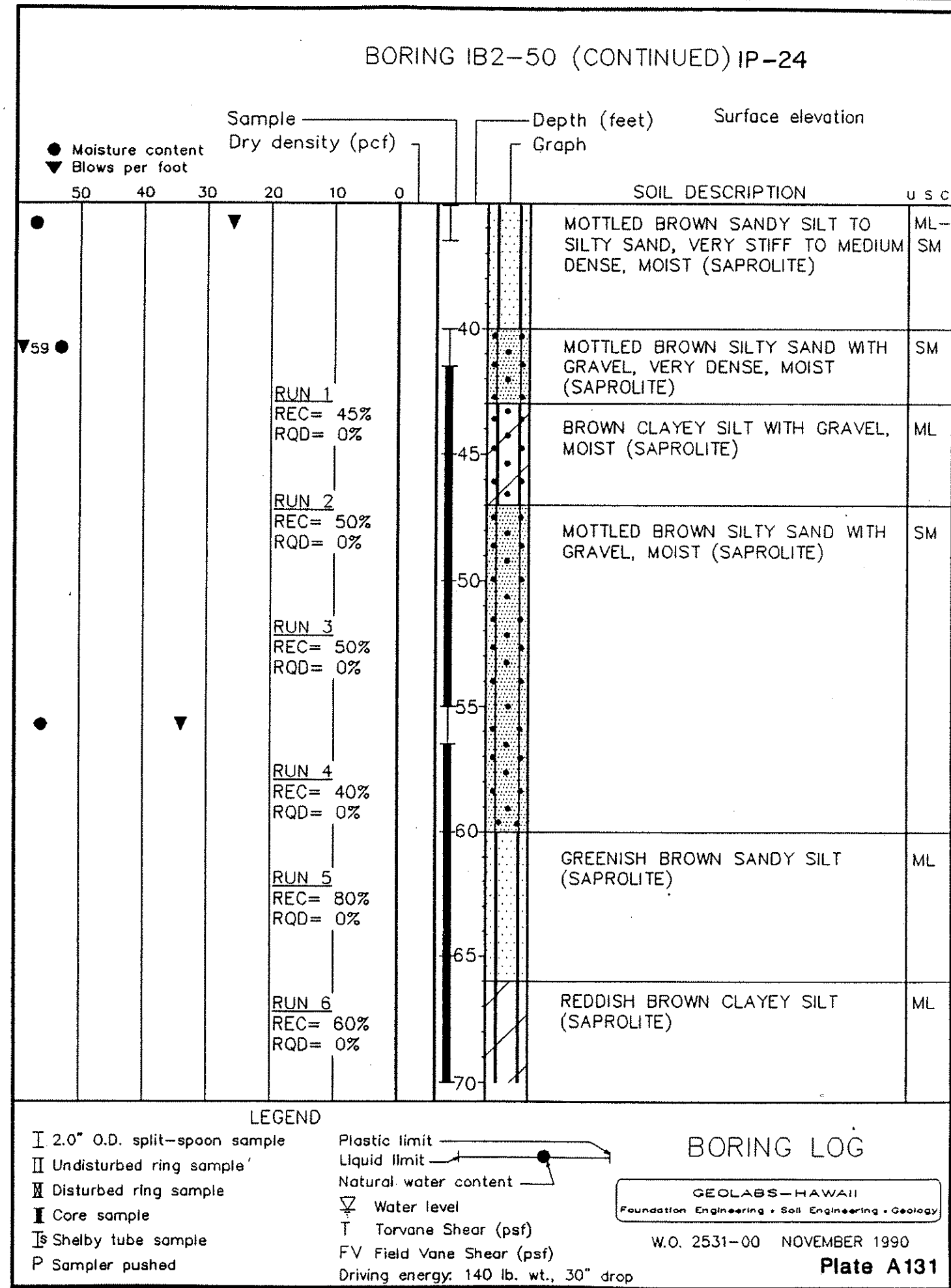
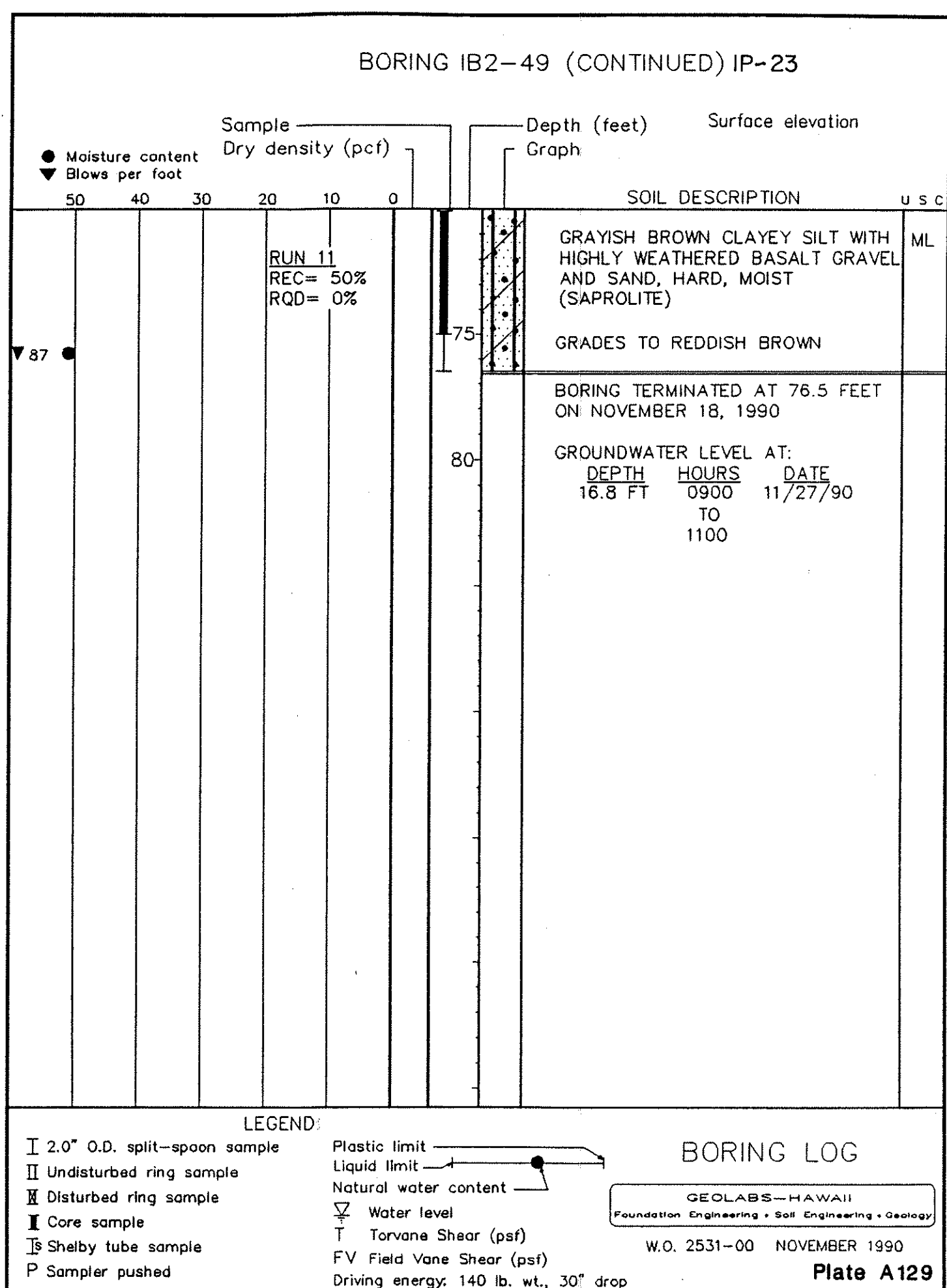
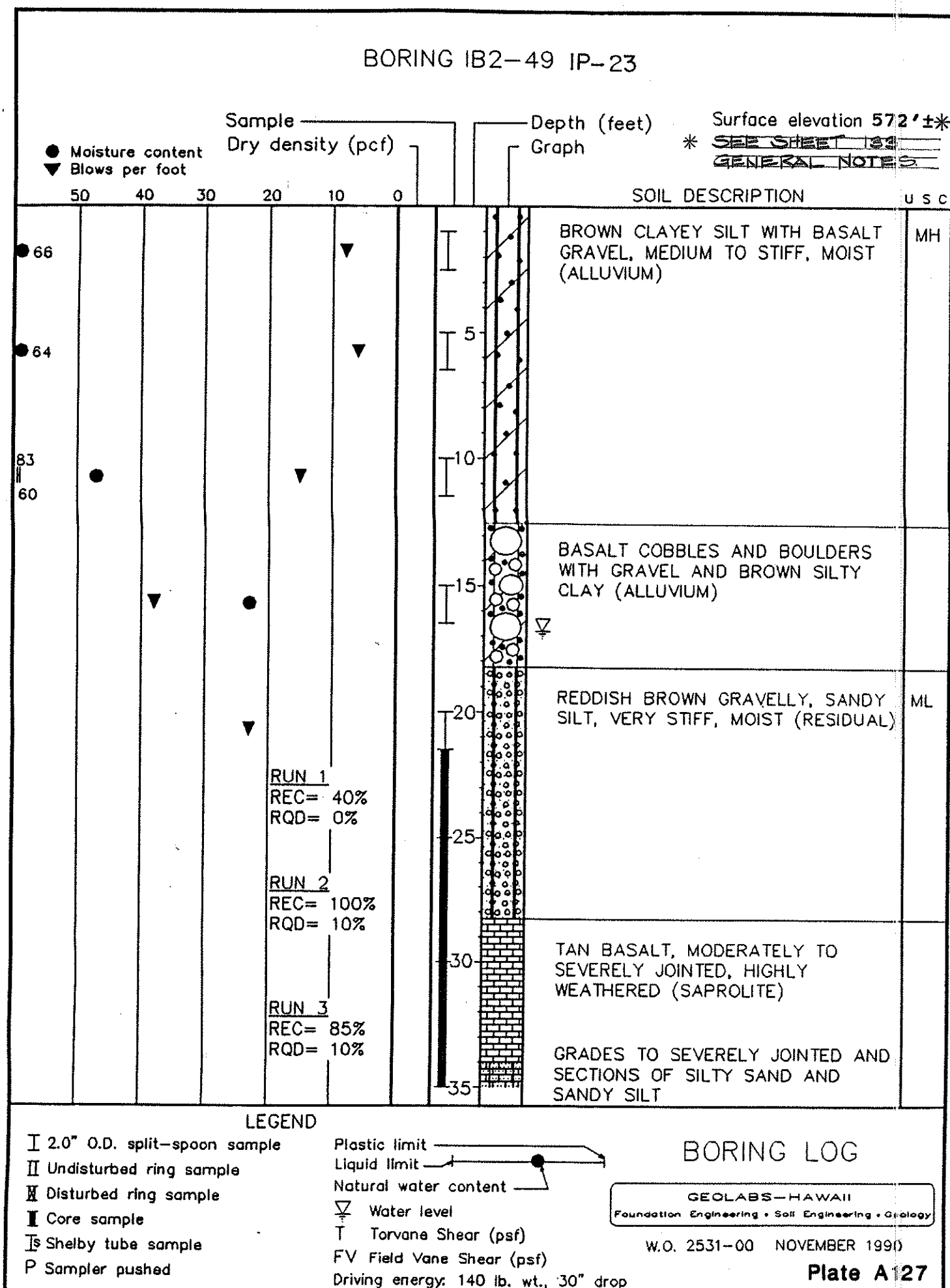
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ORIGINAL PLAN

NOTE BOOK

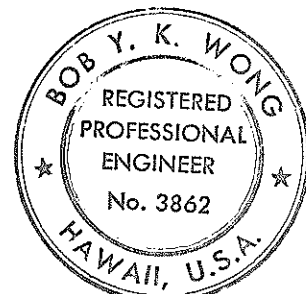
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	155	325



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

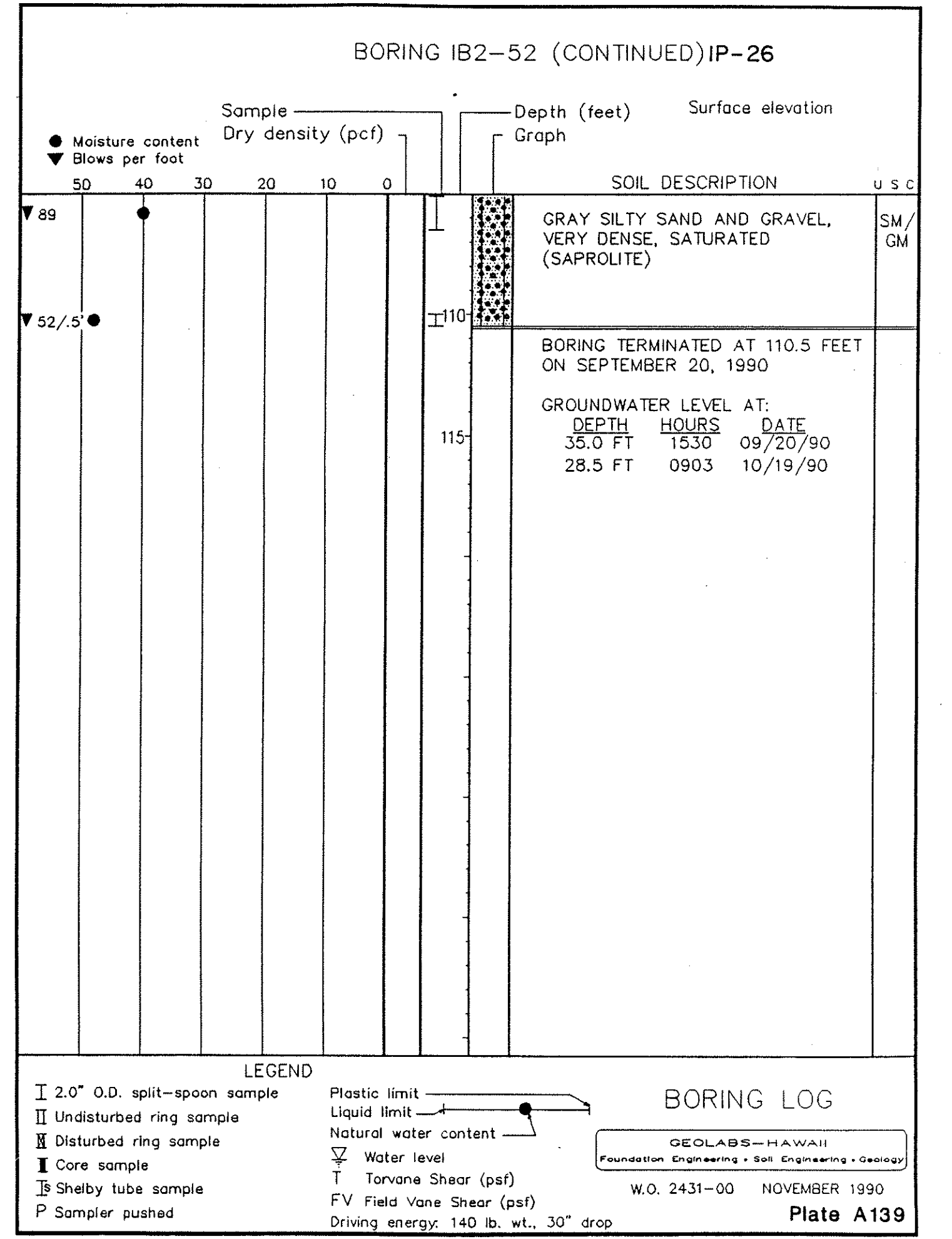
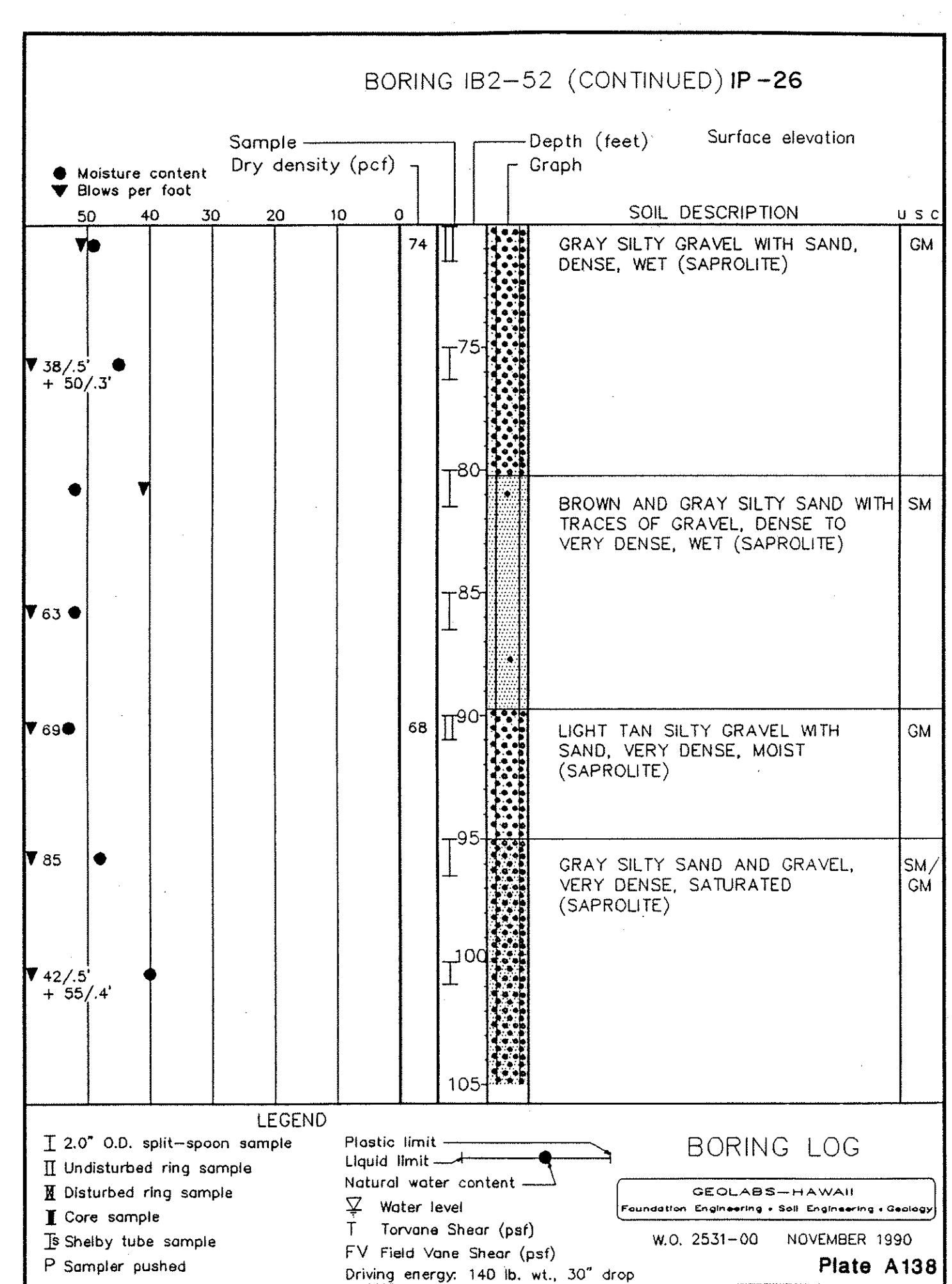
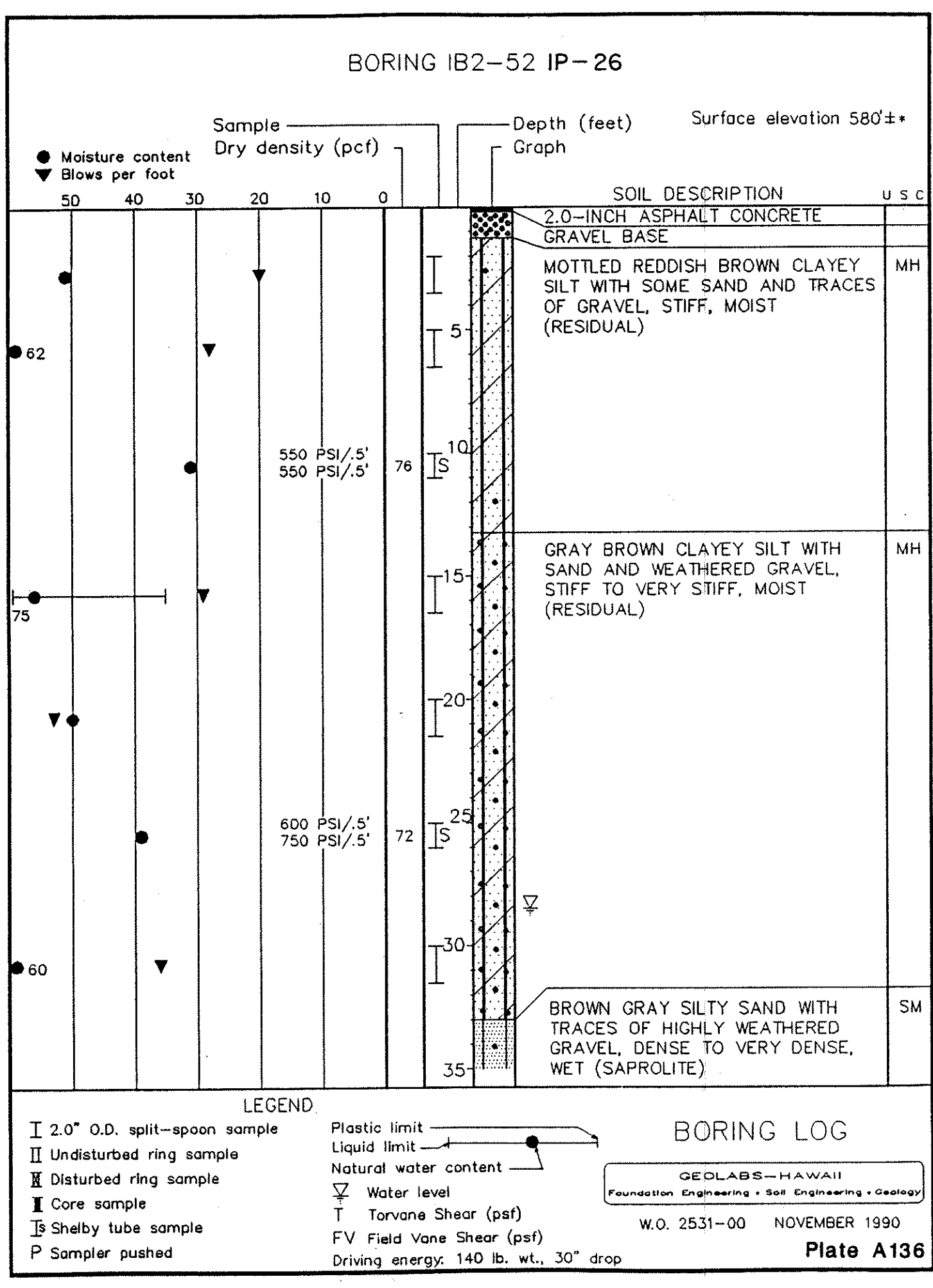
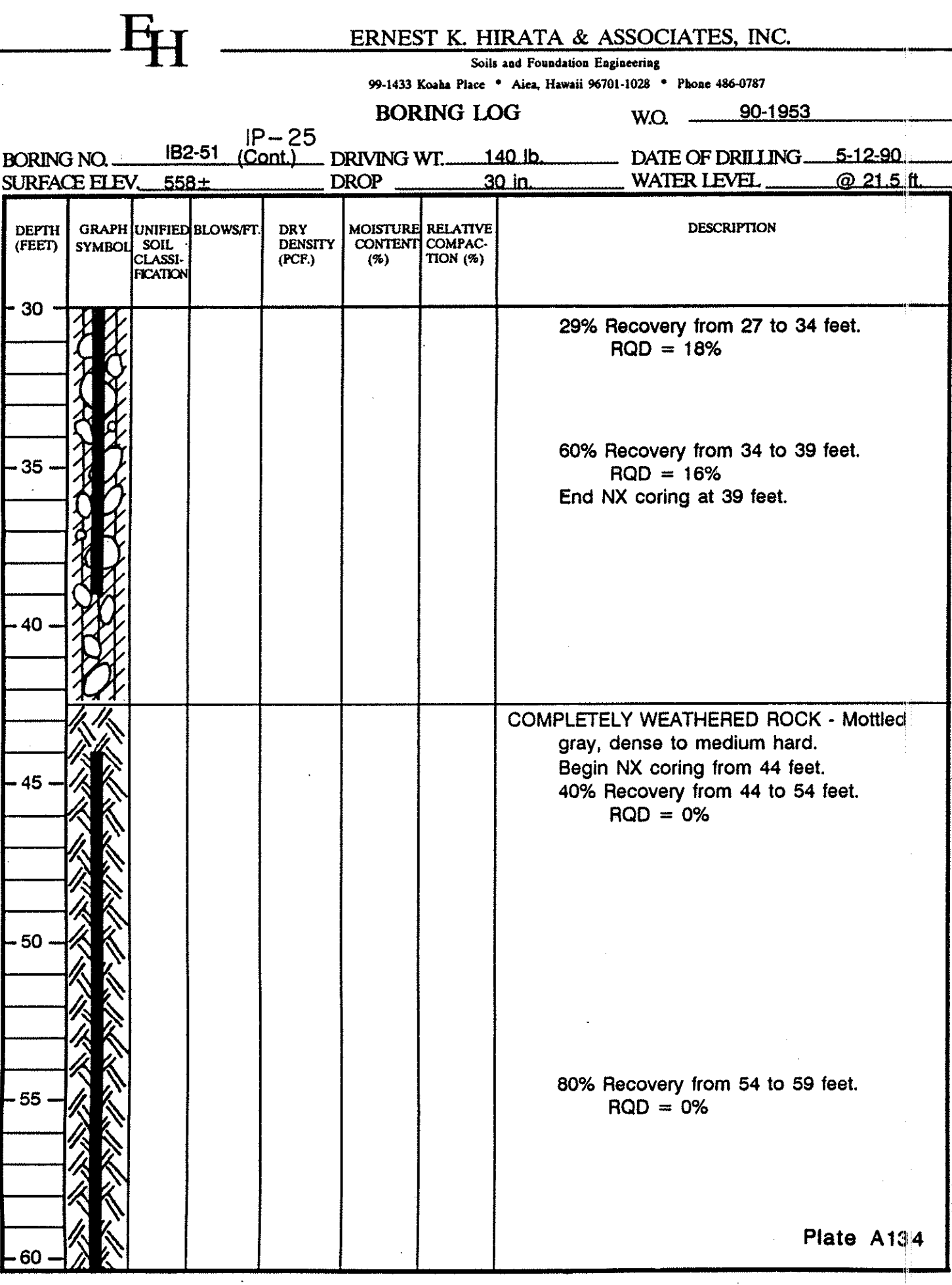
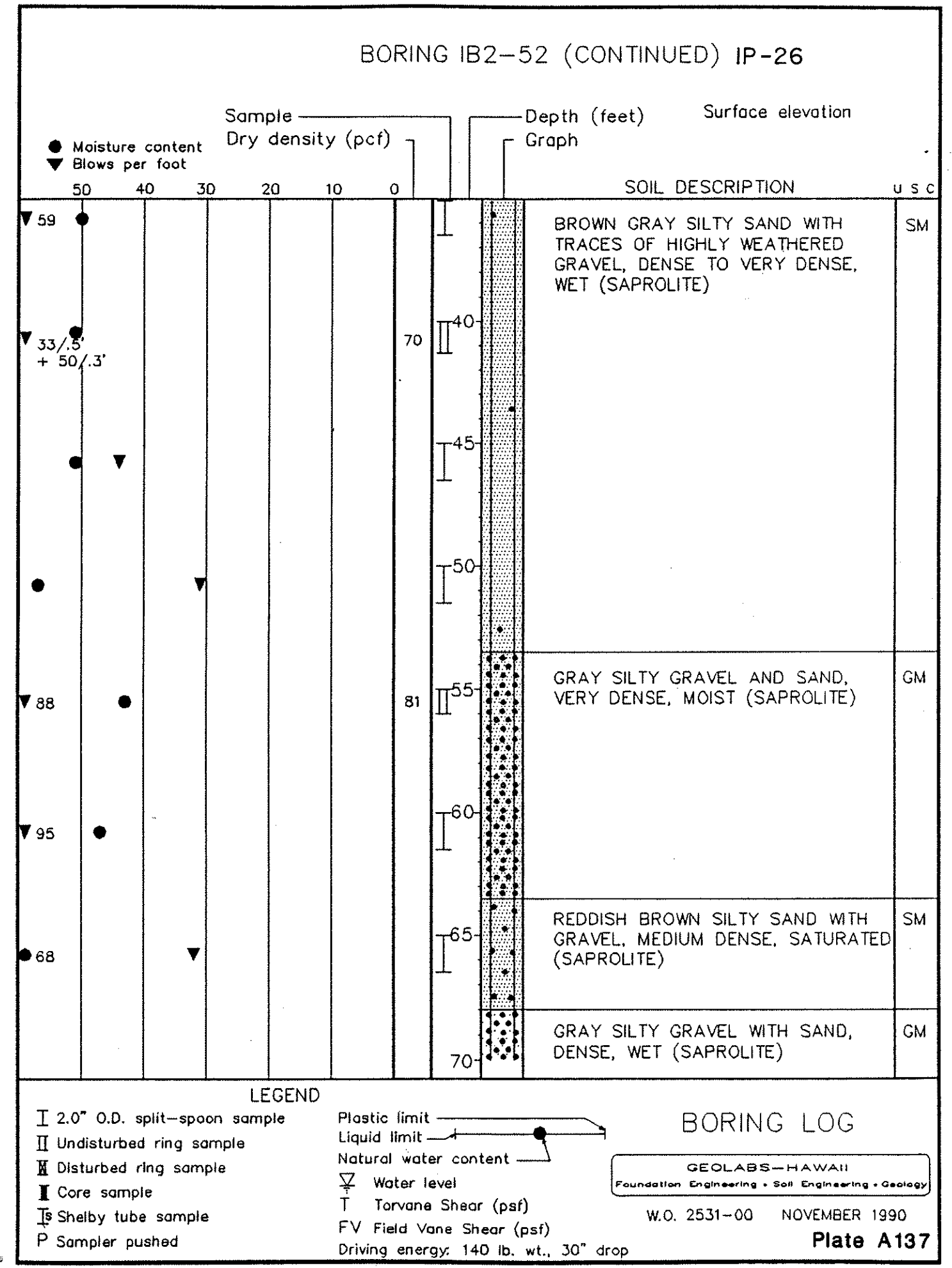
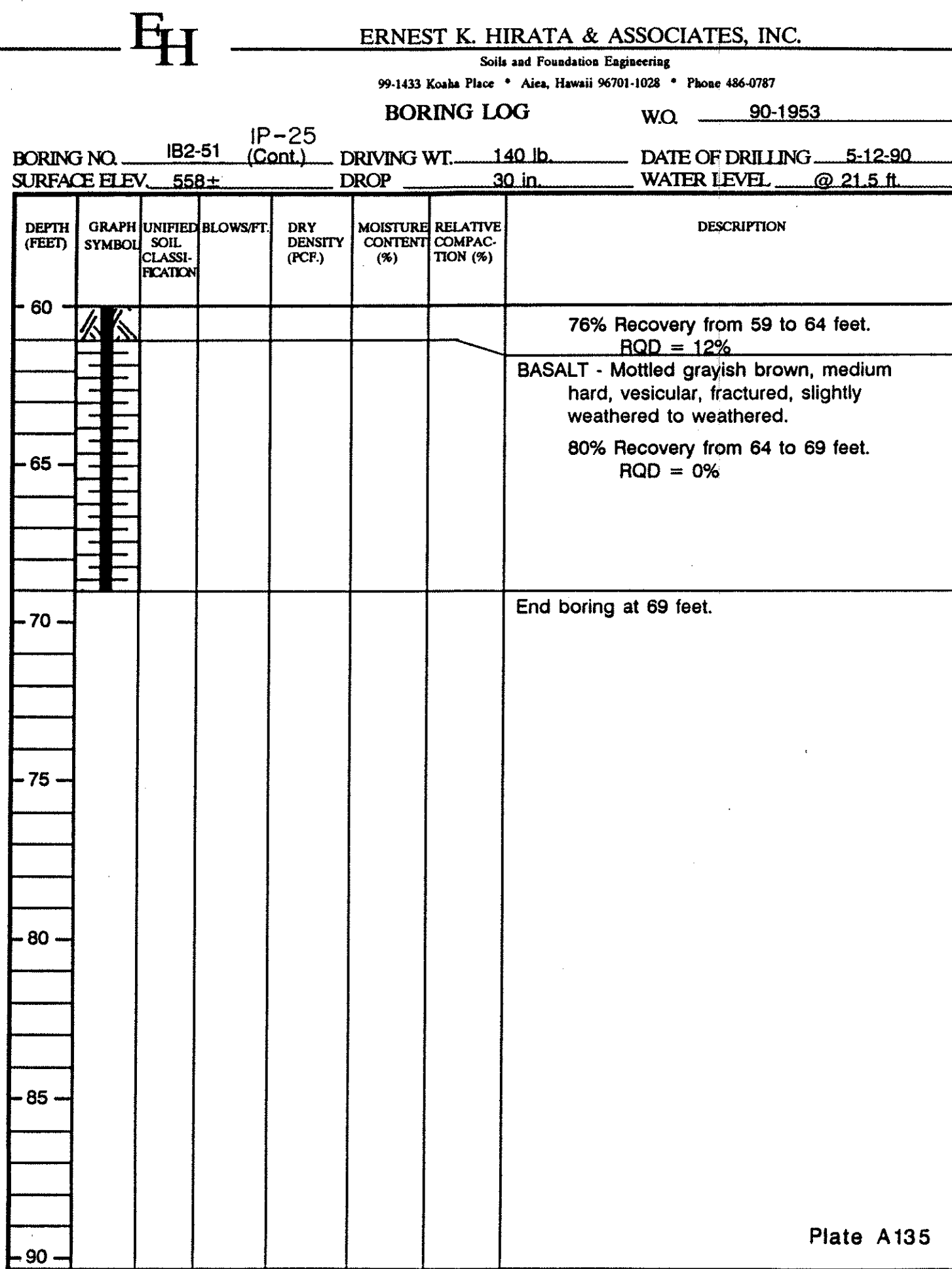
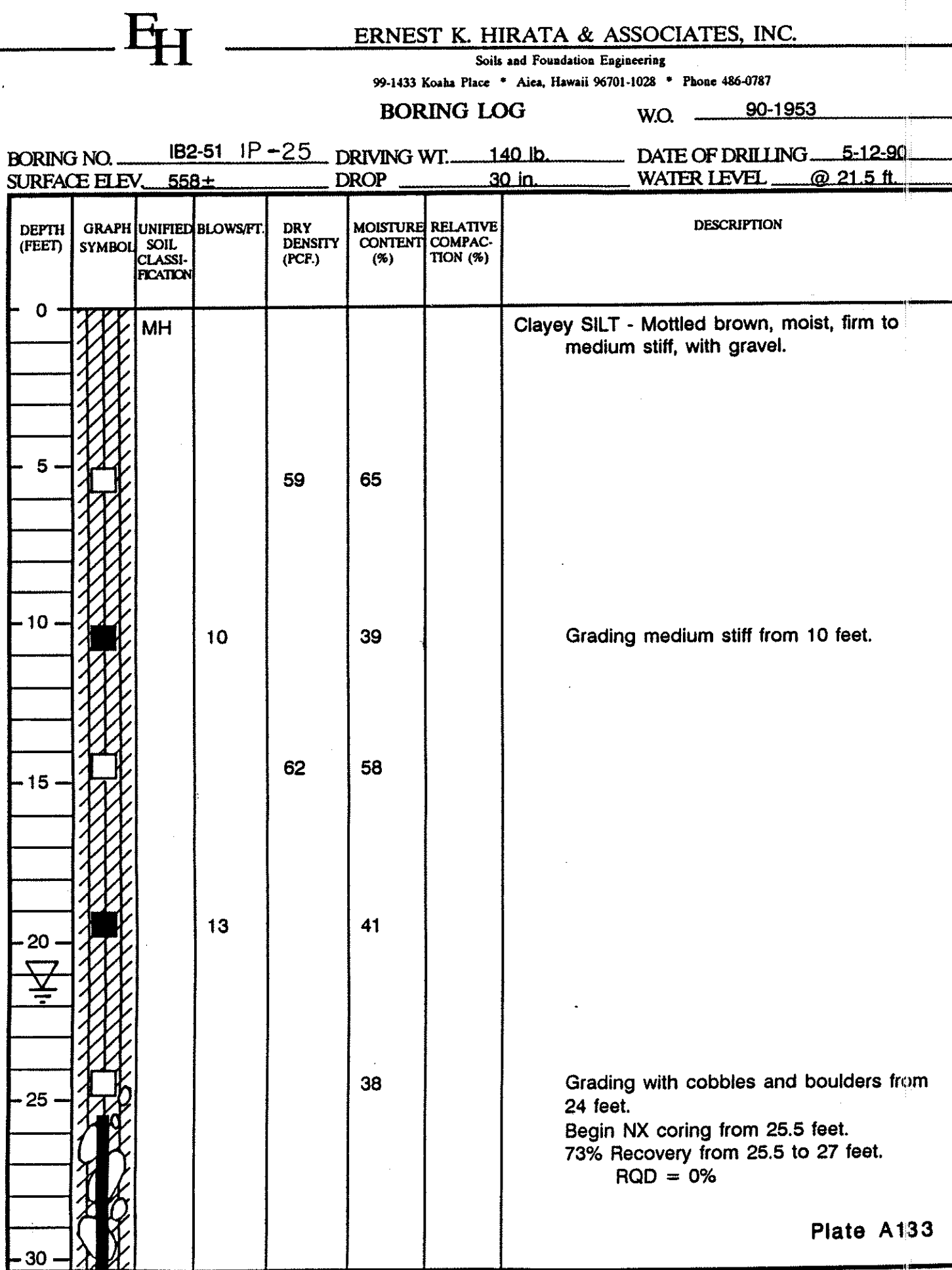
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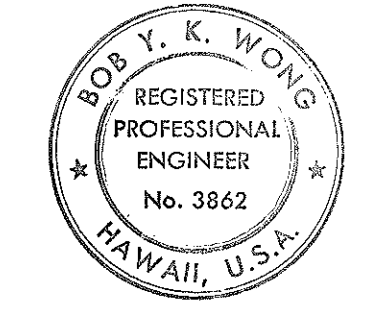
SHEET NO. 155 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	130	325

PAUL S. MORIMOTO
REGISTERED PROFESSIONAL ENGINEER
No. 5299
HAWAII, U.S.A.
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Paul S. Morimoto
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Paul S. Morimoto
SIGNATURE



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

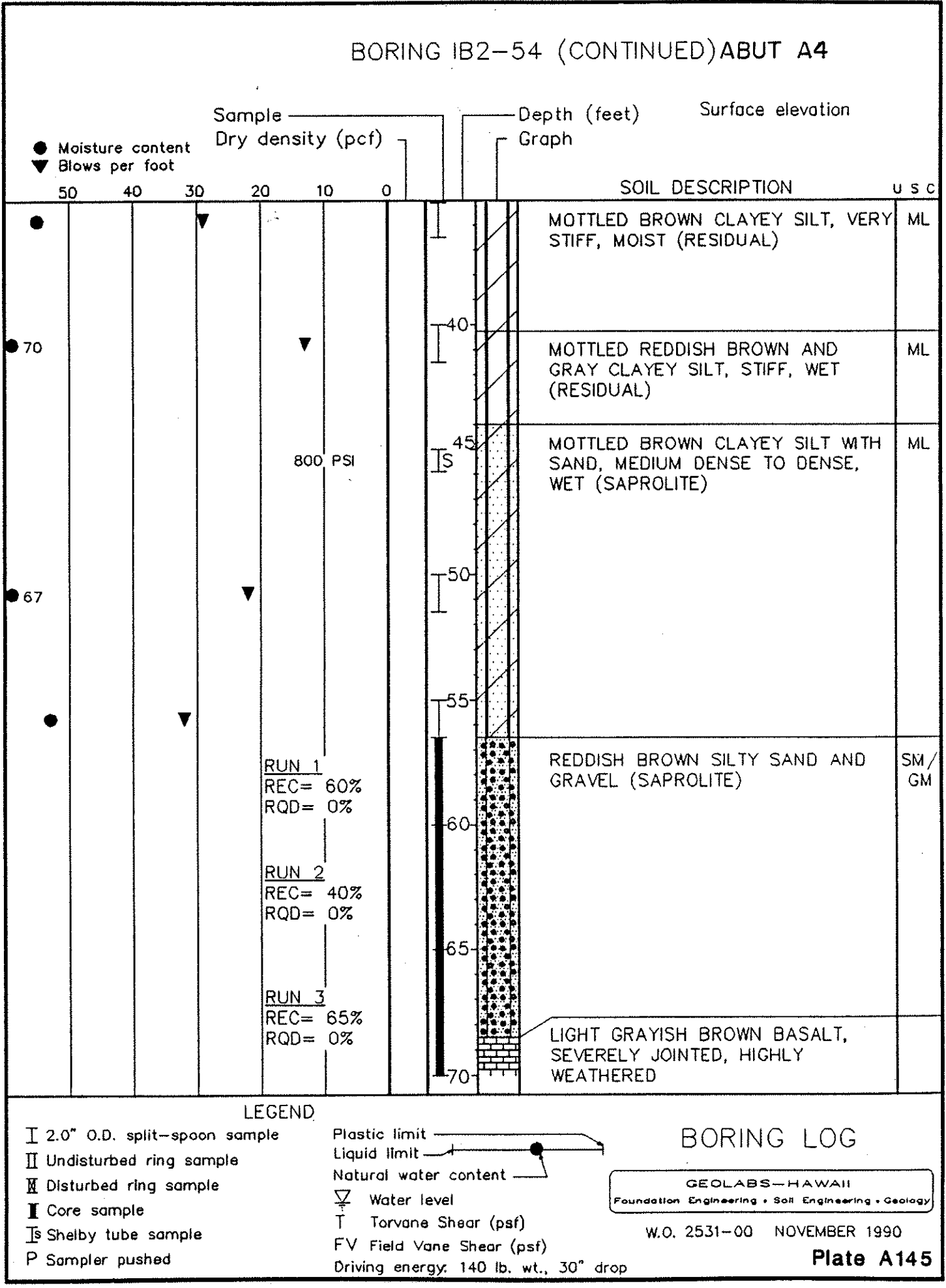
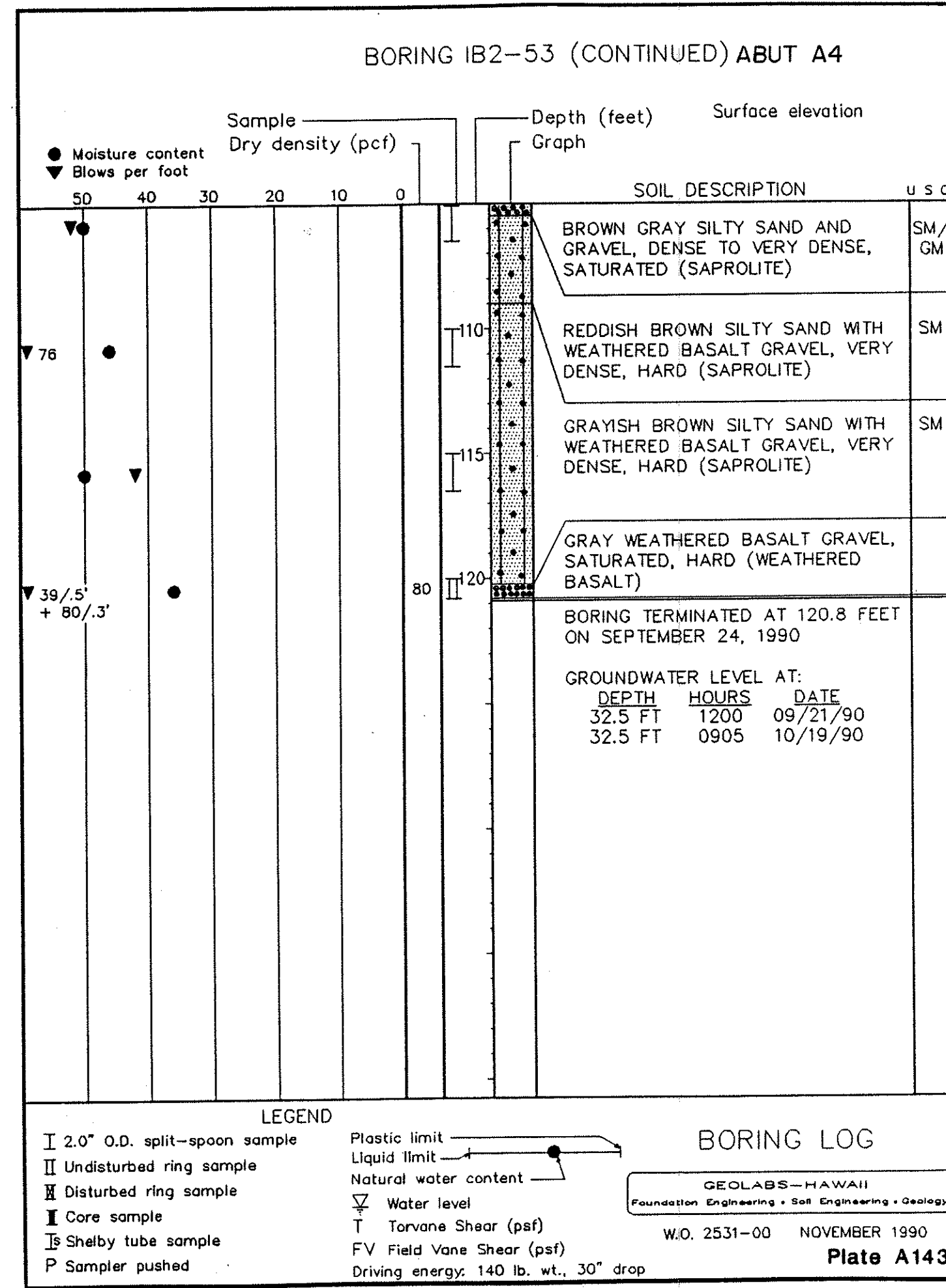
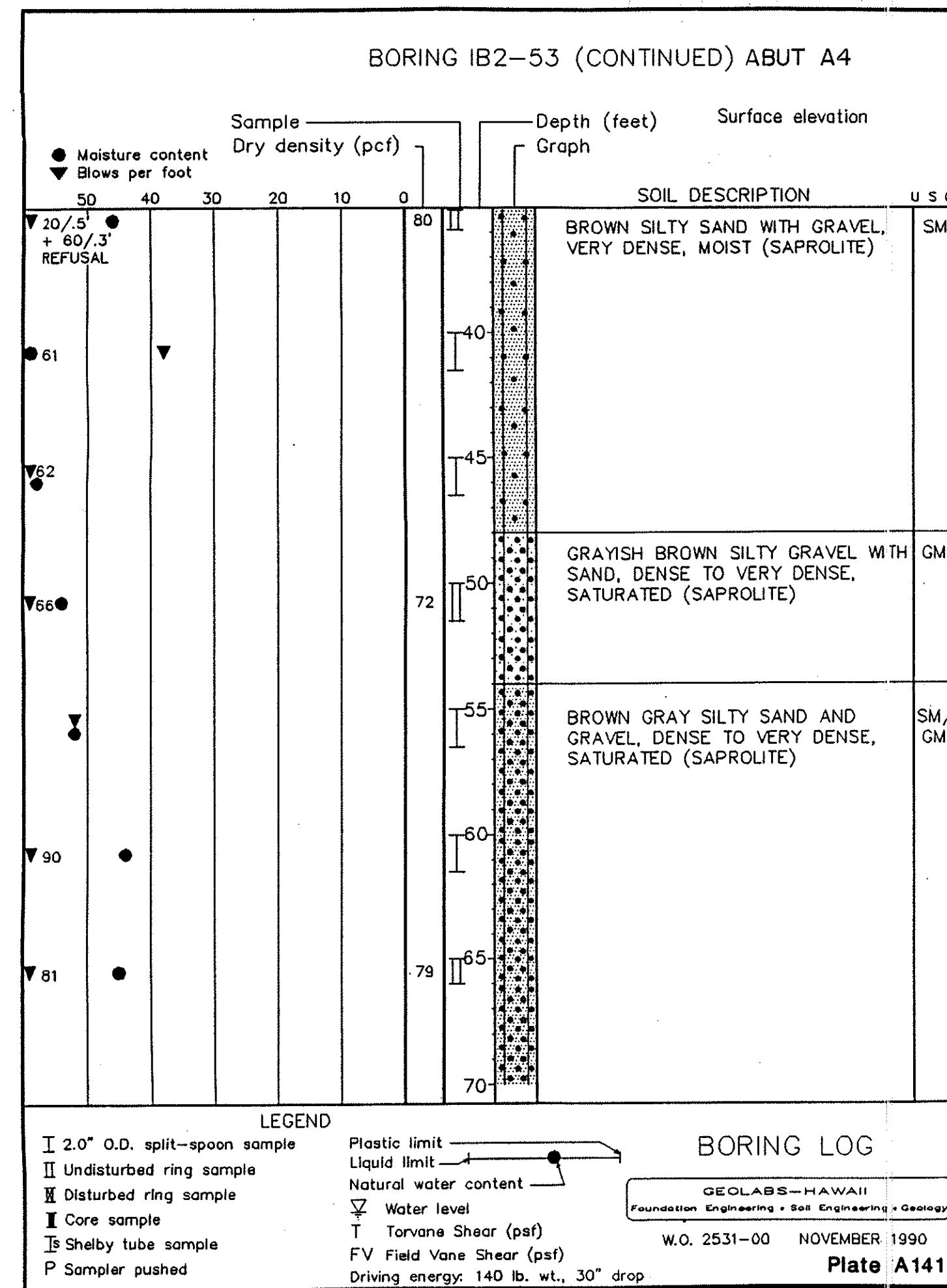
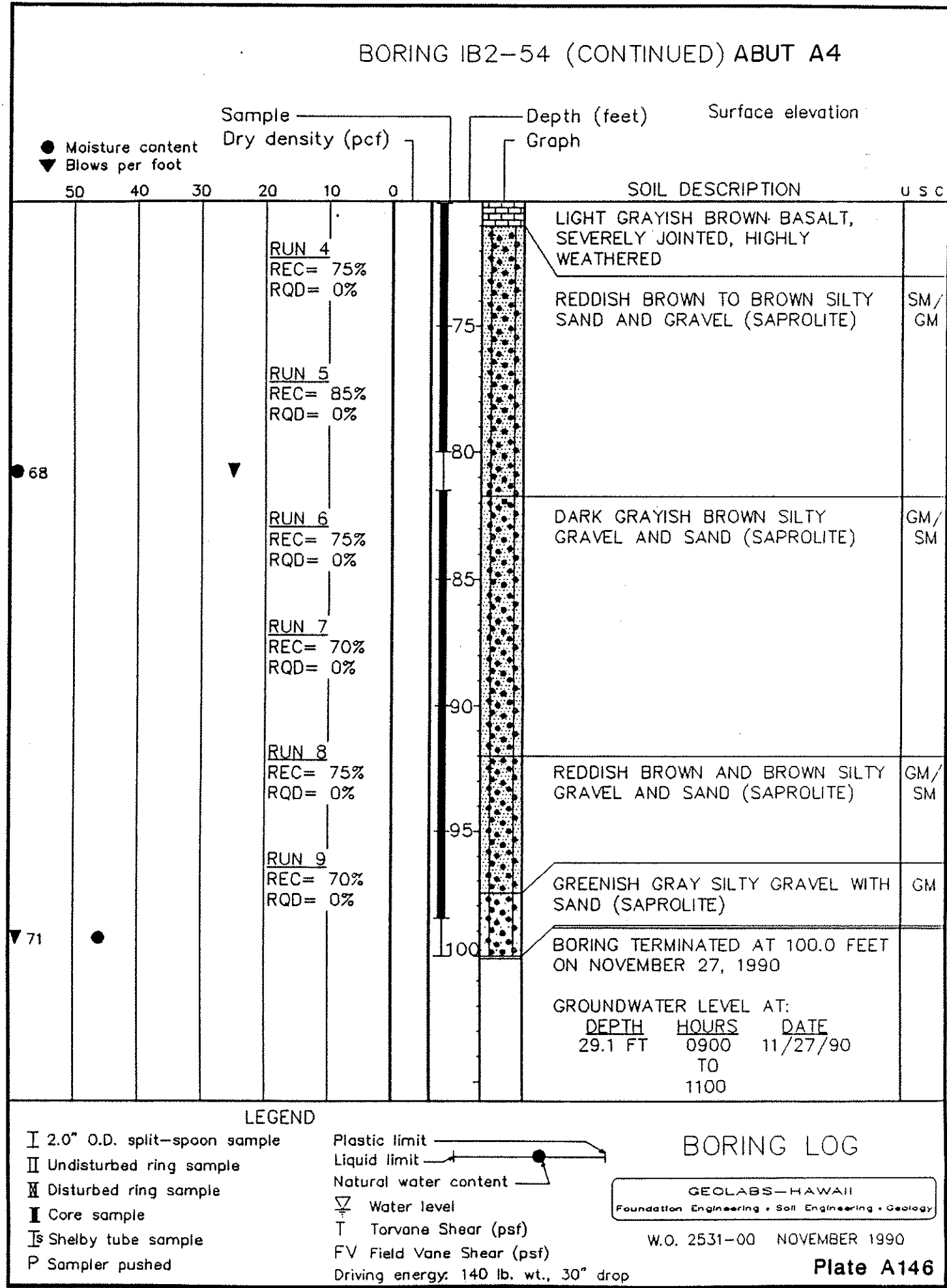
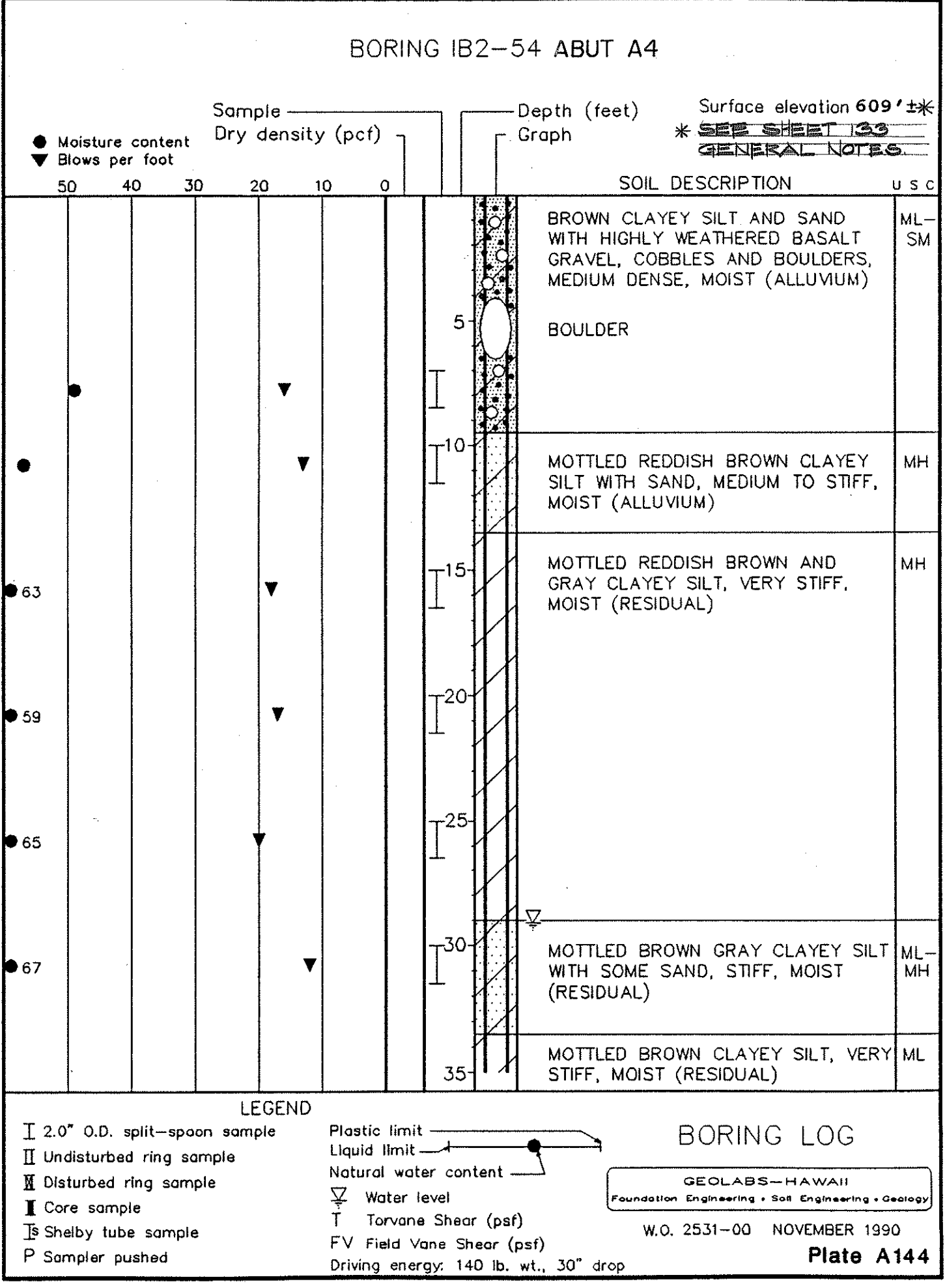
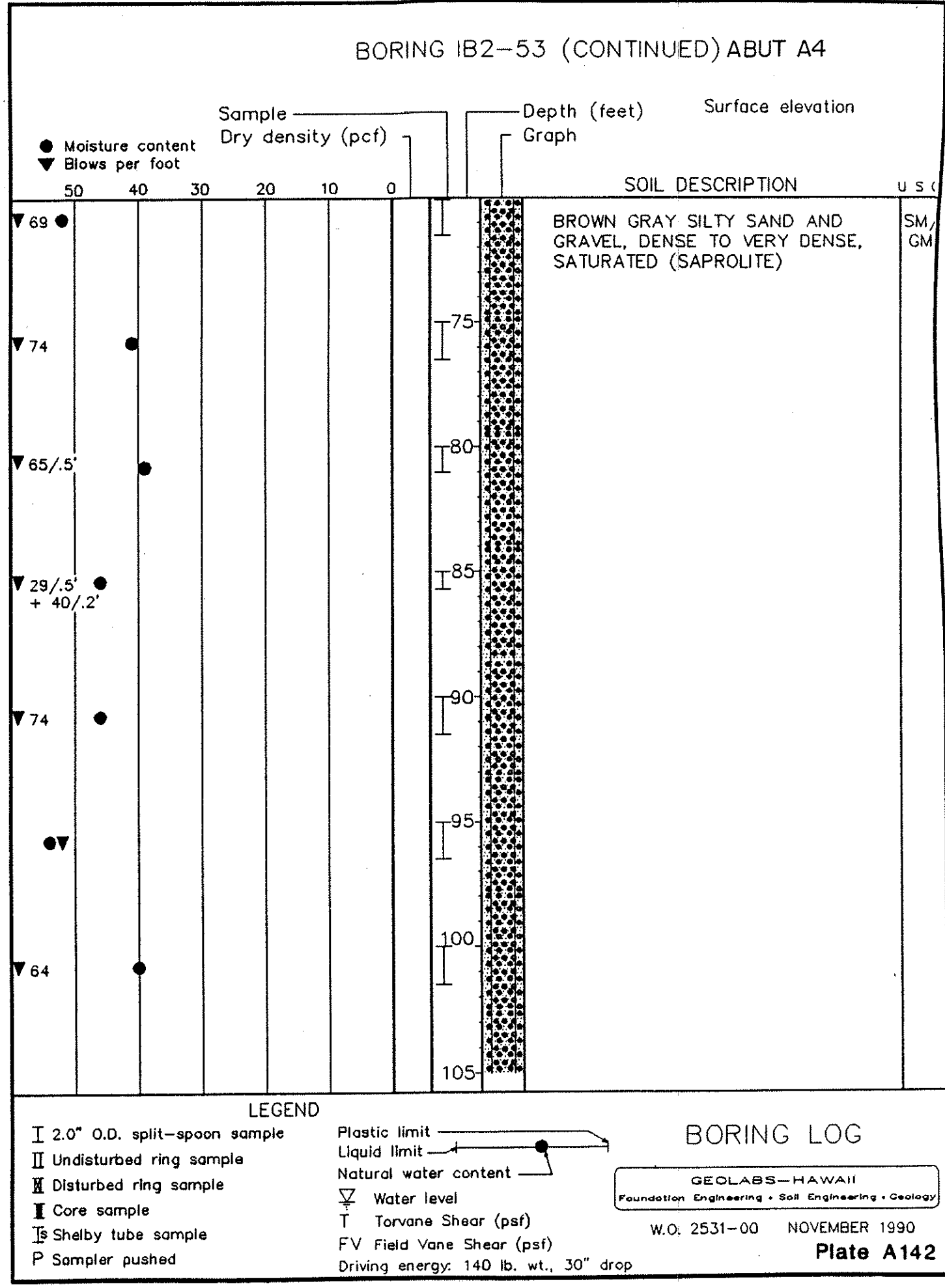
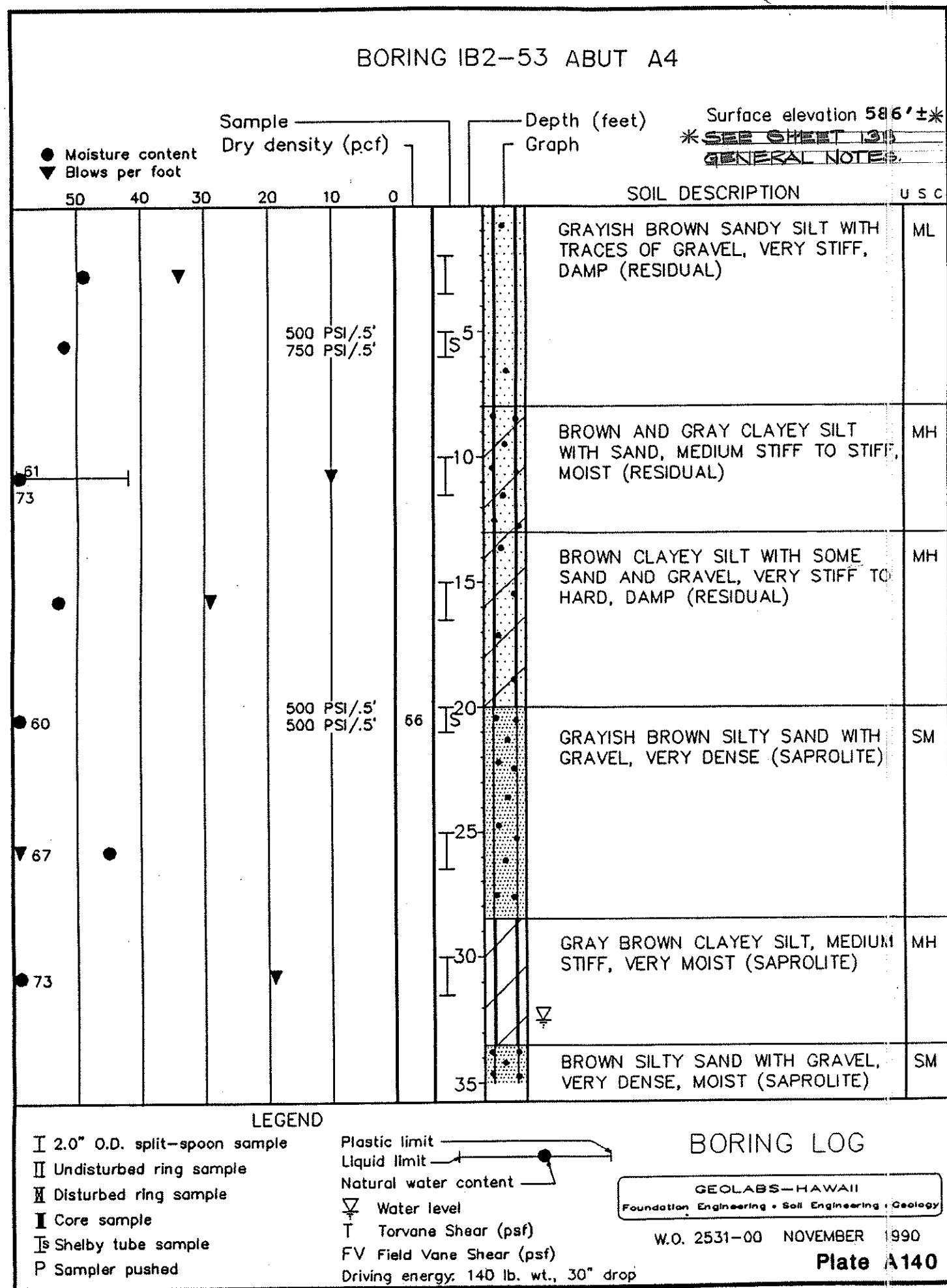
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) 8 (70)

SCALE: NONE DATE: AS NOTED

SHEET NO. 130 OF 33 SHEETS

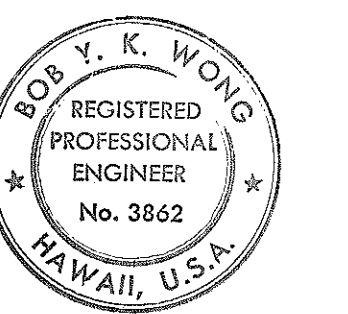
DATE
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
ORIGINAL PLAN
NOTE BOOK
No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H3-1(69)	1992	157	325



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

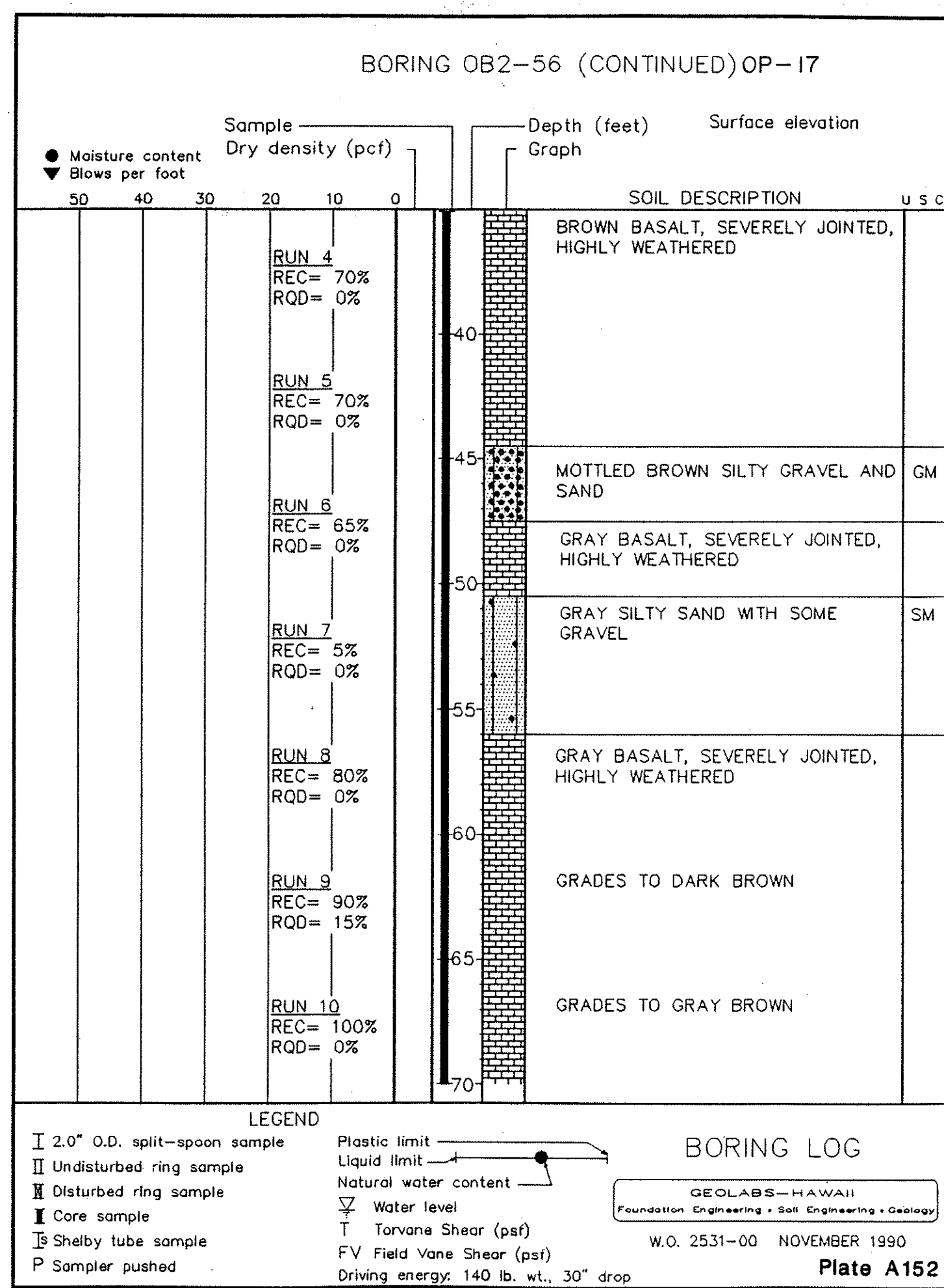
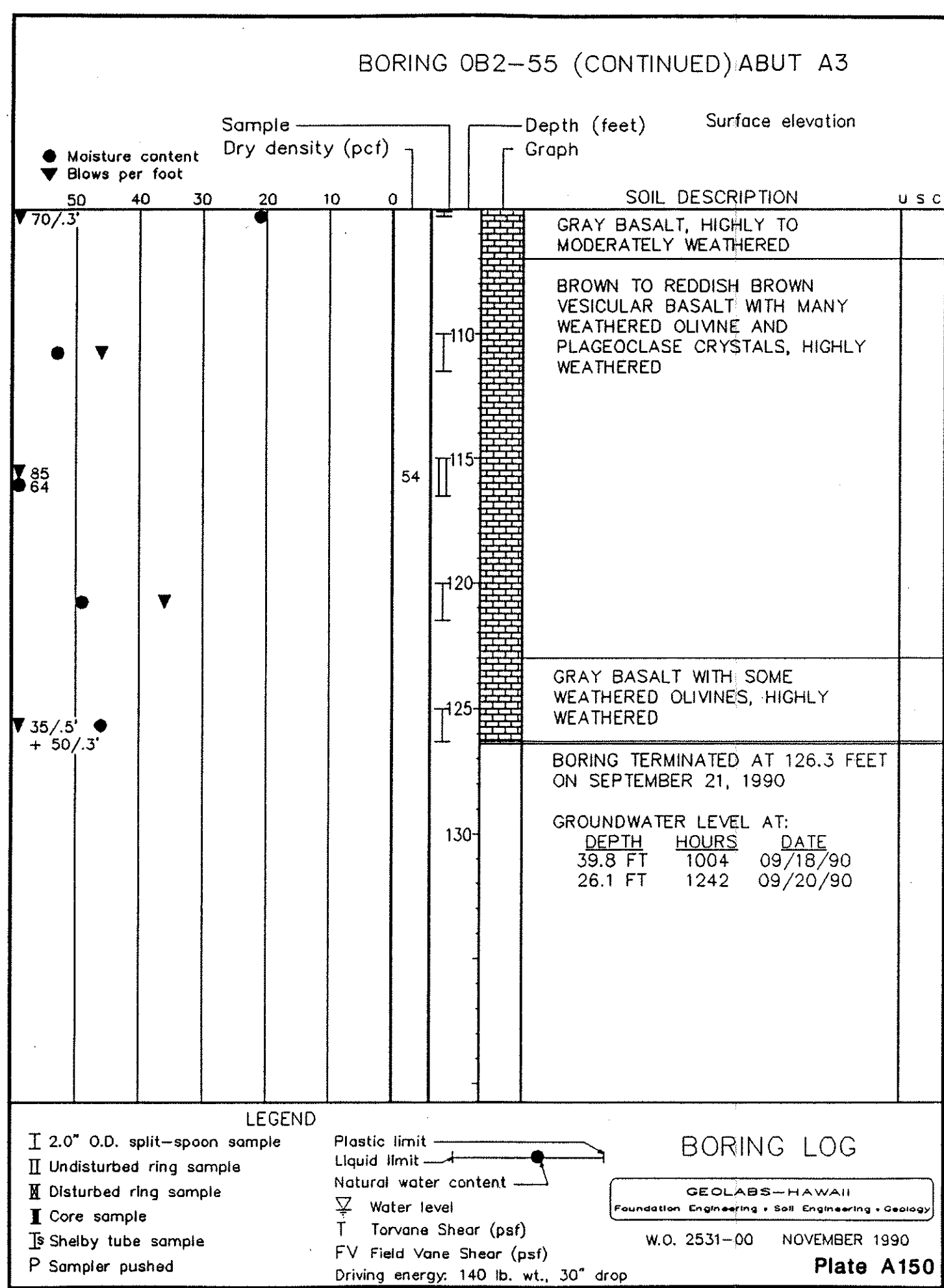
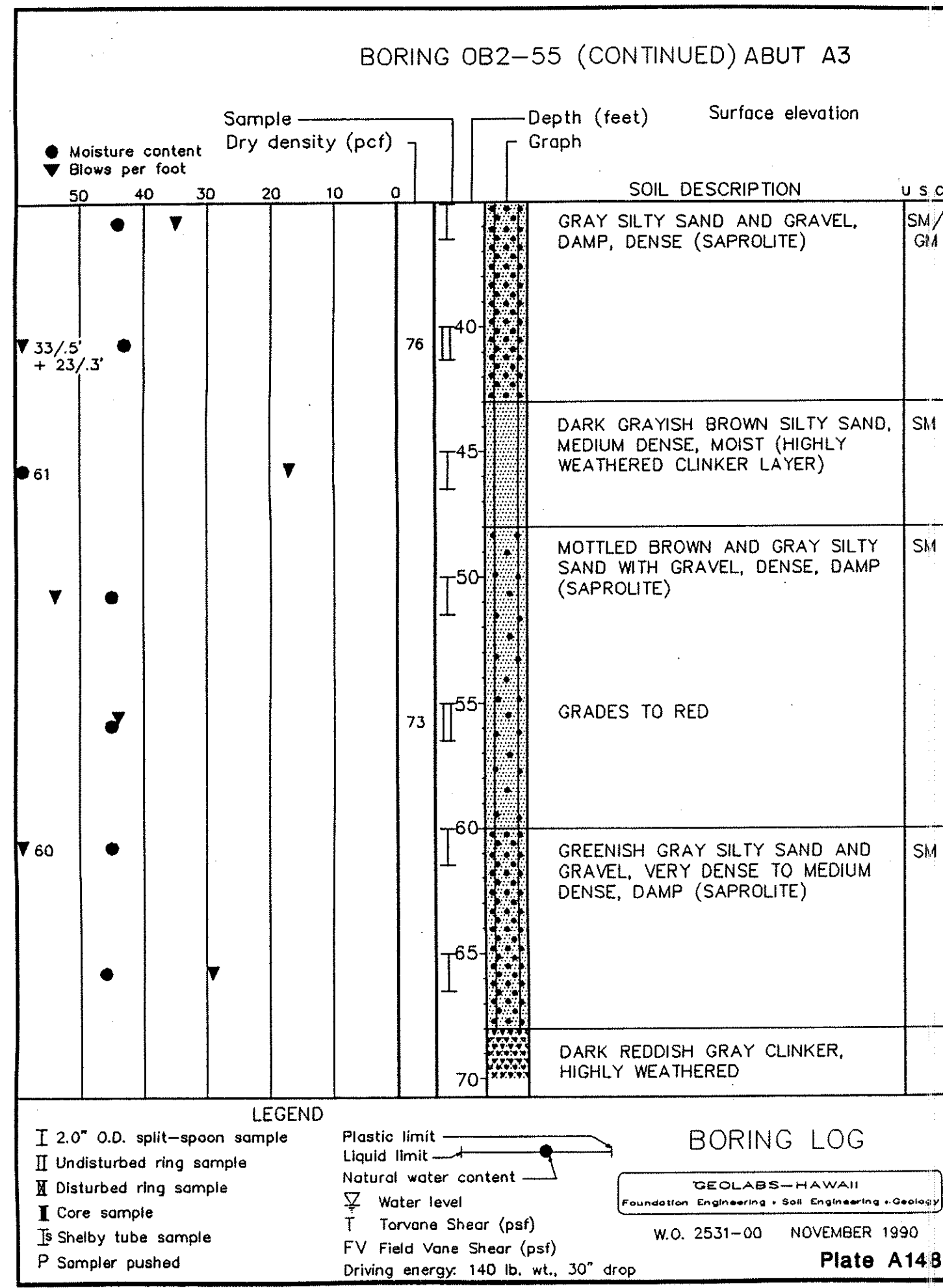
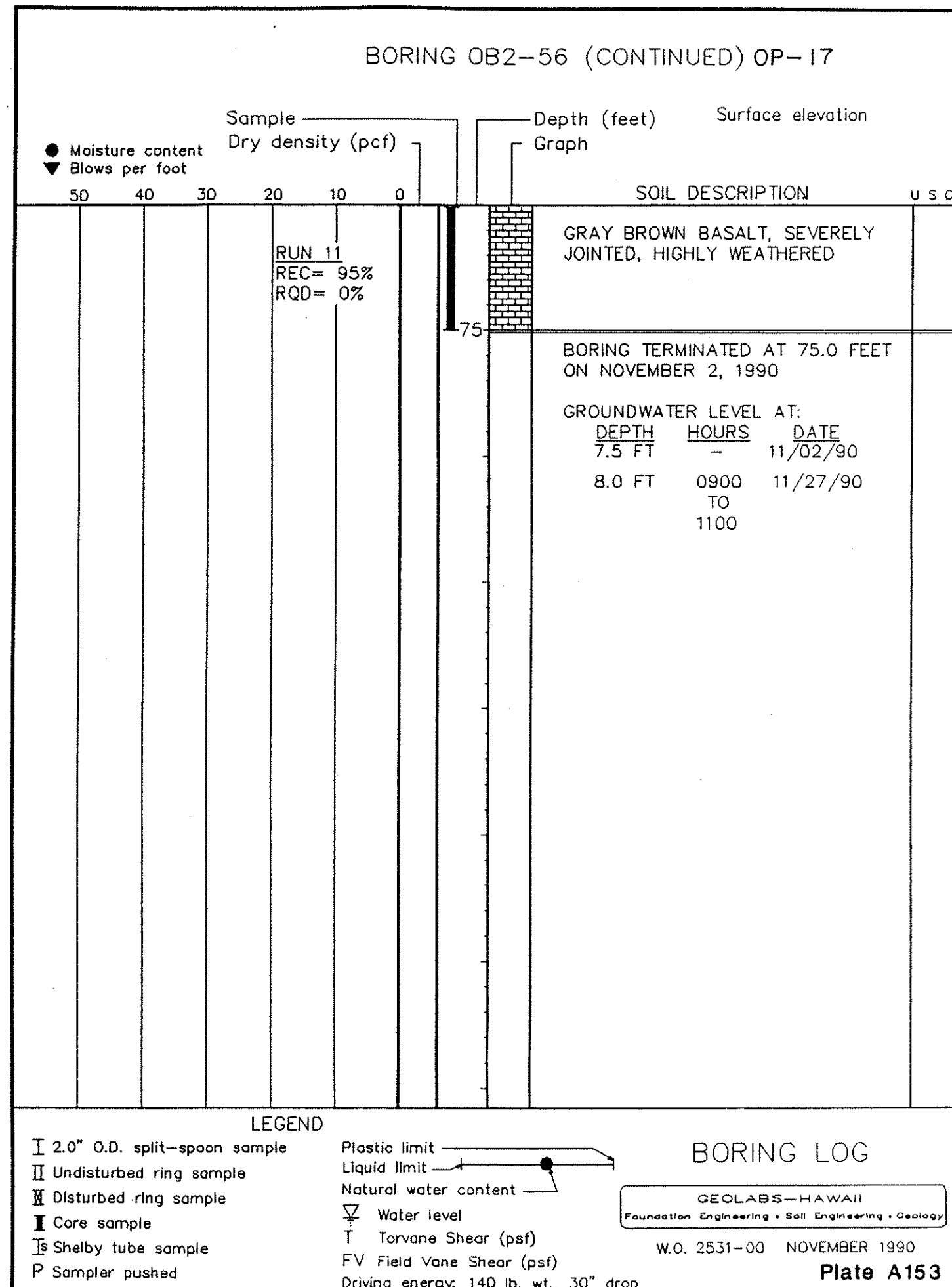
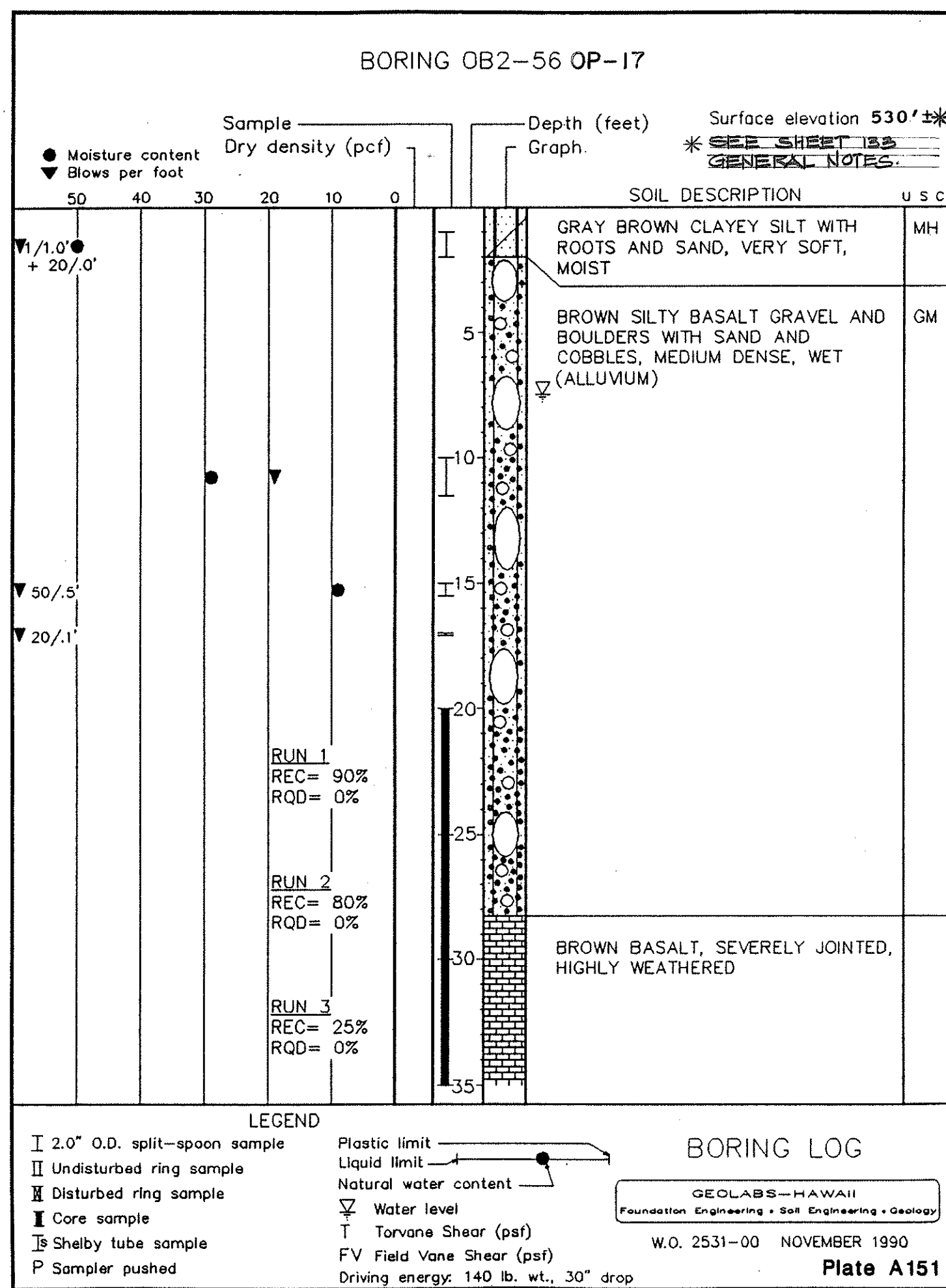
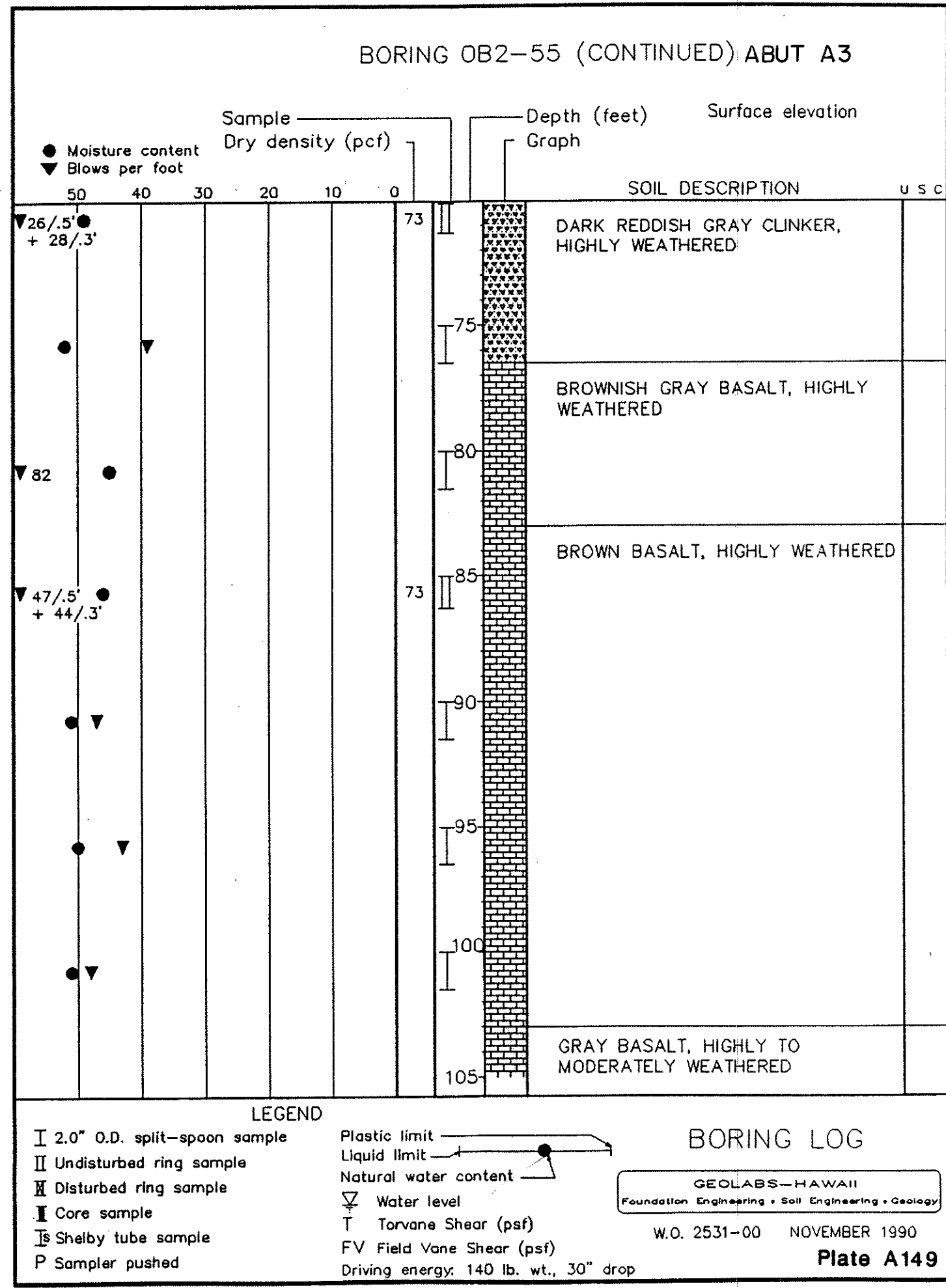
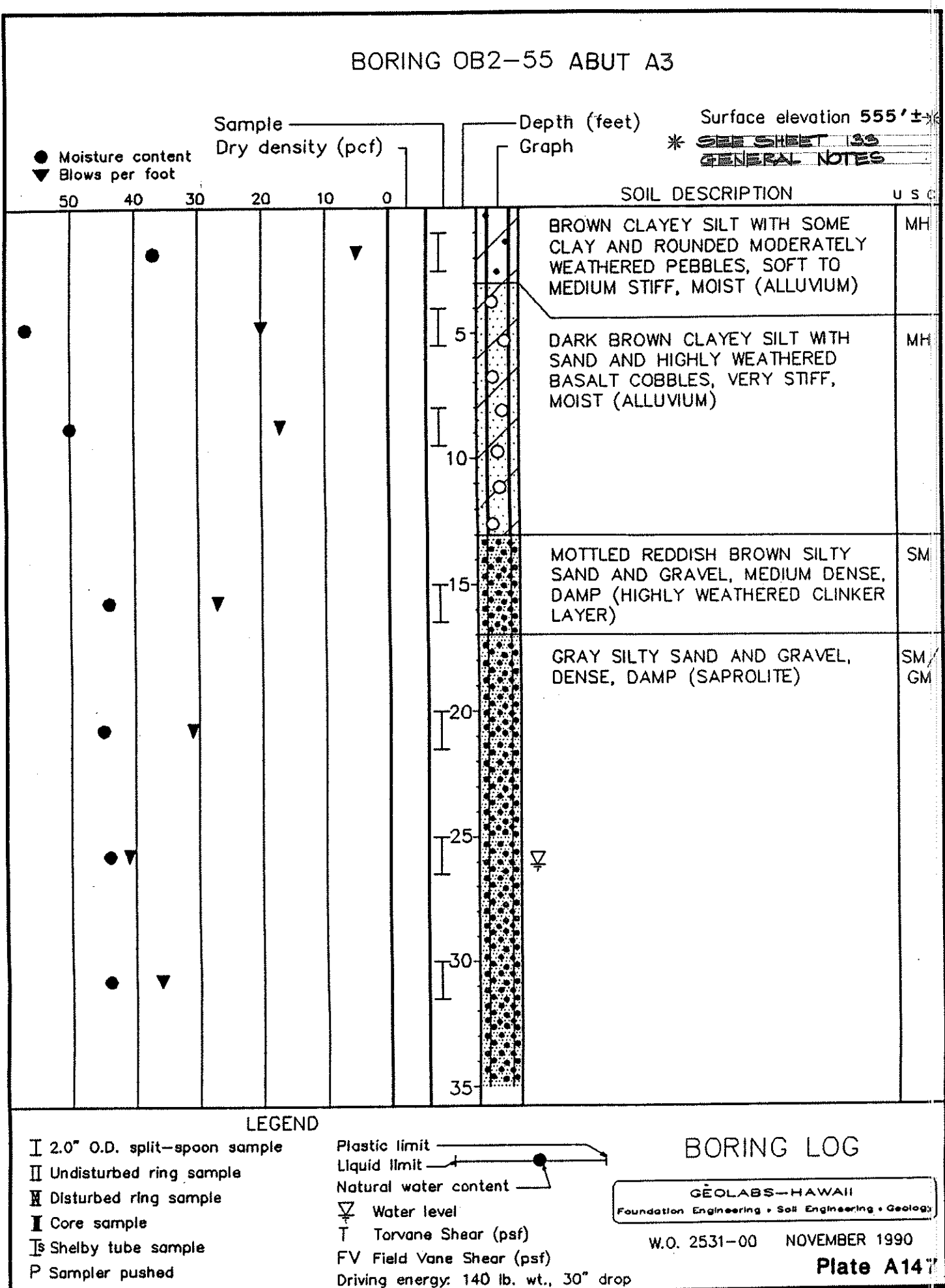
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. 1-H3-1(69) 8 (70)

SCALE: NONE DATE: AS NOTED

SHEET NO. 157 OF 33 SHEETS

ORIGINAL PLAN
DATE
DRAWN BY
DESIGNED BY
CHECKED BY

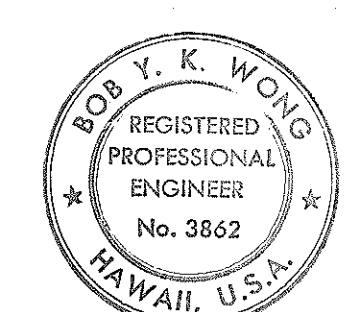
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HAWAII	HAW.	I-H3-1(69)	1992	158	325



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) 8 (70)

SCALE: NONE DATE: AS NOTED

SHEET No. 158 OF 33 SHEETS

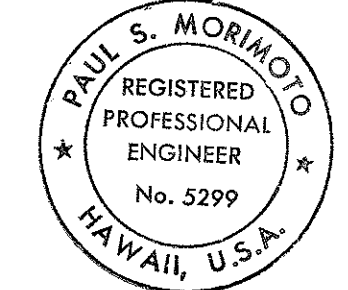
DATE

DESIGNED BY

CHECKED BY

NO.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	159	325



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Paul S. Morimoto
 Signature

ERNEST K. HIRATA & ASSOCIATES, INC.
 Soils and Foundation Engineering
 99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

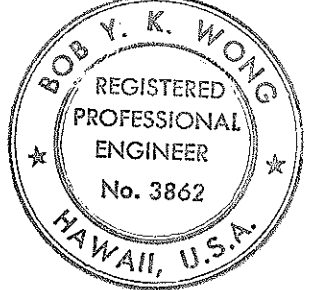
BORING LOG W.O. 90-1953
 BORING NO. OB2-58 (Cont.) OP-19 DRIVING WT. 140 lb. DATE OF DRILLING 6-9-90
 SURFACE ELEV. 551± DROP 30 in. WATER LEVEL @ 26.2 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
90							
95							
100			40				No Recovery
105			42		22		
110			97				No Recovery
115							
120			37		28		End boring at 120.5 feet.

Plate A160

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 SIGNATURE



STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) & (70)	
SCALE: NONE	DATE: AS NOTED
SHEET NO. 159 OF 33 SHEETS	

ERNEST K. HIRATA & ASSOCIATES, INC.
 Soils and Foundation Engineering
 99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787
 BORING LOG W.O. 90-1953
 BORING NO. OB2-58 (Cont.) OP-19 DRIVING WT. 140 lb. DATE OF DRILLING 6-9-90
 SURFACE ELEV. 551± DROP 30 in. WATER LEVEL @ 26.2 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30							
35			42		32		
40			86		22		
45			33		26		Grading to mottled brown color from 44 feet.
50			61		38		
55			82		30		Grading medium hard from 54 feet.
60							

Plate A158

ERNEST K. HIRATA & ASSOCIATES, INC.
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 99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787
 BORING LOG W.O. 90-1953
 BORING NO. OB2-58 (Cont.) OP-19 DRIVING WT. 140 lb. DATE OF DRILLING 6-9-90
 SURFACE ELEV. 551± DROP 30 in. WATER LEVEL @ 26.2 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60							
65			25				No Recovery
70							No Recovery
75							
80			54		29		
85							
90			20		41		

Plate A159

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 Soils and Foundation Engineering
 99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787
 BORING LOG W.O. 90-1953
 BORING NO. OB2-58 (Cont.) OP-19 DRIVING WT. 140 lb. DATE OF DRILLING 6-9-90
 SURFACE ELEV. 551± DROP 30 in. WATER LEVEL @ 26.2 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
75							
80							
85							
90							
95							
100							
105							
110							
115							
120							

Plate A157

ERNEST K. HIRATA & ASSOCIATES, INC.
 Soils and Foundation Engineering
 99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787
 BORING LOG W.O. 90-1953
 BORING NO. OB2-58 (Cont.) OP-19 DRIVING WT. 140 lb. DATE OF DRILLING 6-9-90
 SURFACE ELEV. 551± DROP 30 in. WATER LEVEL @ 26.2 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0							
5			60		52		Grading with gravel, cobbles and boulders from 5 feet.
10			96/7"		31		Grading stiff from 9 feet.
15			17		28		
20			79		22		
25			27		45		
30			77		42		COMPLETELY WEATHERED ROCK - Mottled reddish brown, moist, dense.

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 BORING LOG W.O. 90-1953
 BORING NO. OB2-57 OP-18 DRIVING WT. 140 lb. DATE OF DRILLING 6-9-90
 SURFACE ELEV. 535± DROP 30 in. WATER LEVEL @ 26.2 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
5							
10							
15							
20							
25							
30							
35							

Plate A154

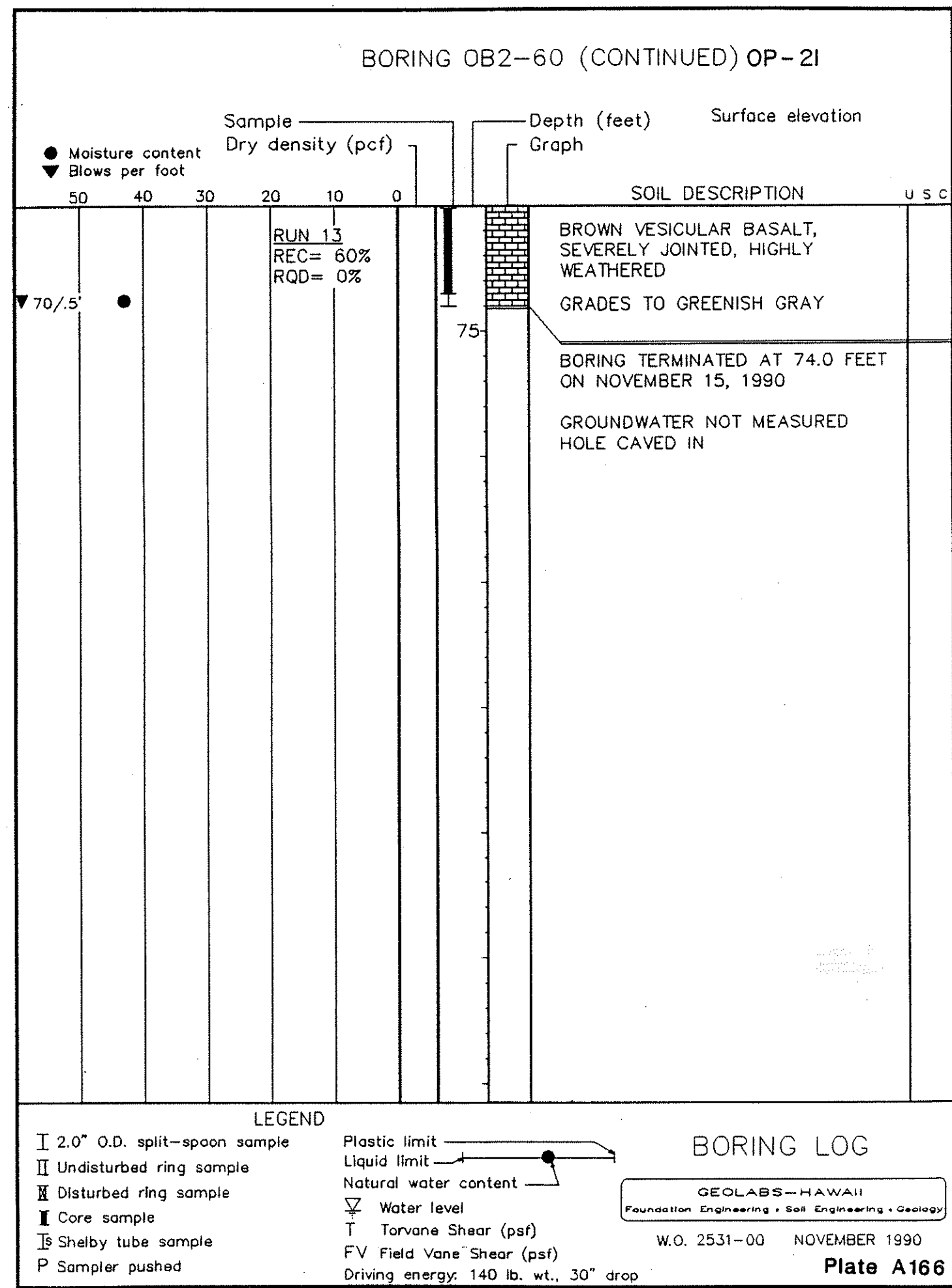
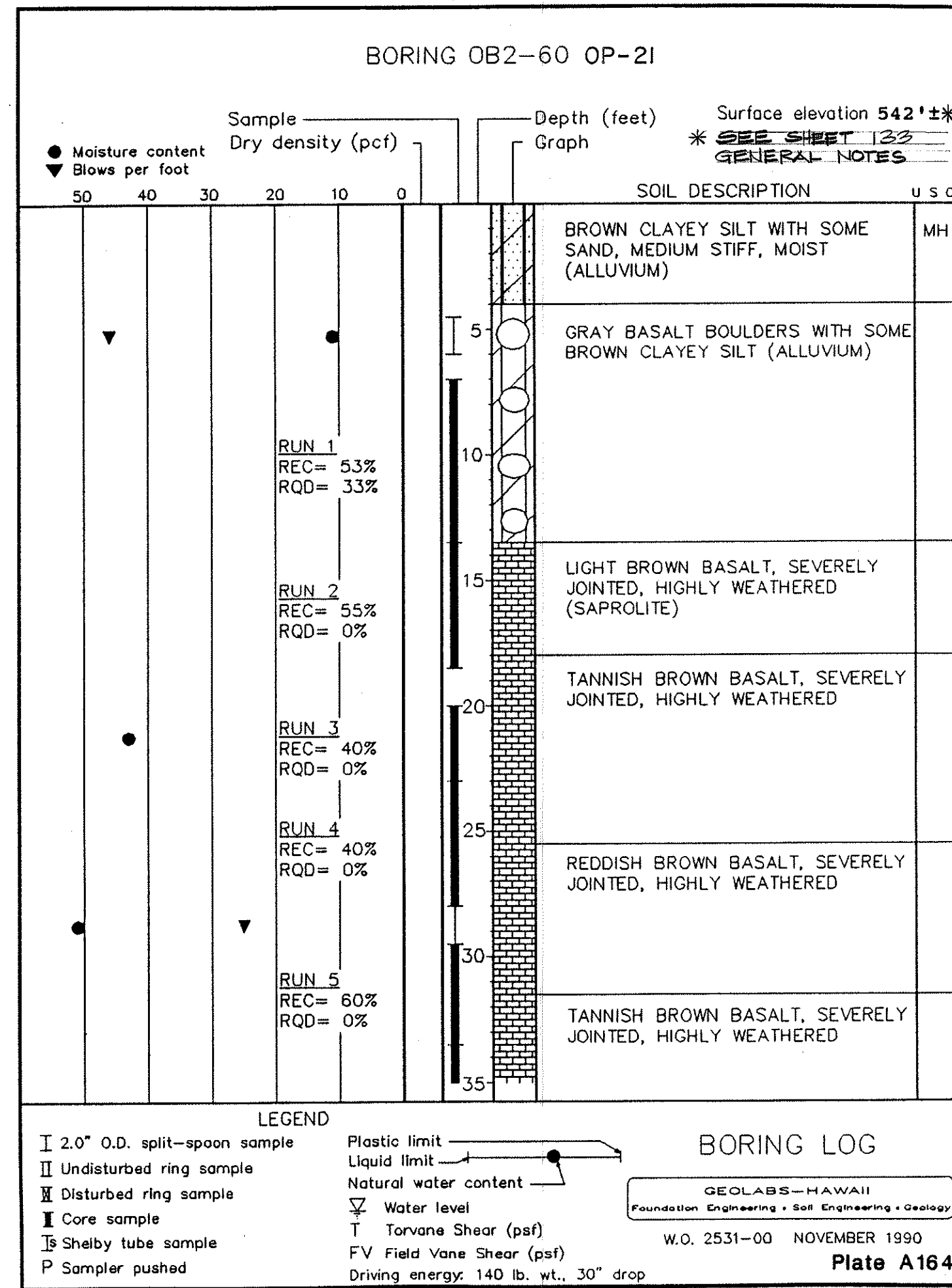
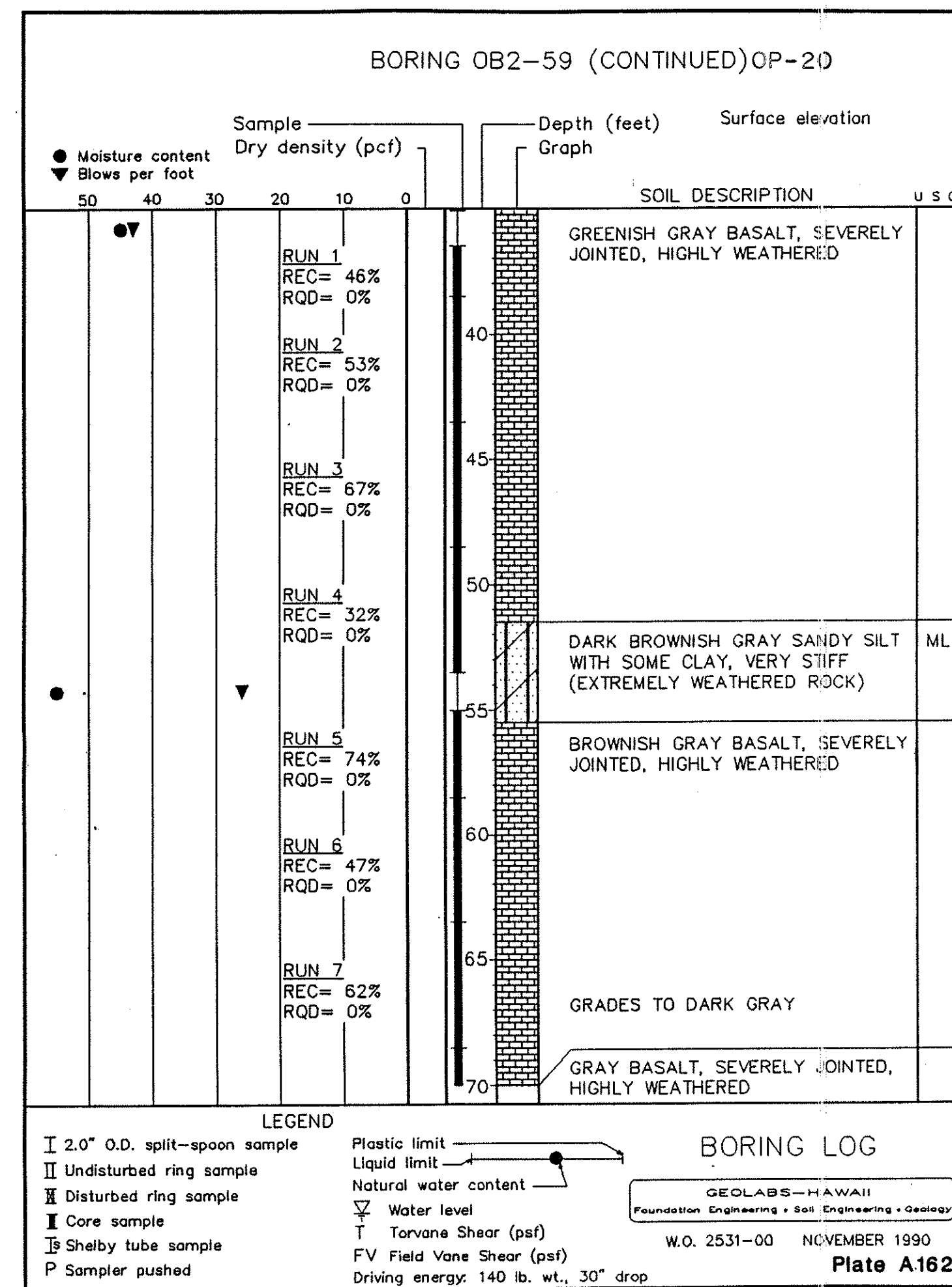
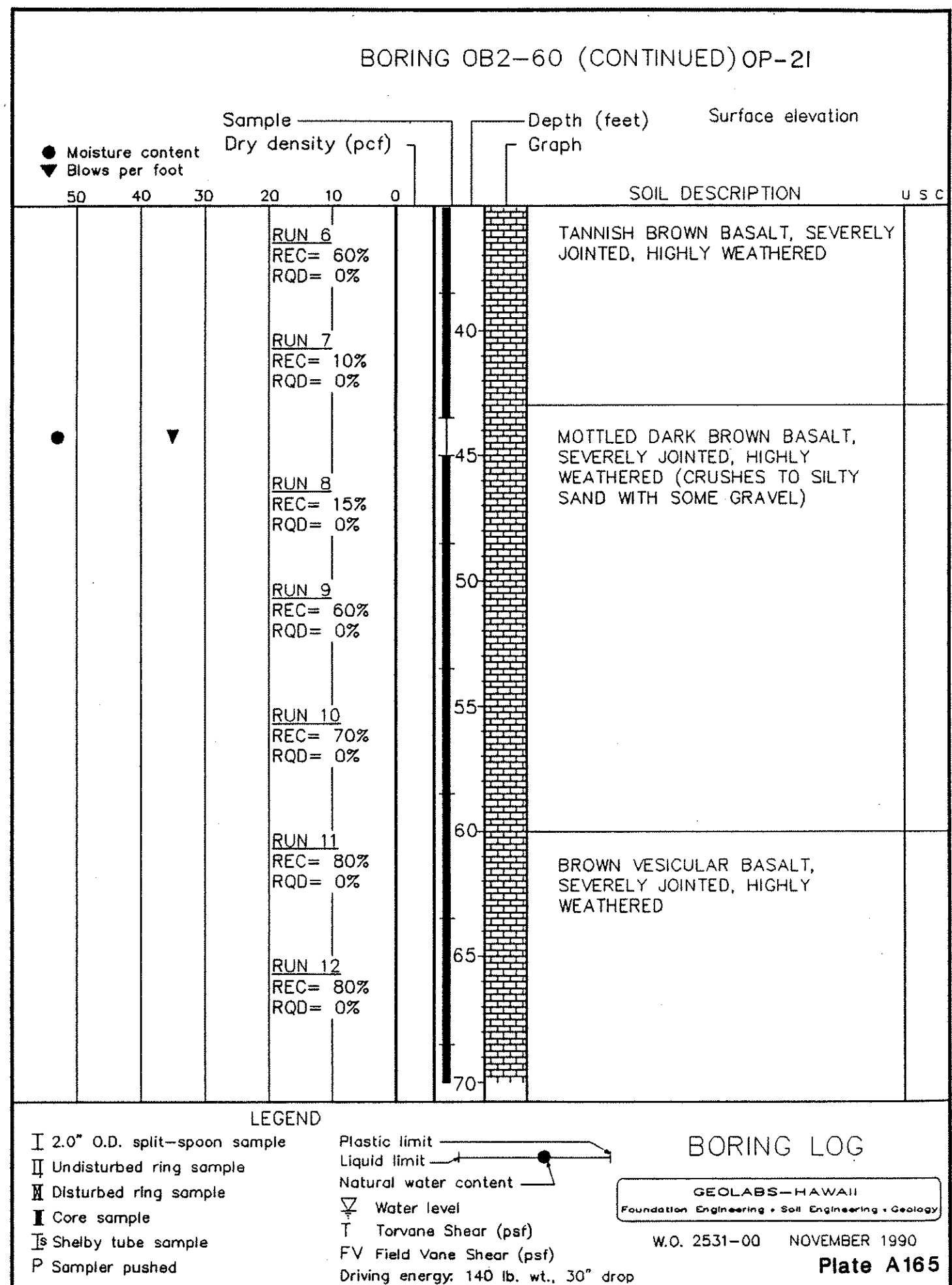
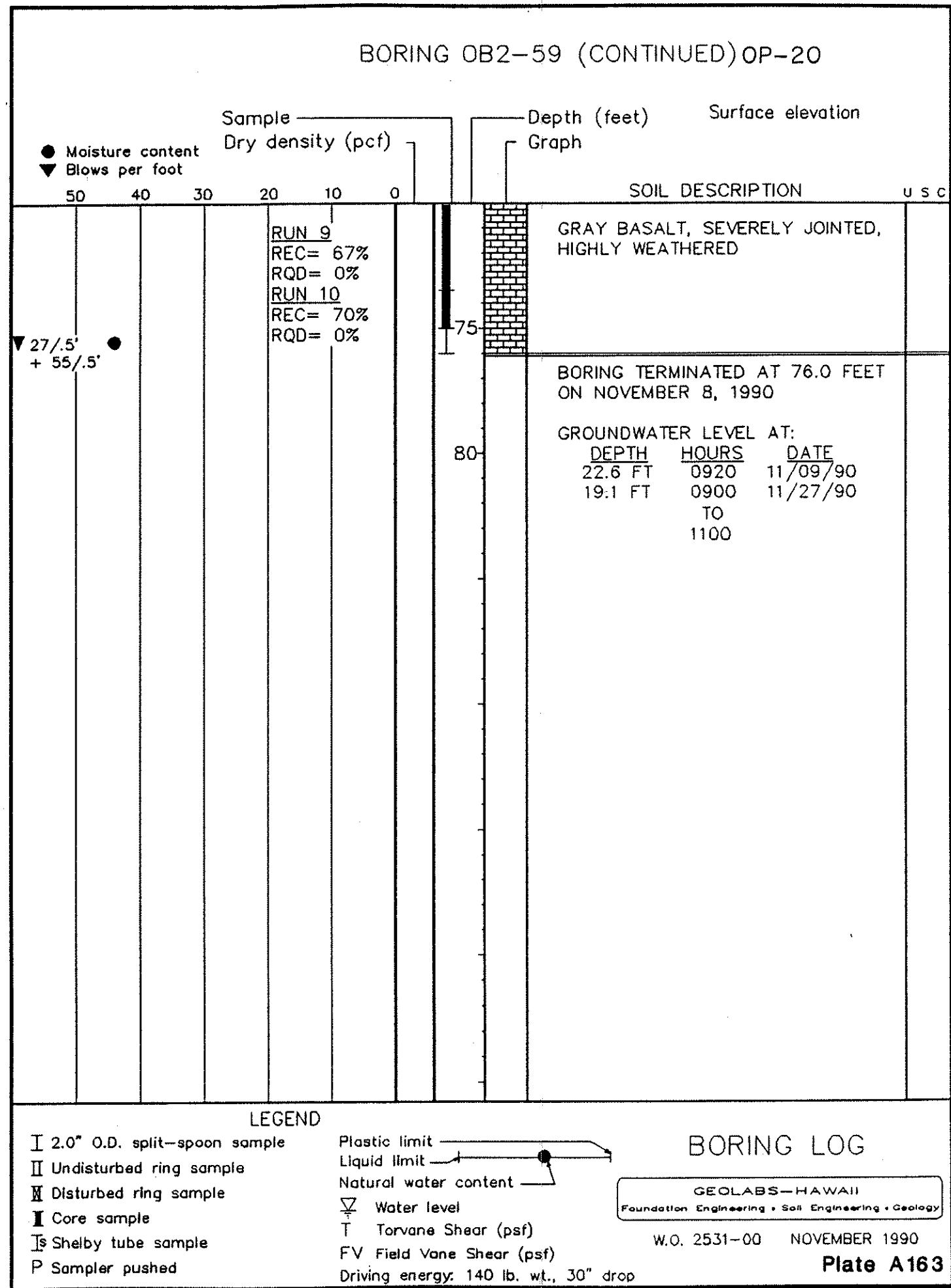
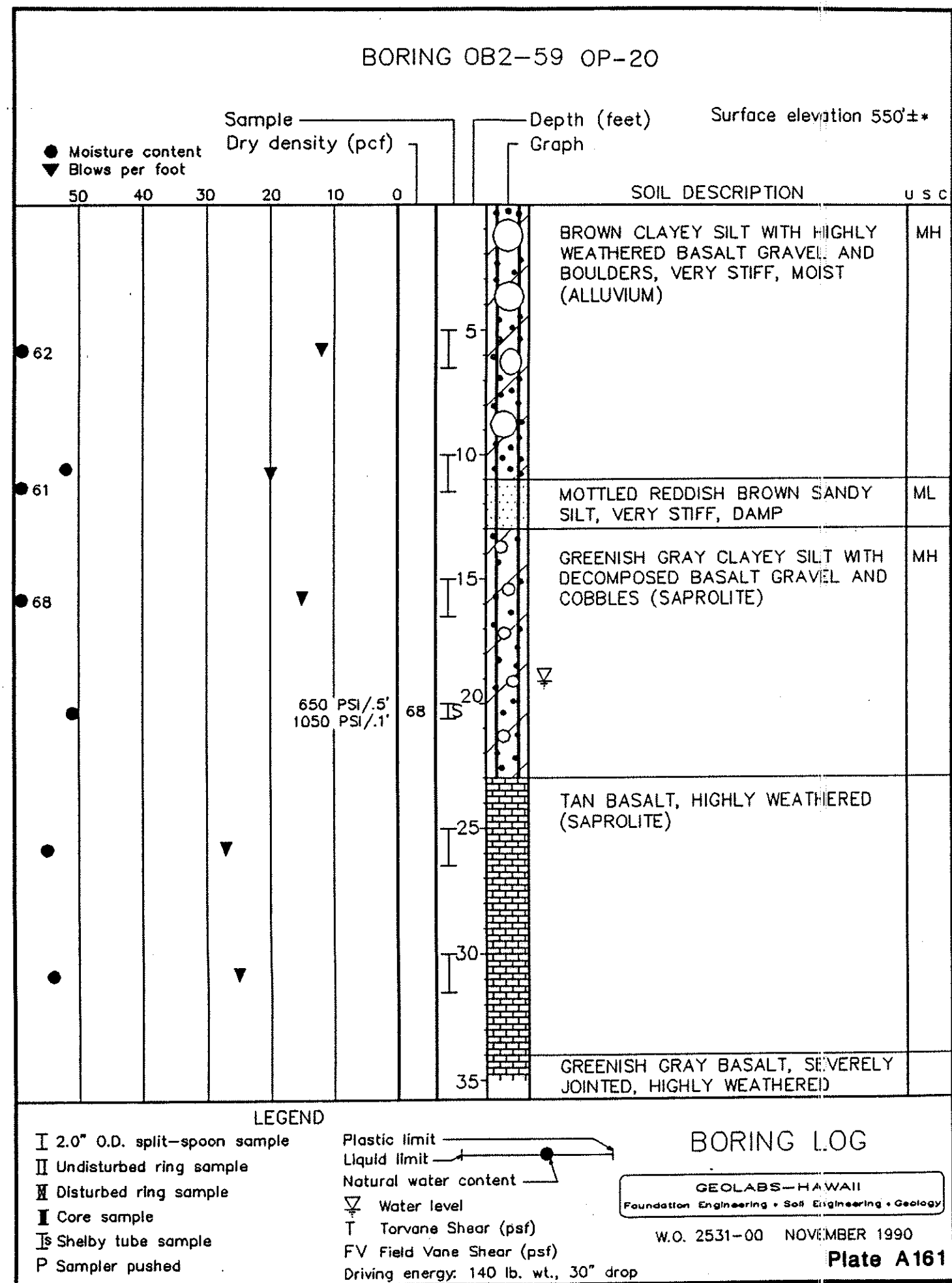
ERNEST K. HIRATA & ASSOCIATES, INC.
 Soils and Foundation Engineering
 99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787
 BORING LOG W.O. 90-1953
 BORING NO. OB2-57 (CONTINUED) OP-18 DRIVING WT. 140 lb. DATE OF DRILLING 6-9-90
 SURFACE ELEV. 535± DROP 30 in. WATER LEVEL @ 26.2 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
40							
45							
50							
55							
60							
65							
70							

Plate A155

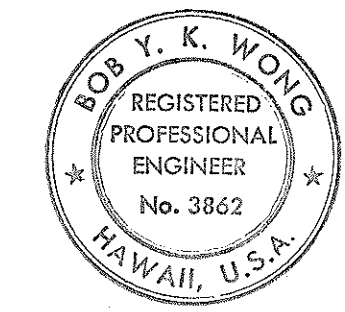
SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
CHECKED BY	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	160	325



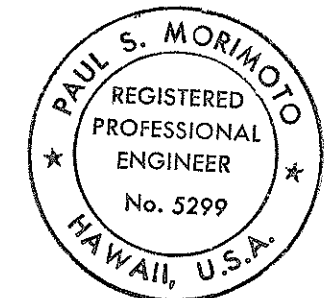
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Signature



STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOGS	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) & (70)	
SCALE: NONE	DATE: AS NOTED
SHEET NO. 160 OF 33 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H3-1(69)	1992	161	325



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Paul S. Morimoto
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EH

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BORING LOG W.O. 90-1953

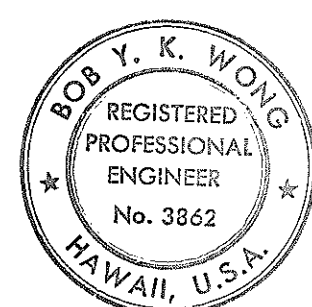
BORING NO. OB2-62 OP-23 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 6-19-90
SURFACE ELEV. 552± DROP 30 in. WATER LEVEL @ 11.4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
90							
95			32		63		
100							
105			49		49		
110							
115							
120							End boring at 106.5 feet.

Plate A173

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Bo Y. K. Wong
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. 1-H3-1(69) & (70)

SCALE: NONE

DATE: AS NOTED

SHEET NO. 161 OF 33 SHEETS

EH

ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koala Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG W.O. 90-1953

BORING NO. OB2-62 OP-23 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 6-19-90
SURFACE ELEV. 552± DROP 30 in. WATER LEVEL @ 11.4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
30			26				
35			80		34		
40			26		31		
45			19		25		
50			54		21		Grading dense from 50 feet.
55			41		32		
60							

Plate A171

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BORING LOG W.O. 90-1953

BORING NO. OB2-62 OP-23 (Cont.) DRIVING WT. 140 lb. DATE OF DRILLING 6-19-90
SURFACE ELEV. 552± DROP 30 in. WATER LEVEL @ 11.4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
60			28		No Recovery		
65			65		29		
70			32		27		
75			46		50		
80			74		41		
85							
90							

Plate A172

EH

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BORING LOG W.O. 90-1953

BORING NO. OB2-62 OP-23 DRIVING WT. 140 lb. DATE OF DRILLING 6-19-90
SURFACE ELEV. 552± DROP 30 in. WATER LEVEL @ 11.4 ft.

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH					Clayey SILT - Mottled grayish brown, moist, firm to medium stiff, with gravel.
5			3		29		
10			27		20		
15			92		29		
20			38		21		
25			76		28		
30							

Plate A170

BORING OB2-61 (CONTINUED) OP-22

Sample	Depth (feet)	Surface elevation	SOIL DESCRIPTION
Moisture content Blows per foot	Graph	546'±	BROWN CLAYEY SILT WITH SOME SAND, GRAVEL, COBBLES AND BOULDERS, VERY STIFF, WET (ALLUVIUM)
			LIGHT BROWN TO DARK GRAY BASALT, SEVERELY JOINTED, HIGHLY WEATHERED (SAPROLITE)
			TANNISH BROWN BASALT, SEVERELY JOINTED, HIGHLY WEATHERED
			REDDISH BROWN BASALT, HIGHLY WEATHERED (CRUSHES TO CLAYEY SILT WITH SOME GRAVEL)
			GRAY BASALT, SEVERELY TO MODERATELY JOINTED, MODERATELY TO HIGHLY WEATHERED

LEGEND	BORING LOG
I 2.0" O.D. split-spoon sample II Undisturbed ring sample III Disturbed ring sample IV Core sample V Shelby tube sample P Sampler pushed	Plastic limit Liquid limit Natural water content Water level Torvane Shear (psf) Field Vane Shear (psf) Driving energy 140 lb. wt., 30" drop

Plate A169

BORING OB2-61 OP-22

Sample	Depth (feet)	Surface elevation	SOIL DESCRIPTION
Moisture content Blows per foot	Graph	546'±	BROWN CLAYEY SILT WITH SOME SAND, GRAVEL, COBBLES AND BOULDERS, VERY STIFF, WET (ALLUVIUM)
			LIGHT BROWN TO DARK GRAY BASALT, SEVERELY JOINTED, HIGHLY WEATHERED (SAPROLITE)
			TANNISH BROWN BASALT, SEVERELY JOINTED, HIGHLY WEATHERED
			REDDISH BROWN BASALT, HIGHLY WEATHERED (CRUSHES TO CLAYEY SILT WITH SOME GRAVEL)
			GRAY BASALT, SEVERELY TO MODERATELY JOINTED, MODERATELY TO HIGHLY WEATHERED

LEGEND	BORING LOG
I 2.0" O.D. split-spoon sample II Undisturbed ring sample III Disturbed ring sample IV Core sample V Shelby tube sample P Sampler pushed	Plastic limit Liquid limit Natural water content Water level Torvane Shear (psf) Field Vane Shear (psf) Driving energy 140 lb. wt., 30" drop

Plate A167

BORING OB2-61 (CONTINUED) OP-22

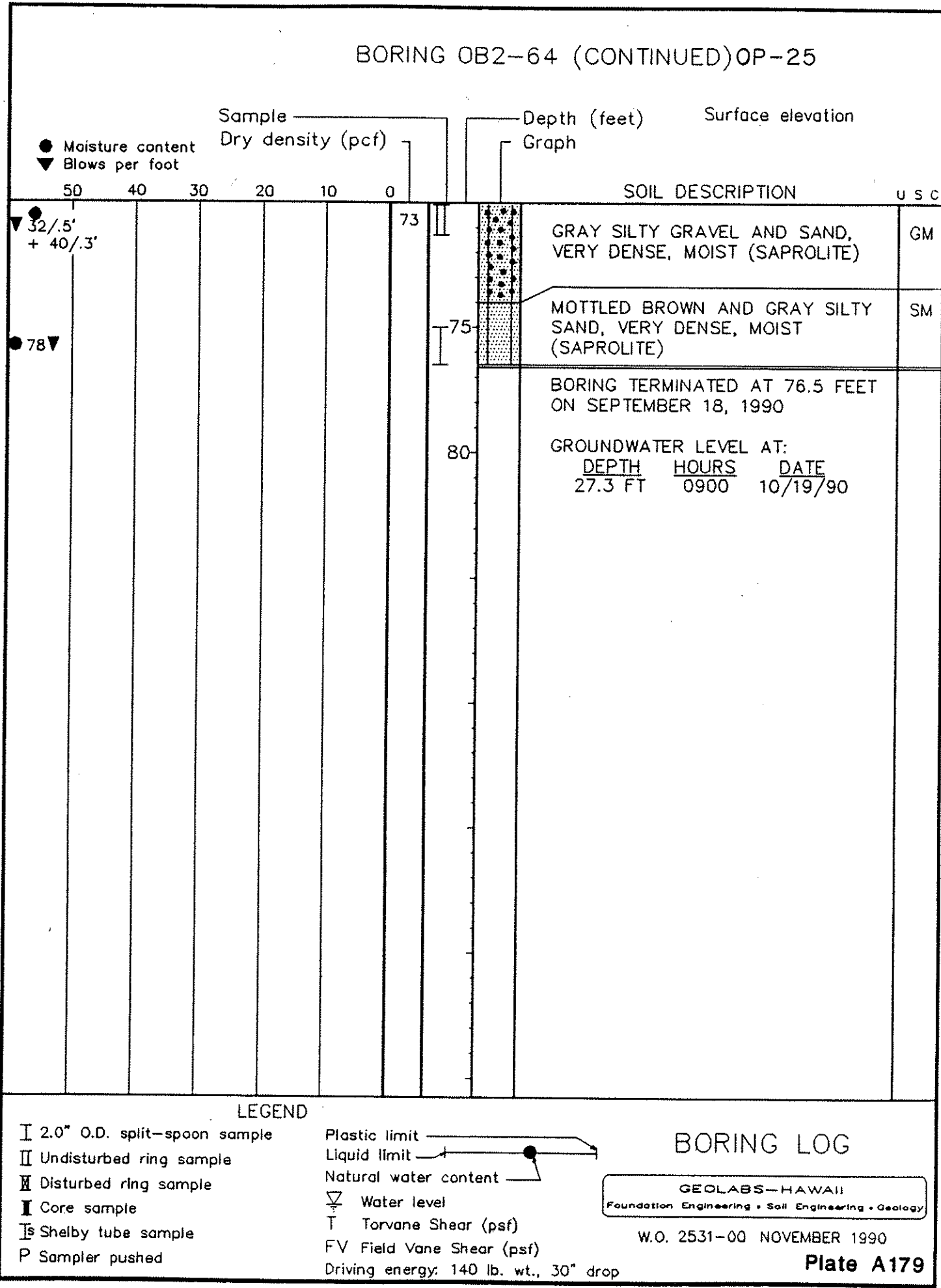
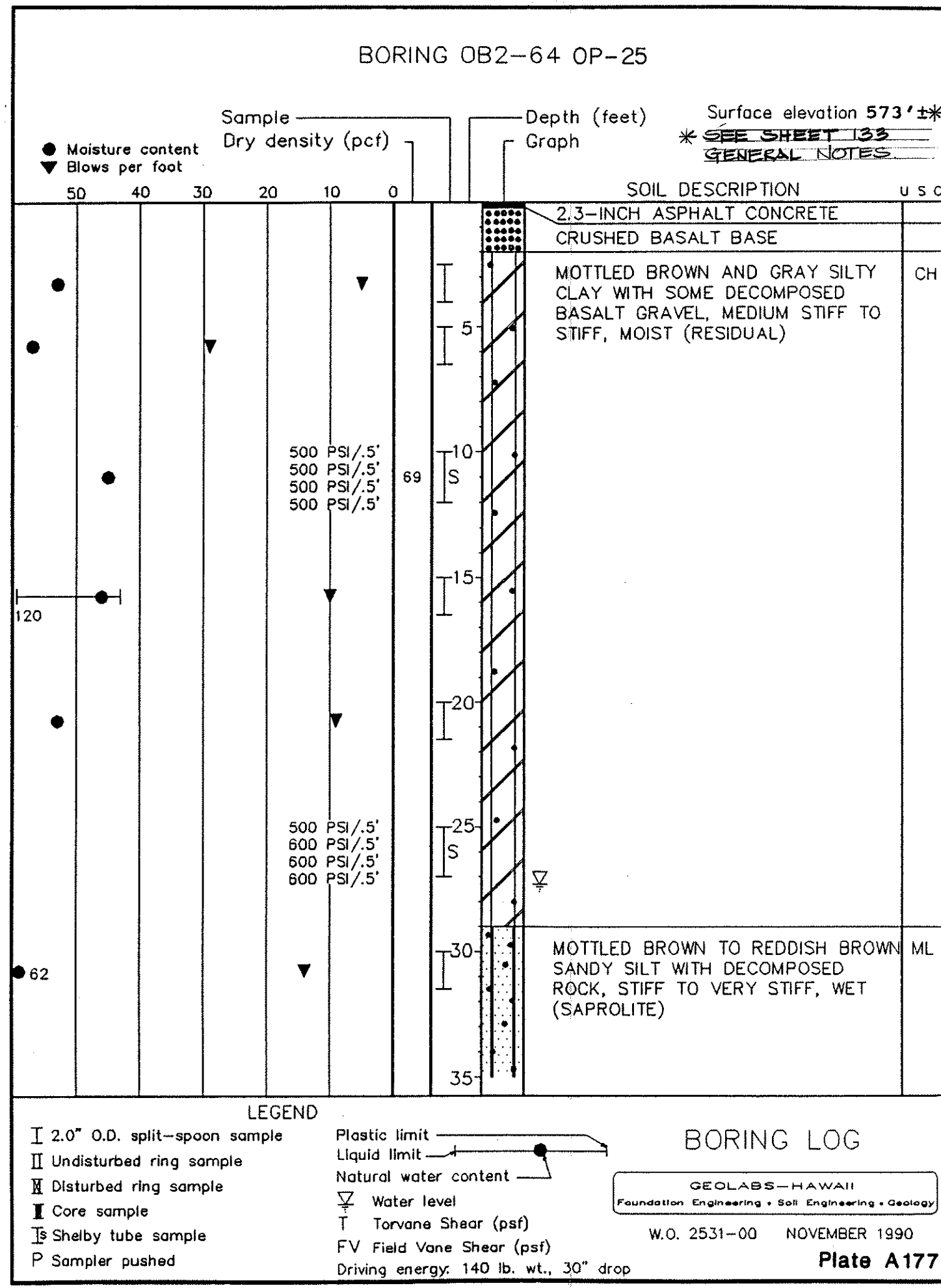
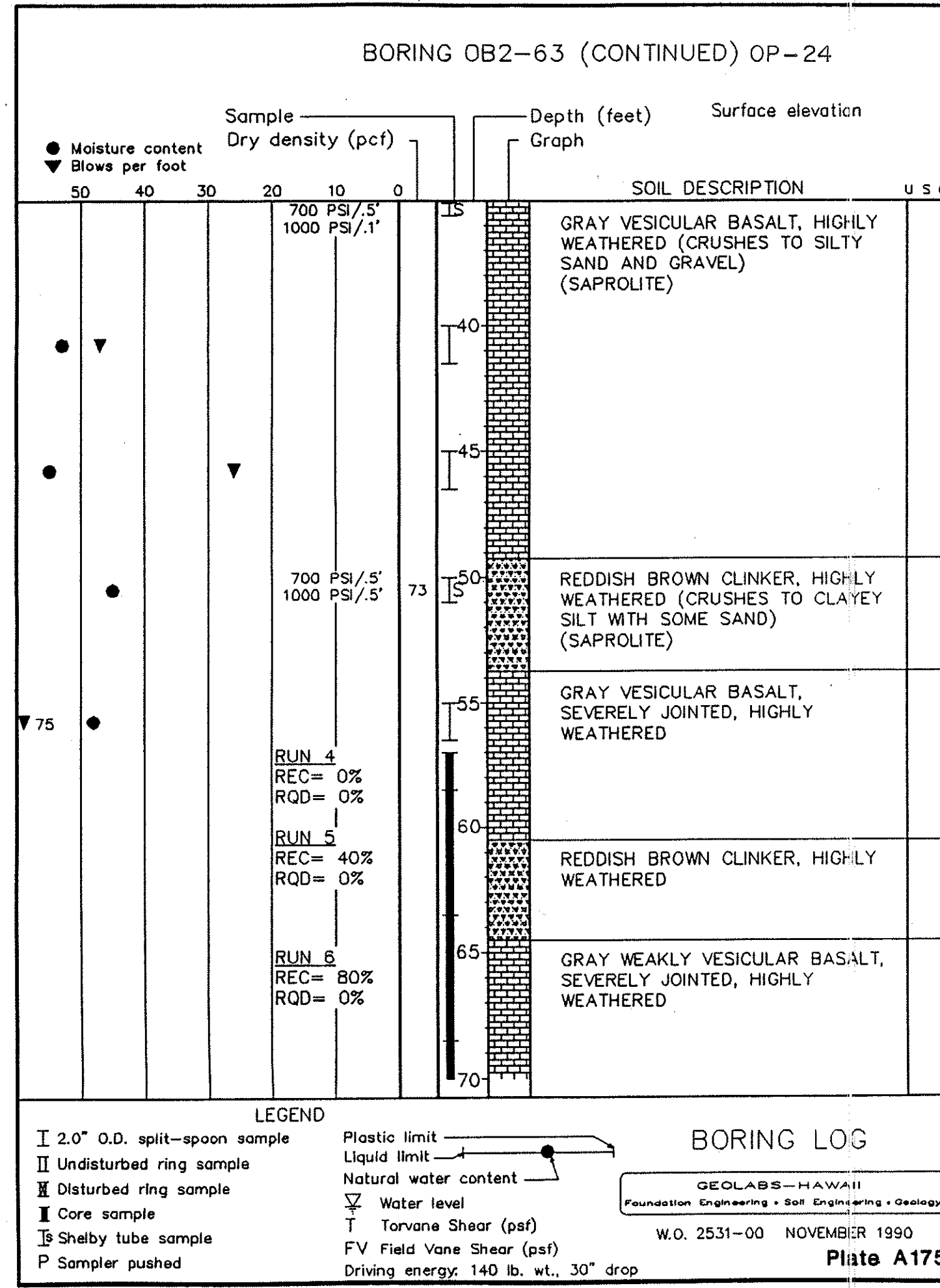
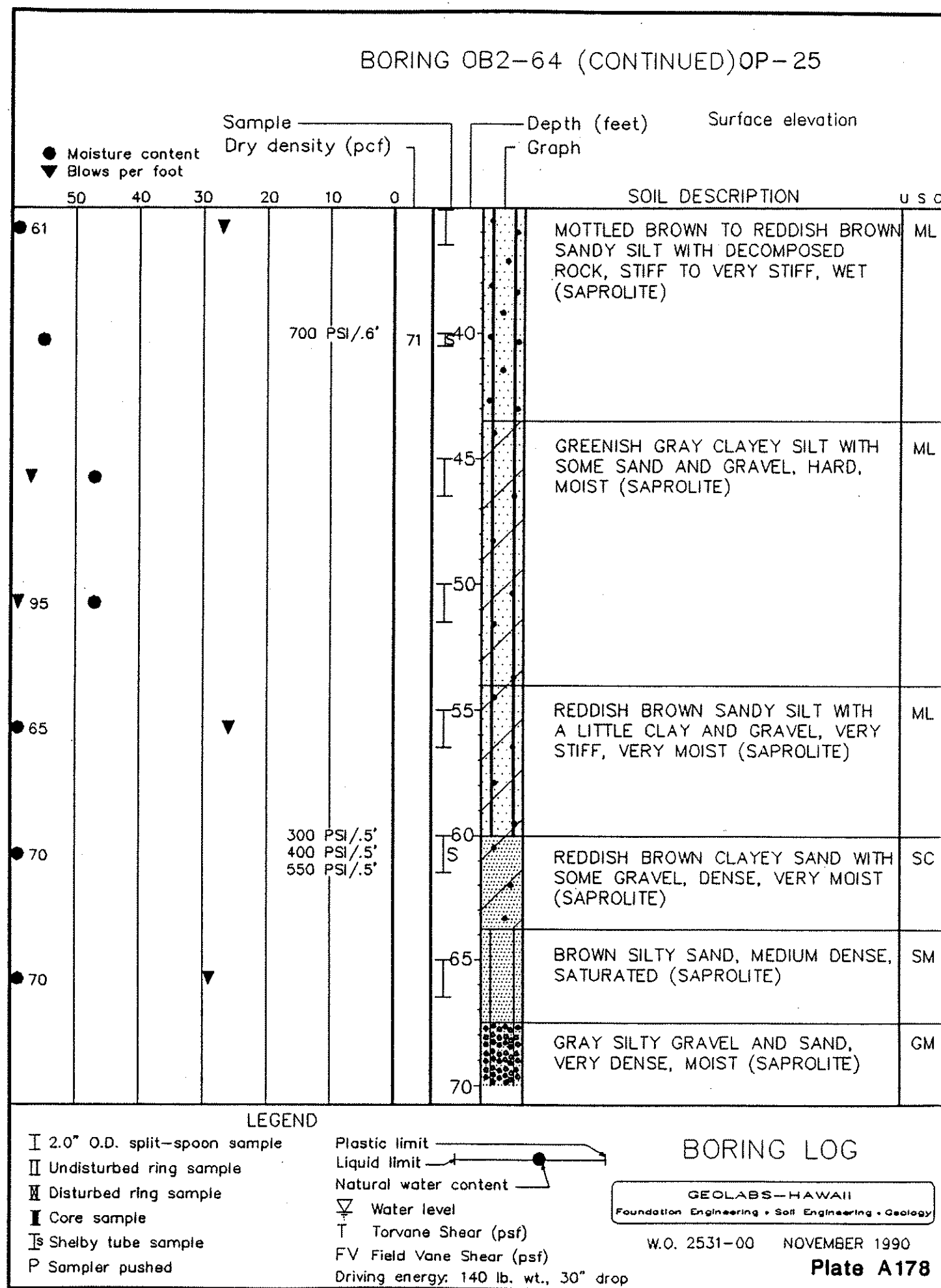
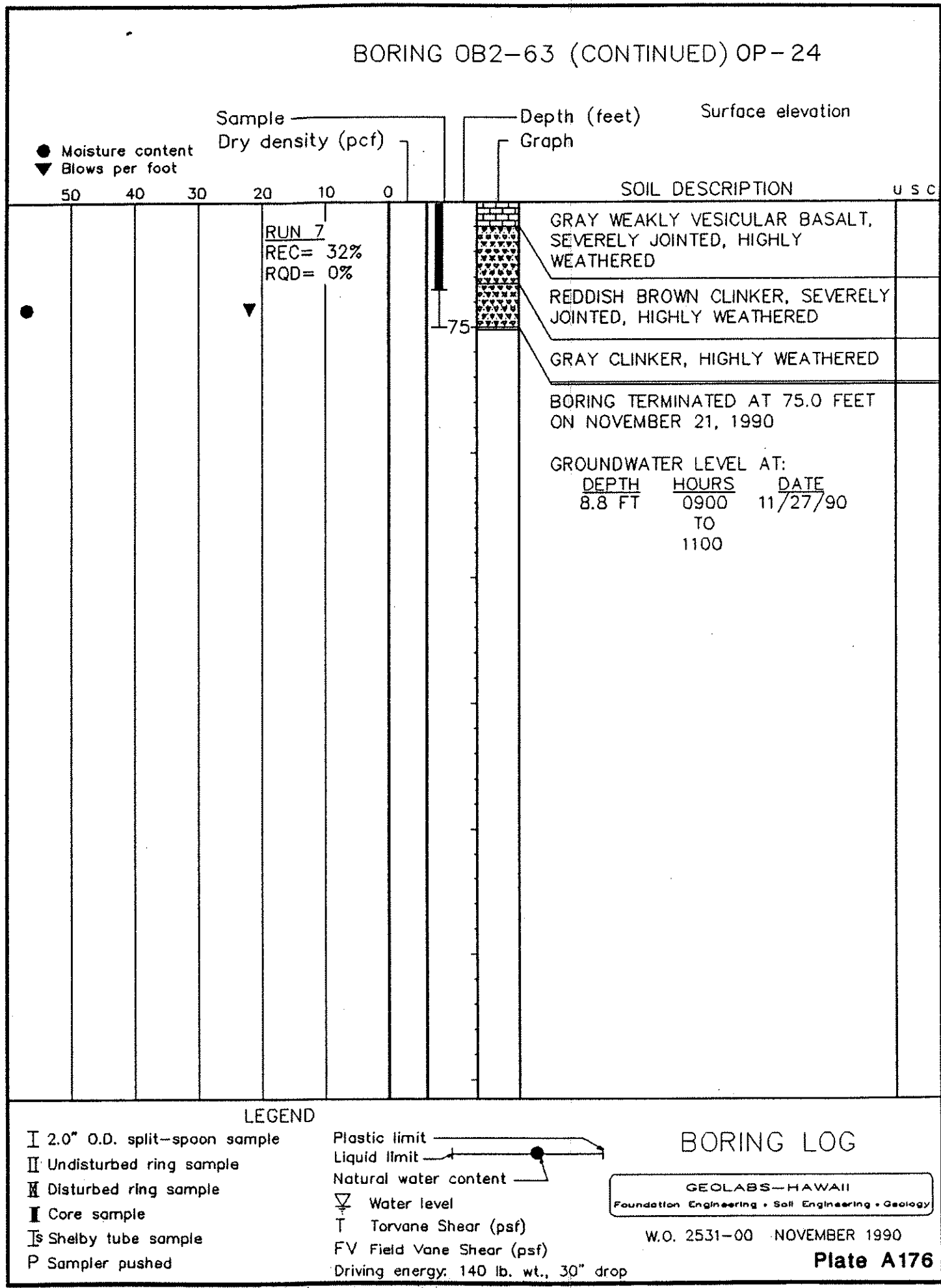
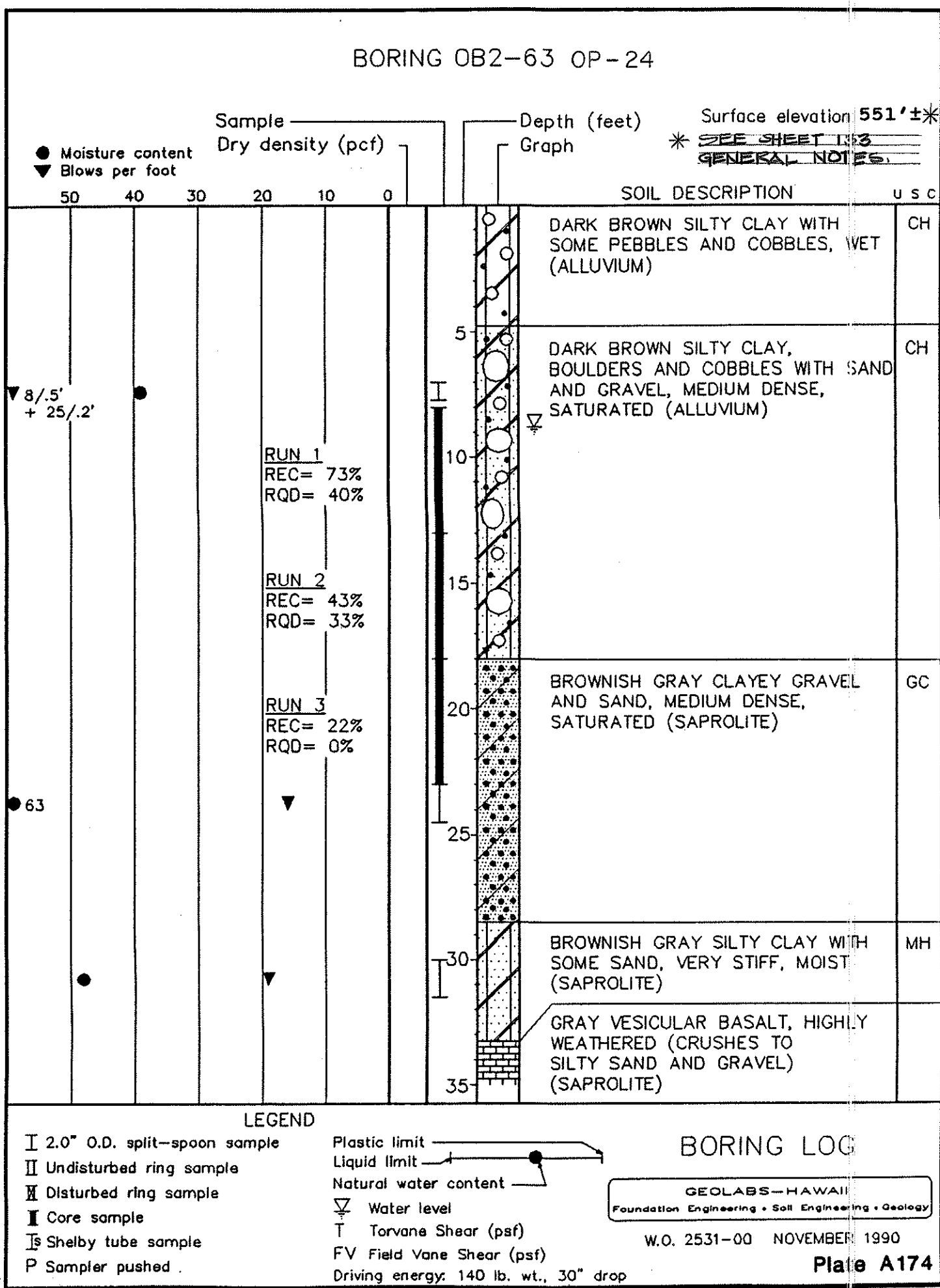
Sample	Depth (feet)	Surface elevation	SOIL DESCRIPTION
Moisture content Blows per foot	Graph	546'±	GRAY BASALT, SEVERELY TO MODERATELY JOINTED, MODERATELY TO HIGHLY WEATHERED
			GRAY AND MOTTLED RED CLINKER, SEVERELY JOINTED, HIGHLY WEATHERED
			GRAY WEAKLY VESICULAR BASALT, MODERATELY JOINTED, MODERATELY WEATHERED
			REDDISH BROWN CLINKER, SEVERELY JOINTED, EXTREMELY WEATHERED
			GRAY BASALT, MODERATELY JOINTED, MODERATELY WEATHERED
			BROWN GRAY CLINKER, SEVERELY JOINTED, EXTREMELY WEATHERED
			ORANGE RED TUFF (CRUSHES TO SILT)
			LIGHT BROWN VESICULAR BASALT, BASALT, MODERATELY JOINTED, HIGHLY WEATHERED
			GRAY BASALT, MODERATELY JOINTED, MODERATELY TO HIGHLY WEATHERED
			ORANGE RED CLINKER, SLIGHTLY JOINTED, EXTREMELY WEATHERED
			GRAY BASALT, SEVERELY JOINTED, MODERATELY WEATHERED

LEGEND	BORING LOG
I 2.0" O.D. split-spoon sample II Undisturbed ring sample III Disturbed ring sample IV Core sample V Shelby tube sample P Sampler pushed	Plastic limit Liquid limit Natural water content Water level Torvane Shear (psf) Field Vane Shear (psf) Driving energy 140 lb. wt., 30" drop

Plate A168

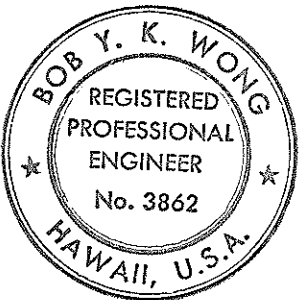
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SURVEY PLOTTED BY	_____
DRAWN BY	_____
TRACED BY	_____
DESIGNED BY	_____
CHECKED BY	_____
NOTE BOOK	_____
No.	_____

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(69)	1992	162	325



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Bob Y. K. Wong



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

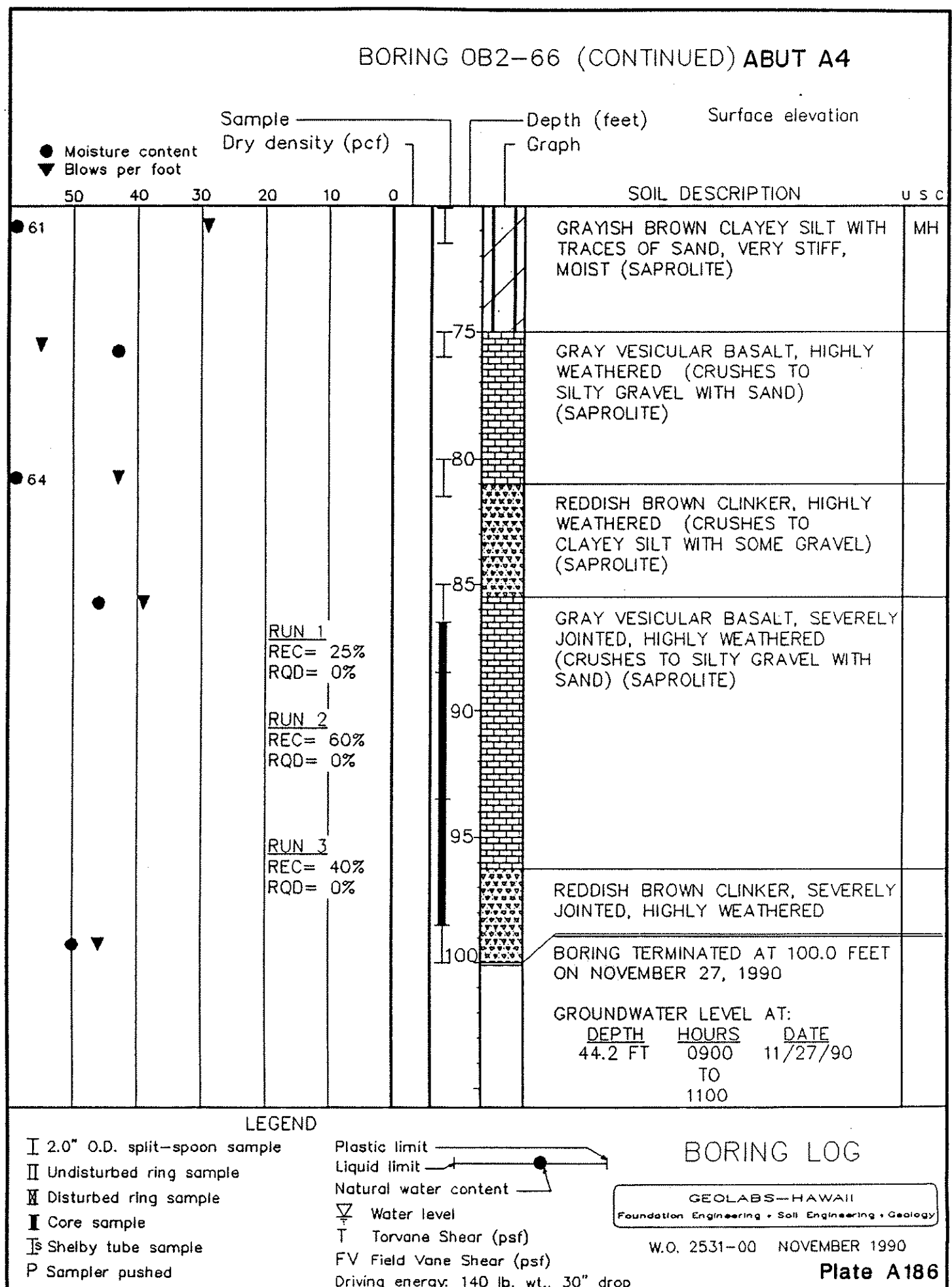
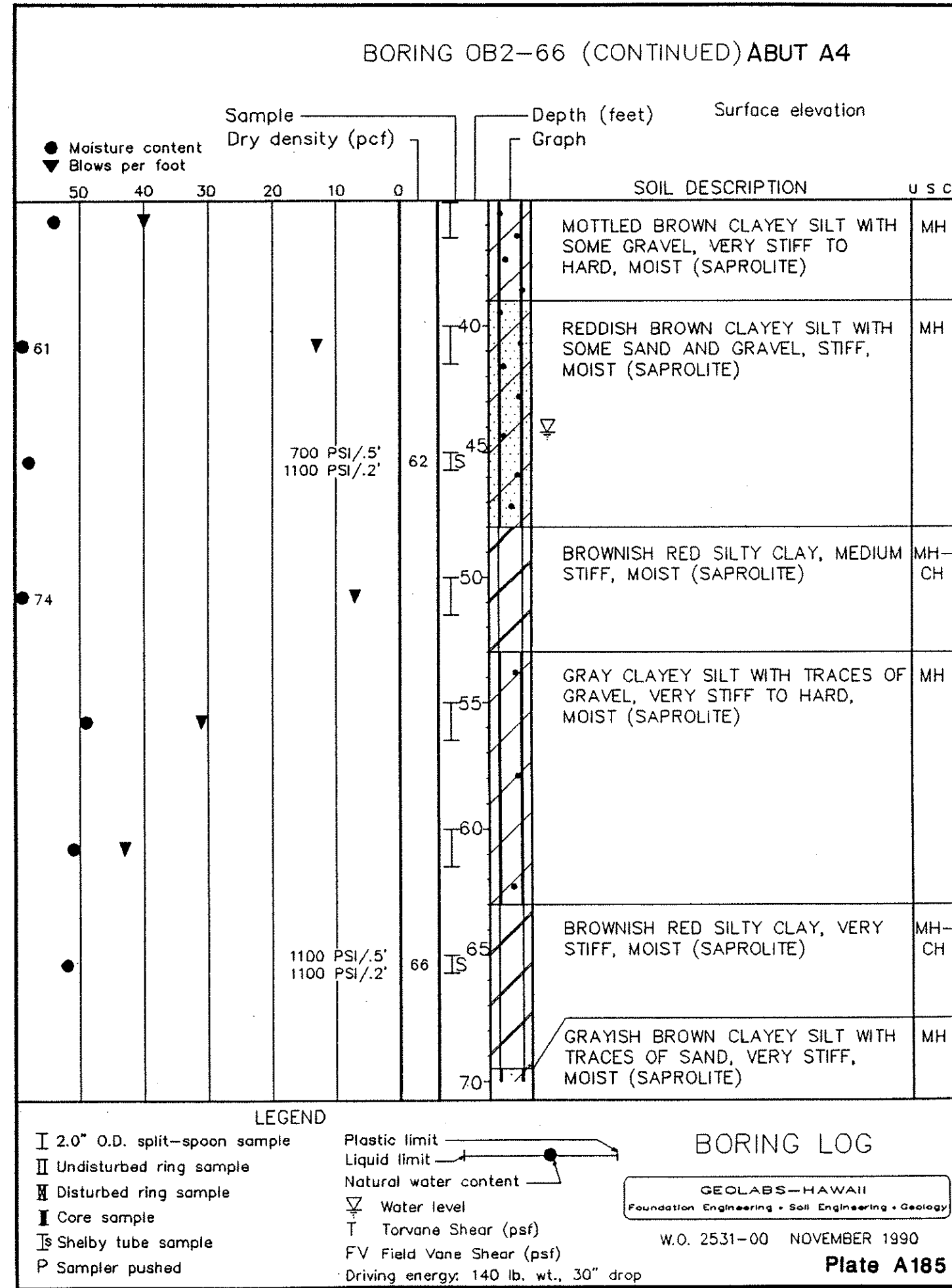
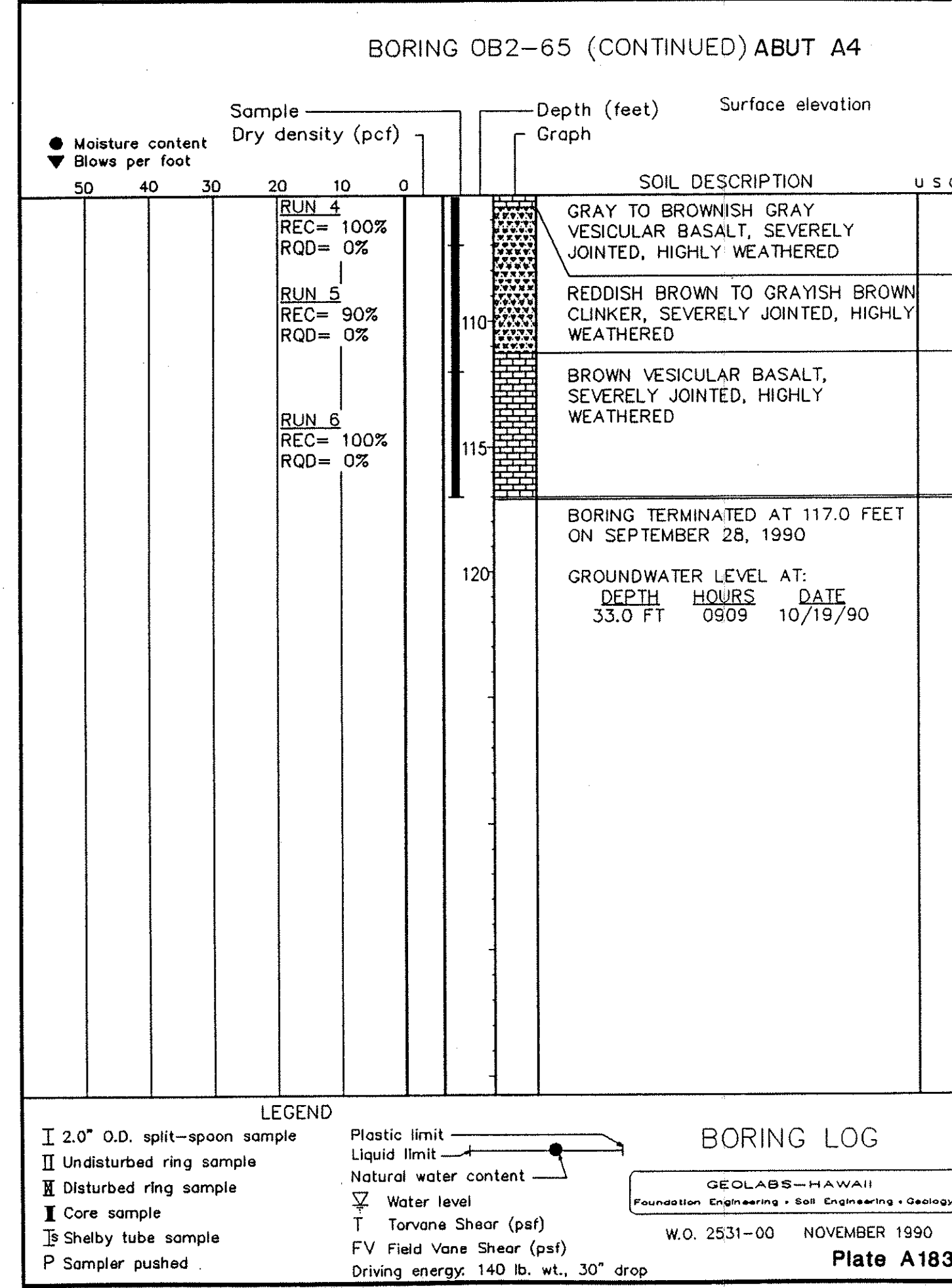
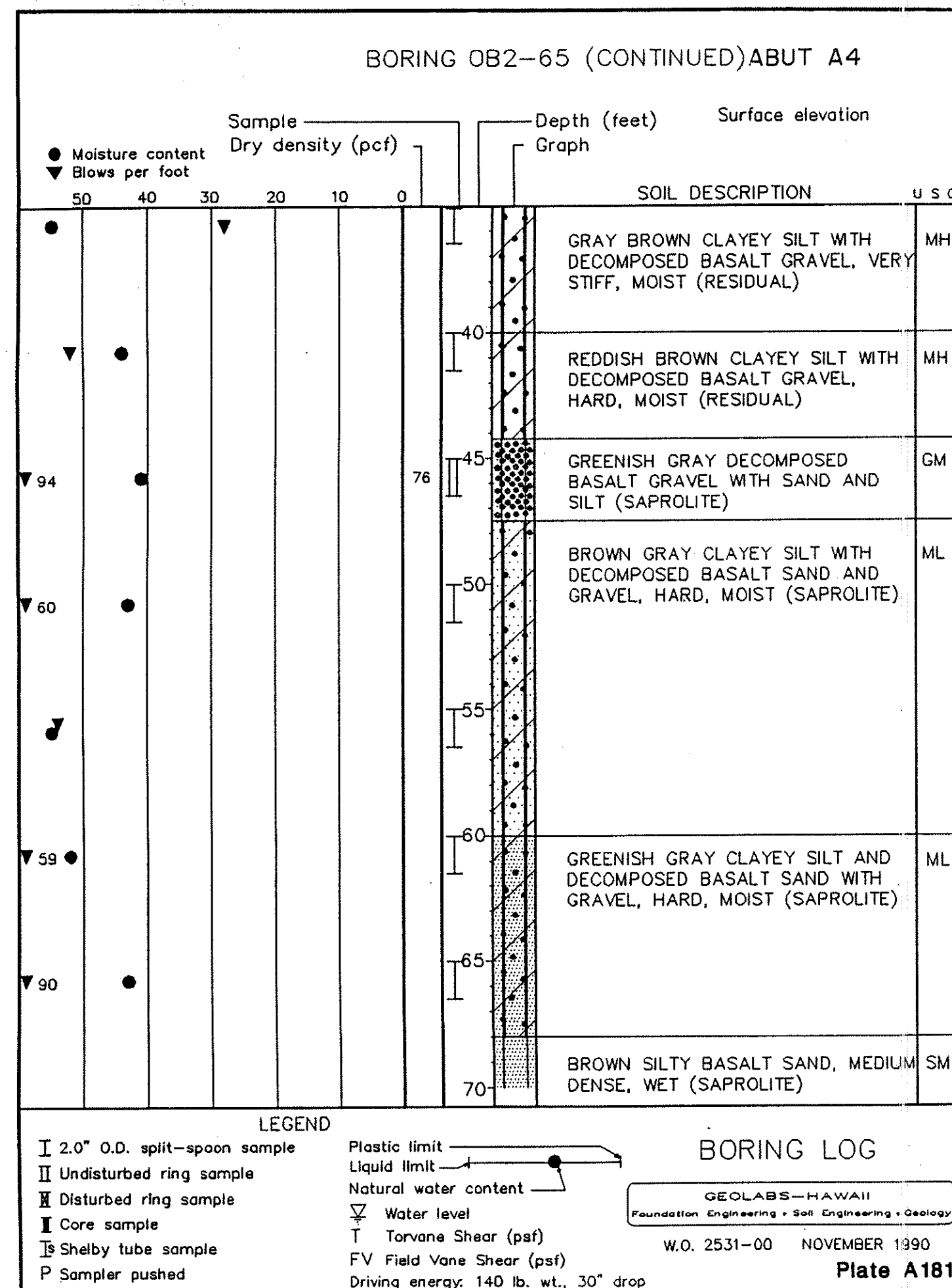
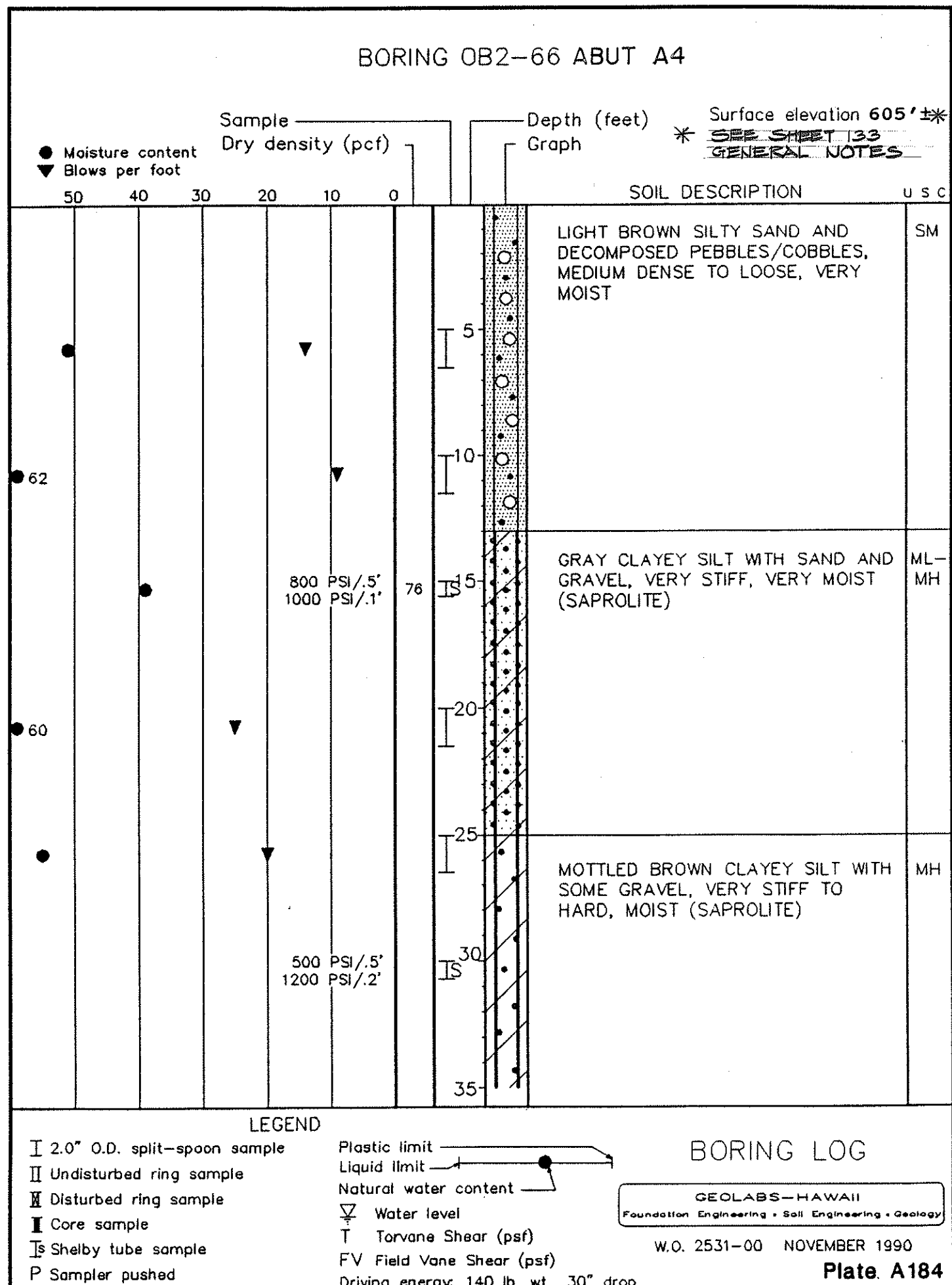
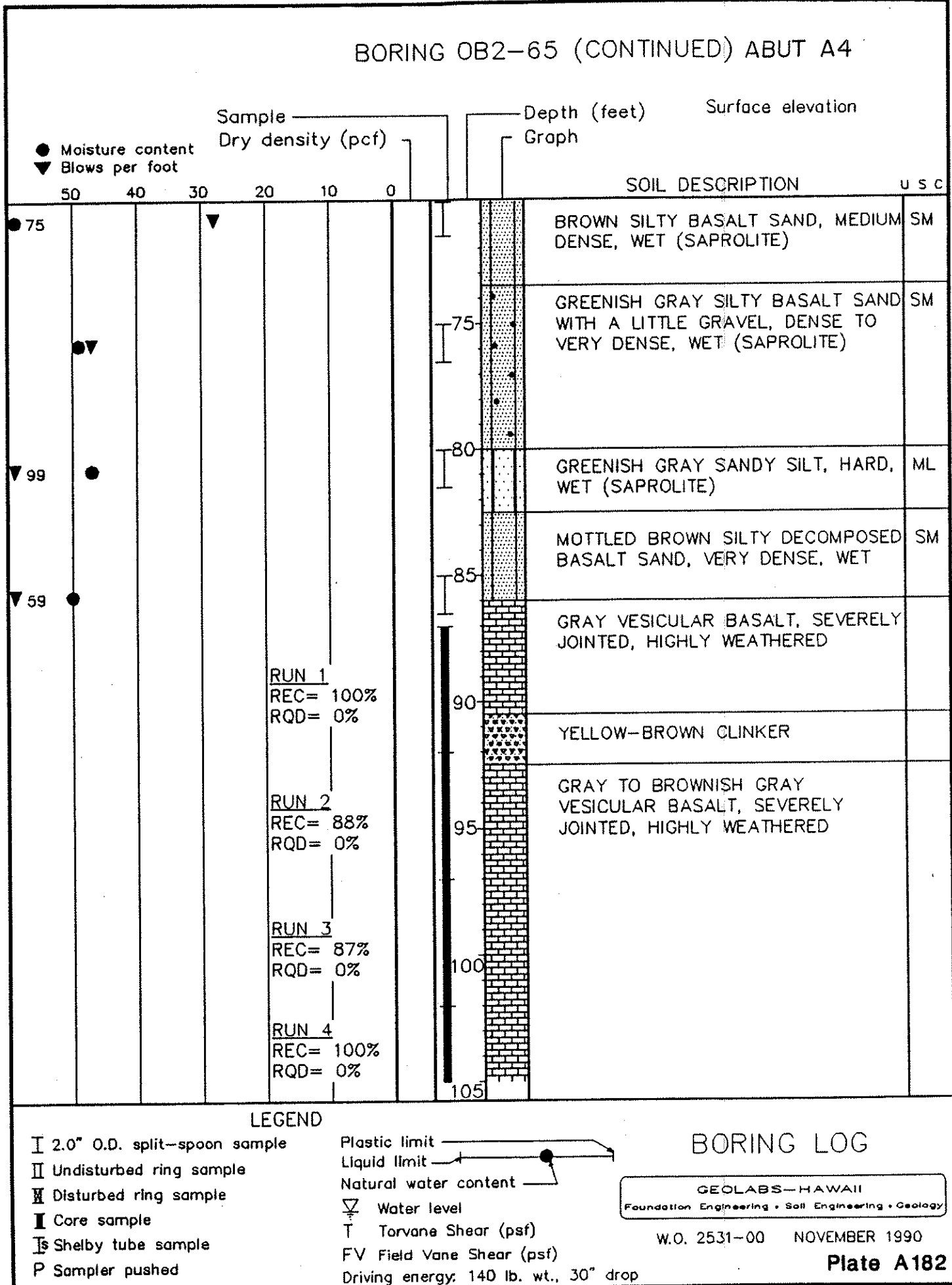
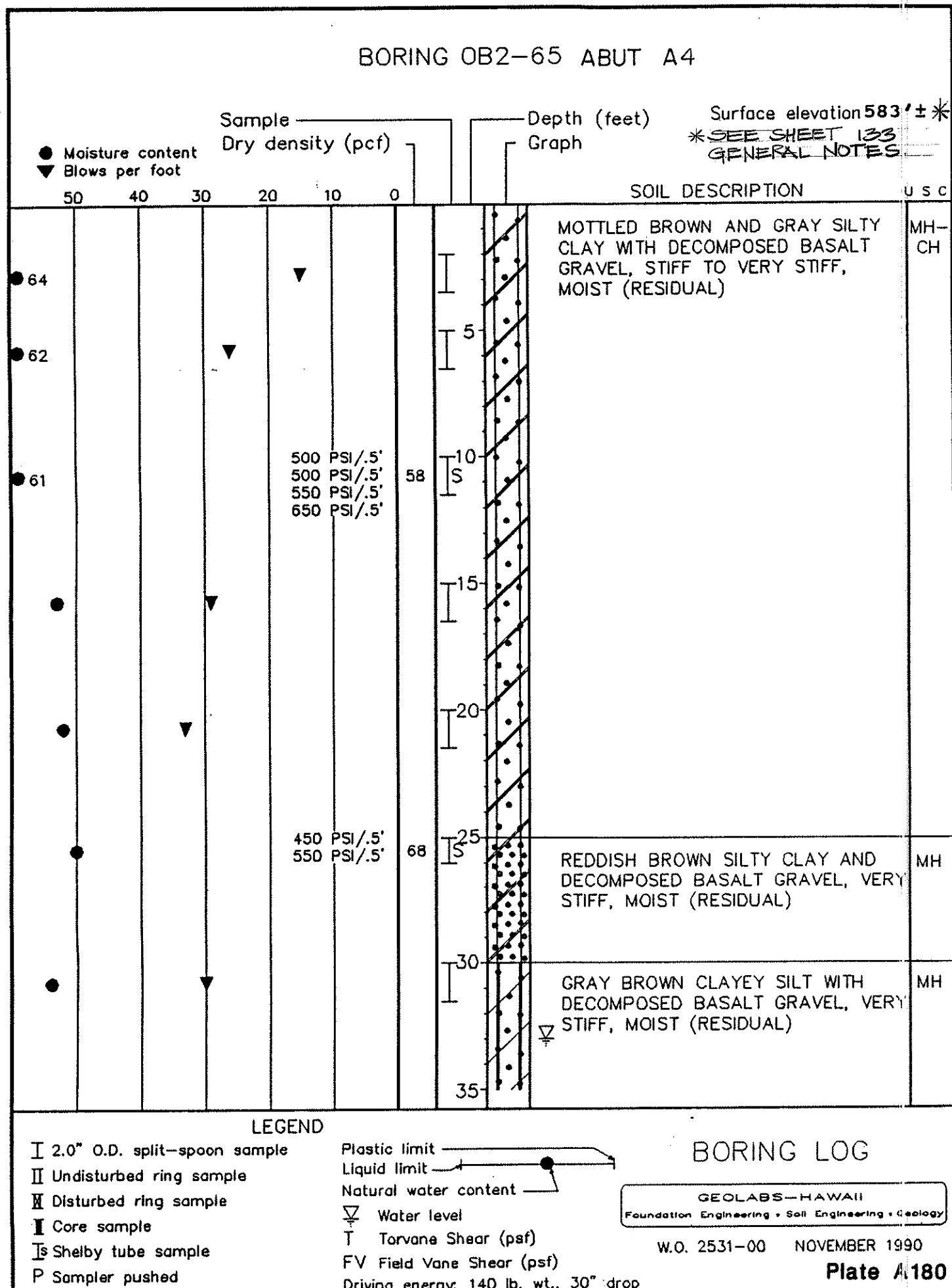
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE

DATE: AS NOTED

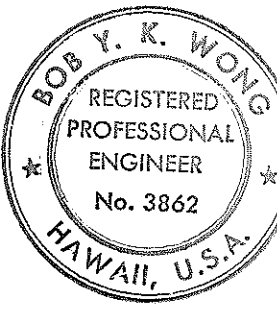
SHEET NO. 162 OF 325 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H3-1(69)	1992	109	325



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Signature: *Bob V. K. Wong*



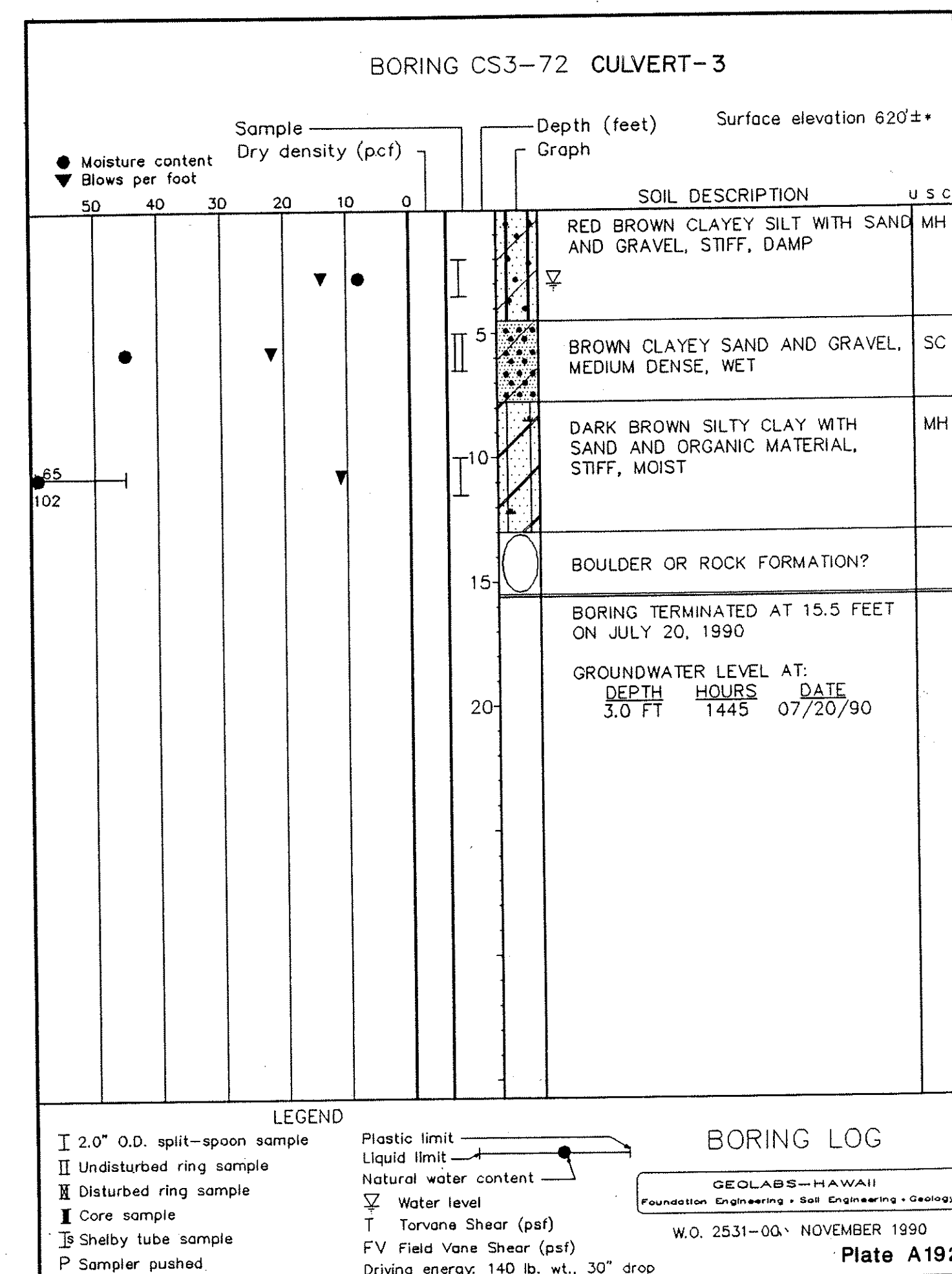
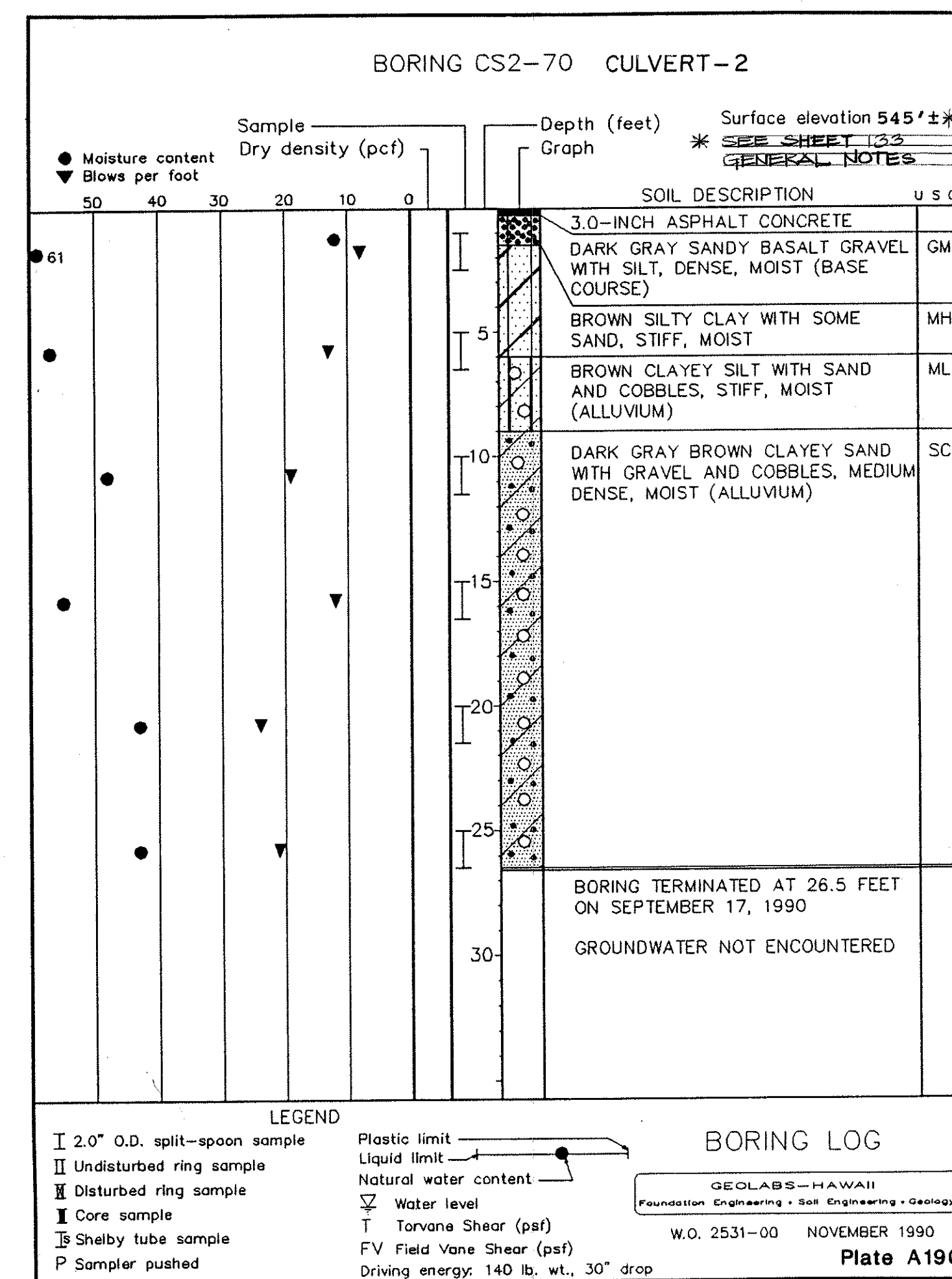
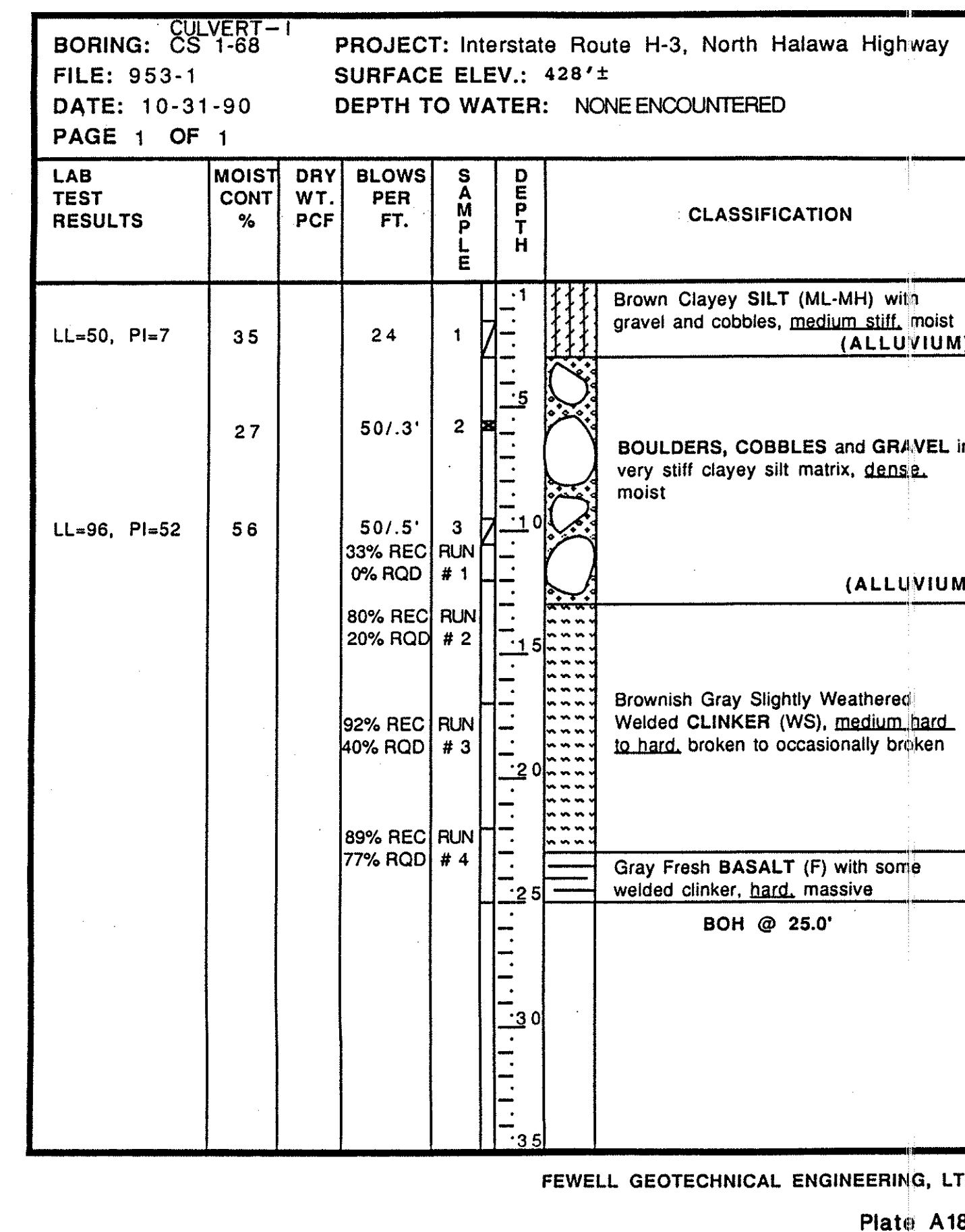
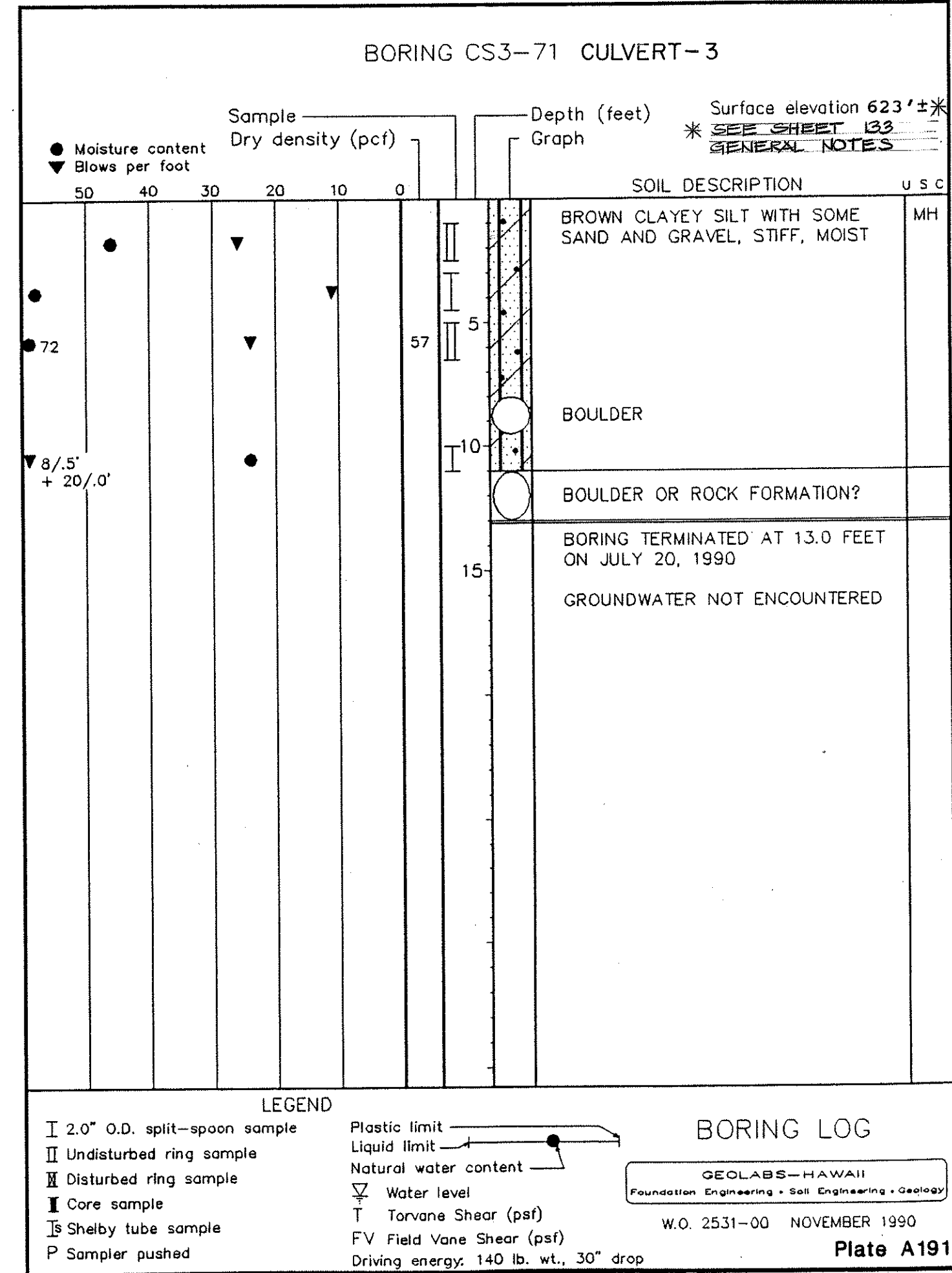
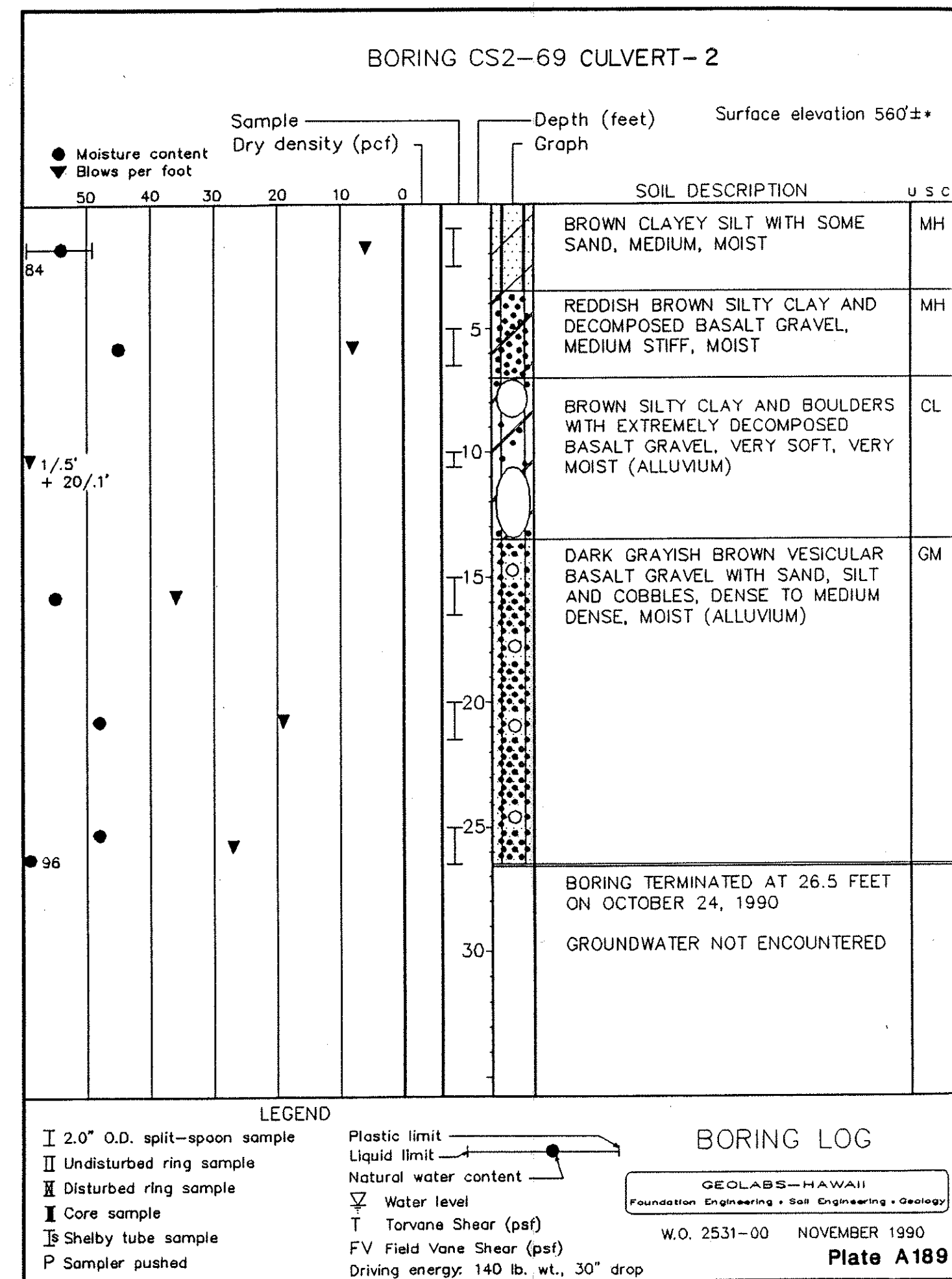
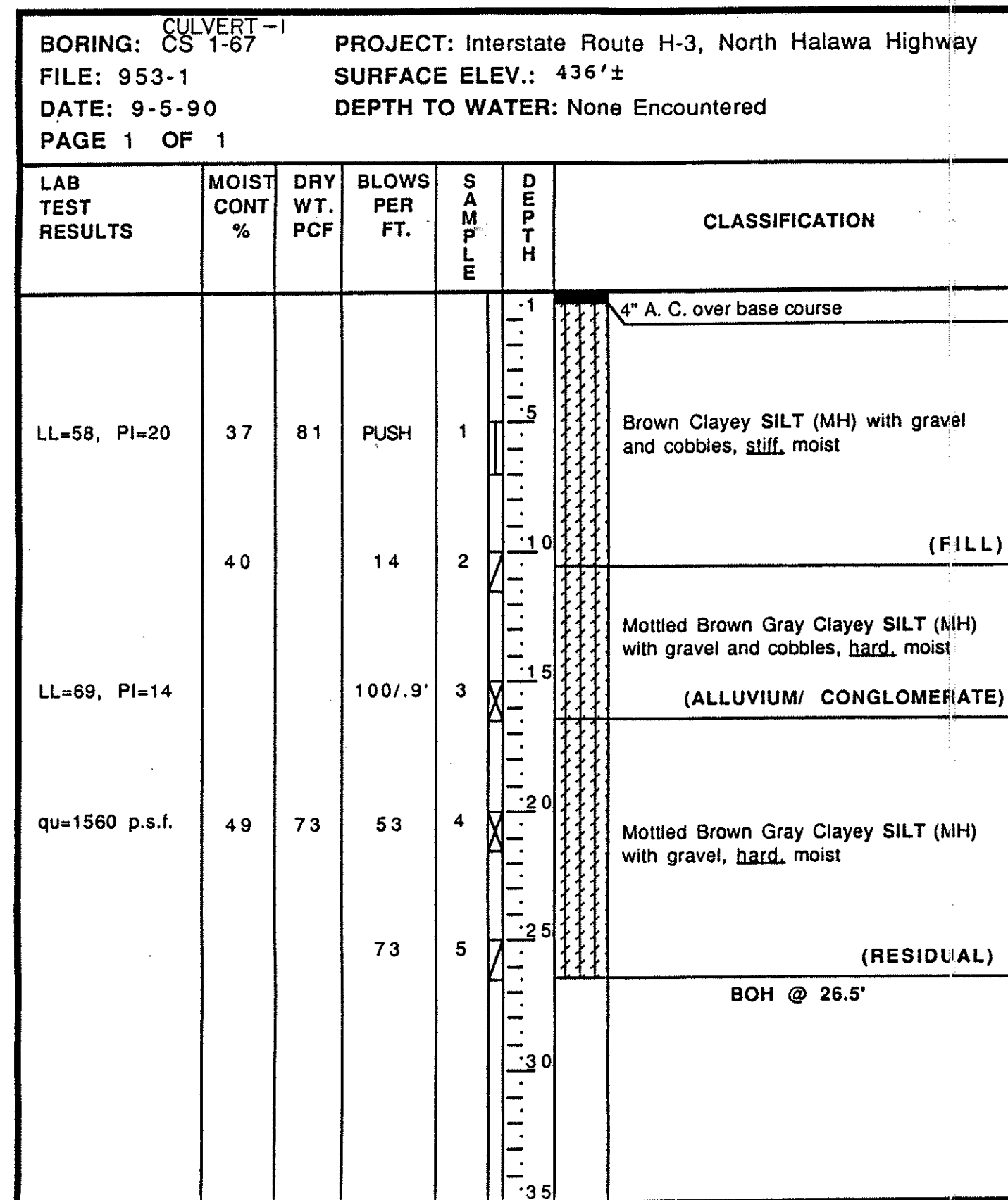
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. 1-H3-1(69) & (70)

SCALE: NONE DATE: AS NOTED

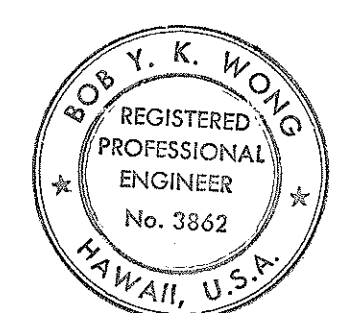
SHEET No. 109 OF 325 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1 (69)	1992	104	325

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Bob Y. K. Wong
SIGNATURE



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I-H3-1(69) & (70)

SCALE: NONE

DATE: AS NOTED

SHEET NO. 104 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1 (69)	1992	165	325

FH

ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering
99-1433 Koahe Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG

W.O. 90-1953

BORING NO. 370'± FROM CULVERT-1
OGB-73
SURFACE ELEV. 436±
DRIVING WT. 140 lb.
DATE OF DRILLING 6-22-90
DROP 30 in.
WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH					Clayey SILT - Mottled brown, moist, firm to medium stiff, with gravel and roots at upper 5 feet. Covered by 4 inches of asphaltic concrete and 8 inches of base course material.
5			15/0" 6	No Penetration	51		
10			75	42			
15			6/6"	52			Grading with cobbles and boulders from 9 feet.
20			72	39			
25			4	66			
30			68	41			
35							End boring at 26 feet.
40							
45							
50							
55							
60							

Plate A193

FH

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BORING LOG

W.O. 90-1953

BORING NO. 220'± FROM CULVERT-3
OGB-74
SURFACE ELEV. 640±
DRIVING WT. 140 lb.
DATE OF DRILLING 7-25-90
DROP 30 in.
WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0		MH					Clayey SILT - Mottled brown, moist, medium stiff to stiff, with gravel.
5			11	47			
10			74	30			
15			19	54			
20			69	42			
25			12	52			
30			72	43			
35							COMPLETELY WEATHERED ROCK - Mottled grayish brown, moist, dense.
40			25/0"	No Penetration			
45							
50							
55							
60							

Plate A194

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Soils and Foundation Engineering
99-1433 Koahe Place • Aiea, Hawaii 96701-1028 • Phone 486-0787

BORING LOG

W.O. 90-1953

BORING NO. 220'± FROM CULVERT-4
OGB-74 (Cont.)
SURFACE ELEV. 640±
DRIVING WT. 140 lb.
DATE OF DRILLING 7-25-90
DROP 30 in.
WATER LEVEL None

DEPTH (FEET)	GRAPH SYMBOL	UNIFIED SOIL CLASSIFICATION	BLOWS/FT.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	DESCRIPTION
0							
5							
10							
15							
20							
25							
30							
35							
40							
45							
50							
55							
60							

Plate A195

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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ME OR UNDER MY SUPERVISION.
Paul S. Morimoto
Signature

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
BORING LOGS
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(69) & (70)
SCALE: NONE DATE: AS NOTED
SHEET No. 165 OF 33 SHEETS